Understanding the Evolution of Poverty and Income Distribution in Mexico, 1992-2008

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I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

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DEGREE OF DOCTOR OF PHILOSOPHY

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SUMMARY

This thesis documents and investigates the evolution of poverty and inequality in Mexico between 1992 and 2008. It applies best practice techniques and in doing so, aims to reconcile the differences that emerge between studies that use the same data. It also investigates and identifies some of the underlying processes and factors driving high levels of poverty and inequality; mapping these on to periods of crisis, reform and recovery and also to changes in the underlying population characteristics (e.g. education). The thesis adopts a microeconomic approach that uses household survey micro-data, available for every other year since 1992 and representative at a national and rural/urban level.

This research aims to answer the following questions: 1) How sensitive are poverty and inequality measures in Mexico to the use of different methodologies. 2) How have poverty and income inequality evolved between 1992 and 2008, specifically, is it possible to arrive at robust results regarding the changes observed in poverty and income inequality in the period of study? And 3) what are the underlying processes behind the levels and trends in income inequality?

Using sensitivity analysis we show that in the Mexican case, poverty and inequality measures are highly sensitive to some methodological choices (e.g. economies of scale) but less sensitive to others such as the choice of poverty line. We obtain robust results regarding the evolution of poverty and income distribution in Mexico between 1992-2008, which show that periods of crisis have had a very negative impact on the majority of the population. Finally, our results suggest that education is the most important factor driving the levels and changes of inequality in Mexico, accounting for 20 percent of the total inequality observed. Moreover, it seems that changes in the returns, rather than the distribution of education, appear to be behind these changes.

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CHAPTER 1. AN INTRODUCTION TO POVERTY AND INEQUALITY IN MEXICO

1.1. INTRODUCTION

Latin America is the most unequal region in the world. And although Mexico is not among the most unequal countries in the region (which in 2008 were Brazil, Guatemala, Colombia and Honduras), its levels of inequality are very high and close to those countries at the top of the list.[1] Indeed, among the OECD group, Mexico is the most unequal country, only followed closely by Turkey.[2] The income inequalities observed in Mexico are only surpassed by a few countries. Indeed, from a list of 127 countries from which data is available, the World Development Report of 2006 ranks Mexico's Gini coefficient as the 22nd highest in the world. Regarding poverty rates, Mexico ranks just below the average of the region. However, around half of Latin America's poor live in the two largest countries of the region: Brazil and Mexico.[3]

This thesis is about poverty and inequality in Mexico. The two main objectives are: 1) to chart or document the evolution of poverty and inequality using best practice techniques and in doing so, reconcile the differences that emerge between studies that use the same data; 2) to examine or investigate and identified some of the underlying processes and factors driving high levels of poverty and inequality mapping these on to periods of crisis, reform and recovery and also to changes in the underlying population characteristics (e.g. education).

Some of this disagreement is about methodology, since most studies use the same data sets. In the case of poverty, specific estimates might vary when different poverty lines are used. However, the direction of the changes at crucial points in time seems to differ among different studies. For instance, in 1989 Hernández-Laos and Velázques-Roa (2003) report a Headcount of 41.3% while Székely (2005b) reports the same measure at 22.7%, finally, ECLAC reports it at 18.7% (see table 1.1). Regarding the trends, we observe discrepancies during the 1970s and 1980s among Hernández-Laos (2003), Altimir (2001) and

[1] CEPAL (2009).
[2] www.stats.oecd.org
[3] Puryear and Jewers (2009).

Székely (2005b); in 1992 between Székely (2005b) and Hernández-Laos (2003); and in 2005 between ECLAC and CONEVAL (see table 1.1).

Regarding the evolution of income inequality, Mexico's Gini coefficient rose slightly during the 1980s and 1990s, fell again at the beginning of the century but seems to have risen more recently (see figure 1.2). According to Cortés (2006), in 2002 the bottom twenty percent of the population had only 2.4% share of total income, while the richest ten percent had 40.5%. Indeed, in order to equal the percentage share of the richest 10% of the population, it would be needed to sum all the percentage shares of the first 8 deciles. That is, 10% of the Mexican families enjoy the same share of income as the sum of the bottom 80%.

As mentioned by Alarcón (2001) there is no consensus regarding the levels and trends of poverty in Mexico. This is the result of a lack of official poverty lines and measurement methodology until the early 2000s. The literature is abundant, but the studies use different methodologies, making it almost impossible to compare their results in a direct way. As Hernández-Laos (2001:868) points out "It has almost no meaning to affirm something about the incidence of poverty in Mexico without carefully detailing the methodology used for its measurement". And even when two different studies use per capita income as the welfare indicator and very specific poverty measures such as the headcount index, their results are very different as a result of different methodological decisions such as the use of different poverty lines. But regardless of the methodology used it seems that most studies agree in that the observed levels of poverty in Mexico are too high for a country with such a level of income (e.g. Lustig and Székely (1997); Hernández-Laos (2000); Székely, (2003); Cortés *et al* (2005)). The results using the official poverty lines introduced by the government in the early 2000's show that the levels of poverty increased after the *peso crisis* of December 1994. Then they decreased from 1998 onwards, to reach the lowest levels observed in 2006. Unfortunately, this trend reversed in 2008 as a result of the world financial crisis, and we observe an increase in poverty levels.

Studying the evolution of inequality and poverty in Mexico remains important even with the addition of official figures since the early 2000's. The total population of the country in 2008 was estimated at around 106 million.[4] Thus, the official estimations suggest that in the same year 19 million people did not have enough money to buy the minimum requirements of food and 50 million (a bit more of the whole population of Spain) could not afford to acquire the minimum requirements of food, plus health, education, shelter, clothes and transport.[5] The period of study (1992-2008) is also interesting, since it covers the brief economic recovery of the early 1990's after the 'lost decade' of the 1980s, the years after the peso crisis of December 1994, the enactment of NAFTA, the years of the Fox administration where the opposition won the presidency after 70 years of ruling of the PRI party, the poor GDP growth observed during the 2000's, and the unfolding of the 2008 world financial crisis.

This research aims to contribute to the debate on the levels and trends of poverty and the distribution of income between 1992 and 2008. It also aims to contribute to the not so abundant literature about the determinants of income inequality.[6] This study will start by exploring the sensitivity of poverty and inequality measures to the use of different methodologies, by using the ENIGH household surveys available for every other year starting in 1992 and applying sensitivity analysis. The ENIGHs household surveys have information for income, consumption and non-monetary consumption at the household and individual level. Although the quality of the surveys and number of observations has increased throughout the years, researchers agree that they are compatible between 1984 and 2008 (e.g. Székely, 2003, Hernández-Laos and Velázquez-Roa, 2003). In particular, this research aims to answer the following questions: 1) How sensitive are poverty and inequality measures in Mexico to the use of different methodologies. 2) How poverty and income inequality evolved between 1992 and 2008, specifically, is it possible to arrive at robust results regarding the changes observed in poverty and income inequality in the period of study? And 3) what are the underlying processes behind the levels and trends in income inequality?

The structure of this chapter is as follows. Section 2 gives a brief literature review of the main empirical studies about the levels and trends of

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[4] www.conapo.gob.mx

[5] www.coneval.gob.mx

[6] For a literature review on Mexico's inequality determinants see the Data and Methodology chapter.

poverty and income inequality in Mexico. Section 3 presents a brief economic and political history of Mexico for the last three decades. Section 4 presents the conclusion of this chapter, emphasizing the limitations of the existing literature on poverty and inequality in Mexico, the original contributions of the thesis, and a brief summary of the following chapters.

1.2. A Brief Review of Poverty and Income Inequality Trends in Mexico

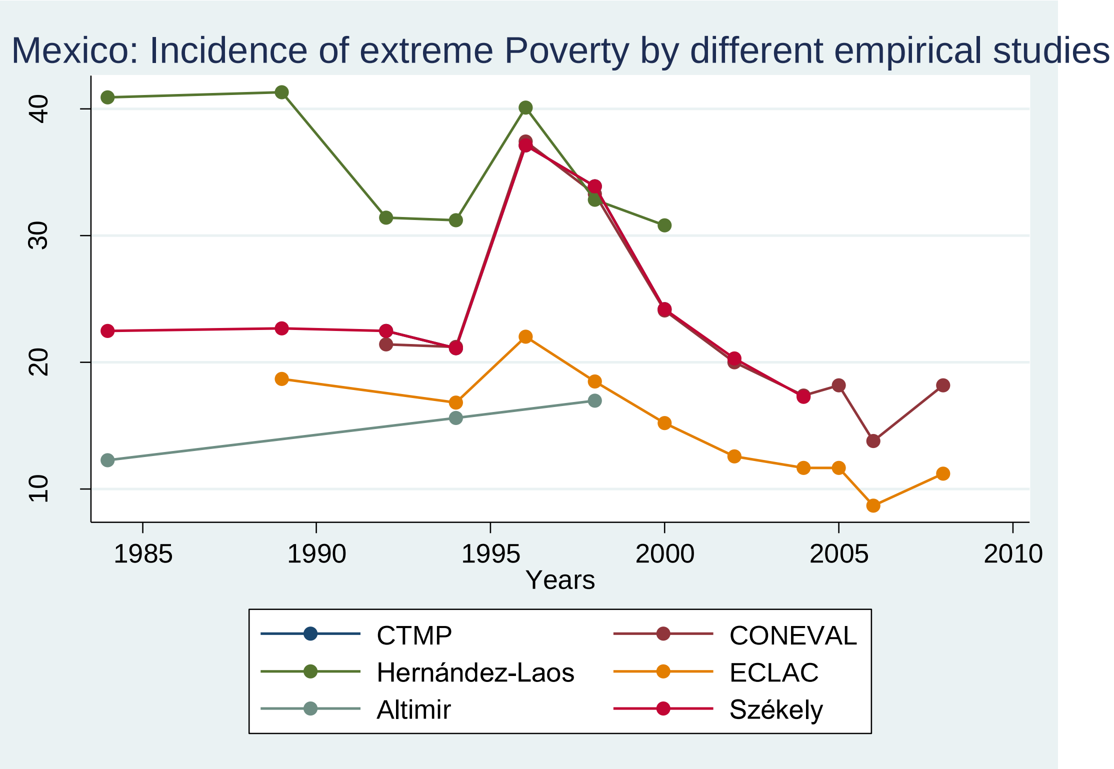
This section reviews important empirical studies about poverty and inequality trends in Mexico. Since the literature is really abundant, we will focus on the most relevant studies, including the official poverty measures proposed by the CTMP and recently carried out by CONEVAL. Each subsequent chapter introduces relevant literature related to the issues presented there. But the aim of this section is to illustrate the differences among poverty and inequality estimates in published work.

1.2.1. Poverty trends in Mexico from 1950

As previously mentioned, poverty estimates in Mexico vary among different empirical studies. In Mexico, the main data used are the ENIGH household surveys, which are methodologically comparable since 1984. Most of the empirical studies used the same data sets, but their methodologies differed. Thus, we observe a disagreement not only in the magnitude of the poverty measures presented, but sometimes even in the direction of the trends. In order to illustrate this problem, we present in table 1.1. and figure 1.1. a summary of the Headcount index for extreme poverty by six relevant studies. It is important to mention that the measures before 1963 use population census rather than income/consumption household surveys, and that although those of 1963, 1968 and 1977 are from household surveys, they are not strictly comparable with the rest of the ENIGHs. Thus, the only results that are completely comparable are those from 1984 onwards (figure 1.1. presents only comparable data).[7]

[7] See Chapter 3 for more details about the comparability among the ENIGH household surveys..

Figure 1.1.



Source: With data from table 1.1.

Table.1.1.

Mexico: Headcount Index/Percentage of population in extreme poverty, different studies, 1950-2008

Years	CTMP	CONEVAL	Hernández-Laos	ECLAC	Altimir	Székely
Poverty line used	Official	Official	COPLAMAR	INEGI-CEPAL	INEGI-CEPAL	Official
Adjustment for underreporting	No	No	Yes	Yes	Yes	From 1950-1968
1950*					48.5	61.8
1963			60.9		34.7	45.6
1968			40.8		24.1	24.3
1977			30.4		15.6	25.0
1984			40.9		12.3	22.5
1989			41.3	18.7		22.7
1992	22.5	21.4	31.4			22.5
1994	21.1	21.2	31.2	16.8	15.6	21.1
1996	37.1	37.4	40.1	22.0		37.1
1998	33.9	33.3	32.8	18.5	17.0	33.9
2000	24.2	24.1	30.8	15.2		24.2
2002		20.0		12.6		20.3
2004		17.4		11.7		17.3
2005		18.2		11.7		
2006		13.8		8.7		
2008		18.2		11.2		

Source: CTMP from Cortés *et al* (2005); CONEVAL from www.coneval.org.mx; Hernández-Laos and Velázquez Roa (2003); ECLAC from www.eclac.org; Altimir (2001); and Székely (2005b).
* The data source for this year is a Census rather than a Household Survey. The rest of the years are Household Surveys, but they are strictly comparable from 1984 onwards.

Regarding the incidence of poverty, we observe that the highest percentage is given by Hernández-Laos, while the lowest are those of Altimir and ECLAC. Székely's coincides with the official CTMP and CONEVAL measurements from 1992 onwards. The difference in the magnitude among studies is not small, and it goes up to 20 percentage points. However, we observe that the gap appears to be closing in more recent years. Regarding the direction of the changes, we observe that the trends remain mostly similar, with the exception being the 1970s and the 1980s. That is, Hernández-Laos indicates a rise in the percentage of people living in extreme poverty and Altimir and Székely suggest a fall. In addition, we observe some discrepancy between the results of ECLAC and the official figures of CONEVAL for the changes between 2004 and 2005.

The main differences among these studies arise from two important methodological decisions: the poverty line chosen and whether adjustments are made for underreporting of certain income sources. For decades, Mexico lacked an official poverty line and most of the empirical studies used the data on basic needs requirements and prices of COPLAMAR.[8] However, the use of COPLAMAR data leads to quite controversial results, since its extreme poverty line is 4.9 times bigger than that used by the World Bank (PPP $1 dollar a day) and 6.4 times bigger than the moderate poverty line (PPP $2 dollars a day).[9] Nevertheless, in 2002 the Mexican Government held a symposium to determine the guidelines to measure the evolution of poverty in the country.[10] The study suggests the use of three different poverty lines and it also proposes to do not adjust the data from underreporting. The minimum calorie intake to set the different poverty lines was defined using the Basic Consumption Basket defined by INEGI/CEPAL (1993). The use of this basket instead of that specified by COPLAMAR in the late 1970s, might be the result of the recognition that the actual conditions of the country might not be as satisfactory as those present 20 years ago.[11] The INEGI/CEPAL basket was calculated in 1992 and represents the minimum needs in that year and it has been subsequently indexed by changes in prices since then. However, the methodology used by INEGI/CEPAL

[8] A governmental programme that operated in the late 1970s for improve the living standards of the poor.
[9] Hernández-Laos (2001), pp.865.
[10] CTMP (2002).
[11] Hernández-Laos (2001) suggests that the COPLAMAR basket might need to be adjusted by the new impoverishment conditions of the country.

has also been strongly criticized (e.g. Boltvinik and Damián, 2003). In the studies presented here, Hernández-Laos and Velázquez-Roa (2003) use the poverty line from COPLAMAR. Altimir uses CEPAL/INEGI poverty lines as a benchmark (these poverty lines are less generous than COPLAMAR's). And Székely uses the official CTMP poverty lines for the whole period of study.

The adjustment from underreporting has been part of the methodological debate in Mexico for decades. The rationale behind the adjustment is that the income data from the National Accounts is higher than that reported by the household surveys. Thus, several methods to adjust or increase the income reported in the household surveys have been proposed (a detailed discussion about this issue is presented in the next chapter). But more recently other authors like Leiva-Parra (2005) have criticized the adjustment and advocate for the use of the original data. Hernández-Laos and Velázquez-Roa adjust their data; ECLAC and Altimir also adjust their data; Székely uses the adjusted data between 1950 and 1968 and unadjusted data for 1977 onwards; and the CTMP and CONEVAL use unadjusted data for the whole period of study.

Regardless of these differences among the studies presented, we observe that the 1950s and 1960s are the decades with the highest levels of extreme poverty, with some studies indicating that up to 60% of the population lived in extreme poverty. The situation somehow improved during the 1970s with the oil boom. But this tendency stopped/reversed during the 1980s, with the onset of the debt crisis in 1982. Poverty decreased somehow at the early 1990s, when the Mexican economy recovered and finally left behind the "lost decade". But unfortunately in December of 1994 Mexico suffered from a deep economic crisis, and we can see the big negative impact that it had in the levels of extreme poverty in 1996, with several studies indicating that around 40% of the population lived in extreme poverty at that year. The levels of extreme poverty decreased slowly but steadily during the following years, until they reached the lowest point in the whole period of study in 2006, where the official results indicate that 14% of the population lived in extreme poverty. However, we observe an increase in 2008, which coincides with the onset of the 2008 world financial crisis, with official results for the headcount being 18%. To sum up, the levels of extreme poverty have decreased during periods of economic stability, but this positive trend has been reversed during the debt crisis of 1982, the peso crisis of 1994 and the world financial crisis of 2008. This suggests that there is an important percentage of the population that is highly vulnerable to the negative effects of economic turmoil. Population that without savings, access to credit or a safety net, end up with insufficient resources to buy the minimum food basket.

1.2.2. Inequality trends in Mexico from 1950

There are no official inequality estimates in Mexico. When the CTMP gave its recommendations to the Mexican government about poverty, inequality measures were not part of the discussion. As a result, the government only presents results for the Gini coefficient for the total population, disregarding the use of different inequality measures such as the Generalized Entropy Measure (GE) which have more interesting qualities.[12] Although recent published work presents a richer set of inequality measures, we present results for the Gini coefficient, since is the most popular inequality measure and it has been calculated in historical series that date from 1950.

Table 1.2 and figure 1.2 present inequality trends in Mexico between 1950 and 2008, using the Gini coefficient as the preferred inequality measure. Contrary to poverty measures, we observe that the calculations for the Gini coefficient do not vary much among each other, and that the direction of the changes is also similar. The highest levels of inequality are recorded in 1963, with the Gini being around 0.600. Inequality went down in subsequent years, reaching the lowest level of the period in 1984. This trend reverses during the late 1980s, but the levels somehow stabilize during the 1990s. Inequality then increases again in 1998, but decreased in subsequent years to stabilize again from 2004 onwards, with the official data recording the Gini at 0.496 in 2008. Thus, we observe some improvement regarding income inequality, especially during the late 1960s up to 1984. However, apart from the increase observed in 1998, inequality does not seem to have changed much since 1989. Thus, inequality remains stable but at a very high level.

[12] Full definitions of the Gini coefficient, the GE and other inequality measures are given in section 2.7 in Chapter 2.

The Gini coefficient results seem consistent over time. But it is important to mention that the Gini has an undesirable characteristic: it is more sensitive to changes in the distribution of income in the mean of the distribution than to those happening in the tails. Indeed, it is possible to obtain measures of the Gini where inequality increases in each and every subgroup of the population and a decrease in total inequality at the same time (Cowell, 2000:59). Not many other studies look at other inequality measures or analyze rural/urban differences and given the kind of economic turbulence we expect that there will be changes in the distribution. Thus, the apparent stable levels of inequality of the 1990s for the total population could be the result of increases in inequality in rural areas offset by decreases in urban ones.

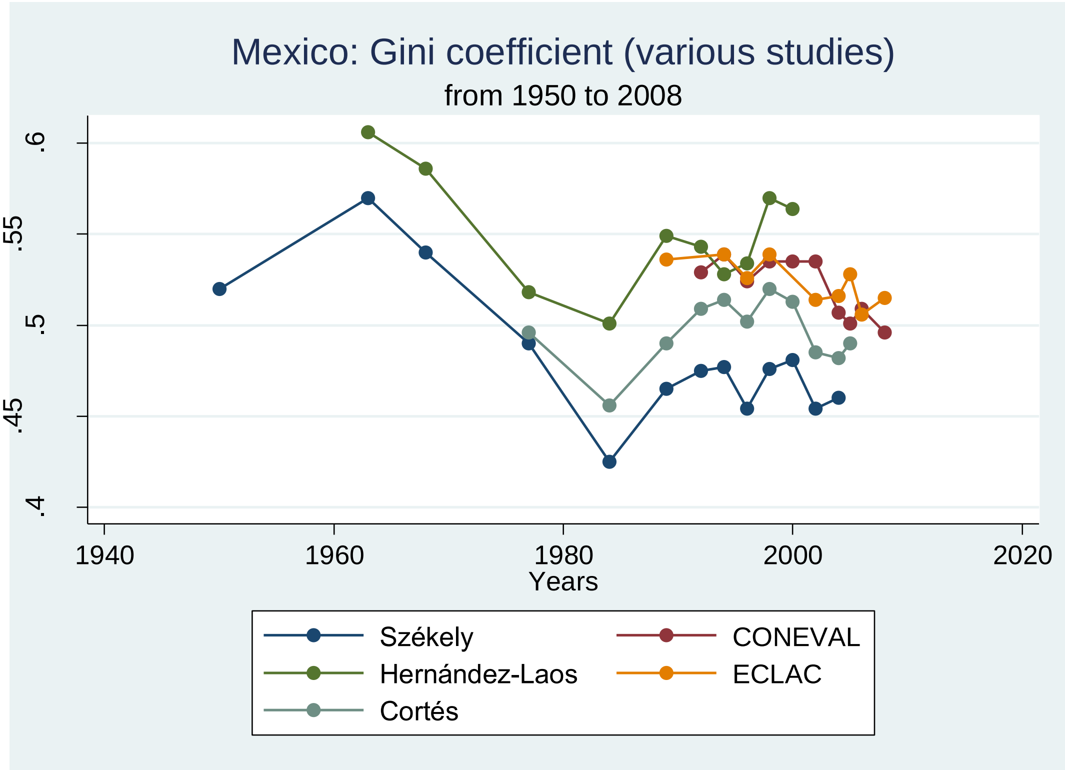
Table 1.2.

Mexico: Income inequality, measured by the Gini coefficient, different studies, 1950-2008

Years	Székely	CONEVAL	Hernández-Laos	ECLAC	Cortés
1950	0.520				
1963	0.570		0.606		
1968	0.540		0.586		
1977	0.490		0.518		0.496
1984	0.425		0.501		0.456
1989	0.465		0.549	0.536	0.490
1992	0.475	0.529	0.543		0.509
1994	0.477	0.539	0.528	0.539	0.514
1996	0.454	0.524	0.534	0.526	0.502
1998	0.476	0.535	0.570	0.539	0.520
2000	0.481	0.535	0.564		0.513
2002	0.454	0.535		0.514	0.485
2004	0.460	0.507		0.516	0.482
2005		0.501		0.528	0.490
2006		0.509		0.506	
2008		0.496		0.515	

Source: Cortés (2000) and (2006); CONEVAL from www.coneval.org.mx; Hernández-Laos and Velázquez Roa (2003); ECLAC from www.eclac.org; and Székely (2005b).

Figure 1.2.



Source: Table 1.2.

Therefore, we believe that the distribution of income in Mexico should be studied with a different set of measures, such as the Generalized Entropy Measure, which has more desirable properties than the Gini coefficient and allows the researcher to explore inequality among groups.[13] In addition, we will also make a division among rural and urban areas when studying the distribution of income.

1.3. Brief Economic History of Mexico 1980-2009

This section briefly describes the economic history of Mexico during the last three decades. More specifically, a description of economic policies, reforms, economic crisis, recoveries and their possible links with the levels of poverty and income inequality will be given. A wider panorama of the economic, political and social conditions of Mexico could be very useful to understand the results

[13] For a detailed explanation of the Generalized Entropy Measure and other inequality measures refer to section 2.7. in Chapter 2.

presented in the empirical chapters. Mexico went through a rapid unilateral trade liberalization in the mid 1980’s as part of the stabilization programmes that were implemented after the debt crisis of 1982, and also with its adherence to the GATT in 1986. Later in 1994 trade liberalization deepened when the North American Free Trade Agreement (NAFTA) that was signed with the USA and Canada came into force. NAFTA covers goods and services, but not labour. In addition, investment among the three countries should be also free of barriers. Trade liberalization was used by the De la Madrid administration and later by the Salinas government to signal to the international investors and other governments that deep structural reforms were happening in Mexico, and also as a way to decrease the dependency from oil exports by increasing the proportion of non-oil exports.

Mexico also went through a fierce privatization strategy applied by the Government since the mid 1980’s as part of the stabilization programmes. From 1982 to 2003, the number of State Own Enterprises fell from 1,155 to 210 (Chong and López-de-Silanes, 2004:9). These privatizations have covered all sectors of the economy, from the sugarcane industry, to the banks and telecommunications and the trains transportation and metallurgy industry. The privatization of the banks in particular has been very controversial, since it ended up with a bailout equivalent to 20% of GDP which was never recovered by the government once the banks were sold to foreign investors.[14]

These reforms changed the role of the Mexican state in the economy, and were implemented in a context of economic crisis, deregulation of financial markets, relaxing restrictions on foreign investment, and large cuts in public spending. Trade liberalization advocates promised that it would bring only good results to Mexico. But after more than 20 years of reforms, there is an understanding among researchers that free trade is no panacea, and that in order to reap all its benefits, it should be always being accompanied by other policies such as investments in human capital and infrastructure.[15]

In addition to these trade and investment liberalizations, the Mexican economy has been in crisis and recession for several periods since the 1980’s

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[14] This estimate was made by ex-president Ernesto Zedillo during the last Economic Forum in Davos (EFE, 2009).
[15] For two cases of study about Mexico see: Alarcón (1994) and Scott (2003).

with only a few intervals of recovery. Thus, any periods of GDP growth and economic stability have been hampered by periods of economic crisis with negative or very low GDP rates of growth (see table 1.4.). That is, economic growth has been elusive for the Mexican economy during the last 30 years. Indeed, Mexico has suffered an economic crisis each of the last 3 decades, the first two originated nationally and the last one being of a global scope. The 1980's has been labelled the *lost decade* for Mexico. And although the country recovered during the first years of the 1990's, at the end of 1994 another economic crisis was unfolded, the *peso crisis.* In the following paragraphs a brief summary of these two crises is given. This is a mere introduction to the topics, but it is not in the purpose of this research to go deeper in the analysis of them. In addition, some reforms and other key indicators are provided, such as the annual rate of inflation, GDP growth, tax collection, real wages, and trade liberalization. The purpose of this section is to highlight the possible implications of certain economic policies, reforms and economic crises on the levels of poverty and income inequality in the country. In any case, it will be impossible to isolate the effects of each reform into the inequality and poverty levels observed during the last three decades.[16]

1.3.1. The debt crisis of the 1980's

The debt crisis of 1982 unfolded after a period of high GDP rates of growth. These results were possible due to the combination of high oil prices and new oil discoveries in 1979 (Lustig, 1998:20). The crisis was the result of a balance-of-payment disequilibrium and high inflation combined with a dramatic fall in oil prices in 1981. Since the government did not correct the imbalances, capital flight accelerated, the peso devaluated and the government was forced to suspend the payments of the principal on foreign debt. The government forced full exchange controls of capital flows and the nationalization of the banks. What followed was chaos, devaluations, high inflation (rising to 98%), a contraction of GDP by -0.6% (Ibid:25) and a painful adjustment process experienced by the following administration of De la Madrid (1982-1988). The De la Madrid

[16] Although there are many studies exploring the consequences of trade reforms on wage differentials in Mexico. For a review on this literature see Hanson (2003).

government made cuts to the fiscal deficit and there was a severe fall in real wages, but this was not sufficient to control inflation and restore output. It was until 1986 when Mexico as part of the Baker Plan rescheduled its debt. In addition, it received external financing from the IMF and World Bank, but recovery remained elusive for the remaining of the 1980s (Ibid:50).

After nine years of stabilization programmes and with the cost absorbed internally, the majority of the population suffered a fall in their living standards. However, as mentioned by Lustig and Székely (1997) the costs were not borne equally by all the Mexicans. By the end of the 1980s the richest 10% of the population increased their income by a 17.6% while the rest 90% reduced theirs, with the poorest 3 deciles suffering the biggest losses (Székely, 1995b:341). That is, the contractionary fiscal policy and a drastic fall in real wages, resulted in an increase in the levels of poverty and income inequality. The results of Székely (op.cit.) show that between 1984 and 1989 poverty increased. Although from a macroeconomic point of view the stabilization programmes were successful, the social costs that they created were not shared equally, and it resulted in a transfer of resources from the poor to the rich (Székely, op.cit:346).

1.3.2. The peso crisis of December 1994

The new government of Salinas de Gortari (1988-1994) implemented a new stabilization strategy called the *Solidarity Pact*,[17] which basics were a fiscal surplus, an incomes policy (price and wage controls), trade liberalizations, privatizations (with an emphasis in the bank system) and changes in the *ejido* sector.[18] Although inflation was finally put under control, it was not until the Government disclosed in 1990 that it was pursuing a free trade agreement with the USA and the intention to privatize the banking system that the private investment and capital flows increased. Thus, by 1991 the future of the country

[17] The *pact* was agreed jointly by the government, the private sector, unions and agricultural producers.
[18] The *ejidos* are parcels of land that were given to rural households by president Cardenas, in the only land redistribution attempt after the Revolution. Under the *ejido* system, villagers could not rent or sell their land. The reform allowed *ejidatarios* to own and therefore, to rent or sell their parcels for the first time.

looked brighter, with inflation levels of 20% and a GDP rate of growth of 4.2% in real terms.[19]

The economy continued experiencing positive rates of growth until 1994. But then again at the end of the Salinas de Gortari presidency another economic crises unfolded. What went wrong? This administration was the role model on the eyes of foreign investment and international institutions. The Salinas administration reduced the participation of the government in the economy, embarked in a fierce privatization process, increased trade openness with NAFTA, and promoted non-oil exports. But regardless of all these efforts, another economic crisis unfolded, a crisis that had repercussions in other Latin-American countries.

As Sachs *et al* (1995) explain, by the end of 1994 Mexico had two imbalances: 1) an overvalued currency (of around 20-25%); and 2) a very large current account deficit (7.9% of GDP in 1994) which was the result of an increase in investment and a decrease in national savings. However, none of these imbalances were enough to lead the economy into an economic crisis. But since the current account deficit was being financed by external borrowing, the balance of the whole system depended of the sentiments of foreign investors. And the political distress created by the assassination of the presidency candidate Luis Donaldo Colosio (the chosen predecessor of the then president Carlos Salinas de Gortari) and the emergence of the guerrilla group *Ejército Zapatista de Liberación Nacional* (EZLN) motivated a changed in the perceived risk of the country. But instead of increasing the interest rate to represent the new perceived higher risk, the Central Bank expanded the domestic credit, and the current account deficit was then covered using the central bank reserves instead of flows of capital as in the precedent years (Idem). Without reserves, the government ended up unable to pay short-term liabilities, and a devaluation of the peso and panic unfolded (Idem:16). The problem was that the devaluation happened once the central bank reserves were depleted. In order to restore order, the IMF and the US government announced a rescue package of $52 billion dollars, which “was far and away the largest single IMF programe in history” (Idem:24). The package was successful

[19] See tables 1.3 and 1.4 below.

in restoring access to capital markets in such a way that Mexico was able to repay US$13.5 billion loans from the United States by January 2007, several years ahead of plan (Lustig, 1998:185).

But even with the access to the rescue package, the economy was severely hit. In 1995 inflation grew over 50%, GDP fell in real terms by 6.2% and real wages (the main source of income) fell by 15% (see figures 1.3 to 1.5). Thus, although the Mexican economy was able to recover faster from the peso crisis as compared with the debt crisis of 1982, the negative effects on the general population were similar. This result seems counterintuitive when it is during the presidency of Ernesto Zedillo (1994-2000) when we observe the highest rates of GDP growth during the past three decades. Unfortunately, economic growth did not materialized in an increase in the living standards of the majority of the Mexican population.

1.3.3. The ejido sector reforms and shocks 1984-2008

This section discusses the ejido sector reforms and shocks from 1984 to 2008. It begins by describing some of the main characteristics of the agricultural sector as a whole and continues by focusing on the *ejido* sector.

The Mexican agricultural sector is characterized by a dualism, where 60% of land owners have properties of less than 5 hectares which represent only 15% of the total agricultural land, while the rest 40% of land owners have properties bigger than 5 hectares that represent 85% of total agricultural land (Puyana *et al,* 2006). But as Fox and Haight (2010) mention, since many farm-workers are also smallholders, there are not many estimates of how the agricultural population is divided. However, it has been suggested by Puyana and Romero (2008) that in 1993 55% of the population were farm-workers and 45% were producers (cited in Fox and Haight, 20010:12).

Although a large majority of 63% of agricultural employment is located in farms of less than 5 hectares, the majority of the governmental subsidies are given to large land owners, especially those located at the north of the country (Ibidem, pp.12). Thus, there is a dual agricultural development approach, where big land-owners are given a disproportionate share of agricultural subsidies while small land-holders are taking care of with social programmes that cover low quality basic education and poor health care as well as cash transfers like Oportunidades (Ibid, pp.13).

The majority of the population in Mexico lives in urban areas of more than 15,000 inhabitants. In 1992 the percentage of rural population was 41%, by 2006 this percentage went down to 36.8% (see table A5.9). Indeed, emigration has been a constant phenomenon in rural areas that intensifies after negative shocks. In terms of income shares, the rural population held an average of 22% of income share from 1992 to 2006, while urban areas held an average of 78% (see table A5.9). Participation of agricultural GDP on total GDP has also diminished over time. In 1950 agricultural GDP was roughly 20% of total GDP. By 1980 this percentage went down to roughly 7% and by 2008 went down again to 4%.[20]

As it has already been described in this chapter, urban households were hit by the fall in real wages. However, rural households were primarily hit by the 70% fall in cocoa and coffee international prices during 1984-1994. The fall in these prices mostly affected the indigenous population, which accounts for 65% of all coffee producers, producing one-third of Mexico's coffee output (Bouillon, *et al* 1998). In addition, there was a retreat of the state in the *ejido* sector that started under the Salinas administration, but without any private institution taking the role of the state to service it. The *ejidos* are land that was given to rural households by president Cardenas, in the only land redistribution attempt after the Mexican Revolution. Under the *ejido* system, the nation retained direct ownership of the lands, while villagers had the right to use it either as a community or individually, but it could not be rented or sold. In 1992 the Salinas government modified the property rights attached to *ejido* land, and for the first time *ejidatarios* (those with rights to use *ejido* land) were given full rights to rent, mortgage or sell their land. The idea behind was for the inefficient *ejidatarios* to sell their land to more productive farmers and for the remaining ones to use their land titles as collateral for credit (Randall, 1996).

Before the changes in the property rights system, the *ejido* sector was a command economy with government controls and subsidies (de Janvry, *et al,*

[20] Puyana *et al* (2006) and Saldaña, Sergio (2008).

1996). But after the reforms, the *ejidatarios* were left without access to credit, insurance, technical assistance, fertilizers, seeds, water and basic infrastructure (Ibid). The *ejido* sector is very important in terms of social welfare and control over national resources, since it contains around 60% of the rural population, and half of the agricultural and irrigated land, and it remains an important source of migrants to the United States (Davis, *et al*, 1999:105).[21] Indeed, the amount of income received by Mexican families through remittances is now over 4 times larger than what it was in 1999 (Banco de México, 2009b). Thus, migration to the USA has increased significantly as a strategy to overcome a combination of negative shocks and poor policy making in Mexico.

The main critique to the *ejido* reform has been that it was implemented in an adverse environment for the agricultural sector.[22] Since only two years later the peso crisis unfolded and also the NAFTA free trade agreement was enacted. Since under NAFTA each country is free to choose its own internal subsidies,[23] this has been one of the main controversies in Mexico, since it puts poor Mexican farmers into unfair competition with big subsidised American ones. For instance, from 1998 to 2000 the American farmers received an average of $20,800 dollars of subsidies, with their Mexicans counterparts receiving only an average of $720 dollars (Reyes et al, 2007).

However, NAFTA is not responsible for the amount of investment in human capital, infrastructure and new technologies in the Mexican agricultural sector or in the rest of the economy. The open up of the agricultural sector was done in phases. These phases were designed for the Mexican government to have time to dynamize this sector and to help farmers to increase their productivity by 2008 (the year when the agricultural trade was open up fully). But neither the private nor the public sector provided enough credit, insurance or investment in infrastructure and human capital. Indeed, average schooling of adults in Mexico is 60% of what it is in the USA and 50% of the one observed in Canada (Scott, 2003:8). Regarding infrastructure, there are also important regional divisions in the country, with the rail and roads infrastructure connecting Mexico City with the North of the country very efficiently, and very

[21] Indeed, in 1997 almost 45% of the ejido households had a family member who emigrated to the United States, or had children or brothers living there (Davis, 2000:114).
[22] See for example Davies (2000).
[23] Yunez-Naude and Barceinas (2004:33).

few and bad roads connecting Mexico City with the South. Thus, the 15 years given for the Mexican farmers to catch up with their American and Canadian counterparts were an opportunity deliberately lost by the Mexican government. It seems that as Legovini *et al* (2005:308) mentioned, trade liberalization caught Mexico unprepared.

In order to partially overcome the negative effects of all the mentioned shocks and reforms, some rural social programmes have been implemented by the government during the last decades. PROCAMPO is a cash transfer programme that aims to compensate farmers from the losses derived from NAFTA. Starting in 1993, it covers around 80% of ejido households (Davies, 2000:102). In the absence of credit to small rural producers, PROCAMPO has alleviated some of the basic credit needs of the ejido sector. However, the amount granted is not big enough for producers to move towards riskier and more profitable crops, such as fruits and vegetables (Davis, op.cit.:111). *Alianza para el Campo* started in 1995 and aims to increase the productivity and access to new technologies for large agricultural producers in a free trade environment (Yunez-Naude and Barceinas 2004). But only 12% of the ejido households received grants from this programme (Davis, op. cit.102). OPORTUNIDADES, previously known as PROGRESA, is a conditional cash transfer scheme initially targeted to poor rural children only (in 2009 it expanded to partially cover urban ones). The scheme is innovative in the sense that in order to continue being granted the transfer, children should remain in school, and visit a local doctor regularly. It also gives nutritional supplements to children and pregnant women. According to the last Official Annual Report from president Calderón, on 2009 the scheme covered 5.2 million families. Despite being highly praised worldwide, the scheme operates in an environment of poor investment in infrastructure, rural development, communications, access to credit and transport, reducing potential multiplier effects (de Janvry and Sadoulet, 2005:8).

It becomes obvious that any changes in the *ejido* sector will be reflected in the levels of rural poverty and in urban/rural gaps that could potentially increase inequality. The virtual abandonment of the sector in terms of technical assistance has resulted in a sharp decline in the use of fertilizers, an increase in the use of hand labour, and a decline in the use of machinery for agricultural practices (de Janvry, *et al,* 1996). Without access to credit (from the private sector or the government) and lack of investments in the agricultural sector, the future of the ejido sector and the rural population in general seems very challenging. Finally, it seems that NAFTA has only exacerbated the already precarious conditions of poor rural farmers by promoting an unfair competition with large and heavily subsidized American farmers.

1.3.4. The Fox and Calderon's administrations (2000-until present)

The year 2000 represented a victory of democracy for many Mexicans. It was the first time that the opposition won since the *Partido Revolucionario Institucional* (PRI) came to power more than 70 years before. The expectations were very high at the beginning of the Fox administration. But with a minority in the Congress, the newly elected administration was far from those PRI presidencies where the word of the president was omnipotent. In this new environment the power is divided between three main political parties: 1) Partido Revolucionario Institucional PRI (the old regime); 2) Partido Acción Nacional PAN (right conservative); and 3) Partido de la Revolución Democrática PRD (central-left). Thus, any reform had to be approved by the Congress, and therefore, needed to be negotiated with the other two main political parties. In this complex political environment, there was a need of a skilful negotiator determined and able to communicate with the opposition and make alliances. Unfortunately, president Fox was not the right person for the job and even after only one year of power it became evident that important reforms were not going to happen.[24]

Nevertheless, one important achievement of the Fox administration was to keep inflation at a very low level. This stopped real wages to continue deteriorating, and slightly reversed the fall experienced every year since the debt crisis of 1982. However, the increase was very small (4.2% for the minimum wage) and therefore, real wages have not recovered, and by the end of 2006 the purchasing power of the minimum wage compared with that of 1980 was only 34% (see figure 1.5).

[24] President Vicente Fox had experienced mostly in the private sector as manager of Coca-Cola, and later he was elected as governor of the State of Guanajuato.

Another good result of the Fox administration has been a fall in poverty levels. According to official results, the levels of poverty decreased for the rural population in 2000-2002 and for the total population in 2005-2006.[25] Regarding social programmes, there was an important increase in the coverage of PROGRESA, which changed its name to *Oportunidades.* And during the 6 years of his presidency, the Fox administration doubled the number of coverage, going from 2.4 to 5 million poor rural families.[26]

Regarding tax collection, the government of Fox did not change much. That is, big and rich enterprises were still exempted of paying taxes and the dependency from oil revenues continued. Nevertheless, an increase in oil prices gave the administration unexpected resources. Unfortunately, the high prices of oil did not translate into high economic growth, and during the first three years (2001-2003) the economy was stagnated. Economic growth recovered during the second part of the term, with 2006 observing an annual rate of GDP growth of 4.6% (see figure 1.4. below). It is important to mention that the Mexican government has a very poor tax system, where the majority of its tax revenue coming from the tax charged to PEMEX, the national petrol company. Indeed, the Department of Treasury (SHCP) takes 70-80% of the gross income of the company every year (Rodríguez, 2005). The payment of PEMEX to the government in 2006 was equivalent to 70% of the total taxes collected by the government from half a million of private companies and 19 millions of tax payers (Zúñiga and Gonzáles, 2005).

With the Fox administration there was a consensus that for the first time Mexicans felt like part of a democratic country. Regrettably, this perception of democracy changed with the more recent presidential elections in 2006. Problems arose from a highly competitive election, with the PAN candidate Felipe Calderón winning the election over the PRD candidate Andrés Manuel López Obrador, with a majority of 0.6% of total votes. The result was an even more polarized and divided political sphere, with open confrontations between the left wing PRD and the right wing Calderón administration and the old regime PRI somewhere making alliances with any of the two according to its interests. Thus, the new administration had a rough beginning of term with electoral fraud

[25] Information from: www.coneval.gob.mx
[26] Presidencia de la República (2006).

allegations. In addition, a fierce combat to narcotraffic and among mafias has seen an increased in the number of deaths related to this illegal activity as never seen before. Indeed, during 2007 the number of deaths related to this activity was 2,447. By 2008 this number doubled to reach 5,400 (el país.com access 25/Sep/2009). Another out of control problem is the professional kidnapping gangs that are terrorizing not only rich families but also the middle class. This increase in insecurity has touched the lives of many Mexicans and a stop to this trend has become one of the main demands of society.

Finally, during 2008 a world financial crisis was unfolded with many negative repercussions for the Mexican economy. It is true, that the Calderón administration benefited from historic high oil prices until 2008.[27] But the shock from the 2008 world financial crisis was so deep that the excess income from petrol was not enough to overcome it. Indeed, in 2008 the Mexican economy had an annual rate of GDP growth of 1.4% and by mid 2009 the same figure was -9.2% (see figure 1.4.). With many internal problems and now an external shock as the global financial crisis, the actual administration faces many challenges. Unfortunately, it is the most vulnerable groups who mainly suffered during the debt crisis of 1982 and the peso crisis at the end of 1994 and the results from this new crisis could be similar. With such a poor tax base and low oil prices, the Mexican government will have to tighten even more its expenditure. For the moment, it is impossible to know when the negative tendencies will subside. Moreover, it is also difficult to predict the outcome of the strategies followed by the actual administration.

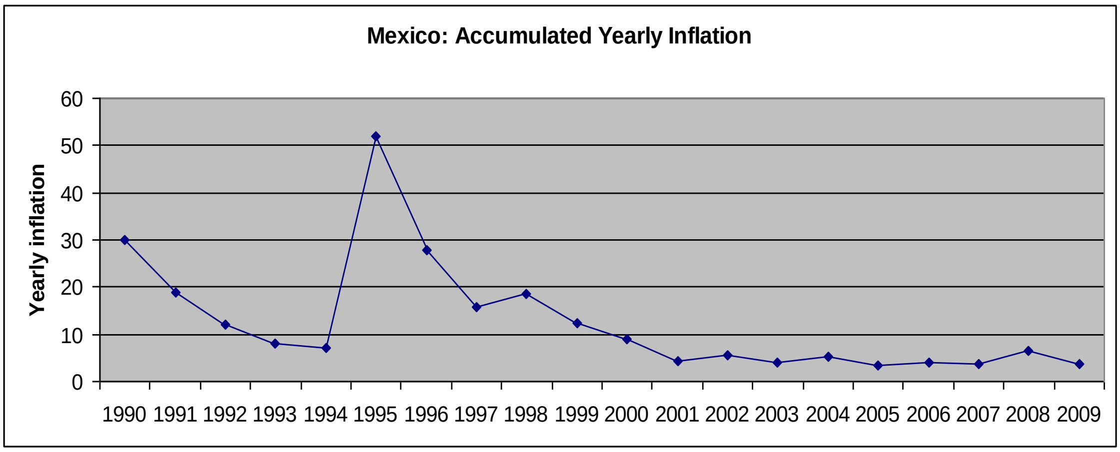
1.3.5. Key economic Indicators: Inflation, GDP and Wages

Figure 1.3 below plots the yearly accumulated inflation from 1990 to 2009. As we can observe, the Mexican economy suffered very high levels of inflation after the economic crisis of 1994. The peak was 1995, with an accumulated rate of inflation of almost 52%. We also can see that after this peak, the annual inflation rate decreased consistently until reaching pre-crisis levels in 2000. From 2000 onwards we observe a completely different panorama. Not only had

[27] The trends in average price of petrol come from : www.mexicomaxico.org

the levels of inflation been lower than those observed at the beginning of the 1990's. But we also observe that the trend is very stable all throughout these years, with an average yearly rate of 4.9%. Indeed, a stable and low rate of inflation has been one of the main macroeconomic achievements of the last governments. It is believed that inflation affects the poor mainly towards its effect on real wages. That is, nominal wages might struggle to catch up with price level's changes and this could diminish real wages.

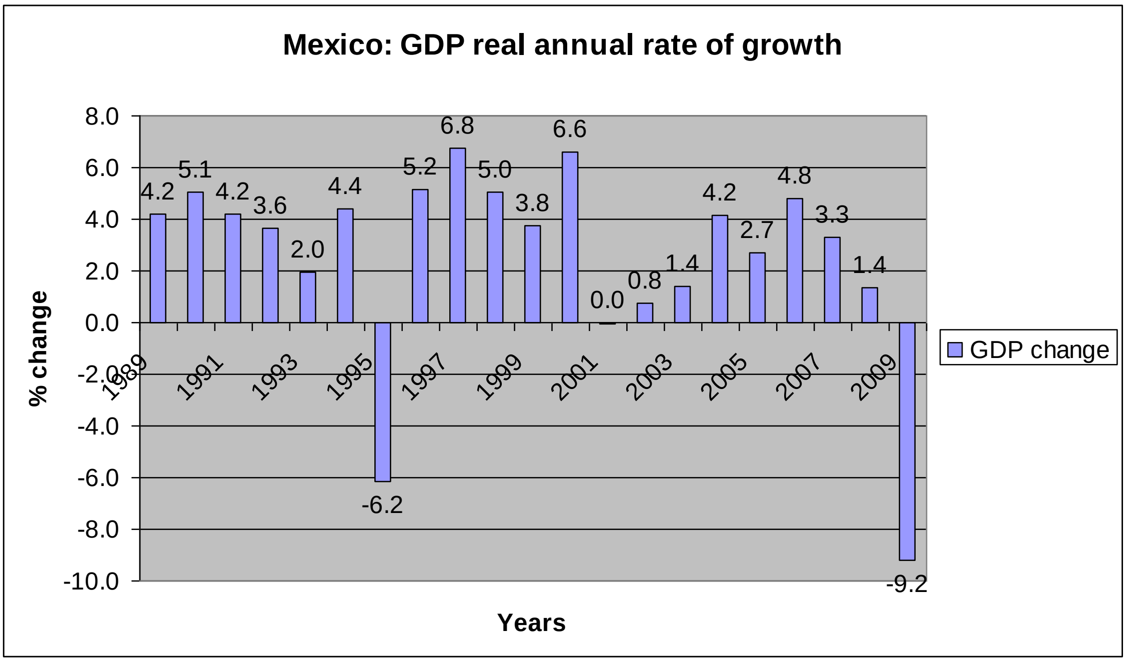
Figure 1.3.



Source: Banco de Mexico (www.banxico.org.mx).
Inflation is calculated using the General National Price Index (INPC).

Figure 1.4 below shows the Gross Domestic Product (GDP) annual rate of growth since 1989. We observe how GDP recovered in the early 1990s after the lost decade of the 1980s. It is during the presidency of Ernesto Zedillo (1994-2000) when we observe the highest rates of GDP growth. However, one of the most severe economic crisis in the country, the *peso crisis*, unfolded during the first days of his term. Thus, we observe in 1995 a fall in the GDP by -6.17%. The peso crisis had several repercussions in the Mexican economy, the fall in the GDP by -6.17% is only one of them. However, we also observe that the next year the GDP recovered and grew by 5.15% and we observe positive rates of growth until 2000. During the presidency of Vicente Fox (2000-2006) we observe mixed results. Indeed, during the electoral year of 2000 the GDP grew at a rate of 6.59%. But then in 2001 the economy seemed stagnated with a negative growth rate of -0.03%. After this, the economy seems to recover but very slowly, and we observe growth rates of 0.77 and 1.39% in 2001 and 2002 respectively. The last three years of Vicente Fox's presidency show a small recovery with rates of growth of 4.2, 2.7 and 4.8% respectively. The first year of the Calderón administration shows a very modest growth 3.3% similar to what we observed in precedent years. But in the next two years we observe the effect of the global financial crisis with the GDP growing at a modest 1.4% in 2008 and a negative growth of (-9.2) in the first semester of 2009. The drops in GDP growth in each post-electoral year suggest that the change of president in Mexico had a marked negative influence in the rate of growth of GDP during the last years. Finally, we also observe a recurrent crisis and recovery cycle that seems inherent to the Mexican economy.

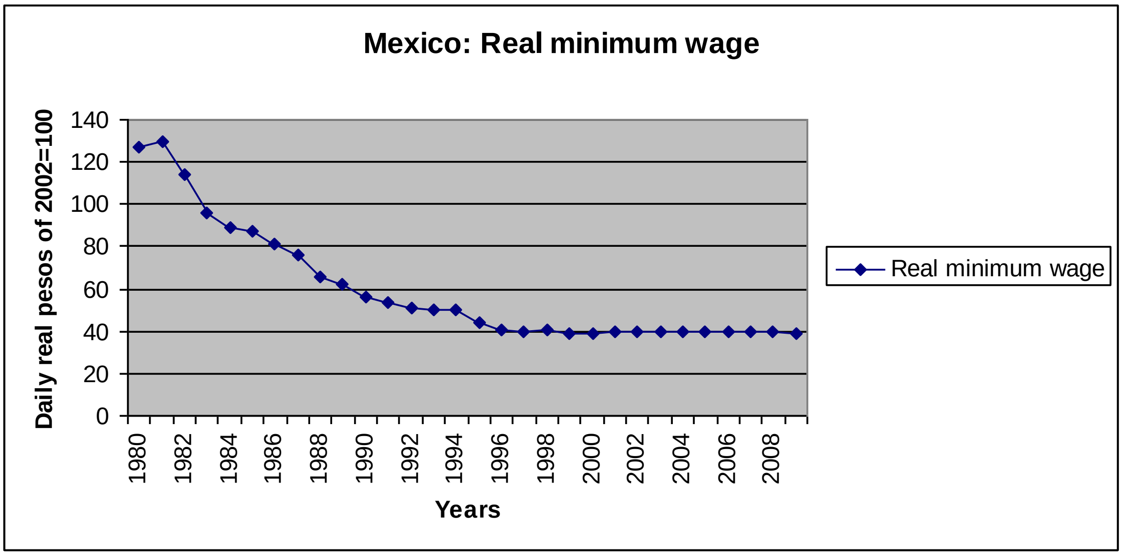
Figure 1.4.



Source: Author's calculations with data from www.inegi.gob.mx (constant prices of 1993=100 -- last accessed 10th Sep. 2008). The data for 2009 corresponds to January-June only.

Figure 1.5 below presents the trends of the nominal and real *minimum wages* in Mexico. The concept of minimum wage is specified in the Mexican Constitution. It is called "minimum" since it is supposed to be the minimum wage that a worker should receive for the services given for a day's work. This wage should be sufficient for a household head to meet the minimum material, social, cultural and educational necessities of his/her family (Banco de México, 2005:11). According to the 2000 Mexican population census, around 14% of the population earned 1 minimum wage and around 36% between 1 and 2. That is, around 50% of the population earned up to 2 minimum wages in 2000 (Banco de México, 2005:12). Theoretically, this minimum wage should then be close to the value of the official Poverty line 3, which is equal to 45 daily pesos per person in constant prices of 2002. In reality, in 2007 the minimum real wage was equal to 40 daily pesos in constant prices of 2002. This means that the population earning one or less than a minimum wage is below the third poverty line, even if the person spends all his salary on himself, let alone if he needs to share the salary with his spouse or his children. In addition, the minimum wage is not enough to put a family of two above the first poverty line, which considers only food.[28]

Figure 1.5.



Source: Author's calculations with data from www.banxico.org.mx (last accessed 10/Jan/2011)

We observe the following patterns: a) real minimum wages decreased enormously during 1980-1990; b) real wages continue decreasing from 1990 to 1999; and c) from 1999 onwards, real wages have not varied significantly. Indeed, real minimum wages lost 55.6% of their purchasing power in 1980-1990 and a further 13.8% in 1990-1999. From 1999 to 2009, real wages purchasing power has remained almost constant. That is, with the same minimum wage in 2009 a worker was able to buy only 30.7% of what she/he was able to buy back in 1980.

[28] The food poverty line equals 22 daily pesos per person; the capabilities poverty line equals 27.4 daily pesos per person and the assets poverty line equals 45 daily pesos per person, all at constant prices of August 2002=100.

Regarding unemployment, it is very difficult to have a reliable source of information in the case of Mexico. Since without unemployment insurance, and only a fraction of the total population working in the formal sector, the statistics do not reflect the actual situation. For instance, in 2001 the urban unemployment rate was 2.6 (Salas & Zepeda, 2003:36). Moreover, the majority of Mexicans cannot afford to be unemployed. That is, in the absence of personal savings and unemployment insurance, workers are forced to look for any type of job in the informal sector, forcing workers to take jobs with salaries below the minimum wage, usually not related to their skills and under inadequate conditions of work (Salas & Zepeda, op.cit.).

1.4. CONCLUSIONS

As it was made evident in this chapter, the economic history of Mexico since the 1980s has been convoluted. The debt crisis of 1982 set the country into what it is now known as the 'lost decade'. The country recovered during the early 1990s but suffered from another crisis in December 1994 – the peso crisis. The economy stabilized in the late 1990s but economic growth has been elusive during the 2000s, when the annual average real rate of growth has been 1.6%. Recovery seems even more elusive at the end of the 2000s, with the unfolding of the 2008 world financial crisis. All these turbulences have had a deep impact on the living conditions of the majority of Mexican families.

As previous sections show, the literature about poverty and income inequality in Mexico is abundant. These empirical works have enriched our understanding about such complex phenomena as poverty and inequality. In the one hand, the different methodological decisions applied contributed to the debate. In the other hand, they created differences among the poverty results. Thus, the magnitude and the direction of the changes of poverty at crucial points vary among studies. There are central issues that aggravated the discrepancies among them, such as the use of different poverty lines, the adjustment for underreporting, and the use of different concepts of income. Other secondary issues as the degree of desegregation of price indexes have also affected the results. The discrepancies seem to be larger in the case of poverty than inequality, and although some tendencies can be observed when we put their data altogether, there are crucial periods where the results go in different directions.

The introduction of official poverty lines decreased the gap among results from different studies. However, it has created a problem of oversimplification of information. Indeed, the recommendations of the CTMP have not been fully followed by the new Secretariat in charge of measuring poverty, CONEVAL.[29] Although the official methodology introduced in the early 2000's established a transparent and relatively easy way to measure poverty in the country, their methodology has some limitations. Firstly, since the creation of CONEVAL, there has been an oversimplification of the results available for the public, with only the headcount index being analyzed. Other poverty measures are infrequently reported and the results for rural and urban areas have been also disregarded. Secondly, no robustness check is proposed apart from the introduction of statistical inference to test the significance of changes in the levels of poverty. Thirdly, since the use of different poverty lines seems to have an important impact on the results, it is unclear why the official estimations do not include stochastic dominance analysis to try to arrive to robust conclusions. Finally, income inequality was excluded from the discussion, thus, there are no official measurements apart from the Gini coefficient. Even though the trends of the Gini seem to be consistent over time, the Gini has two undesirable characteristics: it is more sensitive to changes in the distribution of income in the mean of the distribution than to those happening in the tails and it is not decomposable (Cowell, 2000). Among the academia, there are study cases that include a very good set of poverty and inequality measures and stochastic dominance analysis, but they have used different poverty lines, adjustments, and periods of analysis, so it is very difficult to make comparisons among them (e.g. Székely 1998, Lustig and Székely 1997, Alarcón 2001, Rubalcava, 2002).

The first objective of this thesis is to document the evolution of poverty and inequality using best practice techniques and in doing so, reconcile the differences that emerge between studies that use the same data. Regarding the latter, there are certain tools that could help to resolve some of the

[29] Chapter 3 presents the official methodology use in poverty measures in Mexico, including an explanation of the three official poverty lines.

discrepancies among studies. For instance, the use of stochastic dominance analysis could help to overcome the poverty line issue, since results are independent of them. The use of stochastic dominance analysis in published work on Mexico is the exception rather than the rule. This is particularly a limitation when the new official poverty lines have been criticized for not being generous enough. We could also use stochastic dominance analysis to test the sensitivity of results to different poverty and inequality measures. Regarding other issues such as economies of scale and equivalence scales, it is important also to test the sensitivity of the results to them, rather than just implementing them or not. The use of different concepts of income has also contributed towards variations in the results. Therefore, we will use a very similar concept than that used by the official methodology. Finally, since inequality has been almost neglected by the official measurements, we would use different inequality measures – such as the Generalised Entropy Measures in addition to the popular Gini coefficient – to see if we can arrive to robust conclusions regarding the levels and changes in inequality during the period of study and to explore the differences between rural and urban areas.

The second objective of the thesis is to investigate and identify some of the underlying processes and factors driving high levels of inequality mapping these on periods of crisis, reform and recovery and also to changes in the underlying population characteristics (e.g. education). It is precisely in this area that there is an interesting gap in the literature. Indeed, the literature about the determinants of income inequality in Mexico is not abundant.[30] That is why the aim of the final empirical chapter is try to understand the different factors affecting the levels and trends of income inequality. Understanding the causes of income inequality remains important, since although it seems that the levels of inequality in Mexico haven not changed much since 1989, its magnitude remains very high. The following paragraphs summarize the rest of the chapters of the thesis.

Chapter 2 aims to review central issues regarding the concept and measurement of poverty and income inequality. The chapter looks at these issues in a general way and it also reviews the way they are put into practice in

[30] Chapter 3 contains a literature review about empirical work on inequality determinants in Mexico.

Mexico. Section 2 explores the concept of poverty and the most common ways to measure it. It explores the advantages and disadvantages of these methods. Section 3 investigates the different approaches to aggregate the characteristics of the poor in a global indicator. Section 4 focuses on the theoretical and practical reasons that justify the use of income versus consumption as measures of individual or household welfare. Section 5 discusses the debate regarding the different approaches to deal with the problem of underreporting in the Mexican Household Surveys. Section 6 looks at the reasons for and against the use of equivalence scales and economies of scale. Section 7 explores the definition of income inequality and the ways to aggregate it into a global indicator and introduces three of the most common inequality measures used in applied work: the Gini coefficient, the Generalized Entropy Measure and the Atkinson inequality index. Finally, some concluding remarks are given.

Chapter 3 presents the Data and Methodology used in the empirical chapters. This chapter introduces the ENIGH household surveys, which are the main data source of this thesis. It briefly explains the survey design and their comparability through out the period of study. The chapter also includes the definition of income and consumption used through out the empirical chapters, the price index used to calculate real income and consumption, the definitions of urban and rural households and the official poverty lines. Finally, a literature review about inequality determinants in the context of Mexico is also provided alongside the three different methodologies for income inequality decomposition applied in Chapter 6.

Chapter 4, which is the first empirical one, has the objective of testing the sensitivity of poverty and inequality measures for Mexico to the use of different methodologies. It is important to mention that this chapter is not a quest to find “the perfect poverty and inequality methodology for Mexico”, it is more a quest to identify the sensitivity of a set of inequality and poverty measures to different methodological choices. We explore the following methodological choices: a) the sensitivity of our preferred inequality and poverty measures to the use of equivalised income and economies of scale; b) a sensitivity analysis for the Gini coefficient, the Generalized Entropy Measure, the Atkinson Inequality measure and the Foster-Greer-Thorbecke (FGT) family of poverty measures; c) a sensitivity analysis to the use of welfare indicator – income vs. consumption; d) use of stochastic dominance analysis to check the sensitivity of the headcount index to the use of different equivalised incomes; e) use of stochastic dominance analysis to check the sensitivity of our results to our specific measures and in the case of poverty, to the use of specific poverty lines; and f) we will use the conclusions to decide which will be our 'preferable welfare indicator', the one that will be used to measure the levels and trends of poverty and inequality for all the rest of the ENIGH household surveys that are available for 1992-2008.

The main objective of chapter 5 is to apply the recommendations that resulted from the previous chapter to measure the evolution of poverty and income distribution in Mexico between 1992 and 2008. That is, 16 years of changes in the income and consumption levels of the Mexican population will be analyzed. As in the previous chapter this will be a microeconomic approach that will use data from the ENIGH household surveys. The main objective of the chapter is to obtain robust results in the changes over time in poverty and income inequality. We believe that being clear about the sensitivity of the data to some of the most common assumptions when making calculations about poverty and income inequality in Mexico should be the rule rather than the exception.

Chapter 6 is devoted to try to find the potential factors behind the high levels of income inequality in Mexico. The aim of this chapter is try to understand the different factors affecting the levels and trends of income inequality. Three different methodologies will be used to analyze the determinants of the levels and trends of income inequality in Mexico between 1992 and 2008. Section 1, describes the contribution of this chapter to the existing literature. Section 2 briefly describes two key issues that have been linked to changes in inequality over time in Mexico: 1) trade liberalization and wage differentials; and 2) education and inequality in Mexico. The rest of the chapter presents the actual results for the different inequality decompositions. It starts with the two arithmetic decompositions – population sub-groups and income-source – and it finishes with the regression-based decomposition results.

Chapter 7 presents a summary of the whole thesis and some concluding remarks. It describes what we achieved with this research and the contributions of this research to the existing literature. It focuses on key findings and policy implications. Finally, the limitations of the thesis are also highlighted and future possibilities for research are also presented.

Chapter 2. Issues in the Concept and Measurement of Well-being and Income Inequality

2.1. Introduction

Although many people agree on the goal of reducing poverty in the world, it seems that there is a debate regarding the concept and measurement of poverty, and Mexico, is not exempt from this. Indeed, as Thorbecke (2005:4) states, "Poverty has to be defined, or at least grasped conceptually, before it can be measured. The broader the definition of poverty, the more difficult is its measurement". That is why, this chapter reviews central issues regarding the concept and measurement of poverty and income inequality. The chapter looks at these issues in a general way and it also reviews the way they are put into practice in Mexico.

Section 2 explores the concept of poverty and the most common ways to measure it. It explores, in a broad perspective, the advantages and disadvantages of these methods. This section introduces the official methodology to measure poverty in Mexico. Section 3 explores the aggregation of the welfare levels of the poor in a global indicator. Section 4 explores the definition of income inequality and the ways to aggregate it into a global indicator. This section also introduces three of the most common inequality measures used in applied work: the Gini coefficient, the Generalized Entropy Measure and the Atkinson inequality index. Section 5 focuses on the theoretical and practical reasons that justify the use of income versus consumption as measures of individual or household welfare. Section 6 discusses the debate regarding the different approaches to deal with the problem of underreporting in the Mexican Household Surveys. Section 7 looks at the reasons for and against the use of equivalence scales and economies of scale. Finally, some concluding remarks are given.

2.2. The Concept of Poverty

As mentioned by Sen (1992) the measurement of poverty can be divided in two different tasks, firstly, the identification of the poor and secondly, the aggregation of the characteristics of the poor in a global indicator. This section refers to the identification problem (the next section deals with the aggregation task). Poverty means different things to different people. These conceptualizations of poverty are related to different ways to measure it. Focusing on poverty leads to question who the poor are. Many definitions of poverty have been used, and as Glewee and Van Der Gaag (1990) argue, it is not certain that they identify the same people as poor. However, the answer to such question has been traditionally found in an empirical way. The following paragraphs will look at the similarities, differences, advantages and disadvantages and implications of using different concepts of poverty: the monetary, basic needs, the integrated and capabilities approaches. Most of the methodological choices explained in this chapter are related to the concept and measurement of individual welfare. Nonetheless, there is no agreement regarding this concept and the way to measure it empirically.

2.2.1. The Monetary Approach

In theory, most studies state that poverty is a multidimensional phenomenon. However, in practice, the monetary approach is the most common method applied to identify the poor (Ruggeri *et al*, 2003:3). The monetary approach is known as an indirect method to identify the poor and consists in calculating a minimum income or poverty line (PL) at which all the basic needs are satisfied. Then, one has to identify the households or people which have an income below the poverty line. Boltvinik (2000) sums up the approach as follows: i) the definition of basic needs and its components; ii) the definition of a normative consumption basket of characteristics, goods and services for each household that satisfies the basic needs; iii) to calculate the cost of the latter consumption basket and then set it as the poverty line; iv) to compare the poverty line with each household's income; and v) to identify as poor those households with an income below the poverty line. "It identifies poverty with a shortfall in monetary income (or consumption) from some poverty line. The valuation of the different components of income or consumption is done at market prices, which requires identification of the relevant market and the imputation of monetary values for those items which are not valued through the market (such as subsistence production and, in principle, public goods)… The assumptions needed for such imputation are generally somewhat heroic" (Ruggeri *et al*, 2003:8). The popularity of the approach lies in its compatibility with the microeconomics' utility maximizing assumption. That is, individuals want to maximize their utility. In this approach, welfare is measured as the individual's (or household's) total monetary income or consumption. The poor are those which fall "below some minimum monetary income, which is termed the poverty line" (Idem.pp.8). Thus, utility is used as a definition of well-being.

One of the main critiques of the monetary approach is that income cannot incorporate important dimensions of poverty, such as literacy, availability of public goods, life expectancy, security and freedom. And that even if income or consumption were able to perfectly identify the minimum thresholds for each basic need to set a poverty line, there is no guarantee that households will allocate their incomes in the best possible way, that is, to buy the minimum basic needs basket. Indeed, a household head can decide to use part of the money to buy tobacco or alcohol instead of food (Thorbecke, 2005:4). Anyhow, the approach has been justified as a short-cut method which is, allegedly, a good proxy for other aspects of poverty and welfare, and most importantly, which is also based on widely available data.

2.2.2. Basic Needs Approach BNA (the direct method)

As Sen (1992) argues, the 'direct' way to identify the poor identifies the set of persons with a consumer basket which does not satisfy one of the basic needs. However, this process does not include the income of the households not even that related to a particular poverty line. The procedure is as follows: 1) a set of *basic needs* is defined, which usually includes: nutrition, education, shelter, health, clothing, access to electricity and drainage; 2) a minimum threshold is determined, and households below that minimum threshold are those which do not satisfy a particular necessity; and c) finally, the households that do not satisfy one or more necessities are identified as poor.

The main problem with the basic needs approach is that apart for nutrition, it is very difficult to establish a minimum level for the rest of the variables (Thorbecke, 2005:6). Indeed, this decision is subjective and what is considered ‘minimum’ in one region might be considered insufficient in another. In addition, there are other basic needs that might be more elusive to quantify, let alone to set a minimum threshold (as in the case of security, discrimination and recreation time).

2.2.3. The Integrated Poverty Measure (IPM) as a combined method.

A combined or integrated method has also been applied and it mixes the Basic Needs and Monetary approaches.[31] Since the two methods complement each other, we need to be careful not to take into account information twice. Then we need to decide which necessities will be identified by each of the approaches. In general, the Basic Needs Approach tends to identify access to water and drainage, level of education, electricity, shelter, household equipment and recreation time. In contrast, the Monetary approach tends to identify necessities which depend of current private consumption, such as, food and clothing. The IPM approach can identify three different groups of poor: i) the people which are identified by BNA and the Monetary approach; ii) the poor which are identified only by the BNA approach; and iii) people which are identified solely by the Monetary approach.

2.2.4. Sen’s Capability approach

Sen (1985) argues that the assessment of personal well-being and advantage should focus on the capability to function ‘what a person can do or can be’ instead of a more standard approach that focuses on opulence whether being income or utility. Thus, “what ultimately matters is the freedom of a person to choose her functionings. In order to function, an individual requires a minimum level of well-being brought about by a set of attributes” (Thorbecke, 2005:4). Sen (1985:5) focuses on two ways of a person’s fulfilment and interests, ‘well-being’ and ‘advantage’. “Well-being is concerned with a person’s achievement:

[31] This paragraph is heavily based on Boltvinik (1992).

how ‘well’ is his or her ‘being’? ‘Advantage’ refers to the real opportunities that the person has, especially compared with others. The opportunities are not judged only by the results achieved, and therefore not just by the level of well-being achieved. It is possible for a person to have genuine advantages *and* still to ‘muff’ them. *Or* to sacrifice one’s own well-being for other goals, and not to make full use of one’s freedom to achieve a high level of well-being”.

In welfare economics, welfare judgements are solely based on individual utilities. The capability approach is a departure from welfarism, in the sense that includes non-utility information when evaluating individual welfare. (Kuklys, 2005:13). The well-being of a person is related with how ‘rich’ she or he is. However, ‘well-being’ is sometimes confused with ‘being well off’. But the former is the state of a person and the latter is the extent of her possessions. Therefore, “well-being cannot in any way be identified with opulence. The latter is, at best, one of the factors influencing the former” (Sen 1985:24). Sen (1985:28) asks why opulence should not be use to measure well-being and his answer is: “a person’s well-being is not really a matter of how rich he or she is, and this is particularly important to bear in mind when we are dealing with large interpersonal variations of personal or social characteristics (e.g., nutritional demands of pregnancy, medical demands or age, or social demands of particular customs). Commodity command is a means to the end of well-being, but can scarcely be the end itself. To think otherwise is to fall into the trap of what Marx (1887) called ‘commodity fetishism’ – to regard goods as valuable in themselves and not for (and to the extent that) they help the person”.

In the following paragraph, Sen explains why opulence cannot give enough information to compare the well-being of two different persons:

“But in comparing the functionings of two different persons, we do not get enough information by looking merely at the amounts of bread (and similar goods) enjoyed by the two persons respectively. The conversion of commodity-characteristics into personal achievements of functionings depends on a variety of factors – personal and social. In the case of nutritional achievements it depends on such factors as (1) metabolic rates, (2) body size, (3) age, (4) sex (and, if a woman, whether pregnant or lactating), (5) activity levels, (6) medical conditions (including the presence or absence of parasites), (7) access to medical services and the ability to use them, (8) nutritional knowledge and education, and (9) climatic conditions” (Sen op.cit.pp.26).

That is, two households with the same level of income per capita may or may not have the same level of well-being. For example, Kuklys (2005) applies the capabilities approach to explore the disadvantages of British households with disabled members. Using data from the British Household Panel Survey for the years 1996-1999, she finds that a disabled individual has a 40% lower consumption opportunity set compared to that from a non disabled individual.

But if 'the capability of a person is an opportunity set of bundles of functionings and not the functionings achieved' (Tsui 2002:72 cited in Thorbecke 2005:5), it remains very difficult to measure these capabilities *ex ante*. However, we can measure, with some limitations, the actual outcomes or achieved functioning *ex post* (Thorbecke, op. cit.). These outcomes include those of the Basic needs approach – good nutrition, education, shelter, health and clothing – in conjunction with other more difficult to measure – freedom of religion, oppression and expression, discrimination, social exclusion and security (Thorbecke, op. cit.). That is, instead of using income or consumption to assess welfare, Sen proposes a multidimensional measure. The first empirical studies that applied Sen's multidimensional approach show significant differences when compared with income-based welfare analyses. For instance, country rankings based on the Human Development Index[32] differ significantly with those obtained by using GDP per capita (Kuklys, 2005:2). However, welfare economics literature has been influenced in a limited way by the capability approach. Kuklys (Idem, pp.3) explains the reasons for the latter: i) when comparing the capabilities and income approaches, it is impossible to determine which is the best by using hypothesis testing; ii) the way that the capability approach is written might be more related to philosophy than economics; and iii) there is no consensus on the operationalisation of the capability approach. It is in this last respect that most of the critiques of the capability approach stand. Since apart from the levels of nutrition, it is very hard to set a minimum level for the rest of basic needs, especially those concerned to human rights and more intangible dimensions of well-being, such as, discrimination, freedom and security. In addition, when household A is deprived in all attributes (e.g. shelter, food, education, health, security and freedom) and other household B is not deprived in any attributes, we can say that there is

[32] The HDI is a composite index that focus on three basic criteria: 1) knowledge (measured by a combination of primary, secondary and tertiary enrolment ratio and adult literacy); 2) longevity (measured by life expectancy at birth); and 3) a decent standard of living (measured by Gross Domestic Product per capita in PPP US$).

stochastically dominance, and household A is unambiguously poor. However, it is difficult to classify households as poor when they are deprived in one or two attributes, but not in the rest (Thorbecke, op. cit).

Bourguignon and Chakravarty (2003) suggest a multidimensional way of measuring poverty that specifies a poverty line for each dimension and considers a person to be poor when she/he falls below at least one of the poverty lines. Their study presents an empirical example on rural Brazil in the 1980s using education and income as poverty dimensions. They present three set of results for the FGT family of poverty indexes: a) when a person is either poor with the income dimension or the education dimension; b) when a person is poor using a multidimensional poverty measure that gives 50% weight to income and 50% weight to education; and c) when the person is poor according to a multidimensional poverty measure that gives 80% weight to income and 20% weight to education. Interestingly, their results show an increase in rural poverty in Brazil from 1981 to 1987 when using income as a separate dimension and a fall in poverty when using education (for α= 1,..5). In addition, when using a multidimensional poverty measure the changes in poverty depend on the weight assigned to each variable. That is, we observe a fall in inequality when using a measure that gives 50% weight to income and 50% weight to education. But we observe the opposite for several results when assigning 80% weight to income and 20% to education. Thus, the results are sensitive to the weight assigned to each dimension. However, the substitutability among the different dimensions remains an empirical issue. Finally, one of the main limitations of this methodology is that "the measures only represent poverty at a given moment in time without regards to its development in terms of how a certain constellation of achievements leads to certain future outcomes. Poverty dimensions or attributes may be substitutes to each other in the short-run but complements in the long-run (Thorbecke, 2005:20 cited in Busch and Peichl, 2010:29).

To sum up, the critiques to the solely use of income or consumption as an indicator of welfare remain important if we want to study poverty or inequality. However, the capabilities approach remains difficult to put in practice. Indeed, several problems remain, as which functionings are the most important to be measure, how to measure the chosen functionings, and how to compare unidimensional welfare measures with multidimensional ones.

2.2.5. Are the different methods alternatives to measure the same thing?

Sen (1992) argues that the direct method to measure poverty is superior to the indirect one, since it does not require any assumption about the consumption patterns of the household. Thus, the monetary method is viewed as a "second best" option that should be used only when there is no sufficient data about the basic needs. However, he mentions that the monetary method is more than just a way to approximate the results obtained by the basic needs approach. Indeed, the monetary method would be able to identify a rich person which decides not to eat properly and to sleep in a needle bed. In contrast, the basic needs approach would identify the same person as poor. The monetary approach has the advantage of providing a set of numerical distances or gaps with respect to the poverty line. The latter, is not given by the direct approach, which only gives the gap for each type of necessity (Idem). Finally, the capabilities approach identifies those households that do not have the freedom to choose a set of functionings that would allow them to become non-poor. However, it remains difficult to put in practice.

But the main problem with the different approaches is that they tend not to identify the same households as poor. It is a question of the degree of overlap between different definitions. For instance, the percentage of the population that was poor in 1976 in Buenos Aires was said to be 21.9% under the BNA and 15.8% under the Monetary Approach. In Montevideo, the same figures in 1986 were 20.5% and 11.5% and 16.4% and 10.2% in 1986 (Boltvinik, 2000:44). In a more recent study, Deutsch and Silber (2005), assess the sensitivity of poverty incidence and determinants to the use of different multidimensional approaches to poverty measurement. Using the 1995 Israeli census, they found that the results among various multidimensional poverty indices are similar, especially those concern with the determinants of poverty. But surprisingly, they also found that the results based only on total income or consumption of the household were similar to the multidimensional ones.

Using household surveys from Côte d'Ivoire, Glewwe and Van Der Gaag (1990) find that different definitions of poverty identify different population groups with different characteristics as poor. For instance, their results show that there is little correlation between being poor and being malnourished. Thus, in the case of Côte d'Ivoire any policy to diminish malnourishment will not diminish poverty. They also argue that this result reflects the multifaceted nature of poverty. However, if different definitions of poverty identify different people with different characteristics as poor, the definition of poverty must be chosen with care (pp.812).

In the same direction, Ravallion and Sen (1996) use two different methodologies to measure urban and rural poverty in Bangladesh in the period of 1983-1992. The two methods are The Food-Energy Intake Method of setting poverty lines (FEI) and The Cost-of-Basic-Needs Method (CBN). The former methodology consists in obtaining a poverty line for each sector (urban/rural) and for each period …"by finding the expenditure (or income) level at which the expected value of caloric intake, conditional on expenditure, equals the predetermined food-energy requirement" (pp.764). By applying the CBN approach Ravallion and Sen find that the results from the FEI method are biased by the methodology implemented, and in fact poverty increased in rural areas not in urban ones (as concluded by other studies that used the FEI approach). The main conclusions from this exercise are: i) normative judgments will always be needed to interpret the available imperfect data. However, it is more important to find out the impact of such choices on the conclusions. Data and methods need to be critically evaluated in order to favour or reject some estimates against others; and ii) unreliable methods for calculating changes in poverty can mislead policy (pp.785).

As we can see from the above paragraphs, each of the different approaches to poverty measure has their advantages and disadvantages. Most of the discussion in this section refers to theoretical issues. However, many decisions taken by researchers come from practical reasons. Indeed, not all the information required to apply these approaches is ready available for the use of researches. In the case of Mexico, the most detailed and historical survey about Mexican households is based on the monetary approach. The National Income and Consumption Survey (ENIGH) captures in detail income and consumption from Mexican households. The surveys are representative at the national, urban and rural levels.[33]

To conclude, different concepts of measuring poverty are not considered to be alternative ways to identify the same thing. Actually, the direct and indirect methods are embedded in two different concepts of poverty. The basic needs method identifies the people with a real consumption that does not satisfy what is established as minimum necessities in their community. The capabilities approach identifies those households that do not have the freedom to choose a set of functionings that would allow them to become non-poor. The monetary method identifies those households or people that do not have the capacity to satisfy such set of minimum necessities which are defined in accordance with the typical behaviour. The main problem when deciding which of the approaches we are going to implement is that they tend not to identify the same households as poor. As a consequence, there is no consensus regarding how to measure well-being. Using the monetary approach has the advantage of the ready availability of data related with it. But when data is available, multidimensional measures should be attempted. Therefore, the issue of identifying the poor remains not only theoretical, but also empirical.

The decision to use one poverty concept over another is often related to the availability of information. Using a multidimensional approach seems very appealing. However, the Mexican ENIGH household surveys do not provide information for the more intangible dimensions of well-being (e.g. discrimination, freedom and security). In addition, value judgements will be needed to decide a minimum level for all the basic needs. And in the absence of stochastic dominance (when a household is deprived in all the attributes such as education, health, shelter, clothing, food, freedom, and security) it would also be very difficult to decide which households are poor and which are not. It is for the above reasons that we will apply the monetary approach in this thesis.

[33] The ENIGHs are produced by the National Institute of Statistics, Geography and Informatics (INEGI) and although there are surveys reported since 1956, most researches agree that those which are comparable date from 1984 and onwards. Indeed the surveys from 1984 and 1989 differ from most recent surveys in their definition of urban and rural households. Thus, the surveys which are really comparable date from 1992 to 2008.

2.3. Aggregating the Welfare Levels of the Poor in a Global Indicator

Deciding which concept of poverty to use is only the first step towards measuring it. The second task consists in aggregating the welfare levels of the poor in a global indicator. We can choose arbitrarily a poverty measure or we can look for a poverty measure that would have some desirable qualities. Sen (1976) follows the second approach and proposed a series of axioms that poverty measures should not violate. The motivation for his research lies in the fact that although the Headcount index has some undesirable properties, it remains the most widely used poverty measure. The *headcount index* **H**, indicates the proportion of the population which has a level of income or consumption which is lower than the designated poverty lines (or the percentage of the population below the poverty line). However, this measure is not sensitive to differences in the depth of poverty, this means that it does not tell us anything about if a person is just below the poverty line or far below it. “A seminal paper by Sen (1976) drew attention to the undesirable properties of this measure, such as the fact that when a poor person becomes poorer the headcount index of poverty will not increase (indeed, if the person dies, the index will fall!). A large literature has since proposed and studied enumerable alternative measures, though as yet no single measure has toppled the headcount index from public attention” (Lipton and Ravallion, 1995:1328-29). The second most common index considers the depth of poverty and is *the poverty gap index* **PG** which is simply the average shortfall below the poverty line computed for the whole population, counting non-poor as zero. That is, this measure takes into account how far households are below the poverty line and provides an average for the whole population. But even in its narrowed measure of “well being”, both of these measures neglect inequality among the poor.

In order to overcome the limitations of the most widely used poverty measures, Sen (1976) presents a set of axioms or rules that a poverty measure **P** should not violate. Following Sen’s approach, other researchers have added to the list of axioms.[34] A list of them is given as follows:

[34] The list includes those presented in Sen (1976) and Amiel and Cowell (1997).

Monotonicity: Keeping other things constant, if the income of a person below the poverty line falls, the poverty measure **P** must increase.

Transfer: Keeping other things constant, if a person below the poverty line transfer part of his/her income to a person who is richer, the poverty measure **P** must increase.

Relative equity: The increase in the poverty measure **P** should be greater if a reduction in income happens from a poorer person than that of a relatively richer person.

Anonymity: The poverty measure **P** should be invariant to permutations of income.

Focus: The poverty measure **P** is independent of all incomes above the poverty line. Thus, it should focus on the incomes of the poor.

Decomposability: The sum of sub-group poverty measures equals the total poverty measure.

One poverty measure that follows the rules or axioms is the squared poverty gap index of *Foster-Greer-Thorbecke* (FGT hereafter), which is sensitive to inequality among the poor. This index considers both, how far away are poor households from the poverty line (g_i/z) and it also gives a higher weight to those households who are more far away from the poverty line (the higher the difference between z and the income of the household y, the higher the value of $(g_i/z)^{\alpha}$). Furthermore, this index has a quality that makes it better for policy prescriptions. The **FGT** index is decomposable, this means that it can be used to make poverty profiles, that show how poverty varies across sub-groups of society (e.g. urban and rural) and how poverty in these groups contribute to the changes in total poverty.[35]

The following[36] is the formula of the Foster Greer Thorbecke (1984) index which is used to calculate the three different poverty measures used in the empirical chapters:

[35] For further discussion about setting poverty lines and Poverty Measurement see Ravallion, M. (1994).
[36] These paragraphs are heavily based on Foster, J.E., J. Greer, E. Thorbecke (1984),

$$P_\alpha(y;z)=\frac{1}{n}\sum_{i=1}^{q}\left(\frac{g_i}{z}\right)^{\alpha}. \tag{2.1}$$

where y = (y_1, y_2,…, y_n) is a vector of household incomes in increasing order; z is the desired poverty line; q is the number of households with an income less than the poverty line; n is the number of total households in the population; and g_i= z-y_i is the difference between the income of the household i*th* and the poverty line (or the income shortfall of the i*th* household). The parameter α could "be viewed as a measure of poverty aversion: A larger α gives greater emphasis to the poorest poor" (pp.763). We use three specific values of α to obtain three of the most common poverty measures. When α = 0 we obtain the Headcount Index; when α = 1 we obtain the Poverty Gap; and when α = 2 we obtain the squared Poverty Gap.

2.4. Inequality Measures and some Desirable Properties

When choosing and inequality measure there are two approaches: the first will be to use the one(s) that are used most frequently; the second will be to think about some "desirable" properties for the measures to have. Frank Cowell (2000) applies the second approach when introducing several inequality measures. Cowell (2000) specifies five properties which are desirable for a given inequality index. These properties are: the weak principle of transfers, scale independence, decomposability, the population principle and the strong principle of transfers. An inequality measure is to pass the test of *the weak principle of transfers* if for any given transfer of income from a richer person to a poorer person the result is a decrease in inequality (pp.55). The *Income Scale Independence* property refers to the idea that "the measured inequality of the slices of the cake should not depend on the size of the cake" (pp.56). That is, if the income/consumption share of each household changes in the same proportion, then the inequality measure should remain the same. The *principle of Population* is satisfied when the inequality measure is not affected by the number of people. Thus, a country where 50% of their households have no income at all and 50% have all the income of the economy should have the same level of inequality no matter if the country has 10,000 or 10 million inhabitants. *Decomposability* is also a desirable property. It means that the inequality of the whole population can be written as a function of inequality within and between the subgroups of the society (Ibid:57). The Gini coefficient is an example of an inequality measure that is not decomposable. Finally, an inequality measure satisfies the *Strong Principle of Transfers* when the size of a change in inequality due to an income transfer depends only on the distance between the income shares of the persons concerned (Ibid:60-61).

2.4.1. The Gini coefficient

Although the Gini coefficient does not satisfy all the properties that were just stated, it is the first inequality measure that we are going to calculate. The Gini coefficient is an example of an inequality measure that is not decomposable. Indeed, it is possible to obtain measures of the Gini where inequality increases in each and every subgroup of the population and a decrease in total inequality at the same time (Ibid:59). In addition, the Gini coefficient does not satisfy the strong principle of transfers. However, this measure is the most common used in the literature. We can derive this coefficient by using the Lorenz Curve. As mentioned by Cowell (2000:23) although there are many ways of defining the Gini coefficient "perhaps the easiest definition is as [half] the average difference between all possible pairs of incomes in the population, expressed as a proportion of total income." The value of the Gini ranges between 0 and 1. An egalitarian society where everybody gets the same share of the cake will lead to a value of 0. In opposition, an extremely unequal society where only one household holds all the income/consumption will lead to a Gini value of 1. However, the Gini has an undesirable characteristic: it is more sensitive to changes in the distribution of income in the mean of the distribution than to those happening in the tails (Ibid:23). That is, consider a country where the minimum household income was $1 peso per month and the maximum was $100 pesos. The Gini will decrease more with a transfer of $1 peso from a household earning $50 pesos to one earning $45; than with a transfer of 1 peso from a household earning $5 pesos to the one earning just $1; or a transfer of

$1 peso from a household earning $100 pesos to one earning $90 pesos. The following is one mathematical expression for the Gini:

$$G = \frac{1}{2n^2 y} \sum_{i=1}^{n} \sum_{j=1}^{n} \left| y_i - y_j \right| \tag{2.2}$$

where *y* is the income/consumption of the i*th* household; *n* is the total population; and y is the mean income/consumption.[37]

2.4.2. The Generalised Entropy Measure

But which inequality measures actually have all the desirable properties that were mentioned at the beginning of this section? The Generalised Entropy Measure does and its formula is as follows:

$$E_\theta = \frac{1}{\theta^2 - \theta} \left[\frac{1}{n} \sum_{i=1}^{n} \left[\frac{y_i}{y} \right]^\theta - 1 \right] \tag{2.3}$$

where θ is a real parameter with a negative, zero or positive value (Ibid:59). This measure is equally sensitive to changes across the distribution when θ = 1. This is the Theil index and it can be expressed as:

$$E_1 = \frac{1}{n} \sum_{i=1}^{n} \frac{y_i}{y} \ln\left(\frac{y_i}{y} \right) \tag{2.4}$$

The GE is more sensitive to changes in the lower parts of the distribution when θ is close to zero. This is the mean log deviation, which may be written as:

$$E_0 = \frac{1}{n} \sum_{i=1}^{n} \ln\left(\frac{y}{y_i} \right) \tag{2.5.}$$

Finally, the GE is more sensitive to changes in the higher parts of the distribution for higher values of θ.[38] The GE is the second inequality measure that we will calculate.

[37] From Cowell, F. A. (2000:137).

2.4.3. The Atkinson Inequality Index

The final inequality measure that was calculated is the *Atkinson Inequality Index*. This index[39] does not pass the test for the Strong Principle of Transfers. Its formula is as follows:

$$A_\varepsilon = 1 - \left[\frac{1}{n} \sum_{i=1}^{n} \left[\frac{y_i}{y} \right]^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} \tag{2.6}$$

where ε is a parameter for inequality aversion; for low values the index becomes very sensitive to changes in the high end of the distribution; in contrast, when a high value is used, the index becomes more sensitive to the lower end of the distribution (Cowell, 2000:47).

2.5. Choosing the Right Well-Being Indicator

2.5.1. Income Vs Consumption as an indicator of well-being in the Monetary Approach

One of the main problems when working with Households Surveys is the choice of one variable to measure the standard of living. As mentioned by Deaton and Grosh (2000:91) although there are more important types of deprivation than the purely material ones (e.g. education, freedom from crime, health), "…measuring the material basis of living standards will always play an important role in the assessment of levels of living." However, it is not that obvious which variable should be used to measure well-being. The latter question has not a straight forward answer, since income and consumption are not different ways to measure the same concept. They are, indeed, different concepts. Although there are several theoretical reasons to use one or the other, the use of any of them is more related to practical than theoretical reasons, since data is not always available for the two indicators. This section explores the main

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[38] http://siteresources.worldbank.org/INTPA/Resources/tn_measuring_inequality.pdf (accessed the 11/Sep/07) and http://siteresources.worldbank.org/PGLP/Resources/PMch6.pdf (accessed the 19/Dec/10).
[39] Cowell (2000:46).

theoretical and practical issues regarding the use of income or consumption as a way to measure well-being as a purely material deprivation.

Ravallion (1994) explains that the main reason to use current consumption instead of income as the preferred indicator of living standards in developing countries seems to be variability. While incomes of the poor have a tendency to vary over time, the poor may have the possibility to smooth their consumption and have access to insurance mechanisms. If the latter is true, current consumption is a better indicator than current income to measure current and long-term well-being. Consumption might capture permanent income or well being in a better way than income. Indeed, a household which has accumulated assets should not be identified as poor, even when its current income equals zero, since it might be able to satisfy all its basic needs by depleting assets (Hernandez-Laos, 1992:255). Another important reason to prefer consumption over income is that the former has typically smaller seasonal patterns and random irregularities than the latter, since consumption is less tied to weather-related and seasonal patterns in agriculture. However, if it is possible to collect data on income in many occasions during the year, income might be as good as consumption as a measure of material well-being. Moreover, if panel data is available, income can be averaged and become as stable as consumption (Deaton and Grosh, 2000:93-94).

However, Lipton and Ravallion (1995:2573) explain that consumption can be a noisy welfare indicator for the following reasons. First, even when smoothing is available, people might not always prefer to have a constant consumption at all times. Second, current consumption might not be a better indicator to identify all the poor. That is, while smoothing and insurance mechanisms are available for the poor, it is widely recognised that the poorest of the poor do not have the same access to such mechanisms. Indeed, using data from India, Chadhuri and Ravallion (1991) compare the ability of current income and consumption to identify the chronically poor. They found that income is generally a better indicator than consumption to identify the chronically poor. However, current consumption was better to identify the poor at a given date. Thus, it was not clear which of the two indicators was to be used to measure the standard of living in India (Quoted in Ravallion 1992:72).

McKay (2000) accounts for the advantages of collecting and using household income from surveys. Firstly, income finances current consumption and provides resources for savings. Secondly, it can be used to measure households' living standards. Thirdly, it can be used to explore the determinants of poverty. Indeed, data on total household income is more helpful to understand the economic returns of the different sources of income. This approach makes it possible to identify which factors are associated with low or high standards of living. Fourthly, it is useful to estimate household savings. That is, savings can be obtained as the difference between household income and consumption. In addition, income-based estimators have been useful to explore the dynamics of poverty. Indeed, income has proved to capture more accurately the differences between the chronically poor and the poor.

Irrespective of the theoretical advantages that consumption may have over income, there are more practical issues when making the decision on measuring one or the other. Firstly, Deaton and Grosh (2000:94) mention that the Consumer Expenditure Survey of the United States costs five times more than the Current Population Survey, which is the one that gather data on employment, earnings and income. Secondly, since income varies more than consumption throughout the year, it requires to be collected several times during a year. In contrast, consumption may require only one visit for collection. Thirdly, respondents to questionnaires are more prone to lie about their level of income, which is taxable.

In the Latin-American context, income is the primary well-being indicator used. Székely *et al* (2000) explain that the reason is that from the 17 household expenditure surveys available on the region only the ones from Ecuador, Peru and Mexico collect data on consumption on regular basis (pp.12). They found that using consumption or income as the well-being indicator has different implications for these three countries. For Mexico it makes a difference of 3.2 percentage points in the poverty rate. Peru seems to be more sensitive to the choice of indicator, using income leads to a poverty rate of 43.3 percent whereas consumption leads to a 50.5 percent one. By contrast, the choice of indicator makes almost no difference for Ecuador.

In addition, the definition of income used also varies. Indeed, Colombia, Chile, Mexico and Guatemala include the monetary value of in-kind and/or self-production of goods in their income definitions (Psacharopoulos *et al*, 1993:9). In the case of Mexico, self-consumption is estimated by the informant based on the local market price of retail sales (INEGI, 2002). However, as mentioned by Ravallion and Chen (1997:360), the way to value self-consumption in other surveys is different, some surveys use the farm-gates selling price, while others use the price at the nearest market. The inclusion of in-kind and self-production of goods in the definition of income could make comparisons among countries difficult, since the poor might have a higher share of income from these sources. Therefore, poverty and inequality measures that include such sources of income could result in lower measures in comparison with those that do not include them (Psacharopoulos *et al*, 1993:9). For instance, in the case of Mexico, the non-monetary component of the income and consumption concepts represented 10.6% of total income for the urban population and 14.7% for the rural population in 2006. Using a per capita income concept that includes non-monetary income and using the food poverty line gives results for the headcount index of 7% for the urban population and 23% for the rural population. However, using an income concept without the non-monetary component gives higher results for the headcount index, 11% for the urban population and 29% for the rural population, confirming Psacharopoulos *et al*, (1993) hypothesis.[40]

Finally, not all the household surveys are representative at national level. While Brazil, Chile, Mexico, Guatemala, Costa Rica, Dominican Republic, Jamaica, Panama, Peru and Venezuela have surveys at national level coverage, some have only urban coverage like Ecuador, El Salvador and Uruguay and some only cover important cities like Bolivia, Colombia and Honduras (Ibidem, Annex I:121).

2.5.2. Income or Consumption as well-being indicators in the case of Mexico

Most studies about poverty in Mexico use mostly income as their preferable welfare indicator. Indeed, the Technical Committee to Measure Poverty in

[40] Own calculations with data from the 2006 ENIGH household survey.

Mexico (the Committee here after), which was appointed to provide recommendations to the Mexican Government to establish an official methodology to measure poverty, recommends the use of current income as opposed to consumption for all the calculations. This section presents relevant studies in the use of income or consumption as the main well-being indicator in the case of Mexico.

Teruel (2004) explores if it makes any difference to use income or consumption when studying the distribution of resources across Mexican households for the 1984-1994 period. Using cross sections of the Mexican income-expenditure surveys Teruel finds that when calculating a group of inequality measures including the Gini coefficient, the variance of the logs, Theil's, the Atkinson measure and the coefficient of variation, the qualitative results of the changes in the level of inequality do not vary irrespective of the welfare measure used. However, when looking at the distribution by decile, the choice of welfare indicator matters. Indeed, when using income, all deciles but the last one decreased their income share from 1984 to 1989. But when using consumption, the share of the first seven deciles did not experience an important change.

In the same direction, de la Torre (2005) measures poverty and inequality using income and consumption. Using three different poverty lines, he finds that in all cases, the percentage of people that is poor (FGT=0) is higher when using consumption as the welfare indicator. In 2002 this difference is around 2 percentage points for the lowest poverty line (the food one), but of 6 percentage points for the highest one (the assets one). Poverty is also higher when using consumption as opposed to income when looking at the intensity of poverty (FGT=1). However, the difference is only 1 to 2 percentage points. Finally, poverty is also higher when using consumption as opposed to income when looking at the severity of poverty (FGT=2), with differences between 1 to 2 percentage points. In conclusion, the use of income or consumption as an indicator of welfare does have an impact in poverty measures. Poverty is higher when using consumption as opposed to income as the welfare indicator. This impact becomes bigger with higher poverty lines.

To sum up, choosing an indicator is a difficult task and there seem to be reasons pro and against using any of them. Nevertheless, it seems more important “to know how the choice matters” (Lipton and Ravallion, 1995:2575) and focus on how results are affected by the different methodologies applied and the assumptions made by the researcher. Since it is difficult to identify the sensitivity of poverty and inequality measures theoretically, in the first empirical chapter we will use different techniques to check for the sensitivity of our poverty and inequality measures to the use of different welfare indicators. These will include not only per capita income and consumption, but also a set of different equivalised incomes. In addition, we will look at the sensitivity of the per capita income and consumption variables to the inclusion of imputed rents and durable goods.

2.6. Adjusting the Data from Household Surveys using National Accounts' Statistics

When looking at empirical studies about poverty and income inequality in Mexico, it becomes obvious that one of the main methodological differences among them is to adjust or not the data from household surveys from underreporting. There are two ways to measure the income from households: a macroeconomic way that uses the National Accounts and a microeconomic way which uses data from Household Surveys (Leyva-Parra, 2005). In theory, both sources should give the same results. In practice, the National Accounts always give higher sums of income. Indeed, some estimations suggest that around 60% of the income registered on the National Accounts is missing in the ENIGH household surveys (Herández-Laos, 2008 cited on Cortés, 2001:81). The discrepancy between the two sources of information has led several authors to adjust the data from Household Surveys using the data from the National Accounts. However, by doing so, these authors assume that the information from the National Accounts has a superior quality (Leyva-Parra, 2005). This section introduces the debate behind this adjustment and its pros and cons.

The most popular methodology to adjust households’ income is that proposed by Altimir (1987). In this methodology, income is adjusted by source. That is, each source of household income is adjusted by using the amount of the same source from the National Accounts. Altimir assumes that the differences between the National Accounts and the Household Surveys are derived from underreporting. Moreover, it assumes that this underreporting is more related to the type of income than the amount of it. Thus, it is done by using specific adjusts for each income source, regardless of the level of income of the household, with the exception of property rents (Leyva-Parra 2005:741). However, making adjustments to Household Survey's income data using National Accounts data implies the following assumptions: a) the concepts of income used by the two data sets are equivalent; b) the quality of the income data captured by the National Accounts is higher than that of the Household Surveys; c) the disparities between the data are due to underreporting and not to truncation; and d) there is an optimized rule to adjust the macroeconomic data from the National Accounts to the microeconomic data of the Household Surveys (Leyva-Parra, 2005).

There are two main problems regarding the latter assumptions. Firstly, since Mexico is a highly unequal society, there is a high probability for the richest households not to be represented in the survey, since participation is optional and they tend to opt out.[41] In addition, Cortés (2001) has given evidence that supports the existence of truncation by stating that the size of the sample is not big enough to represent certain groups of the population, such as the rich. This bias does not allow the ENIGHs to capture the incomes of the majority of the rich. The presence of truncation and sub-reporting are common problems of household surveys, such as the Household Budget Surveys (Cornia *et al*, 2004, cited in Cortés, 2010). Then there should be no surprise to observe that the income derived from the ENIGH household surveys is less than that from the National Accounts. In other words, the difference between the two incomes could be the result of truncation of the sample and not underreporting or a mix between the two. If that is the case, then the adjustment of income using National Accounts data might not be appropriate, since it would redistribute income from the richest households to the rest of the population (Leyva-Parra, 2005:15-16). Second, prior to 1993 there was not a separate account for the households in the National Accounts. Thus, the adjustments used an estimation of the household's accounts.

[41] Perhaps as a security measure since rich individuals in Mexico are targets not only for robbery but also for kidnapping. Such detailed information about a rich family could be easily sold to the organized crime. In addition, rich families live in private streets and this could limit the access to the household to the surveyor.

The use of the households' account from the National Accounts to correct the under-reporting of the ENIGH household surveys is usually based on the assumption that the former source has a higher quality than the latter. However, Leyva-Parra (2005:766) has provided evidence that suggests that because of the way the institutional households account is constructed, there is a high probability that the income measures gathered by this account give estimations that are very far away from the true value of this variable. Thus, it is impossible to say which source is closer from the household incomes' true value. Having this result in mind, the use of the National Accounts to try to approximate the ENIGHs total incomes to their true value becomes unnecessary (Ibidem).

The main problem with this adjustment seems to be the lack of information regarding which percentage of the missing income reported in the ENIGHs is due to truncation and which is due to sub-reporting. Moreover, as mentioned by Székely *et al* (2000), even by assuming that 100% of this percentage is due to sub-reporting, there is no agreement on the way to make this adjustment. Indeed, using different adjustments leads to very different poverty and inequality estimations as exposed in the following paragraphs. Thus, it remains very important to know the implications of applying any adjustment. It is important to note that the recommendation of the Poverty Committee, CONEVAL and other researchers such as Cortés (2001, 2010) and Székely *et al* (2000) is to do not apply any adjustment for under-reporting to the ENIGH household surveys.

Leyva-Parra (2005) explores the sensitivity of poverty and inequality results to the adjustment for underreporting. He finds that using the adjusted data increases the Gini coefficient in 2000 and 2002. Additionally, he finds that the incidence of poverty is highly sensitive to the different adjustments made by using the National Accounts. For instance, the incidence of poverty using the lowest official poverty line in 2002 varies from 1.0% (global adjustment), to 17.2% (unadjusted). And using the highest poverty line, the incidence varies from 13.4% (global adjustment) to 53.8% (unadjusted). Indeed, the different methodological choices make it possible to obtain almost any incidence of poverty in the period of study. Yet, not all studies that adjust income data using National Accounts clarify that when they apply a factor for adjustment (pp.36).

In the same direction, using data from 17 Latin American countries, Székely *et al* (2000) explore the sensitivity of the Foster-Greer-Thorbecke family of poverty measures to different ways of adjusting data from underreporting. This study replicates several ways to adjust household survey data by using National Accounts. They use the methodology applied by ECLAC and Altimir (1987), that used by Psacharopoulos *et al* (1993) and the one used by the World Bank's World Development Indicators. Their results are striking: i) they found that the Head Count Index of the Latin American region ranges from 20.7 to 65.8 percent of the population depending on the type of adjustment made; ii) the poverty gap varies between 8.9 percent and 35.8 percent; iii) the FGT(2) measure oscillates between 5.3 percent and 23.8 percent; and iv) the most sensitive country is Mexico, where the Head Count Index varies between 14 percent and 76.6 percent of the population depending of the adjustment used, that is, a range of almost 63 percentage points (pp.24). After presenting these results, is no longer surprising their conclusion that the most sensitive methodological decision regarding the measurement of poverty in the Latin American region is not that of the poverty line, but the way that the original data is adjusted for under-reporting. Their main conclusion is that "since there is little theoretical guidance as for which adjustment methods are adequate, any attempt at correcting for misreporting or under-reporting is inevitably a highly arbitrary exercise" (pp.20).

Based on the above paragraphs, the argument to adjust data from the Household Surveys using the National Accounts seems not to be strong. Indeed, because of the way that the Household Surveys data is collected in Mexico the difference between the two incomes could be the result of truncation of the sample and not of underreporting. If that is the case, then the adjustment of income using National Accounts data might not be appropriate. Therefore, any adjustment seems inappropriate, since a) it is unknown which part of the adjustment is due to underreporting and which part is due to truncation; and b) there is not much theoretical guidance to know which adjustment is the right one. Thus, if truncation is ignored, the result could be an "over-adjustment" that assumes that all the differences between the macro and the micro data comes entirely from underreporting.[42] For all the above reasons, we will not adjust the data from the ENIGH household surveys from underreporting.

2.7. Equivalence Scales and Economies of Scale

The unit of measure is important when we are to explore the incidence and depth of poverty. Most Household Surveys use the household as their unit of measure. However, households have different demographic characteristics such as number of members, sex and age. When using the household as the unit of measure we could conclude that a household with 1 person that earns $4,000 pesos per month has the same level of welfare than one formed of a single mother with 3 children earning the same amount of money. In order to overcome such problem, most studies use *per capita* income or consumption. In this way, there is an adjustment to the number of members of each household. However, *per capita* measures might not be the best solution since as mentioned by Deaton (1997:241-2), they imply that each member of the household consumes the same amount of goods and services. But the consumption requirements of a 9 months-old baby are completely different from those of an adult. In order to solve this problem we can adjust the data by weighting the cost of children as a fraction of the cost of an adult, an approach known as *equivalence scales*. Another problem arises when we compare small and large households. Larger households share household facilities such as kitchen, bedrooms and toilets. Thus, by adding a member to the family the household expenditure will not increase that much, since the household will not need to build an additional kitchen or toilet to accommodate for the new member. This effect is known as *economies of scale* and it is mostly ignored in the Mexican poverty literature.[43] There is a wide recognition that larger families enjoy of a degree of economies of scale by decreasing their cost of living when sharing common facilities.

At this point, it would be useful to have some information about household sizes in rural and urban areas of Mexico. As expected, average

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[42] Cortés *et al* (2005) and Leiva-Parra (2005).

[43] All of the studies presented in the introduction about poverty and income inequality in Mexico use per capita income as the welfare indicator.

household size is bigger in rural areas as compared with urban ones. In 2006 average household size in urban areas was 3.8 and 4.2 in rural areas. In addition, the standard deviation in rural households was higher (2.2) as compared with the urban one (1.9).[44]

There is agreement that we should allow for some kind of adjustment for different household compositions. However, even after one century of discussion in the economics literature there is no consensus regarding the way to implement the adjustments or even if it makes sense to try (Deaton, 1997:242). Thus, we could ask if it is really necessary to introduce these adjustments or if it makes a big difference in the calculations of poverty and inequality in Mexico. This section explores the use of economies of scale and equivalence scales in Mexico. It also introduces three of the main ways to calculate equivalence scales: 1) The Engel's method; 2) the Rothbarth method; and 3) parametric scales.

2.7.1. The Engel's method to measure the cost of a child

The Engel's method to calculate equivalence scales "is based on the identifying assumption that the share of the budget devoted to food expenditure correctly indicates welfare between households of differing demographic composition. A large household and a small household are equally well-off if, and only if, they devote the same fraction of their budget to food" (Deaton 1997:251). Figure 2.1 illustrates this method, on axis *y* we have the share of food in the budget of two households, a small household of two adults without children, and a large household with two adults and a child.[45] The *x* axis plots the total household income. At any given level of income, the small household has a higher level of welfare (less food share), and at any level of welfare, the big household needs a higher income.[46] The difference between y_1 - y_0 is the cost of the child, and the equivalence scale will be $(y_1 - y_0)/y_0$.

On the basis of Nicholson's argument, Deaton (1997:255) mentions that "the identifying assumption of the Engel methodology is not an acceptable one. The method is unsound and should not be used". The argument is as follows,

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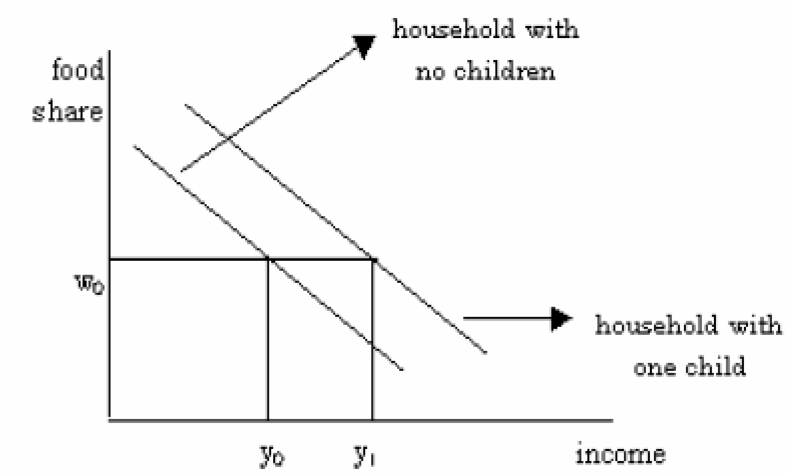
[44] See also table 3.2 (page 77) that gives information on the distribution of household sizes by deciles.
[45] Based on Deaton (1997) and Bellú and Liberati (2005).
[46] Bellú and Liberati (2005).

supposed that a child is born into a couple that does not have any other children. Supposed that we knew the exact amount of money that will compensate for the costs of the new baby and that we would give this amount to the couple, so the consumption patterns of the couple would not be affected. Nevertheless, the baby has different consumption patterns than the adults. That is, babies consume mostly food. Thus, even when the couple has been monetary compensated, the food share of the household will increase. According to Engel, if the food share increases the household is worse-off. Thus, the Engel compensation is “overcompensating” and overestimates the cost of a child.

Figure 2.1. The Engel’s method to measure the cost of a child.



Source: Figure 1 in Bellú and Liberati (2005) Equivalence scales, objective methods. FAO. www.fao.org

2.7.2. The Rothbarth’s method for measuring the cost of children

Rothbarth calculates the cost of children in a slightly different way than Engel. His idea is that the welfare of adults can be measure by looking at the expenditures made in goods which are solely consumed by adults (e.g. alcohol and tobacco). For example, if there is a couple which just had a child and they reduced the consumption of alcohol and tobacco and other adult goods, this reduction could be viewed as the cost of the child (Deaton, 1997:256). This approach is similar to Engel’s but in this case we use expenditure on adult goods (e.g. tobacco and alcohol) in the *y* axis, and again the level of income in the *x* axis.

The main problem concerning this methodology is that the choice of adult goods is quite arbitrary. For instance, Deaton and Muellbauer (1986) consider all non-food goods as adult goods, whereas other authors use only alcohol and tobacco. According to Deaton (1997) the arguments against the Engel method to calculate the cost of children are so serious than the actual choice is between using Per capita Expenditure or the Rothbarth method. However, it is not completely clear that assigning weights to children is more correct than assuming that everybody is equal in a household. Indeed "the measurement of welfare and poverty would rest on a much firmer footing if there existed a solid empirical and theoretical basis for the construction of equivalence scales" (Deaton 1997:259).

2.7.3. Parametric scales

A more straight forward way to adjust for the cost of children in a household is by using a parametric scale. Parametric equivalence scales are transparent and can replicate non-parametric ones. The new equivalence scale proposed by the National Research Council in the USA is a good example and is as follows:

$$(A + PK)^F \tag{2.7}$$

where A is the total number of adults in the household, K is the number of children in the household which cost a proportion of P of an adult, and F is the scale economy factor, which reflects the economies of scale of large families. The National Research Council recommends setting P at 0.70 (meaning that each child consumes 70% of and adult) and setting F in the range of 0.65 to 0.75 .This power is used to adjust for economies of scale, by decreasing the cost per adult equivalent as the number of adult equivalents increases. That is, each adult counts 1 and each additional child counts 70% of an adult. And the whole scale is powered to a factor between 0.65 and 0.75 in order to take into account the economies of scale in larger families. To sum up, this scale: a) adjusts for both, the differences in the cost of children and adults and the differences between small and bigger families; b) is easy to apply and to understand; and c) recognizes the arbitrariness in implementing any adjustment to the poverty thresholds instead of disguising it by applying opaque econometric analysis (pp.178).

Finally, there are two other parametric scales applied in the Latin American context, that proposed by the OECD which formula is:

$$1+0.7\,(A-1) + 0.5\,C \qquad (2.8)$$

where A is the number of adults and C the number of children. It assigns a value of 1 for the first adult and a value of 0.7 for any additional adult, and all children under 14 years-old are expressed as 0.5 of the first adult. The LIS (Luxembourg Income Study) scale is “equivalent to the square root of the number of members in the household (ECLAC 2001:84).

2.7.4. Equivalence scales in Mexico - a short review

Teruel *et al* (2005) use data from the 2000 National Household Surveys of Mexico (ENIGH) to calculate the sensitivity of the measurement of the levels of poverty in the country when using per capita income (or consumption) as a measure of welfare compared with the use of equivalence scales. They use two different methodologies to calculate the scales, that proposed by Engel and the one proposed by Rothbarth. Their results are as follows: i) the equivalence scales vary according to the methodology used (e.g. the cost of a child between 0-5 years-old is 0.64-0.77 percent of one adult); ii) all the measures of poverty are always higher when calculated by per capita instead of considering that different members of the household have different necessities; iii) there are up to 13 percentage points of difference between the poverty levels calculated when using per capita income or equivalence scales (pp.35).

Another important issue is housing costs in both urban and rural areas, since if housing costs are low, this is one argument in favour to use the per capita scale. In the case of Mexico, the majority of the households own the house where they live. Indeed, in 1995 80% of the existent housing stock was occupied by owners, while the share of rented homes was only 12% (Herbert and Pickering, 1997). However, only 17% of the Mexican households are able to cover the requirements asked by the banks to have access to a mortgage (SHCP, 2010). Indeed, poor households would use a disproportionate percentage of their disposable income to pay for a mortgage. According to official estimations, the poorest three deciles would use 60% of their disposable income. Those between the 4th and 7th deciles would use around 25% and the upper three deciles would use only 15% (Idem). Thus, in theory, it seems impossible for the first three deciles to buy even a very modest house, since the burden of the mortgage would be impossible to bear. In contrast, the rest of the deciles could buy a house without compromising a big percentage of their disposable income. In reality, 80% of Mexican households are owners of the house where they live and only 12% rent. Indeed, very poor households usually build their own houses. Using the ENIGH household survey of 2000 we also calculated the number of households that rented their dwelling and compared it with the number of households that either owned the house where they lived, borrowed it from somebody else or received it as an employee benefit. From a total of 10,108 observations: a) 646 (6.4%) reported to rent it; b) 9,390 (93.5%) reported to either own it, borrow it, or receive it as an employee benefit; and c) 72 (0.7%) reported neither. Thus, the ENIGH results show that only a small percentage of Mexican households rent their dwellings (6.4%). These results suggest that housing costs are low and therefore, this is one argument in favour to use the per capita scale.

Using data from 17 Latin American countries, Székely *et al* (2000) also test the sensitivity of poverty indexes to the use of equivalence scales and economies of scale. Using a parametric scale and applying different values for the equivalence scale and economies of scale, they found that the Head Count Index for the Latin American region varies from 31.4 to 50.7 percent. Moreover, some of the countries of the region were found to be more sensitive to these changes. For instance, Mexico was found to be the most sensitive of the countries with a Head Count Index ranging between 32.5 and 58.8, that is, 26 percentage points. In contrast, in Venezuela and Paraguay the range of values for the same measure goes around 17 percentage points and in Costa Rica around 10 percentage points.

ECLAC (2001) recommends to continue using per capita welfare indicators instead of equivalised ones, since poverty estimations in Latin America are highly sensitive to the use of equivalence scales and there is no consensus about which scale to use and which values to assign to them. In their study they use a parametric scale and assign values to the parameters of the function used in developed countries. In particular, they use the scales proposed by the OECD, the one used to construct the poverty line in the USA and the one proposed by the Luxembourg Income Study (LIS). In the case of Mexico, the Head Count in 1998 in per capita terms is around 47%. However, by using the OECD scale, this percentage is 41.5%, using the USA scale is 32.7 and finally, using the LIS scale the percentage drops to 19.8. That is, the percentage of people living below the poverty line using the LIS scale is less than half than the one calculated in per capita terms.

To sum up, it seems that there is no agreement regarding which method should be used if we want to correct for the differences in the necessities of the household members. Once again, the decisions seem to be arbitrary and it is not really clear if this "correction" to the data should be applied or not. And if so, which method should be used. It is clear from the above paragraphs that different measures of poverty in Mexico are highly sensitive to the use of equivalence scales and economies of scale. The three studies presented above show a Head Count Index that varies between 13 and 26 percentage points. Thus, It is clear that poverty estimations diminish when using equivalence scales instead of income *per capita* as a measure of wellbeing and that could be the reason why this methodology is not applied frequently in the case of Mexico.

The use of different scales would have implications in both, the amount of people that is poor and the distribution of poverty among households. By applying different scales it is actually possible to end up with a very low poverty rate or a very high one. Since such a decision has a potential high impact on poverty measures, the following chapter will explore the effects of using different equivalence scales and economies of scale on different poverty measures. Such approach can be followed with the use of a parametric equivalence scale. Parametric equivalence scales are transparent and can replicate non-parametric ones. For this exercise the new equivalence scale proposed by the National Research Council in the USA will be used. Instead of choosing a fixed value for these parameters, in the following chapter a set of values for the formula proposed by the National Research Council of the USA will be applied. The values proposed by the National Research Council of the USA will be calculated as well as those proposed by Teruel *et al* (2005) that were obtained using the Rothbarth and Engel's methodologies in the case on Mexico.

2.8. Concluding Remarks

As it was made clear in this chapter, poverty and inequality are complex phenomena. There is a very interesting debate concerning their concepts or the way they are aggregated in a single measure. Different concepts of measuring welfare are not considered to be alternative ways to identify the same thing. Actually, the direct and indirect methods are embedded in two different concepts of welfare. The basic needs method identifies the people with a real consumption that does not satisfy what is established as minimum necessities in their community. The capabilities approach identifies those households that do not have the freedom to choose a set of functionings that would allow them to become non-poor. The monetary method identifies those households or people that do not have the capacity to satisfy such set of minimum necessities which are defined in accordance with the typical behaviour. Using the monetary approach has the advantage of the ready availability of data related with it. But when data is available, multidimensional measures should be attempted. Therefore, the decision to use one concept over another is often related to the availability of information. Using a multidimensional approach seems very appealing. However, the Mexican ENIGH household surveys do not provide information for the more intangible dimensions of well-being (e.g. discrimination, ethnic minorities, leisure time, freedom and security). In addition, value judgements will be needed to decide a minimum level for all the basic needs. In the absence of stochastic dominance (when a household is deprived in all the attributes such as education, health, shelter, clothing, food, freedom, and security) it would also remain very difficult to decide which households are poor and which are not. It is for the above reasons that we will apply the monetary approach in this thesis.

Regarding the way to aggregate information into a single poverty and inequality measure, it was found more appropriate to follow an axiomatic approach rather than choosing the measure arbitrarily. Following the axiomatic approach, we found that the FGT family of indexes and the Generalized Entropy Measures were good candidates of poverty and inequality measures, respectively.

We explored central issues surrounding the measurement of poverty and inequality in Mexico, such as choosing the welfare indicator, adjusting data from underreporting, adjusting for the cost of children and the size of the household. Regarding underreporting, the review suggests that it is better not to adjust for it, since it is unclear if the differences between National Accounts data and Household surveys data are originated from underreporting or from truncation of the sample. Regarding the other issues, we found the theoretical debate very interesting but insufficient to decide whether or not to apply these adjustments in the case of Mexico. Therefore, it remains an empirical exercise to decide whether or not to make these adjustments. That is why the objective of the first empirical chapter, is to identify the sensitivity of a set of inequality and poverty measures to the different methodological choices that were presented in this chapter. More importantly, it aims to identify if we can find robust results about the levels and trends of poverty and inequality in Mexico. Different methodological choices would be analyze separately, and then we would point out which of them are driving the sensitivity of the welfare indicator and which others are not. We will apply these different methodological choices to two different household surveys collected during 1992 and 2002, two years where the Mexican economy was very stable. But in order to do so, a Data and Methodology chapter will be introduced first. This chapter introduces the main source of information for the thesis, the ENIGH household surveys. It also describes all the methodologies applied in the rest of the empirical chapters.

CHAPTER 3. DATA AND METHODOLOGY

3.1. INTRODUCTION

This chapter is dedicated to describe the data sources used in the empirical chapters as well as the methodologies applied in them. Section 2 describes the National Income and Expenditure Household Surveys or ENIGHs, which are the main source of information for all the estimations in the empirical chapters. This section introduces the survey design, comparability among surveys, number of observations, changes in the questionnaires, the reference period, and the urban/rural definitions. Section 3 defines the concepts of income and consumption that will be used in the empirical chapters and compares them with those used in the official estimations of poverty in Mexico. This section also describes the price indexes used to change from nominal prices to real prices the different concepts of income and consumption used through out the thesis. Section 4 introduces the three official poverty lines introduced by the Mexican government in 2002. This section also includes a brief discussion about the treatment of missing and zero values. Section 5 describes basic summary statistics about the ENIGH household surveys. Section 6 describes the concepts of stochastic dominance analysis that are applied in Chapters 4 and 5, which includes: CDF curves, Lorenz curves and Generalized Lorenz curves. Section 7 describes the methodology used in Chapter 6, which is all related to income inequality decompositions. This section includes a brief literature review on the topic with a focus on empirical papers about Mexico. The chapter then continues introducing the specific methodologies that will be applied in Chapter 6: a) sub-group decompositions; b) income source decompositions; and c) regression-based decompositions. Finally, it is relevant to mention that most of the calculations in the empirical chapters were done using the programme STATA version 9.

3.2. THE ENIGH HOUSEHOLD SURVEYS

The National Income and Expenditure Household Surveys or ENIGHs are the most important data source of our three empirical chapters and are produced every two years by the INEGI (National Institute of Statistics, Geography and Informatics). Although there are household surveys that date from 1956 and the quality of the surveys and number of observations has increased through out the years, researchers agree that they are comparable from 1984 onwards (e.g. Székely, 2003, Hernández-Laos and Velázquez-Roa, 2003). Nevertheless, the ENIGHs of 1984 and 1989 use a different definition for urban and rural households. Therefore, these two surveys are only comparable at national level. The ENIGHs are representative at national, urban and rural levels. But more recent surveys are also representative for selected states.[47] The ENIGHs household surveys have information for income, consumption, non-monetary consumption, characteristics of the house, socio-demographic characteristics of the household and the members of the household, and occupational characteristics of members of the household who are at least 12 years-old. Relevant variables include: gender, age, marital status, educational level, occupation, conditions of work, rural/urban and region.[48] All the surveys from 1992 to 2008 have a reference period August-November, with the exception of the 1994 one which was carried out during September-December.

The ENIGH household surveys have a complex survey design that has the following characteristics: a) probabilistic; b) stratified; c) multi-stage; and d) clustered. The sample is to be said probabilistic since all the sampling units have a known probability of being selected that is different from zero.[49] It is stratified since there is separate sampling for population sub-groups. The clusters are sample units from where the sample is obtained. Finally, this is a multi-stage procedure, since the household is selected after several stages. That is, instead of surveying each and every household in the country, the survey makes sure that there will be households in the sample from each and every state of the country. Then inside of each state the sample is divided in

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[47] For instance, the 2005 edition is representative for Puebla, Sonora, Tabasco y Veracruz and the 2008 edition is representative at state level.
[48] www.inegi.gob.mx
[49] INEGI, Encuesta Nacional de Ingreso y Gasto de los Hogares 2002, Diseño de la Muestra.

two groups: urban and rural households. But instead of using a list from all the existing households in each rural and urban *strata* to obtain the sample, the survey obtains the sample from *clusters,* which are groups formed of 480 households in high urban areas, 280 in urban areas and 100 in rural areas.[50] For INEGI high urban areas are those with more than 10,000 inhabitants, urban areas are those with between 2,500 and 10,000 and rural areas are those with less than 2,500 inhabitants. It is important to mention that the official poverty estimations use a different definition of urban/rural and in order to compare our results with theirs, we use the same definition which is:

- <u>Urban:</u> households in localities with more than 15,000 inhabitants.
- <u>Rural:</u> households in localities with up to 14,999 inhabitants.

When a sample is obtained directly from the whole population, the probability of being selected is equal for all households. But the use of *strata* to obtain a representative sample for rural households increases the probability of being selected for them, since in Mexico the majority of the population lives in urban areas. Thus, we need to re-weight the sample in order to obtain the population's estimates. In order to do so, the weights or *expansion factors* are provided with the survey and we only need to multiply each household in the sample by this weight and we obtain the total number of households in the population (de Hoyos, 2005). By taking into account this part of the survey design we make sure that the totals, means, proportions and regression coefficients are not affected. However, since observations from the same primary sampling unit are not independent, clustering needs to be incorporated in order to compute valid p-values and correct confidence intervals and standard errors.[51] But in order to correct for the rest of the survey design additional information is needed. Unfortunately, the information about the *clusters* or primary sampling units is not given with the ENIGHs and it was not available upon request from INEGI. In addition, the stratification was not taken into account. As mentioned by Deaton (2000:58), when most of the variation is within the strata rather than between them, allowing for stratification might have a very little effect on the standard errors. However, failing to allow for clustering

[50] INEGI (op cit).
[51] Carolina Population Center, STATA tutorial, available from: www.cpc.unc.edu

most probably had a big impact on the standard errors and make them too small. This problem needs to be taken into account when we calculate tests of significance difference on Chapter 5. Finally, the *unit of analysis* is the individual, since household size was incorporated to the weights. That is, each row in the data sets represents a household, but because we used wgt*hhsize then the unit of analysis is the individual because each household get represented n times, where n is household size.

Table 3.1.

ENIGH household surveys basic information
1992-2008

Year	Observations (households)					Sample size households (weighted)	Sample size individuals (weighted)	Urban population (weighted)	Rural population (weighted)
	Total pop.	Urban pop.	Rural pop.	Zero values	Missing values				
1992	10,530	5,535	4,995	4	0	17,819,414	84,049,655	49,589,297	34,460,359
1994	12,792	6,604	6,188	0	0	19,419,042	89,318,281	51,625,966	37,692,315
1996	14,042	7,604	6,438	12	0	20,452,136	92,519,839	54,771,745	37,748,094
1998	10,952	5,947	5,005	14	0	22,142,631	95,219,484	56,274,715	38,944,769
2000	10,108	5,494	4,614	7	0	23,653,262	98,276,109	60,046,703	38,229,406
2002	17,166	10,414	6,752	6	0	24,522,666	100,829,878	62,312,865	38,517,013
2004	22,595	15,857	6,738	10	0	25,556,447	102,975,224	64,359,515	38,615,709
2005	23,174	14,208	8,966	11	0	25,703,546	103,912,234	65,360,795	38,551,439
2006	20,875	13,294	7,581	13	0	26,531,642	104,783,324	66,223,061	38,560,263
2008	29,830	19,463	10,367	25	0	26,987,438	107,255,780	68,531,029	38,724,751

Source: ENIGH household surveys 1992-2008.
a) The ENIGHs from 2000 to 2005 use the new weights.
b) Zero and missing values refer to the income variable ictpc2.

Table 3.2. Mexico: Distribution of household size by deciles, 2006.

Decile	Group	No. of Obs.	Mean	Std. Dev.	Min.	Max.
	rural	825	5.67	2.40	1	17
I	urban	1,208	5.10	2.13	1	15
	rural	688	5.20	2.46	1	19
II	urban	1,223	4.81	1.97	1	25
	rural	676	5.09	2.35	1	17
III	urban	1,101	4.65	1.94	1	14
	rural	680	4.88	2.18	1	15
IV	urban	1,228	4.30	1.90	1	18
	rural	651	4.43	1.97	1	13
V	urban	1,201	4.14	1.88	1	15
	rural	634	4.12	1.99	1	14
VI	urban	1,231	3.87	1.59	1	12
	rural	625	3.96	1.92	1	15
VII	urban	1,360	3.70	1.60	1	12
	rural	780	3.81	1.82	1	15
VIII	urban	1,484	3.35	1.58	1	13
	rural	782	3.48	1.72	1	11
IX	urban	1,573	3.09	1.49	1	9
	rural	1,240	2.84	1.59	1	11
X	urban	1,785	2.56	1.39	1	10

Source: Own calculations with data from the 2006 ENIGH household survey.

Table 3.1 above shows some basic information about the ENIGH household surveys used in this thesis. It is important to mention that in 2006 in Mexico average household size was 3.8 in urban areas, 4.2 in urban ones and 3.9 for the total population. As we can see on table 3.1, the ENIGHs do not have missing values. In addition, the number of zero values is also negligible, implying that the quality of the ENIGHs is good. However, it is difficult to go further in this analysis since there is no much discussion about the quality of the ENIGH household surveys among the studies that use them. The discussion is rather focused on the comparability among new and old household surveys. From 1992 onwards the ENIGHs became available every two years and INEGI has stated that the surveys from 1992 to 2008 are fully comparable.[52] However, the comparability of the 2002 and onwards surveys with those from before 2002 has been doubted by part of the academia (e.g. Damián, 2010 and ECLAC, 2003). The reasons given are as follows: a) As we can see on table 3.1 above, the number of observations changed dramatically from 2000 to 2002 and then again from 2006 to 2008; b) The sample design changed from 2002 onwards in two ways, first to make the sample representative not only for urban and rural areas but for the strata from the index of exclusion of the National Council of Population or CONAPO and second, to include enough households receiving the cash transfer OPORTUNIDADES to make it representative[53]; and c) From 2002 onwards the questionnaire of the ENIGHs changed, in particular, several questions were introduced regarding income from transfers.[54]

The official poverty studies claim that the ENIGHs from before and after 2002 are fully comparable (see Cortés, 2005) and that the changes in the questionnaires and the sample design do not affect any poverty estimations. The World Bank (2004) agrees with the poverty Committee's conclusions and affirms that the ENIGHs are comparable regarding total households incomes. They arrive to this conclusion by comparing the ENIGHs with the ENETs (National Survey of Employment) that shows an increase in labour incomes and income from transfers (including Oportunidades) and remittances from 2000 to 2002.

[52] www.inegi.gob.mx
[53] Damián (2010:5-6).
[54] ECLAC (2003:58).

To sum up, the two arguments for or against the comparability of the ENIGHs are convincing. However, the studies that affirm that the surveys are comparable have looked at the issue in more depth and presented convincing evidence. Therefore, we present the analysis from 1992 to 2008 on the basis that the ENIGH household surveys are comparable.

Finally, on table 3.2 above, we can see the distribution of household size by decile for urban and rural areas. We can observe that not only average household sizes were bigger in rural areas for all deciles, but the standard deviation was also bigger. In addition, we can see that poor households tend to be larger. For example, average household size for the poorest 3 deciles was over 5 members, while the same figure for the richest decile was below 3.

3.3. The Definitions of Income and Consumption

The information in the ENIGHs comes in separate data sets that need to be combined into a single one using the variable *folio*, which is a unique household identifier. A typical ENIGH will include the following data sets:

- Households: Includes the characteristics of the households, such as, number of rooms, services available, urban/rural, geographical location and household size.
- Population: Includes the socio-demographic and occupational characteristics of the household members, such as, gender, age, educational level, marital status, occupation and type of job.
- Income: Monetary income of the household from different sources. It includes income from the previous six months.
- Expenditure: monthly expenditure of the household.
- Non-Monetary expenditure: Includes expenditure from four sources, imputed rents, self-consumption, in kind payments and presents.
- Disbursements: Financial disbursements such as, credit cards payments, insurance payments, buying of stocks and deposits in savings accounts.

Once the data sets are combined into one data set, we proceeded to create different income and consumption variables, including the non-monetary consumption. INEGI’s income and consumption variables differ from those used by official poverty estimations of the poverty Committee and CONEVAL. Moreover, in Chapter 4 we choose our own "preferred" income and consumption definitions, which are slightly different from those used by the official poverty measures. The following paragraphs describe the differences among what it would be our preferred definitions of income and consumption and those used by the official poverty estimations.

The official income definition used by the government is *per capita net income* (CTMP:2005), which includes monetary and non-monetary income and is obtained as follows:

1. The monetary component is the sum of income derive from six different sources: 1) Wages; 2) Cooperatives (includes wages and profits); 3) Business rents (includes agriculture, industry, fisheries, forestry, commerce, services, collection of fauna and flora); 4) Property rents; 5) Transfers (includes pensions, insurance compensations, scholarships and presents); and 6) Other types of income (includes sale of cars, second hand household appliances and travel expenses).
2. The non-monetary component is calculated using the information provided in the non-monetary consumption data set and it includes four different sources: 1) Self-consumption (the value of these goods and services is estimated by the informant based on the local market price of retail sales); 2) In-kind payments; 3) In-kind presents; and 4) imputed rents.[55]
3. The next step consists in changing from nominal to real prices all the monetary and non-monetary sources of income. For the monetary sources, the general National Consumer Price Index or (CPI) on constant *pesos* of August 2000 is used to change nominal prices to constant prices. We use a monthly index to correct for inflation for the income variable. The income variable refers to the past six months. That is, the variable ing_1 refers to the income earned during the last month; ing_2 refers to income of the month before the last month and so on. Thus, to change from nominal to real values, we located the last month in the

[55] From 1992 to 2000 imputed rents were estimated by asking the household for an "estimated value of the rent". From 2002 onwards two questions were asked to calculate imputed rents: 1) How much would you charge of rent if you were renting your property; and 2) How much would you pay if you were paying rent for your property.

"month" variable, which are the first 2 digits of the "meses" variable. For example, if we want to change nominal income ing_1 to real prices, since this refers to income of the last month, we use the general Consumer National Price Index (CPI) of July if the last month is the 7^{th} month of the year, we use the CPI of August if the last month is the 8^{th} month of the year and so on. If we want to change the nominal prices of ing_2 to real prices, we would need to use the CPI of the previous month. Thus, If the last month was July, we used the CPI of June and if the last month was August, we use the CPI of July and so on. In order to change the nominal prices of ing_3 to real prices, we would need to use the CPI of the 2 months before the last month. That is, if the last month was July, we use the CPI of May. We follow this procedure for all the income variables ing_1 to ing_6. Since it might be easier to follow this procedure by looking at an example, we included in the Annex an extract of the do file that contains the way to change nominal to real prices for both the income and consumption variables in 2006.

4. The non-monetary sources nominal values are changed into real values in the same way than the consumption variable (see below), using the Itemized Consumer Price Index provided by *Banco de México*.
5. Since the ENIGH provides income information for 6 months, the next step is to obtain a monthly mean income. And since the non-monetary consumption is provided for 3 months, we also obtain a monthly mean non-monetary consumption. We then sum the monetary income and the non-monetary sources to obtain *Total current monthly income*.
6. The next step is to subtract 'Other types of income' (since it includes income derived from sells of cars and the like) and also 'Presents given to other households', to obtain *Total net monthly income.*
7. The final step is to divide the total net monthly income by the size of the household, to obtain *Per capita net monthly income.*

The official definition of per capita consumption is obtained by adding the monthly expenditure of the household to the non-monetary expenditure (imputed rents, self-consumption, in-kind payments and in-kind presents), and dividing it by the size of the household. The procedure is as follows:

1. The monetary component of the consumption variable is divided in 16 different groups (defined in table 3.4 below).
2. Each group nominal values are changed into real values by using an itemized price index at national level (by groups of goods and services) to obtain all values in constant *pesos* of August 2000. The use of regional price indexes was left out of the methodology since they are not available for all the period of study. However, we recommend to use regional price indexes when the period of study allows it. The itemized national price index is called *INPC por rubros.* Another reason not to use regional price indexes is that the official estimations also use price indexes at national level and we wanted to make comparisons with the official estimations. In addition, each group changed from nominal to real values is done according to their periodicity. That is, each group has a different periodicity of consumption: weekly, monthly, three months, and six months (table 3.4 below). Weekly consumption is changed into real prices by using the CPI of the month of the first day that corresponds to the period of collection of information, called "decenas de levantamiento". For monthly consumption we use the previous month than the one that contains the majority of days from the period of collection of information. For the consumption made for three and six months we used the average of the three/six previous months of the CPI, using as a reference the month in which the majority of the days from the period of collection of information are.[56]
3. For example, let us look at the first group of table 3.4 below, the 'Food and non-alcoholic drinks consumed inside and outside the household'. We use an itemized price index specific for this group, which is the SP509. In 2006 there were 9 periods of collection on information called *"decenas de levantamiento"* in the ENIGHs. In order to change from nominal to real prices we located each week and used the CPI value that corresponded to the month in which that week was part of. For example, the "*decena"* 1 in 2006 went from the 20th to the 26th of August. Thus, we generated a new variable in real values that equals the nominal value of

[56] CONEVAL (2006).

the food variable divided by the specific CPI for the food variable on August. That is, for each period of collection of information a different CPI was used. Please refer to the extract of the do file for 2006 in the Annex that exemplifies the change from nominal to real values for the income and consumption variables.

4. The non-monetary consumption variable is also divided into 16 groups and deflated in the same way than the monetary consumption, using the itemized price index. However, imputed rents are not deflated.
5. Since the ENIGH provides information for 3 months, a mean monthly figure is obtained for monetary and non-monetary consumption and we obtain *Total current consumption.*
6. Then presents given to other households either in monetary terms or in-kind are deducted from both concepts of consumption to obtain *Total net consumption.*
7. Finally, *Total net consumption* is divided by the size of the household to obtain *Per capita net consumption.*

In the following chapter, we will nominate one concept of income and another of consumption as our preferred definitions based in results given by sensitivity analysis. These definitions differ from those presented above in three ways:

1. We do not include imputed rents as part of our concept of non-monetary income/consumption.
2. We do not deduct 'presents given to other households' from our concepts of income and consumption.
3. We deflate all our variables to constant *pesos* of August 2002.

The reasons for not including imputed rents are fully described in the next chapter, but the main one is that the question asked to obtain it changed from 2002 onwards. From 1992 to 2000 imputed rents were estimated by asking the household for an "estimated value of the rent". From 2002 onwards two questions were asked to calculate imputed rents: 1) How much would you charge of rent if you were renting your property; and 2) How much would you pay if you were paying rent for your property. In the case of 'presents given to other households' we decided to keep them since once excluded several households reported a negative income and since the calculations for our poverty measures exclude negative and zero values, we would have lost all these households for the final results. Since these are very poor households, we believe that they should be part of the calculations.

Therefore, to obtain our preferred income definition on step 5 of the official income definition, we subtract ‘Other types of income’ from our monetary income and also ‘Imputed rents’ from our non-monetary income to obtain *Total current income*. We then divide this total by household size to obtain *Per capita current income* (which is also referred as ictpc2 in Chapter 4). Similarly, we skip step 5 from the official definition of consumption, and instead we subtract ‘Imputed rents’ to obtain *Total current consumption*, which is then divided by household size to obtain *Per capita current consumption* (gctpc2).

Agricultural income has two components a monetary and non-monetary one. The monetary component of agricultural income is included in the income source *Business rents* which is the sum of income from: agriculture, industry, fisheries, forestry, commerce, services and collection of fauna and flora. Information about the monetary income from agriculture, as the rest of the monetary income sources, is provided by the informant. The non-monetary component of agricultural income is included in the non-monetary consumption variable as part of the variable “Food and non-alcoholic drinks consumed inside and outside the household”. The value of these goods is estimated by the informant based on the local market price of retail sales. Self-reported values of self-consumption might not be that accurate. Indeed, as mentioned by Ravallion and Chen (1997:360), the way to value self-consumption in other surveys is different, some surveys use the farm-gates selling price, while others use the price at the nearest market.

As expected, the importance of the value of non-monetary income as a share of total income is higher for rural households. Non-monetary income/consumption is the sum of three sources: non-monetary consumption of goods and services, in-kind payments and in-kind presents. The non-monetary component of the income and consumption concepts represented 10.6% of total income for the urban population and 14.7% for the rural population in 2006. Looking at the same share by deciles we observe that non-monetary income/consumption is more unequally distributed than monetary income/consumption. As we can see on table 3.3 below, in 2006 the first two deciles in urban and rural areas had a nil share of this income. In contrast, the richest decile in both areas keeps around 50% of this source.

Table 3.3.

Mexico: Share of non-monetary income in total household income, by deciles of household income, for urban and rural areas, 2006.

	Rural Areas		Urban Areas	
Quantile group	Quantile	% Share	Quantile	% Share
1	0.0	0.0	0.0	0.0
2	19.4	0.0	0.0	0.0
3	115.6	0.9	86.8	0.3
4	209.2	2.3	219.7	1.5
5	344.3	3.7	383.1	2.9
6	506.1	5.8	603.3	4.7
7	730.7	8.4	884.6	7.1
8	1090.8	12.2	1381.1	10.7
9	1790.1	18.9	2270.1	16.9
10		47.8		56.0

Source: Own calculations with data from the 2006 ENIGH household survey.

Table 3.4.

Mexico: Income and consumption groups to change nominal values into real ones
1992-2008

Groups	Inflation Index classification	Periodicity of the variable**	1992	1994	1996	1998	2000	2002	2004 & 2005	2006	2008
Food and non-alcoholic drinks consumed inside and outside the household	SP509	weekly	A001-A189 A199-A202	A001-A193 A204-A207	A001-A194 A205-A208	A001-A194 A205-A208	A001-A194 A205-A209	A001-A218 A235-A239 A243	A001-A218 A235-A239 A243	A001-A222 A242-A247	A001-A222 A242-A247
Alcoholic drinks and tobacco	SP831	weekly	A190-A198 A203-A205	A194-A203 A208-A210	A195-A204 A209-A211	A195-A204 A209-A211	A195-A204 A211-A213	A219-A234 A240-A242	A219-A234 A240-A242	A223-A238 A239-A241	A223-A241
Clothes and shoes	SP12	three months	H001-H028 H030-H055	H001-H028 H031-H055	H001-H028 H031-H055	H001-H028 H031-H055	H001-H028 H031-H055	H001-H090 H093-H132	H001-H072 H075-H108	H001-H072 H075-H108	H001-H122 H136
Housing, home improvement, electricity gas and other fuels	SP13	monthly	G003-G006 G008-G009 G011-G029	G003-G006 G008-G009 G011-G014 G016-G033	G003-G006 G008-G009 G011-G014 G016-G033	G003-G006 G008-G009 G011-G014 G016-G033	G003-G006 G008-G009 G011-G014 G016-G033	G002-G005 G008-G015 G018-G020 G023-G030 G033-G047	G002-G010 G019-G029	G002-G011 G020-G030	G002-G022
Imputed rents		It is not deflated	G001, G007 G010	G001, G007 G010, G015	G001, G007 G010, G015	G001, G007 G010, G015	G001, G007 G010, G015	G007, G017 G022, G032	G012, G014 G016, G018	G013, G015 G017, G019	estim32tri/3*
Cleaning items and services	SP868	monthly	C001-C024	C001-C024	C001-C024	C001-C024	C001-C024	C001-C024	C001-C024	C001-C024	C001-C024
Glass, cookery, cuttlery and linen	SP868	three months	I001-I024	I001-I026	I001-I026	I001-I026	I001-I026	I001-I026	I001-I026	I001-I026	I001-I026
Household appliances and furniture	SP531	six months	K001-K029	K001-K029	K001-K030	K001-K033	K001-K033	K001-K036	K001-K036	K001-K036	K001-K036
Health	SP874	three months	J001-J043	J001-J043	J001-J045	J001-J045	J001-J045	J001-J077	J001-J072	J001-J072	J001-J072
Public transport	SP885	weekly	B001-B007	B001-B007	B001-B007	B001-B007	B001-B007	B001-B007	B001-B007	B001-B007	B001-B007
Other means of transportation, including cars	SP16	six months monthly	M001-M016 E009, F006-F010	M001-M018 E011, F006-F010	M001-M018 E013, F006-F010	M001-M018 E013, F007-F011	M001-M018 E013, F007-F011	M001-M018 F010-F015, E013	M001-M018 F010-F015, E013	M001-M018 F010-F017, E013	M001-M018 F010-F017, E013
Communications	SP16	monthly	F001-F005	F001-F005	F001-F005	F001-F006	F001-F006	F001-F009	F001-F009	F001-F009	F001-F009
Education and recreation	SP17	monthly	E001-E008 E010-E025, H029 L001-L024 N003-N005	E001-E010 E012-E031, H029 L001-L027, H030 N003-N005	E001-E012 E014-E034, H029 L001-L027, H030 N003-N005	E001-E012 E014-E034, H029 L001-L027, H030 N003-N005	E001-E012 E014-E034, H029 L001-L027, H030 N003-N005	E001-E035 H091-H092 L001-L030 N003-N005	E001-E012 E014-E033, H073 L001-L029, H074 N003-N005	E001-E033 H073-H074 L001-L029 N003-N005	E001-E012 E014-E033, H134 L001-L029, H135 N003-N005
Items and services for personal care	SP851	monthly	D001-D022	D001-D022	D001-D022	D001-D024	D001-D024	D001-D024, H142	D001-D024, H118	D001-D026, H118	D001-D026, H132
Personal accessories	SP851	three months	H056-H064	H056-H065	H056-H065	H056-H065	H056-H065	H133-H141, H143	H109-H117, H119	H109-H117, H119	H123-H131, H133
Other expenses and transfers	SP1	six months	N001-N002 N006-N015 T101-T103 T902-T905	N001-N002 N006-N016 T101-T103 T902-T905, N013	N001-N002 N006-N016 T101-T103 T902-T904	N001-N002 N006-N016 T101-T103 T902-T905	N001-N002 N006-N016 T101-T103 T902-T905	N001-N002 N006-N016 T101-T104 T902-T914	N001-N002 N006-N016 T901-T914	N001-N002 N006-N016 T901-T914	N001-N002 N006-N016 T901-T914
Given presents	SP1	six months	T101-T103 T902-T905, N013	T101-T103 T902-T905, N013	T101-T103 T902-T904, N013	T101-T103 T902-T905, N013	T101-T103 T902-T905, N013	T101-T104 T902-T914, N013	T901-T914 N013	T901-T914 N013	T901-T914 N013
Monetary current income	SP1	monthly	P001-P011, P013 P015-P027	P001-P028 P043	P001-P029	P001-P034	P001-P034	P001-P047	P001-P060	P001-P060	P001-P008 P011-P013 P015-P018 P020-P045 P067-P080

Source: 1992-1998 based on the methodology proposed by the Poverty Committee. In 2000-2005 Table 2 (pp.7) in CONEVAL (2006) Nota Técnica sobre la Aplicación de la Metodología del Comité Técnico para la Medición de la Pobreza 2000-2005. In 2006 Table 1 (pp.5) in CONEVAL (2007) Nota técnica para la medición de la pobreza por Ingresos y Pruebas de Hipótesis 2006. 2008 based on the methodology proposed by the Poverty Committee.

* In 2008 the value of imputed rents is no longer provided as part of the Expenditure data set. It is instead given as part of the Households data set and the variable is called "estim32tri" which are the imputed rents during the previous three months.

** Each group nominal values are changed into real values by using an itemized price index at national level (by groups of goods and services) to obtain all values in constant pesos of August 2000. In addition, each group changed from nominal to real values is done according to their periodicity. That is, each group has a different periodicity of consumption: weekly, monthly, three months, and six months. Weekly consumption is changed into real prices by using the CPI of the month of the first day that corresponds to the period of collection of information, called “decenas de levantamiento”. For monthly consumption we use the previous month than the one that contains the majority of days from the period of collection of information. For the consumption made for three and six months we used the average of the three/six previous months of the CPI, using as a reference the month in which the majority of the days from the period of collection of information are.

3.4. THE OFFICIAL POVERTY LINES

In Mexico, the official way to identify the poor is the monetary approach.[57] In 2001 The Technical Committee for Measuring Poverty (The Committee here alter), was created by the Social Development Secretariat (SEDESOL) of the Mexican Government. The Committee was presided by SEDESOL and had 7 academic members plus a member from the Presidency, another member from The National Institute of Statistics, Geography and Informatics (INEGI) and another one from the National Population Council (CONAPO).[58] The Committee's goal was to present a preliminary methodology to measure the level of poverty in Mexico.[59] Once the methodology was proposed, SEDESOL modified it by making the poverty lines less generous and presented it as the official methodology and it has been applied since 2002. Indeed, the Committee's second poverty line included the sufficient income to pay for the minimum necessities of food, education, health, housing and transport. In contrast, the poverty line adopted only included the first three components, leaving the last two as part of the third poverty line.

The first poverty line is set by calculating the cost of acquiring a minimum consumption basket. The items contained in this basket are those suggested by INEGI/CEPAL in 1992 and represent the minimum needs in that year and it has been subsequently indexed by changes in prices since then. That is, the Committee adjusted the price of all the items contained in the basket using the different price indexes for each year. For the other 2 poverty lines the Committee uses the inverse of the Engel's coefficient to approximate the non-food consumption (instead of calculating another consumption basket that includes non-food consumption). This coefficient varies each year, however, the Committee decided to keep it fixed for the whole period of study. By using the 1992 consumption basket as a fixed basket the Committee is implying that the basket has not changed since 1992 and by keeping the Engel's coefficient fixed,

[57] At the end of 2010 Coneval introduced a new multidimensional poverty measure. For details about this new way to measure poverty go to: www.coneval.gob.mx
[58] This paragraph is based on Székely, M. (2005) (Edit).
[59] The impartiality of the Committee has been doubted since the academic members are researchers that not only work as consultants for the Mexican Government, but were also chosen by the government itself. For instance see Garduño and Méndez (2005).

they are implying that the ratio of expenses of food and non-food remains constant as well. In our thesis, we adhere to the new official poverty lines, since we would like to compare our results with the official ones. The new official poverty lines are as follows:

1) The *food poverty line* (z_1), where a household is classified as poor if it does not have sufficient income to buy a minimum food basket.[60]

2) The *capabilities poverty line* (z_2), which classifies a household as poor when it does not have sufficient income to cover the minimum necessities of food, education and health.

3) The *assets poverty line* (z_3), where a household is consider to be poor if its income is not sufficient to cover the minimum necessities of food, health, education, clothes, shoes, housing and public transport.

Table 3.5.

Mexico: Official poverty lines
constant prices of August 2002

	Rural	Urban
PL1 - Food	494.78	672.27
PL2 - Capabilities	584.98	824.54
PL3 - Assets	897.83	1348.84

Source: www.coneval.gob.mx
a) All values are in Mexican pesos.

Table 3.6.

Mexico: Official Poverty Lines
Constant pesos of August 2000 and US$ Adjusted for Purchasing Power Parity, 2000

	Mexican pesos of August 2000 per person, per day		US$ PPP, 2000 per person, per day	
	Rural	Urban	Rural	Urban
PL1 - Food	15.4	20.9	2.49	3.38
PL2 - Capabilities	18.9	24.7	3.06	4.00
PL3 - Assets	28.1	41.8	4.55	6.76

Source: Cortés *et al* (2005:224) and Table 4 from Bane M. J. and Rene Zenteno (2005:7).

[60] This poverty line has been severely criticized by part of the academia in Mexico since it does not include the necessary income to: i) cook and prepare the minimum food basket; ii) the minimum income to wear some clothes and shoes; ii) the income to even buy any soap, toilet paper or a blanket to sleep. See Boltvinik, J. and Damián, A. (2003).

It is important to mention that the official calculations present the consumption/income variables and poverty lines in constant pesos of August of each year. However, we set all our income/consumption variables and poverty lines at constant pesos of August 2002. The change in procedure is done to simplify the calculations by having all the information on constant prices of a specific year.

There is another important issue regarding household surveys, the treatment of zero and missing values. As documented by Székely *et al* (2000), in the case of Mexico dropping missing and zero values does not make a big difference in poverty measures, since by definition there are almost none.[61] Székely *et al* (2000) calculate the Headcount by treating Missing and Zero values for income for 17 Latin-American countries. They make six combinations of dropping and imputing missing and zero values with the base being dropping both of them. The results are contrasting for different countries. For instance, in the case of Mexico the Headcount remains the same using any of the combinations (staying at 58.8%). However, Nicaragua's Headcount moves from 63.7% (the base case which is dropping both, zero and missing values) to up to 83.7% (when dropping missing values and keeping zero ones). That is, the HC varies around 20 percentage points by treating in a different way these problematic observations. Since in the case of Mexico it does not make a big difference to drop missing and zero values, we will drop them in all our calculations of the empirical chapters.

3.5. Basic Summary Statistics

In this section, we will look at some basic summary statistics for the ENIGH Household Surveys. Table 3.7 presents the summary statistics for our preferred definition of *per capita income* (without imputed rents and including gifts). We observe several things in this table: a) the number of observations has doubled

[61] As mentioned by CTMP (2002:48) it is unknown if the reason for this low percentage of missing and zero values in Mexico is because people answer correctly the questionnaire or because they do have an income higher than zero or because INEGI imputes some values in those households that report zero income before making the information available to the public.

from 2002 onwards, as compared with the older surveys and it trebled in 2008 as compared with 1992 since for the first time the survey became representative at state level; b) the mean of per capita income decreased in 1996 and did not recover until 2000; c) 2006 is the year with the highest per capita income mean; d) there is an outlier in 2004 and in 2008, where the surveys captured a rich household (rich households usually do not agree to participate in the ENIGH household surveys); and e) we observe that the population in Mexico has been increasing steadily over the period of study, and that there were around 20 million more Mexicans in 2006 than in 1992. That is, there was an increase of around 25% in the population of the country in 14 years.[62]

Table 3.7

Mexico: Per capita monthly Income, summary statistics
1992-2008

Year	Observations	Sample size households[d]	Mean	Std. Dev.	Min	Max
1992	10,526	84,049,655	1,721	2,781	3.0	94,205
1994	12,792	89,318,281	1,997	3,447	19.1	133,008
1996	14,030	92,519,839	1,380	2,473	8.1	207,575
1998	10,938	95,219,484	1,533	3,239	7.6	461,442
2000	10,101	98,276,109	1,824	2,801	11.7	110,336
2002	17,160	100,829,878	1,817	2,362	2.2	50,861
2004	22,585	102,975,224	1,920	4,331	4.6	1,015,828
2005	23,163	103,912,234	1,963	3,829	4.2	293,515
2006	20,862	104,783,324	2,167	3,245	3.4	143,487
2008	29,751	107,255,780	2,303	3,639	20.8	101,512

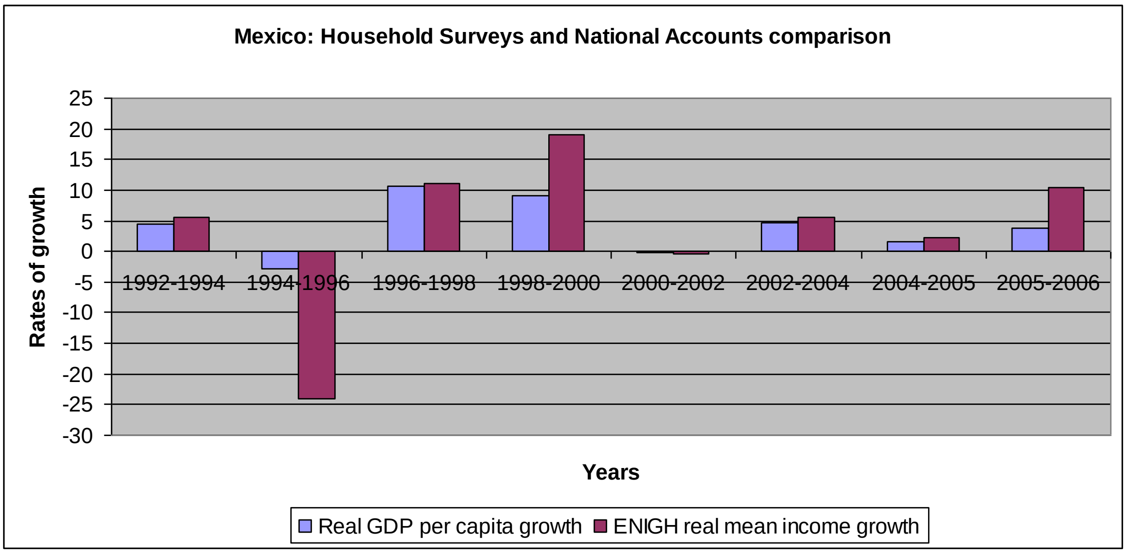
Source: Own calculations using the ENIGH household surveys 1992-2008.
a) The ENIGHs from 2000 to 2005 use the new weights.
b) In constant pesos of August 2002.
c) Excluding zero values.
d) Weighted.

As we will see in Chapter 5, the period of 2005-2006 is very important in terms of poverty results. Indeed, during this year there were markedly high poverty reductions in the three poverty measures for the population under the three poverty lines in urban and rural areas. However, these results are highly atypical. Indeed, in only one year the three measures of urban poverty fell

[62] These numbers coincide with those given the National Council of Population of Mexico (CONAPO), which states that in 1992 there were 87 million people living in Mexico and 104 million in 2006 (www.conapo.gob.mx).

roughly the same percentage points than in the previous nine years. And rural poverty diminished even more in just one year than in the previous nine. However, this result is not consistent with the results gathered by the same Institute (INEGI) but for the National Accounts. Indeed, we know that the GDP annual rate of growth for 2006 was 4.8% and that the population growth was estimated by INEGI at 1% for that year. Therefore, per capita GDP growth should be 3.8%. However, with the data of the 2006 ENIGH household survey, we obtain a per capita mean income rate of growth of 10.4% (see figure 3.1 below). How the mean income of the households surveyed in the 2006 ENIGH could grew more than the double than the rest of the country? The problem seems to be that "the size of the cake" did not increase enough to have these results and there was also no redistribution. Then how can we have these results in poverty reduction? Moreover, 1998-2000 also seems very atypical. These atypical periods are also electoral years. Could it be that the increases in government spending for electoral proposes could account for part of these results? This remains a puzzle, but the discrepancies have been acknowledged by the academia but unfortunately, nobody has come up with an explanation.[63]

Figure 3.1.



Source: Own calculations with data from the ENIGHs 1992-2006. GDP per capita growth from www.inegi.gob.mx.

[63] Esquivel (2007) pointed out to these discrepancies between the 2006 ENIGH and the National Accounts.

3.6. STOCHASTIC DOMINANCE ANALYSIS

Stochastic dominance is a technique that will help us to rank distributions. That is, to find out if one distribution is superior to another one. But instead of focusing on the population whose income/consumption is less than the poverty line, we focus on the way income/consumption is distributed over the whole population. Thus, income/consumption *x* is a continuous distribution over the population with a Cumulative Distribute Function CDF $F(x)$ (Deaton, 1997:163). If we have two distributions $F_1(x)$ and $F_2(x)$ and we would like to rank them, we can say “that distribution with CDF $F_1(x)$ first-order dominates distribution $F_2(x)$ if and only if, for all monotone non-decreasing functions α(x)

$$\int \alpha(x)dF_1(x) \geq \int \alpha(x)dF_2(x) \tag{3.1}$$

where the integral is taken over the whole range of x. The way to appreciate this definition is to think of α(x) as a valuation function, and monotonicity as meaning that more is better (or at least no worse)” (Ibid:163). That is, distribution $F_1(x)$ has more of x and thus first-order stochastically dominates distribution $F_2(x)$.

There is another definition called second-order stochastic dominance. First-order stochastic dominance implies second-order stochastic dominance, but the reverse is not true. Thus, first-order dominance is a stronger definition. “We say that the distribution $F_1(x)$ second-order stochastically dominates distribution $F_2(x)$ if and only if, for all monotone non-decreasing and concave functions α(x), the inequality (3.2) holds” (Ibid:163). That is:

$$D_2(x) = \int^{x} F_2(t)dt \geq \int^{x} F_1(t)dt = D_1(x) \tag{3.2}$$

Thus, for first-order stochastic dominance we compare the CDFs and for second-order we look at the area under the CDFs. Finally, it is useful to mention that second-order stochastic dominance is equivalent to Generalized Lorenz dominance (Ibid:164).

3.6.1. Cumulative Distribution Functions CDFs

It is not always desirable to make conclusions about the changes in poverty when these are based on an arbitrary poverty line. Firstly, we will use CDFs to check the robustness of the headcount index to the choice of a certain poverty line *z*. And secondly, we will plot also the area under the CDFs, known as *the poverty deficit curve*, to check the sensitivity of the poverty gap to the choice of different poverty lines *z*.

Now, consider the following expression, which represents the Headcount ratio or the fraction of the population with a level of income/consumption below the poverty line z:

$$P_0(z;F) = F(z) \tag{3.3}$$

where P_0 is the Headcount index, z is the poverty line and F is the distribution. Thus, we can conclude that the Headcount index is robust to the use of any poverty line if and only if, one of the distributions first-stochastically dominates the other one.[64] In this case, the choice of any poverty line *z*, will not make any difference:

$$F_1(z) > F_2(z) \tag{3.4}$$

However, in practice we can also look at a partial or a more restricted result of first-stochastic dominance, when looking at a certain range of values for *z* and then comparing the distributions below those values. Since in any case, the inequality measures deal with the whole distribution. Thus, for poverty comparisons it might be useful to focus on that part of the distribution concerned with the households that are below a certain level of welfare. The CDFs that we will plot in the empirical chapters are curves that show the proportion of persons that receive no more than a specific income/consumption, represented as a function of that income/consumption.

[64] (Deaton, 1997:165).

3.6.2. Lorenz Curves

As mentioned by Deaton (1997:158-159) *Lorenz Curves* are the most familiar plot to examining the distribution of consumption or income. This curve plots the cumulative population share in the x-axis, and the cumulative income/consumption share in the y-axis (in ascending order). The 45º degree line represents complete equality, and inequality increases the further the Lorenz curve is from the 45º line. Lorenz curves are an important tool to check the robustness of different inequality measures (Ibid:159), since "when two Lorenz curves do not cross, the upper one represents an unambiguously more egalitarian distribution, one that will show a lower level of inequality using *any* measure of inequality that respects the principle of transfers" (Ibid:159). However, Lorenz curves are unaltered by the mean of the distribution and thus, we cannot use them to rank distributions from the point of view of social welfare (that is, incorporating average living standards comparisons). In order to correct this, Shorrocks (1983, cited in Deaton 1997:159) introduced the concept of *Generalized Lorenz curves*. The difference in the two curves lies in the y-axis, which is the cumulative share of income/consumption multiplied by the mean. Thus, a Generalized Lorenz curve is a Lorenz curve with a new scale but with the same shape. And when a generalized Lorenz curve in one period lies above a generalized Lorenz curve in another period it means that "the size of the cake" is bigger in the first period and thus "the poorest person has more, there is more in aggregate, and more generally, each quantile of the distribution is higher" (Deaton, 1997:159). That is, from a social welfare perspective, the first distribution will always be preferred, since average living standards will be higher and poverty lower.[65]

[65] If one Generalized Lorenz curve lies above the other, this implies poverty dominance by poverty gap measures (Jenkins, 2006:37).

3.7. INEQUALITY DECOMPOSITION METHODOLOGY

3.7.1. A brief literature review

Most of the early published work on income inequality is mostly descriptive. However, more recent studies have explored the determinants of income inequality. The following paragraphs contain a brief exposition of key literature about regression-based inequality decomposition, focusing on Mexico in the final part. Although all the methods refer to inequality decomposition, similar approaches can be applied to decompose poverty. As already mentioned, inequality decomposition methods can be divided in two main groups: those which use some kind of factor decomposition and those which use regression based decomposition. Income[66] or its logarithm is used as the dependent variable and a number of variables or proxies are introduced as the independent variables.

The work by Oaxaca (1973) is one of the earliest examples on regression-based methodology. He focuses on the difference in mean income between female and male workers in order to track the source of wage differentials between the two groups in the United States, and uses ordinary least squares to estimate a wage equation for two groups of workers (male/female & non-African-American/African American). The equation is as follows:

$$\ln(W_i) = Z_i'\beta + u_i\,, \qquad i= 1,\ldots,n \tag{3.5}$$

where W_i is the hourly wage rate of the i-*th* worker; Z_i' is a vector of individual characteristics; β is a vector of coefficients; and u_i is an error term.

After assuming that the wage regression has semi-logarithmic functional form and that the absence of discrimination would lead for females and males with the same characteristics to earn the same, wage differential can be decomposed into two effects: i) the difference in endowments (or individual characteristics); and ii) the effects of discrimination. The two effects are as follows:

[66] Income from different sources is normally used, including earnings, that is, income from employment.

$$\ln\left(\frac{\hat{W}_m}{W_f}\right) = \Delta Z' \hat{\beta}_f$$ Estimated effects of differences in individual characteristics. (3.6)

$$\ln(\hat{D}+1) = -Z_m' \Delta\hat{\beta}$$ Estimated effects of discrimination. (3.7)

where

(W_m/W_f) = the observed male-female wage ratio

$(W_m/W_f)^0$ = the male-female wage ratio in the absence of discrimination.

$$D = \frac{W_m/W_f - (W_m/W_f)^0}{(W_m/W_f)^0} \tag{3.8}$$

Discrimination is then calculated as the residual left after subtracting the effects of differences in individual characteristics from the overall wage differential (pp.704). However, Oaxaca (1973:708) mentions that this residual method has the problem that we really do not know "how much of the observed differences in individual characteristics would exist in the absence of discrimination". That is, the residual assumes that all the sex differentials after controlling for individual characteristics are due to discrimination, but the latter might not be true. The empirical results suggests that controlling for a number of individual characteristics[67], discrimination accounts for around 77.7 percent of the wage differential for whites and 93.6 percent for blacks. The latter methodology has been extensively applied to decompose the effects of individual characteristics (e.g. schooling, age, experience, etc) in explaining the differences between two groups, in terms of inequality or poverty levels.

Fields and Yoo (2000) want to identify what accounts for the differences in inequality of earnings between one time/country/group and another, that is, why one income distribution is more equal than another.[68] They decompose the changes in inequality over time into three sources: i) how much of *the level* of inequality can be explained by the explanatory variables and the error term; ii) how much of *the difference* in income inequality between two times or groups arises from the explanatory variables; and iii) which is the exact decomposition

[67] The most important control variables are: experience, age and number of years of schooling completed by each individual.

[68] Since we apply the same methodology in the last empirical chapter, we describe Fields (2002) methodology in detail in section 3.7.6 below.

of the difference in inequality.[69] That is, "to what extent is the change in any given [factor] due to differences between the regression coefficients in the two years; to differences in the inequality of the explanatory variable; to differences in the covariance or the correlation between the explanatory variable and income?" (pp.148). The proposed methodology imposes a standard semi-logarithmic form. We can use any type of inequality measure regarding that we apply the log-linear model in order to calculate *the level* of inequality. On the contrary, different measures of income inequality would lead to different results when calculating *the changes* in inequality. They explore the determinants of income inequality in Korea, using the logarithm of labour income per worker as the dependent variable and a set of different characteristics that include years of education and experience as independent variables. One important result suggests that although most coefficients were found to be statistically different from zero, they account for divergent shares of Korea's labour income inequality (pp.151). Indeed, only five variables account for most of the level and changes of inequality in Korea during 1986-93: job tenure, gender, occupation, years of education and potential experience. Finally, the variable that contributes the most to the fall in labour income inequality in Korea in this period is education.

Wan (2004) proposes a method for inequality decomposition that tries to overcome some of the problems and restrictions generated by earlier works. Inequality decomposition methods involve a constant term and a residual. However, the author argues that the introduction of such terms involves specific problems which are not completely addressed by earlier studies (pp.349). Another problem arises from the imposition of a specific functional form (which prevents model selection) and the type of inequality measures than can be used. To overcome these problems, the author proposes a general regression-based method for decomposing any income inequality measure. This decomposition allows any type of functional form and any parametric specification of the regression model. Wan applies this methodology to examine regional inequality in rural China. He finds that township and village enterprises account for most of regional inequalities in 1995. Education and capital were found to be the second contributors to regional inequality. Nevertheless, as

[69] Fields and Yoo use the basic principles of decomposition proposed by Shorrocks (1982).

mentioned by Krstić *et al* (2007), Wan's approach is more computationally burdensome than the one suggested by Fields (2002), making it a less attractive methodology to be used when applying different methodologies to 10 different ENIGH household surveys. In addition, Wan's approach does not provide a methodology to calculate changes through time.

3.7.2. Empirical papers about Mexico that apply arithmetic decompositions

As already mentioned, there are not many studies about Mexico that decompose the levels and trends of income inequality by income source and population sub-groups. The most relevant of these studies is the one by Székely (1998) which uses the ENIGH household surveys to do decompositions by income source as well as by population sub-groups for 1984-1992. Using a similar methodology to that proposed by Shorrocks (1982) and Jenkins (1995) he finds that the most important population characteristics explaining the levels and changes in inequality were educational levels and occupations, which explained roughly 50% of total inequality. With geographic location, sector of activity, labour market status, household size, age and gender having a lower explanatory power. Regarding the decomposition by income source, wages and entrepreneurial rents were the sources that contributed the most to the levels and changes of inequality. Indeed, wages were expected to be very important, since almost 45% of household income comes from this source. The entrepreneurial rents contribution, however, comes from its high values of factor inequality (rather than its high income shares). Székely (1998:237) then argues that some individuals were in a better position to take advantage of the opportunities created by the liberalization process due to their higher levels in human and physical capital. And that the discrepancy between those who were able to take advantage and those who were not, deteriorated the income distribution of the country even more after the liberalization process. He also suggests that investing in education could potentially reduce inequality.[70]

[70] Székely (1998) however is very cautious in asserting that an increase in public education would lead to a decrease in inequality. Since access to public education "requires at least a

Finally, he argues that the privatization and financial liberalization process also contributed in a negative way towards the deterioration of the income distribution of the country by concentrating the property of resources in fewer hands.

The most recent results regarding arithmetic inequality decomposition in Mexico are those by De Hoyos (2003), which applies Shorrocks (1982) and Jenkins (1995) methodologies for inequality decomposition. Using data from the ENIGH household surveys for 1984-2000, he explores the effects of trade liberalization in Mexico especially the joining to GATT in 1986 and the beginning of the NAFTA agreement in 1994. His results are similar to those of Székely (1998) with entrepreneurial remunerations and wages being the main contributors of the levels of income inequality. Nevertheless, these factors contributed in different ways in the changes of inequality. With entrepreneurial remunerations being the main disequalizing factor in 1984-1989 and 1996-2000, but then being an equalizing one in 1989-1996. And wages being an equalizing factor in 1984-1989 and 1994-1996 but a disequalizing one in 1989-1994 and 1996-2000. Suggesting that the years just after the implementation of GATT and NAFTA, entrepreneurial remunerations increased their income shares and became really dispersed and were the main contributors of inequality, while wages were an equalizing factor due to a decrease in their income shares. Regarding sub-group decompositions, De Hoyos (2003) decomposes by different Occupation groups and by Industries. In the case of *industries*, most of the inequality is explained by the within component (that is, most of the inequality remains unexplained by the sub-groups created). The results by *occupation* groups are different, and in this case, the between-factor inequality seems to become more important during the long run (which means that the differences between occupational groups are important in explaining the levels of inequality). However, the most interesting results of his analysis come from the dynamic decomposition, which shows for both, occupations and industries, a slow labour response after the trade reforms. Indeed, although the incomes of different occupations and industries became more dispersed,

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minimum amount of private investment which is not affordable for the poorest individuals" (pp.83).

population shares remained almost constant. That is, some workers were unable to move from low-income sectors to high-income ones.

Using data from the National Urban Employment Survey (ENEU), Lopez-Acevedo and Salinas (2000) explore how much *earnings* inequality can be explained in the 1988-1997 period.[71] Their aim is to understand why after liberalizing its trade regime, Mexico's demand for its abundant low-skilled workers did not rise. Indeed, in Mexico as in the United States, the demand of low-skilled workers and their real wages declined, while highly-skilled workers wages increased. Using the methodology proposed by Shorrocks (1980), they decompose the General Entropy Measure dividing it into five different groups: education, age, economic sector and work status. They focus only on the wages and salaries (earnings) of the working population in urban areas of Mexico, arguing that wages are the main asset of the poor and that they are the main source of income. Their main result is that education is the variable that explains the largest percentage of earnings inequality in Mexico (pp.11). The explanatory power of their model was around 45% and it increased towards time. And the contribution of the variable education alone seems to be equal to the joint contribution of the rest of the variables. It is argued later, that the contribution of education towards inequality observed in Mexico is also common in the rest of Latin America. But that what it is very peculiar in the case of Mexico is that its contribution seems to be increasing over time.

Lustig and Székely (1997) present an integrated study of economic trends, social indicators, poverty and income inequality in the period 1950-1994. Their study not only looks at the evolution of poverty and inequality (Gini coefficient), but it also examines the determinants of poverty and inequality by using decomposition techniques. They use poverty decomposition based on Morley (1995) and Ravallion and Huppi (1991). Total changes in poverty are then decomposed in three subcategories: population effect, poverty effect and a residual. The categories they look at include household characteristics like

[71] The main difference between Lopez-Acevedo and Salinas (2000) methodology with Székely (1995) and De Hoyos (2003) is that the former includes in their sample only those individuals who are part of the labour force and that live in an urban area to explore earnings inequality (a definition that includes wages and salaries, but excludes other types of monetary income and non monetary income). While the latter use a sample that contains all the household heads in urban and rural areas to explore income inequality (a definition that includes not only earnings, but also other types of monetary income and non-monetary income).

gender, age, occupation, region, and household size. Gini decomposition is then applied to look at inequality changes. Gini is decomposed by source of income: i) salary income; ii) enterprises' rents; and iii) non-monetary income. This decomposition shows that although the total Gini did not change from 1984 to 1994, there was an increased inequality in salaries during the period. The study also presents a detailed poverty profile. But the length of the study is the period 1984-1994. Thus, it excludes the years after the 1995 economic crisis. Their main results suggest that poverty is focalized on rural areas, especially on the Southern region. Indeed, more than 70 percent of the population that lives in extreme poverty is concentrated in households that work in the rural sector. The population that lives in poverty is characterized by: i) living in the Southern region; ii) working in the rural sector; iii) having less years of education; and iv) being part of a big household.

3.7.3. Empirical papers about Mexico that apply regression-based decompositions

Bouillon *et al* (1998) decompose household income inequality by using regression analysis. Their results suggest that household income inequality in Mexico increased sharply during the period 1984 to 1994. Bouillon *et al* use four different measures of inequality; two different measures of welfare (per capita and per adult-equivalent units); and adjusted income data for correcting underreporting. Their methodological approach uses household income equations in a reduced-form at two points in time, with log income as the dependent variable and a series of geographical and household characteristics as independent variables. The paper decomposes inequality into the effects of returns to household characteristics and geographical variables to determine which factors explain this sharp increase in inequality. That is, they are interested in decomposing the changes through time. The decomposition has three steps: i) the estimation of household income equations for 1984 and 1994; ii) the simulation "of the distribution of income which would have been observed in 1984(1994) if the returns would have equalled those of 1994(1984)"; and iii) the calculation "of the contribution of changes in returns, 'endowments', and the residual term to the observed changed in the distribution of income (pp.4).

Regional fixed effects (positive for urban areas and negative for rural ones) and household characteristics (age, gender, education, financial assets and home ownership) were found to be very significant explaining household income. Their results suggest that changes in the returns to education (especially male tertiary education) are responsible for 49 percent of the overall changes in inequality. The second most important factor explaining the increase in inequality in the period is the relative position of the southern part of the country which can explain around 15 percent. Thus “not only living in the South carries a penalty but that penalty has risen over time” (pp.16).

De Hoyos (2007) uses regression analysis to explore the role played by the distribution of skills or education in the levels of income inequality in 1989-2000. Following Murdoch and Sicular (2002) he defines a human capital regression model with Income as the dependent variable and several personal and household characteristics as the independent variables. It is relevant to mention that instead of using the logarithm of income, as proposed by the human capital literature, he uses per capita income. He finds that the coefficient of education (measured as years of schooling of the household head) was statistically significant during all the years and was the variable that contributed the most towards total inequality in each year. The contribution of education to total inequality increased during 1988-1994 and decreased after the peso crisis in 1994-1998, to finally recover in 2000. In addition, he presents individual regressions for 5 industries (manufacturing, non-manufacturing, informal sector, agriculture and other sectors), with the results showing education being more an important factor contributing towards total inequality for the manufacturing and non-manufacturing sectors as compared with the informal, agriculture and other sectors. Another interesting result from his study is the different patterns observed in the tradable (manufacturing and agriculture) vs. the non-tradable sectors (non-manufacturing, informal and other sectors), with the former showing an increase in returns to schooling after the implementation of NAFTA and the latter experiencing the opposite. De Hoyos (op. cit.25) concludes that his results support “the view of a skill-biased shift in labor demand brought about by the Mexican liberalizing reforms of the 1990’s”.

3.7.4. Sub-group income inequality decomposition

3.7.4.1. Static decomposition Methodology

Shorrocks (1982) presents several principles which are desirable when decomposing inequality by the different components of income (or factor components). He arrives to a unique decomposition rule by applying several restrictions to decompose the variance (as a measure of inequality). Another important result is that “the *relative* importance of different income components is independent of the choice of inequality measure” (pp.205). The proportion of total inequality contributed by factor k when the inequality measure is I is then defined by $S_k^*(\sigma^2)$ and using the variance as the inequality measure, its natural decomposition is given by

$$s_k^2(\sigma^2) = \frac{S_k^*(\sigma^2)}{\sigma^2(Y)} = \frac{\operatorname{cov}(Y^k, Y)}{\sigma^2(Y)} \tag{3.9}$$

where Y^k is the income of individual I from source k and the distribution of total incomes is represented by $Y = (Y_1 \ldots Y_n) = \sum_k Y^k$. These proportional contributions of each factor k to total inequality sum to unity. And when the different types of income are uncorrelated then

$$\sigma^2(Y) = \sum_k \sigma^2(Y^k) \tag{3.10}$$

where $\sigma^2(Y^k)$ is the contribution of factor k to total inequality. However, Shorrocks (1982) mentions that not all inequality measures would satisfy the proposed assumptions. Another problem with this type of method is that it ignores the feedback effects on other income sources (pp.210). That is, indirect effects are not taken into account. However, this article has been used by several authors as a guide to decompose changes in inequality.

Mookherjee and Shorrocks (1982) introduced a formula for decomposing the Generalized Entropy Measure at a certain point in time and another one for its trends. We already introduced the formula of the GE in the literature review chapter. But it is presented here so it will be clearer to follow the decomposition:

$$\left.\begin{aligned} I_a &= \frac{1}{n}\frac{1}{a(a-1)}\sum_i\left[\left(\frac{y_i}{\mu}\right)^a - 1\right] \quad a \neq 0,1 \\ I_0 &= \frac{1}{n}\sum_i \log\left(\frac{\mu}{y_i}\right), \\ I_1 &= \frac{1}{n}\sum_i\left(\frac{y_i}{\mu}\right)\log\frac{y_i}{\mu}. \end{aligned}\right\} \tag{3.11}$$

where a is a real parameter with a negative, zero or positive value. This measure is equally sensitive to changes across the distribution when a = 1 (this is the Theil index); more sensitive to changes in the lower parts of the distribution when a is close to zero; and sensitive to changes in the higher parts of the distribution for higher values of a.

And the decomposition proposed by Mookherjee and Shorrocks (1982:889) for the Generalised Entropy measures are as follows:

$$\left.\begin{aligned} I_a &= \sum_k v_k(\lambda_k)^a I_a^k + \frac{1}{a(a-1)}\sum_k v_k\left[(\lambda_k)^a - 1\right] \quad a \neq 0, 1, \\ I_0 &= \sum_k v_k I_0^k + \sum_k v_k \log\left(\frac{1}{\lambda_k}\right), \\ I_1 &= \sum_k v_k\lambda_k I_1^k + \sum_k v_k\lambda_k \log\lambda_k. \end{aligned}\right\} \tag{3.12}$$

where v_k is the subgroup population share and λ_k is the relative mean or μ_k/μ. The first term in all the equations is the *within-group inequality* or the inequality inside each group or the "unexplained inequality". The second term is the *between-group inequality* component, the inequality that comes from the differences between each group or the "explained inequality".

In order to measure the amount of inequality that can be explained by population characteristics, Cowell and Jenkins (1995:423) proposed a simple measure which captures it, the R-index:

$$R_B(\Pi) = \frac{I_B(\Pi)}{I} \tag{3.13}$$

$$R_W(\Pi) = I - \frac{I_W(\Pi)}{I} \quad \textit{or} \quad R_W(\Pi) = 100 - R_B. \tag{3.14}$$

where the "explained inequality" $\mathbf{R_B}$ can be calculated by dividing the between-group inequality of the partition Π by the total inequality; and the "unexplained inequality" $\mathbf{R_W}$ can be calculated as a residual.

3.7.4.2. Dynamic decomposition Methodology

Mookherjee and Shorrocks (1982:897) decompose the trend in Inequality in the following four components:

$$\sum_k \bar{v}_k \Delta I_0^k, \qquad \text{(A)}$$

$$\sum_k \bar{I}_0^k \Delta v_k, \qquad \text{(B)}$$

$$\sum_k \left(\bar{\lambda}_k - \log \lambda_k\right) \Delta v_k, \qquad \text{(C)}$$

$$\sum_k \left(\bar{\theta}_k - \bar{v}_k\right) \Delta \log \mu_k. \qquad \text{(D)}$$

where v_k is the subgroup population share, λ_k is the relative mean or (μ_k/μ), θ_k is the subgroup income share, μ_k is the subgroup mean, and a bar on top of the variables means that it is an average of the current year and the final year, for example: $\bar{v}_k = [v_k(t) + v_k(t+1)/2]$. The first component is the effect on changes in total inequality due solely to within-subgroup inequality or the 'unexplained inequality'; the other three components together are the 'explained inequality' with the second being the impact of changes in the population shares to within-group inequality; the third one is the impact of changes in the population shares to between-group inequality; and the last one is the effect on the changes of total inequality due to relative changes in the subgroup means. *Ineqdeco* provides all the variables needed to compute this dynamic decomposition.

3.7.5. Income Source Decomposition Methodology

As mentioned by Jenkins (1995:39-40), total inequality in any particular year can be equal to the sum of all different income sources, such as salaries, pensions, rents and so on:

$$I = \sum_f S_f \tag{3.15}$$

where I represents total inequality and S_f is the absolute contribution of factor *f* towards total inequality. When $S_f > 0$, factor *f* has a disequalizing effect and when $S_f < 0$, it has an equalizing one. In order to find the proportion of total inequality explained by each factor Jenkins (1995) continues introducing Shorrocks (1982) unique decomposition rule, which is independent of the inequality measure chosen, by firstly defining the relative contribution of factor *f* towards total inequality as follows:

$$s_f \equiv S_f / I \tag{3.16}$$

thus $\sum_f s_f = 1$. But if "all the functions that generate suitable values of s_f are 'decomposition rules'" (pp.39), there seems to be an infinite number of potential decomposition rules for each inequality index. But then, Shorrocks *unique decomposition rule* for a particular year is introduced:

$$s_f = C_f / \sigma^2 = \rho_f \sigma_f / \sigma. \tag{3.17}$$

where ρ_f is the correlation between factor f and total income; σ_f is the variance of factor *f* ; and σ is the variance of total income. That is, the contribution of a certain factor to total inequality will depend of: 1) the inequality within the factor; 2) the income share of the factor; and 3) the correlation of the factor with total income.

Finally, a unique decomposition rule for the changes in inequality in two particular years is introduced, using I_2 as example, with the absolute contribution of any given factor *f* as:

$$S_f = s_f I_2 = \rho_f \chi_f \sqrt{((I_2 I_{2f})} \tag{3.18}$$

and therefore

$$\Delta I_2 \equiv I_2(t+1) - I_2(t) = \sum_f \Delta S_f = \sum_f \Delta \left[\rho_f \chi_f \sqrt{(I_2 \; I_{2f})}\right] \tag{3.19}$$

and then dividing both sides of the equation by $I_2(t)$ to obtain proportionate inequality changes:

$$\%\Delta I_2 \equiv \Delta I_2 / I_2(t) = \sum_f s_f \%\Delta S_f . \tag{3.20}$$

that give us the unique dynamic decomposition rule for I_2.

3.7.6. Regression-based decompositions Methodology

Our preferred methodology for this final part is that of Fields (2002), which mixes the use of econometrics with Shorrocks (1982) unique decomposition rule. The calculations are made in two steps, the first one consisting in creating income-generating equations with income/earnings/wages as the dependent variable and a set of household head and household characteristics as the independent variables under an Ordinary Least Squares (OLS) framework. The second step consists in decomposing the levels and/or changes of inequality using the OLS results. Using Shorrocks (1982) axioms to decompose the levels in inequality means that the results will be the same irrespective of the inequality measure used. In addition to this powerful result, by following this decomposition we can derive exactly how much of the inequality levels/changes is accounted for by each factor. That is, this type of decomposition shares the main advantages of the Shorrocks (1982) sub-group and factor decompositions, while at the same time overcomes its main disadvantage of not being a counterfactual experiment. Indeed, by using econometrics to obtain an income-generating equation, we can now control for the interdependence of the different factors that contribute to total inequality and isolate the contribution of each variable.

The first step to decompose income inequality at a certain point in time is to create an income generating equation, based on theoretical and empirical findings, where the logarithm of income is dependent on several variables or factors:

$$\ln(Y_i) = \alpha + \sum \beta_j x_{ij} + \varepsilon \tag{3.21}$$

which can also be expressed as:

$$\ln(Y) = \sum a_j Z_j \tag{3.22}$$

where ln(Y)= the natural logarithm of income

a_j= the coefficients [α β_1 β_2 … β_j 1] (3.23)

Z_j= the variables [1 X_1 X_2 … X_j ε] (3.24)

The second step is then to decompose such equation on a way that we can identify the exact contribution of each factor towards total contribution. That is, to find out exactly which percentage of inequality is accounted for by each factor or variable (e.g. education, age, gender). And taking advantage of the similarities of this result with that of Shorrocks (1982), Fields (2002) applies the decomposition rules of Shorrocks (1982) to obtain a unique factor decomposition, where the results are independent of the inequality index used.[72] The proportion of total inequality contributed by factor *j* when the inequality measure is I is then define by $S_j^*(\sigma^2)$ and using the variance as the inequality measure, its natural decomposition is given by

$$s_j^2(\sigma^2) = \frac{S_j^*(\sigma^2)}{\sigma^2(Y)} = \frac{\text{cov}(Y^j, Y)}{\sigma^2(Y)} \tag{3.25}$$

where Y^j is the income of individual I from source *j* and the distribution of total incomes is represented by $Y = (Y_1 \ldots Y_n) = \sum_j Y^j$. These proportional contributions of each factor j to total inequality sum to unity. And when the different types of income are uncorrelated then

$$\sigma^2(Y) = \sum_j \sigma^2(Y^j) \tag{3.26}$$

where $\sigma^2(Y^j)$ is the contribution of factor *j* to total inequality.

Fields (2002) then uses this framework to decompose the contributions of each factor (in this case, the variables of an income generating equation) towards total inequality. Therefore, by substituting (3.22) in (3.25) he obtains the following:

$$s_j = \frac{\text{cov}[\ln(Y), (\hat{a}_j Z_j)]}{\sigma^2[\ln(Y)]} = \frac{\hat{a}_j \text{ cov}(\ln(Y), Z_j)}{\sigma^2[\ln(Y)]} = \frac{\hat{a}_j \ cor(\ln(Y), Z_j)\sigma[\ln(Y)]\sigma(Z_j)}{\sigma^2[\ln(Y)]} =$$

$$s_j = \frac{\hat{a}_j \sigma(Z_j) cor(\ln(Y), Z_j)}{\sigma[\ln(Y)]} \tag{3.27}$$

[72] See Shorrocks (1982) for a detail about the decomposition axioms and the unique decomposition rule.

where $\hat{a}_j$ = the estimated coefficient of characteristic *j* estimated from model (3.22)

cor(ln(Y), Z_j) = the correlation between the characteristic *j* and the log of income

$\sigma(Z_j)$ = standard deviation of the characteristic *j* (e.g. education, age)

$\sigma[\ln(Y)]$ is the standard deviation of the natural logarithm of income

and where

$$\sum_{j=1}^{k+1} s_j(\ln Y) = 100\% \tag{3.28}$$

Now, to account for the contribution of factor *j* to the *change* in inequality at two points in time (or between two groups) we have:

$$[I(\cdot)]_2 - [I(\cdot)]_1 = \sum_{j=1}^{k+1}\left[s_{j,2} \times [I(\cdot)_2] - s_{j,1} \times [I(\cdot)]_1\right] \tag{3.29}$$

where the contribution of each factor *j* to the change in total inequality for any given inequality measure $I(\cdot)$ is:

$$\Pi_j = \frac{\lfloor s_{j,2} \times [I(\cdot)]_2 \rfloor - \lfloor s_{j,1} \times [I(\cdot)]_1 \rfloor}{[[I(\cdot)]_2 - [I(\cdot)]_1]} \tag{3.30}$$

where

$$\sum_{j=1}^{k+1} \Pi j = 100\% \tag{3.31}$$

and

$$\sum_{j=1}^{k+1} s_j(\ln Y) = R^2(\ln Y) \tag{3.32}$$

Fields (2002) then notes that since Π is a function of the inequality measure used $I(\cdot)$, the results will depend on the inequality measure chosen. In the case of Korea, Fields and Yoo (2000) found that the results are very similar when using different inequality measures.

CHAPTER 4. TESTING THE SENSITIVITY OF POVERTY AND INEQUALITY MEASURES TO DIFFERENT METHODOLOGICAL DECISIONS

4.1. INTRODUCTION

This chapter has the objective of testing the sensitivity of poverty and inequality estimates for Mexico to different methodological decisions. As it was exposed in chapters 1 and 2, there is a big and interesting debate about different methodologies to measure welfare and different methodological decisions regarding the most common way of measuring welfare in Mexico. It was also stressed the importance to give reasons for the methodological choices made when measuring welfare. It is important to mention that this chapter is not a quest to find 'the perfect poverty and inequality methodology for Mexico', it is more a quest to identify the sensitivity of a set of inequality and poverty measures to different methodological choices, and more importantly, to find out if we can find robust results about the levels and trends of poverty and inequality in Mexico. We will focus on two years rather than applying all the sensitivity analysis to the 10 household surveys that are available. We chose the 1992 and 2002 ENIGH household surveys for this exercise, since the Mexican economy was very stable during these years. These two surveys have fewer outliers and since as inflation was low, then probably incomes and expenditures were easier to estimate. Throughout this chapter we will focus on the official definitions of income and our 'preferred definitions of income and consumption'. After all the sensitivity analysis done in this chapter, we decided to use per capita current income (ictpc2) as our preferred welfare definition, but also to report in an annex a similar consumption variable and another that will adjust for the cost of children.[73] Although it is until the end of this chapter that we arrive to this conclusion, we highlight our preferred definitions through out the chapter.

The previous chapter presented a theoretical discussion about income vs. consumption as the welfare indicator. The first methodological choice explored in this chapter refers to the same issue but in an empirical way. In

[73] The equivalised income variable will consider that the cost of a child is 77% of an adult.

section 2, different definitions of income and consumption will be presented and a sensitivity analysis will be done to analyze the impact on per capita mean income and consumption when using different concepts of income and consumption. In particular, we will explore the inclusion/exclusion of: a) imputed rents; and b) durable goods (includes: household appliances, furniture and purchase and maintenance of cars). The inclusion/exclusion of imputed rents has been polemical in recent studies.[74] The most important critique for this has been that the questions for capturing this concept changed from 2002 onwards to increase the quality of the ENIGH Household Surveys. Section 3 explores the sensitivity of our preferred inequality and poverty measures to the use of equivalence scales and economies of scale. This section will include sensitivity analysis for the Gini coefficient, the Generalized Entropy Measure, the Atkinson Inequality measure and the Foster-Greer-Thorbecke (FGT) family of poverty measures. It also includes a sensitivity analysis to the use of welfare indicator – income vs. consumption. In section 4 we check the sensitivity of the headcount index to the use of different equivalence scales using stochastic dominance analysis. In section 5 we use stochastic dominance analysis to check the sensitivity of our results to our specific measures and in the case of poverty, to the use of specific poverty lines. More specifically, we will use Cumulative Distribution Functions (CDFs), Lorenz curves and Generalized Lorenz curves. Finally, in section 6, we include a set of conclusions derived from all the sections of this chapter. These conclusions will actually help us to decide which will be our “preferable welfare indicator”, the one that will be used to measure the levels and trends of poverty and inequality for all the rest of the ENIGH household surveys that are available for 1992-2008.

[74] Indeed, even the CTMP recognized that when comparing ENIGHs from before 2002 with those of 2002 and onwards, it was better to not include imputed rents in the income/consumption variable, since the question regarding this source changed in 2002 (see Székely:2005a).

4.2. INCOME VS. CONSUMPTION AS THE WELFARE INDICATOR

At the end of the literature review, different theoretical and empirical facts were discussed about the superiority of using income or consumption as the welfare indicator. It was mentioned that this issue is more empirical than theoretical. As a first approximation to this issue we will look at the means of the population as well as the percentage shares of different deciles when using income or consumption as the preferred welfare indicator. Moreover, we will check the sensitivity of the concepts of per capita income and consumption to the inclusion/exclusion of imputed rents and durable goods. The consumption concepts with durable goods included: household appliances, furniture and purchase and maintenance of cars. Those concepts without durable goods excluded household appliances, furniture and purchase and maintenance of cars. In addition, the income and consumption variables will be presented including ‘presents given to other households’ and excluding them. As it was mentioned in the Data and Methodology Chapter, the official definitions of per capita income and consumption subtract ‘presents given to other households’ to obtain *Per capita net income* and consumption. Their motivation to do this is to avoid double account for a present that changes hands more than one time. However, if we follow the official procedure, several households report a negative income and since our poverty and inequality calculations do not take into account negative, zero or missing values, we would lose these observations.[75] In order to prevent that, all of the combinations presented in table 4.2 are given in current and net values, that is, with/without ‘presents given to other households’. The following table describes all the different concepts used for this exercise:

[75] The number of observations which changed into negative values when taking away ‘presents given to other households’ were 14 in 2002. This number might not be high, but we believe that it is important to keep these observations.

Table 4.1

Income and consumption definitions

Name	Description
Base definitions	
ictpc	**Per capita current income:** The sum of monetary income from wages, cooperatives, business rents and property rents. And the sum of all 4 sources of non-monetary income: transfers, self-consumption, in-kind presents, in-kind transfers and imputed rents.
gctpc	**Per capita current consumption:** The sum of all the monetary and the 4 non-monetary expenditure sources
Official definitions	
intpc	**Per capita net income**: same as ictpc, minus 'presents given to other households'
gntpc	**Per capita net consumption:** same as gctpc, minus 'presents given to other households'
Our preferred definitions (without imputed rents and including 'presents given to other households')	
ictpc2	**Per capita current income 2:** same as ictpc but without imputed rents and including 'presents given to other households'
gctpc2	**Per capita current consumption 2:** same as gctpc but without imputed rents and including 'presents given to other households'
Concepts excluding imputed rents and 'presents given to other households	
intpc2	**Per capita net income 2:** same as intpc but without imputed rents
gntpc2	**Per capita net consumption 2:** same as gntpc but without imputed rents
Concepts excluding durable goods	
gctpc3	**Per capita current consumption 3:** same as gctpc but excluding durable goods.
gntpc3	**Per capita net consumption 3:** same as gntpc but excluding durable goods.
Concepts excluding durable goods and imputed rents	
gctpc4	**Per capita current consumption 4:** same as gctpc but excluding durable goods and imputed rents.
gntpc4	**Per capita net consumption 4:** same as gntpc but excluding durable goods and imputed rents.

a) The official definitions are from: www.coneval.gob.mx
b) Current means that includes presents given to other households.
c) Net means that excludes presents given to other households.
d) Durable goods include buys of household appliances, cars and tyres. That is, the entire K section and *claves* M007-M016 of the Consumption file.

Table 4.2

Mexico: Changes in the means of different welfare indicators*
1992-2002

	1992	2002	%Change
Official definitions			
intpc	1,653.47	1,900.57	14.94
gntpc	1,414.82	1,661.63	17.44
ictpc	1,791.58	2,052.43	14.56
gctpc	1,553.12	1,814.32	16.82
Without imputed rents			
intpc2	1,582.48	1,656.25	4.66
gntpc2	1,343.36	1,416.11	5.42
ictpc2	1,719.85	1,806.56	5.04
gctpc2	1,481.36	1,568.05	5.85
Without durable goods			
gntpc3	1,326.86	1,585.36	19.48
gctpc3	1,462.85	1,737.45	18.77
Without durable goods and imputed rents			
gntpc4	1,255.43	1,339.86	6.73
gctpc4	1,391.09	1,491.18	7.20

Source: Own calculations using the data from the 1992 and 2002 ENIGHs.
a) Per capita monthly constant pesos of August 2002.
b) See table 4.1. for the income and consumption definitions.
*weighted and excluding negative, zero and missing values.

As we can see in table 4.2, for all the definitions mean income is higher than mean consumption in both years. Secondly, the direction of the change in mean income and consumption between 1992 and 2002 remains the same (positive) irrespective of the definition used. Thirdly, the inclusion of imputed rents increases three times the percentage change in mean per capita income/consumption between 1992 and 2002 when comparing it with the concepts that do not include imputed rents (Compare concept 1 and 3 with 2 and 4).

A second approach to this issue is to look at the income/consumption shares of Mexican households in 1992 and 2002 by deciles using 16 different definitions of income/consumption. As we can see on table A 4.1 in the Annex, it makes no significant change to include/exclude durable goods from the consumption estimates (with the exception of the bottom 5% of gntpc3). However the inclusion/exclusion of imputed rents (represented on the table by a ‘2’ at the end of each definition) has a very important effect on the bottom 10% of the population for all the income/consumption definitions. For instance, the official income definition (intpc) reports increases in the income shares for the bottom 10% of the population (see table 4.3 below). But when we exclude imputed rents from the official definition of income (intpc2), this definition reports increases for the bottom 1st, 5th, and 10th deciles, but at a much more modest rate than that reported by the definition that includes imputed rents (intpc). The story is similar for our preferred definitions of income (ictpc2) which report a much modest increase for the bottom 10% of the population when imputed rents are not included as compared with the definition that includes them (ictpc). The consumption variables are affected even more when excluding the definition of imputed rents (gntpc2 and gctpc2) and report even smaller increases in the shares of the bottom 10% of the population as compared with the concepts that include them (gntpc and gctpc).

Table 4.3

Mexico: Sensitivity of the official income definition to the exclusion of imputed rents by deciles income shares, 1992 and 2002

	intpc[a](base)			intpc2 (excluding imputed rents)		
deciles	**1992**	**2002**	**%change**	**1992**	**2002**	**%change**
1%	0.06	0.07	25.45	0.05	0.06	16.33
5%	0.13	0.14	13.49	0.12	0.14	13.22
10%	1.27	1.43	12.37	1.24	1.37	10.69
20%	2.33	2.51	7.65	2.30	2.47	7.43
30%	3.26	3.45	5.90	3.25	3.48	7.09
40%	4.17	4.47	7.25	4.14	4.49	8.58
50%	5.20	5.61	7.72	5.15	5.61	8.93
60%	6.43	6.94	7.84	6.43	6.90	7.28
70%	8.20	8.60	4.90	8.15	8.72	6.88
80%	10.87	11.23	3.32	10.85	11.17	2.87
90%	15.84	16.09	1.60	15.88	16.06	1.08
100%	42.43	39.68	-6.48	42.61	39.75	-6.71

Soruce: Own calculations using the data from the 1992 and 2002 ENIGHs.
a) *per capita* total net income (total current income minus presents given to other households)

4.2.1. The inclusion/exclusion of imputed rents in the welfare concept

The imputed rents figure tries to capture the hypothetical rent that households would have to pay if they would not have access to live in a house where they do not pay a rent, either because they own the house or because somebody let them live there for free. We believe that we have sufficient evidence to conclude that imputed rents should not be included in our preferred income/consumption variables.

The *first* reason arises from the comparability of the ENIGH questionnaires over time. In the case of imputed rents, the questions asked to capture the amount of imputed rents changed from 2002 onwards to increase the quality of the ENIGH household surveys. The inclusion of imputed rents when using income or consumption as the preferable welfare indicator has been polemical among the Mexican academia. Indeed, even the CTMP concluded that when comparing the ENIGH household surveys of 2002 onwards with those before, it was advisable to exclude this source from the welfare indicator.

The *second* reason arises from the sensitivity of different welfare variables to the inclusion of imputed rents. As we can see on table 4.2 the inclusion of imputed rents in the income/consumption variables has a big impact on their means. Indeed, the percentage change in the means of these concepts between 1992 and 2002 is three times higher for the variables that include imputed rents than for those that do not. Table A 4.1 in the Annex explores the sensitivity of income/consumption shares by decile to the inclusion of imputed rents in the same period. As we can see, the inclusion of imputed rents increases the changes between 1992 and 2002 in the shares of the bottom 10% of the population.

The *third* and final reason is that our poverty measures also proved to be sensitive to the inclusion of imputed rents. When comparing the changes over the 1992-2002 period, we observe on table A 4.3 that the variables that include imputed rents (intpc and gntpc) report a bigger fall in the period in the incidence, depth and severity of poverty than those that exclude them (ictpc2 and gctpc2).

For all the above reasons, we believe that imputed rents should not be included in the income/consumption definitions when making comparisons over time.[76] Regarding the inclusion of durable goods, since it did not seem to make much of a difference, we will include them. Finally, as mentioned in the data and methodology chapter, we will also include 'presents given to other households' in order to prevent losing observations.

[76] However, for comparison reasons, we will continue reporting some results for the official income variable, the one used by the Poverty Committee and the Mexican Government.

4.3. Analyzing the Sensitivity of Poverty and Inequality Measures to the use of Equivalence Scales and Economies of Scale

Different methodologies and justifications to adjust for the cost of children and family size were introduced in the literature review. The main conclusion from this discussion was that there is no consensus regarding the way to implement such adjustments. Since such a decision has a potential high impact on poverty and inequality measures, this section is going to explore the effects of using different equivalence scales and economies of scale on different poverty and inequality measures. In order to do so, we will use parametric equivalence scales. Finally, a sensitivity analysis will take place and it will consist in using these adjusted values of income and consumption to calculate different poverty and inequality measures. The aim of this section is to find out how sensitive these measures are to the use of different equivalence scales and economies of scale. It is important to mention that when the welfare measure is based on equivalised income, a different poverty line is appropriate. For this reason, it makes more sense to focus on comparing the impact of different definitions on *patterns* of poverty rather than *levels*. In this section, we focus on the levels, but we wanted to recognise this point for future reference.

A whole group of equivalised incomes was derived by using the scale proposed by the National Research Council in the USA[77]:

$$(A+PK)^F \tag{4.1}$$

where A is the total number of adults in the household, K is the number of children in the household which cost a proportion of P of an adult, and F is the scale economy factor. The values for the cost of a child *K* and the parameter for economies of scale *F* were set from 0 to 1. The values proposed by the National Research Council of the USA were calculated, as well as those proposed by Teruel *et al* (2005) that were obtained using the Rothbarth and Engel's methodologies in the case on Mexico. That is, a whole group of equivalised incomes was derived. This group was created using a concept of *household*

[77] A more detailed introduction for this scale was given at the end of the literature review.

income that does not include imputed rents ('ict2' which is the same as ictpc2 but in household terms, not per capita) as a base and by giving different values to the parameters *F* and *P*. For instance, in order to obtain per capita income (the most used adjustment in the Mexican literature) it is only necessary to give a value of 1 to *P* and a value of 1 to *F*. However, the values of these two parameters were modified in the whole range [0-1] in order to derive different values of equivalised income and consumption.

After the different equivalised income values were derived, we proceeded to use them in a sensitivity analysis. This analysis consisted in using these different values of income and consumption to calculate different poverty and inequality measures. The poverty measures include the Foster-Greer-Thorbecke (FGT) poverty indices: FGT(0): headcount ratio (proportion poor); FGT(1): average normalised poverty gap; and FGT(2): average squared normalised poverty gap. The inequality measures include: a) the Generalized Entropy Measures GE; b) the Atkinson Inequality Index; and c) the Gini coefficient. The aim of this section is to find out how sensitive are all these poverty and inequality measures to the use of different equivalence scales and economies of scale. The following sections present all these results with the sensitivity analysis.

4.3.1. Inequality measures and equivalence scales results

In this section the different inequality measures introduced in Chapter 2 will be used to calculate the levels and trends of inequality in Mexico in 1992-2002. But instead of using per capita measures, we will adjust household income to the cost of children and household size, by applying different equivalence scales and economies of scale. The objective is to measure how sensitive are these measures to these adjustments.

4.3.1.1. Gini coefficient results for Mexico, 1992 – 2002

Table 4.4 below presents a summary of the results for the three inequality measures used (the full results are reported in table A 4.2 in the Annex). This table also includes both the official definitions and our preferred definitions of income and consumption. As we can see in tables 4.4 and A4.2, the levels of inequality appear to be sensitive to the choice of equivalence scales and economies of scale. Indeed, there is a difference of 14% and 17% between the minimum and the maximum value of the Gini coefficient in 1992 and 2002, respectively. However, when looking at the percentage *change* between 1992 and 2002 we obtain a consistent picture. Regardless of the adjustment made, there is a decrease of around 6% in inequality from 1992 to 2002 when using the Gini coefficient as the preferred inequality measure and income as the preferred welfare indicator. When using consumption the direction of the changes is also consistent, but the magnitude of the change is much smaller as compared with the income definitions.[78]

Table 4.4

Mexico: Sensitivity of inequality measures to the use of different equivalence scales and economies of scale, 1992 - 2002

	Gini Coefficient			GE			Atkinson		
	1992	2002	% change	1992	2002	% change	1992	2002	%change
				a=1	a=1	a=1	ε=1	ε=1	ε=1
intpc	0.533	0.507	-4.965	0.579	0.494	-14.741	0.399	0.365	-8.475
gntpc	0.501	0.494	-1.372	0.488	0.479	-1.943	0.357	0.347	-2.984
ictpc2	0.531	0.500	-5.879	0.571	0.479	-16.117	0.397	0.356	-10.155
gctpc2	0.503	0.488	-2.903	0.490	0.467	-4.710	0.359	0.339	-5.526
Y02	0.471	0.442	-6.248	0.435	0.356	-18.205	0.323	0.288	-10.781
Y21	0.491	0.461	-6.061	0.479	0.399	-16.797	0.344	0.308	-10.548
Y44	0.478	0.448	-6.407	0.451	0.369	-18.270	0.331	0.294	-11.164
Y61	0.512	0.480	-6.076	0.524	0.438	-16.467	0.371	0.332	-10.579
Y88	0.506	0.475	-6.231	0.512	0.424	-17.208	0.365	0.325	-10.854
Y11	0.531	0.500	-5.879	0.571	0.479	-16.117	0.397	0.356	-10.155
Y771	0.520	0.489	-6.006	0.544	0.455	-16.318	0.382	0.342	-10.428
Mean	**0.492**	**0.462**	**-6.044**	**0.480**	**0.399**	**-17.000**	**0.347**	**0.311**	**-10.510**
Min	**0.467**	**0.438**	**-6.417**	**0.429**	**0.352**	**-18.466**	**0.318**	**0.283**	**-11.190**
Max	**0.533**	**0.507**	**-1.372**	**0.579**	**0.494**	**-1.943**	**0.399**	**0.365**	**-2.984**

Source: Own calculations using the 1992 and 2002 ENIGHs.

a) 'Y61' means P=0.6 and F=1 from formula 2.5 $(A+PK)^F$. 'Y44' means P=0.4 and F=0.4.

b) The first two concepts are per capita net income and consumption, which are the official definitions where the cost of a child is the same of an adult and there are no economies of scale.

c) The third and fourth concepts are our preferred income and consumption definitions, where the cost of a child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

d) Y771 is the adjustment recommended by the Mexican literature, with the cost of a child being 77% of an adult, and no adjustment for household size. That is, P=0.77 and F=1.

e) All the adjustments from Y02 onwards have as base ict2, which is Total household current income, which is the same as our preferred definition, but in household terms, not per capita.

[78] The value of the Gini ranges between 0 and 1. An egalitarian society where everybody gets the same share of the cake will lead to a value of 0. In opposition, an extremely unequal society where only one household holds all the income/consumption will lead to a Gini value of 1.

4.3.1.2. Generalised Entropy Measure results for Mexico, 1992 – 2002

As we can see in tables 4.4 and A4.2, there is a fall in inequality in the period when measured with the GE regardless of the combination of equivalence scales and economies of scale used.[79] However, the magnitude in the change of inequality in each year is highly sensitive to the use of different equivalence scales and economies of scale. For example, the differences between the minimum and the maximum values of adjusted income in 2002 when a=1 is 36%. Finally, when comparing our preferred income definition (ictpc2) with the consumption one (gctpc2) we can see on table A4.2 that there is also a fall in inequality in the analyzed period when using per capita consumption. However, the fall in inequality is less pronounced. Thus, the welfare concept used does not affect the direction of the change but it does affect the magnitude of the change.

4.3.1.3. Atkinson's Inequality Measure results for Mexico, 1992 – 2002

The final inequality measure that was calculated is the *Atkinson Inequality Index*.[80] This index gives consistent results in the direction of the change in inequality in the period 1992-2002. That is, regardless of the combination of equivalence scales and economies of scale used, the index shows a decrease in inequality in the period (see tables 4.4 and A4.2). In contrast, when looking at each year separately, it is clear that the index is highly sensitive to the use of equivalence scales. Indeed, the average difference between the minimum and maximum value each year is around 25%. Finally, when comparing income vs consumption we observe that the direction of the change remains the same regardless of the welfare indicator. But the magnitude of the change is more pronounce when using per capita income.

To sum up, when looking at changes in inequality between 1992 and 2002 the results show a consistent picture in each of the three inequality

[79] The Generalized Entropy Measure is equally sensitive to changes across the distribution when $\theta=1$; more sensitive to changes in the lower parts of the distribution when θ is close to zero; and sensitive to changes in the higher parts of the distribution for higher values of θ.

[80] For low values of its parameter ε the index becomes very sensitive to changes in the high end of the distribution; in contrast, when a high value is used, the index becomes more sensitive to the lower end of the distribution (Cowell, 2000:47).

measures used in this section. Indeed, regardless of the equivalence scales and economies of scale used, there is a decrease in inequality in Mexico during this period. The Gini coefficient gives a fall in inequality of around 6%. When the Generalised Entropy Measure is equally sensitive to changes across the distribution (θ=1), the mean fall in inequality is 17%. Finally, when the Atkinson Inequality Index is equally sensitive across the distribution (ε=1) inequality falls by 10.5%. However, when looking at the magnitude of inequality for each year separately, it is clear that these Indexes are highly sensitive to the use of equivalence scales and economies of scale. In 1992 the difference in between the minimum and the maximum value of the Gini coefficient is 14% and in 2002 is almost 17%. In the case of the Generalised Entropy Index in 1992 and 2002 for values of a=1 the differences between the minimum and the maximum values obtained are 33% and 36%. In the case of the Atkinson Inequality Index the average difference between the minimum and maximum value is around 25% in both years when the index is equally sensitive across the distribution (ε=1). Nevertheless, if we ignore the economies of scale factor and focus only on the equivalence scales (e.g. all the scales that give a value of 1 to the parameter F), it becomes clear that our inequality measures remain highly sensitive only when we give a very low cost to a child (less than 60% of an adult). Thus, it seems that the sensitivity of our inequality measures is mainly driven by the economies of scale factor F once we cross the threshold of 60% of an adult for the cost of a child.

4.3.2. Poverty measures, equivalence scales and economies of scale

"The choice of measure inevitably makes a value judgement, and can have considerable bearing on policy choices" (Lipton and Ravallion, 1995:2572)

Our research identifies the poor in one of the most common ways: First, by using two monetary indicators of household welfare, which represent total household expenditure on consumption and total household income over a year (which is represented by y). Second, by setting three poverty lines, denoted by z_i. These lines estimate the cost of Mexican households to acquire three different levels of welfare.[81] The lowest is the "food poverty line" which reflects the cost of the minimum requirements for a household to cover their basic nutrient needs. The second poverty line includes the cost of the food poverty line plus the minimum requirements of health and education. The third poverty line includes the cost of poverty line two plus the minimum requirements on clothes, shoes, housing and public transport. Finally, three aggregate poverty measures are calculated. The first measure is the most common used in the poverty literature, the Headcount index, which indicates the proportion of the population with a level of income or consumption lower than the designated poverty lines. The second measure that will be calculated is *the poverty gap index* **PG** which "can also be interpreted as a per capita measure of the total shortfall of individual welfare levels below the poverty line, it is the sum of all the shortfalls divided by the population and expressed as a ratio of the poverty line itself" (Deaton, 1997:146). Both of these measures neglect inequality among the poor. That is why, we will also calculate the squared poverty gap index of *Foster-Greer–Thorbecke* (FGT), which is sensitive to inequality among the poor.[82]

Table 4.5 below presents a summary of the complete results about the sensitivity of the FGT index to different economies of scale and equivalence scales reported on table A4.3 in the Annex. The calculations are done using the *Food poverty line* and the command *Povdeco* for STATA. When looking at both tables, it is clear that the FGT index is extremely sensitive to the use of different equivalence scales and economies of scale. For instance, in 1992 the percentage of the population living under the food poverty line in urban areas ranges from 0.0% to 15%. For the rural population the headcount varies from 0.0 to 38%. And for the total population the variation goes from 0.0% to 24%. The results for 2002 are very similar to those of 1992. Moreover, when looking at the direction of the changes from 1992 and 2002 the FGT does not give consistent results all the time. The headcount index ($\alpha=0$) appears to be less sensitive than the poverty gap ($\alpha=1$) and the squared poverty gap ($\alpha=2$). For instance, when looking at the headcount index ($\alpha=0$), we observe that there is a fall in the proportion of the poor irrespective of the equivalence scale and

[81] For a detailed explanation about the official poverty lines see Chapter 3.
[82] For a detailed explanation, pros and cons about the FGT family of poverty indexes see Chapter 2.

economy of scale used,[83] but the magnitude of the change varies. For instance, the extreme adjustments that combine a high economies of scale factor with low costs of a child reports falls in the headcount lower than 1 percentage point. In contrast, *per capita income*, where the cost of a child is the same of an adult and economies of scale are ignored, reports a fall in the headcount of 3.5 percentage points. The results for the depth and severity of poverty (α=1,2) are more sensitive to the choice of equivalence scales and economies of scale than the headcount, since depending on the combination of these used, the FGT index shows either an increase or a decrease in the depth and severity of poverty (α =1,2) for the urban and total population. All the results that appeared shaded on table A4.3 are those where the direction of the change is different than the rest of the results. As we can see, if we ignore the economies of scale factor and keep the cost of a child at least 20% of an adult, we can still obtain consistent results in the direction of the changes in urban areas. However, the magnitude of the change still remains very sensitive, and it remains very close to zero when considering a very low cost of children (between 20 and 40%). Thus, to obtain consistent results, it seems better to ignore the economies of scale factor and keep the cost of a child close to the cost of an adult.

Similar to the inequality measure results introduced in the last section, the FGT index estimates do not seem to be too sensitive to the use of income vs. consumption. This index gives very similar results when using two different per capita definitions of income and two more of per capita consumption. Actually, almost all the definitions give consistent results for the *changes* in the incidence, depth and severity of poverty. It can be observed that the majority of the per capita measures show a decline in the incidence, depth and severity of poverty from 1992 to 2002. Finally, the *levels* of poverty as measured by the headcount, and the poverty gap tend to be higher when using consumption as the welfare indicator, while the squared poverty gap gives similar results for both indicators.

To conclude, the poverty measures that were presented in this chapter (FGT, α=0,1,2) proved to be highly sensitive to both, equivalence scales and economies of scale, with the *levels* of poverty being highly sensitive to both

[83] With the exception of one equivalised income for 1992 and 2002. See the values for Y12 for the urban population and Y08 for the rural population in the annex.

scales and the *direction* of the change being mostly sensitive to the economies of scale factor. Regarding the levels of poverty, we obtained measures of the incidence of poverty ranging from zero to up to 38% for the rural population in 1992. Regarding the direction of the changes between 1992 and 2002, when assuming that there are no economies of scale (all the equivalised incomes with *F*=1) we obtain consistent results of a fall in the incidence, depth and severity of poverty when we set the cost of a child close to that of an adult.

Since inequality and poverty measures proved to be highly sensitive to the *economies of scale* factor *F*, we believe that this factor should be set equal to 1 not only when studying each year separately, but also when studying changes through time. Regarding the *equivalence scales* factor, the direction of the *changes* in inequality and poverty measures between 1992 and 2002 gave consistent results when setting the cost of a child to 20% of an adult or higher and ignoring the economies of scale factor. However, the *magnitude* of the change for our poverty measures proved to be highly sensitive to the equivalence scales factor. We obtain more consistent results regarding the magnitude of the change in our poverty measures only when setting the cost of a child close to the cost of an adult, for example, when setting the cost of a child at 77% of an adult or higher.

4.3.3. Income vs. Consumption as the welfare indicator—conclusions

Several theoretical and empirical reasons to use income versus consumption as the preferable welfare indicator were introduced in the literature review. Since it was not clear which concept was methodologically superior to measure poverty and inequality in Mexico, we use both concepts in this first empirical chapter. Our first exploration shows that: 1) per capita mean income in 1992 and 2002 was higher than per capita consumption; and 2) the use of income or consumption has an impact on the percentage shares of the bottom 70% of the population, since most of the consumption definitions give higher shares to these deciles than when using income.

A deeper exploration of the sensitivity of the use of income/consumption was presented in the inequality and poverty measures section. Regarding our inequality measures, we observed that regardless of the income or consumption

Table 4.5. Mexico: Sensitivity of poverty indexes to the use of different equivalence scales and economies of scale 1992-2002

	1992 urban			1992 rural			2002 urban			2002 rural			% change urban			% change rural		
	FGT			FGT			FGT			FGT								
	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
intpc	0.167	0.048	0.021	0.414	0.166	0.088	0.114	0.028	0.011	0.348	0.122	0.066	-5.242	-2.036	-0.984	-6.679	-4.430	-2.213
gntpc	0.188	0.051	0.021	0.460	0.171	0.087	0.129	0.032	0.012	0.374	0.127	0.059	-5.864	-1.896	-0.879	-8.529	-4.385	-2.716
ictpc2	0.156	0.046	0.019	0.387	0.153	0.081	0.121	0.033	0.013	0.340	0.120	0.059	-3.504	-1.303	-0.607	-4.643	-3.259	-2.194
gctpc2	0.177	0.049	0.019	0.427	0.161	0.081	0.154	0.040	0.015	0.372	0.132	0.064	-2.302	-0.928	-0.446	-5.488	-2.913	-1.766
Y06	0.006	0.001	0.001	0.033	0.009	0.004	0.006	0.002	0.001	0.029	0.006	0.002	-0.035	0.021	0.047	-0.360	-0.235	-0.132
Y24	0.004	0.001	0.000	0.024	0.007	0.003	0.002	0.001	0.001	0.019	0.004	0.002	-0.214	0.025	0.049	-0.555	-0.292	-0.159
Y21	0.036	0.009	0.004	0.155	0.045	0.020	0.030	0.007	0.003	0.135	0.038	0.016	-0.653	-0.187	-0.059	-1.923	-0.669	-0.371
Y44	0.006	0.001	0.000	0.028	0.009	0.004	0.004	0.001	0.001	0.021	0.005	0.002	-0.201	0.015	0.046	-0.679	-0.346	-0.202
Y41	0.061	0.014	0.006	0.225	0.071	0.032	0.047	0.011	0.004	0.185	0.055	0.024	-1.370	-0.350	-0.143	-3.953	-1.572	-0.815
Y61	0.091	0.023	0.009	0.282	0.098	0.047	0.072	0.017	0.007	0.239	0.075	0.034	-1.967	-0.596	-0.260	-4.288	-2.295	-1.318
Y81	0.130	0.034	0.014	0.335	0.126	0.064	0.094	0.024	0.010	0.290	0.098	0.046	-3.521	-0.940	-0.416	-4.486	-2.819	-1.781
Y771	0.123	0.032	0.013	0.331	0.122	0.061	0.091	0.023	0.009	0.283	0.094	0.044	-3.205	-0.883	-0.390	-4.814	-2.741	-1.716
Mean	**0.039**	**0.010**	**0.004**	**0.128**	**0.043**	**0.021**	**0.030**	**0.008**	**0.003**	**0.108**	**0.033**	**0.015**	**-0.959**	**-0.277**	**-0.098**	**-2.051**	**-1.048**	**-0.618**
Min	**0.002**	**0.000**	**0.000**	**0.010**	**0.003**	**0.001**	**0.001**	**0.001**	**0.001**	**0.006**	**0.001**	**0.000**	**-3.521**	**-1.303**	**-0.607**	**-4.814**	**-3.259**	**-2.194**
Max	**0.156**	**0.046**	**0.019**	**0.387**	**0.153**	**0.081**	**0.121**	**0.033**	**0.013**	**0.340**	**0.120**	**0.059**	**0.004**	**0.048**	**0.053**	**0.064**	**-0.100**	**-0.068**

Source: Own calculations using ENIGH household surveys for 1992 and 2002.

a) 'Y24' means P=0.2 and F=0.4 from formula 2.5 $(A+PK)^F$. 'Y44' means P=0.4 and F=0.4.

b) The first two concepts are per capita net income and consumption, which are the official definitions where the cost of a child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

c) The third and fourth concepts are our preferred per capita income and consumption definitions without imputed rents, where the cost of a child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

d) The first digit refers to the cost of a child, the second digit is the economies of scale factor to correct for household size. For example, Y06 means that the cost of a child is zero and that the economies of scale factor is 6 or that P=0 and F=0.6.

*ictpc2 is the extreme adjustment where the cost of an additional child is the same of an adult and there are no economies of scale. This is per capita income.

e) Y771 is the adjustment recommended by the Mexican literature, with the cost of a child being 77% of an adult, and no adjustment for household size or P=0.77 and F=1.

f) The results with a shade refer to changes in the direction of the change with respect with the rest of the results. As we can observe, the most sensitive are the results for urban areas.

definition used, there was a fall in inequality between 1992 and 2002 when measured by the GE, the Atkinson index and the Gini coefficient. However, the magnitude of this fall is always higher when using income as opposed to consumption. Regarding our poverty measures, we observe a fall in the incidence, depth and severity of poverty between 1992 and 2002 when using the FGT index (α=0,1,2) regardless of the use of income or consumption. However, we observe a similar pattern than with our inequality measures with the magnitudes of the changes being almost always higher when using income as opposed to consumption.

If the changes in poverty and inequality are more pronounced when we use income as opposed to consumption, then this should be true not only in the case where there is a fall in inequality and poverty, but also for the years where there was an increase in inequality and poverty. If so, it seems that Mexican households are smoothing their consumption by saving when they have an increase in their income and using those savings or even depleting their capital when their income falls. We would look at this issue in the next Chapter. Since the official poverty measures use income, we will use primarily income as the welfare indicator in the next Chapter. But we will also present results for consumption in order to explore the extent in which Mexican households smooth their consumption.

4.3.4. Equivalence of scale and Economies of scale—conclusions

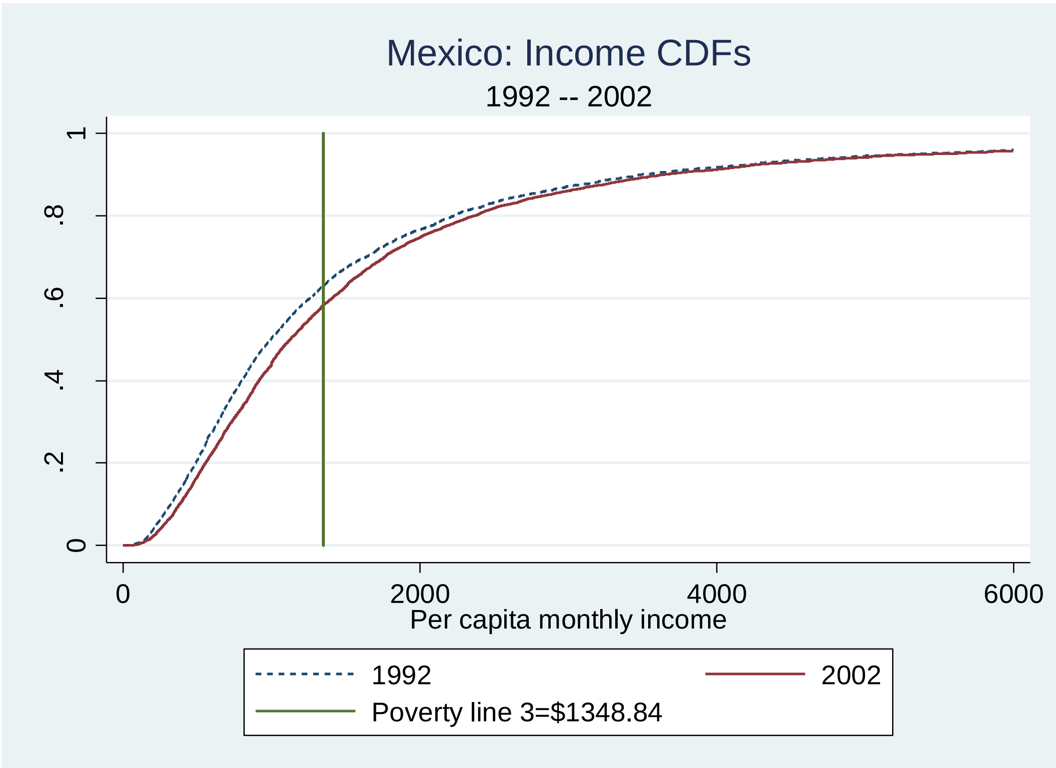
We started this section by discussing that we needed some kind of adjustment to take into account different household sizes and for the cost of children. It was mentioned that the most common adjustment is dividing the total resources of the household in equal parts for each member and ignoring the economies of scale factor. That is, using per capita income/consumption. However, it was discussed that setting the cost of each household member equal, ignored the fact that the cost of a child is in general less than that of an adult. Since there is no consensus regarding the way to implement the different costs of children and adults, we used a parametric scale to measure the sensitivity of different poverty and inequality measures to two different factors: 1) equivalence scales; and 2) economies of scale. We noticed that both, inequality and poverty measures, were highly sensitive to the economies of scale factor. Thus, we believe that this factor should not take part in the adjustment. Regarding the equivalence scales factor, we found that our *inequality measures* were not very sensitive to the adjustment for different costs of children. Nevertheless, our *poverty measures* proved to be highly sensitive. Indeed, the *direction* of the changes between 1992 and 2002 remained the same when ignoring the economies of scale factor and setting the cost of a child to 20% of an adult or higher. However, we obtained consistent results for the *magnitude* of the change only when setting the cost of a child close to that of an adult. The cost of a child could be set at 77% of an adult, which is the average cost found applying the Rothbarth and Engel methods in Mexico from Teruel *et al* (2005). However, choosing a specific equivalence scale above the threshold seems like an arbitrary decision.

Thus, since: a) it is obvious from our results that the incidence, depth and severity of poverty is always higher when using per capita measures as opposed to adjusted ones; b) we are interested not only in the direction of the changes in our poverty measures, but also in the levels of poverty; and c) the official calculations are given in per capita measures, we therefore believe that for the rest of the data sets we should assume that there are no economies of scale and apply two different definitions of income, one in per capita terms (to compare our results with the official ones) and the other using an adjusted income with the cost of a child being 77% of an adult.

4.4. Using Stochastic Dominance Analysis to Assess the Sensitivity of the Headcount Index to the use of Equivalence Scales

The previous section concluded that the Headcount index was not as sensitive to the use of different equivalence scales. However, the Headcount uses a fixed poverty line for its calculations (e.g. the food poverty line). Stochastic dominance is a useful tool to rank distributions without the restriction of a poverty line. That is why, in this section, we will use stochastic dominance analysis as a way to check the sensitivity of the Headcount index to the use of different equivalence scales. We will plot the Cumulative Distribution Functions (CDFs) for 1992 and 2002 using different equivalised incomes. Using the same parametric scale from the previous section, we will use only those adjusted incomes that assumed that there are no economies of scale in order to focus only on the sensitivity of the changes in poverty to different equivalence scales.

Figure 4.1. Cumulative Distribution Functions, per capita income, 1992-2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.
Per capita monthly income and poverty lines are in constant prices of August 2002.

Figure 4.1 above, plots the CDF for per capita monthly income in 1992 and 2002. This figure represents the adjustment when the cost of a child is the same of an adult and there are no economies of scale. However, we plot detailed CDFs to examine in detail the right tail of the distribution and we found out that the distributions intersect around the cut-off point of $16,000 per capita monthly pesos.[84] That is, up to poverty lines of that value, the distribution of 2002 is preferable to that of 1992.

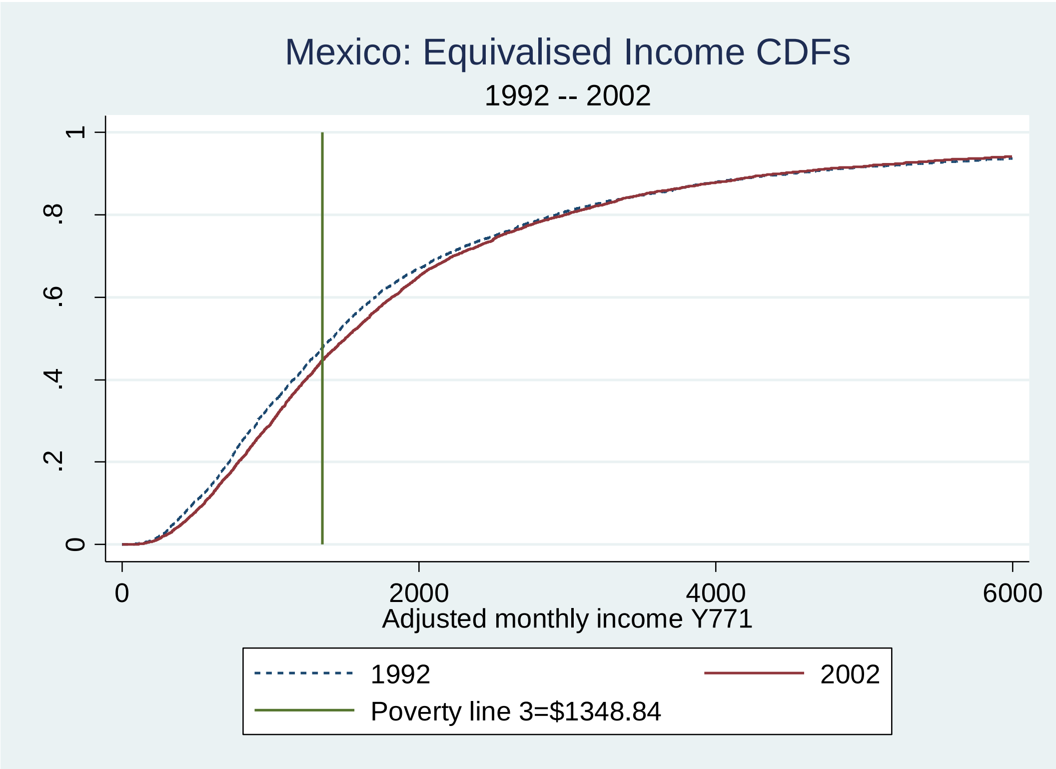
To illustrate the sensitivity of the CDFs to the use of different equivalence scales, figure A4.1 in the Annex plots equivalised income Y01, which means that the cost of a child is zero and there are no economies of scale. As we can see, the curves cross each other several times even before the cut-off point of $1,348.84 which is the poverty line 3 (the most generous one). Figure A4.2 in the annex shows equivalised income Y21, which assumes that the cost of a child is 20% of an adult and that there are no economies of scale. We can observe that at least up to the cut-off point of $2,500 pesos, which is higher than the most generous poverty line 3 ($1,348.84), the 2002 curve is preferable to that of 1992. Figure A4.3 also in the annex plots equivalised income Y41, which assumes that the cost of a child is 40% of an adult and that there are no economies of scale. As in the previous figure, we can observe that at least up to the cut-off point of $2,500 pesos, the 2002 curve is preferable to that of 1992. We also plotted equivalised income Y61, which assumes that the cost of a child is 60% of an adult and that there are no economies of scale and we can observe that as in the previous 2 figures, at least up to the cut-off point of $2,500 pesos, which is around the double of poverty line 3 ($1,348.84) the 2002 curve is preferable to that of 1992.[85]

The following figure plots equivalised income Y771, which assumes that the cost of a child is 77% of an adult and that there are no economies of scale. Where the cost of a child was calculated using the Rothbarth and Engel's methodologies for Mexico by Teruel *et al* (2005). We can see, that this plot resembles a lot that one of per capita income. And as in the previous ones, the 2002 curve is preferable to that of 1992 at least for the bottom of the distribution

[84] These detailed figures are not reported, but are available upon request.
[85] Figure not shown but available upon request.

up to the cut-off point of $2,600, which is roughly the double of the most generous poverty line.

Figure 4.2. Cumulative Distribution Functions, equivalised income, 1992-2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.
Equivalised monthly income and poverty lines are in constant prices of August 2002.

To conclude, apart from the extreme equivalised income Y01 that assumes that the cost of a child is 0% of an adult and that there are no economies of scale, the rest of the CDFs show that at least up to a cut-off point around the double of poverty line 3 ($1,348.84) the 2002 curve is preferable to that of 1992. That is, we obtained robust results to the changes in the level of poverty, as measured with the Headcount Index for a set of values of poverty lines. Nevertheless, if we are interested not only in the direction of the change of poverty, but also in measuring the proportion of the changes, the results will vary according to the equivalence scale used.

4.5. USING STOCHASTIC DOMINANCE ANALYSIS TO ASSESS THE SENSITIVITY OF POVERTY AND INEQUALITY RESULTS TO THE CHOICE OF MEASURE

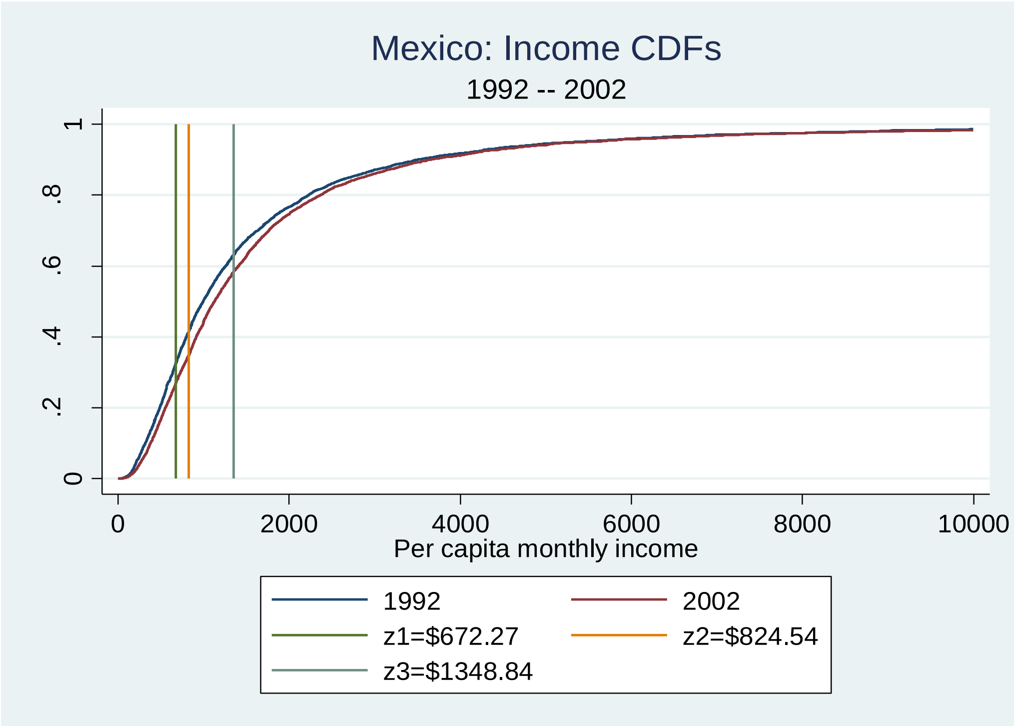
Previous sections documented the sensitivity of different welfare concepts to the use of economies of scale and equivalence scales. In order to do so, different poverty and inequality measures were calculated for each concept. The results obtained, depend on the poverty/inequality measured used and in the case of poverty, also on the poverty line used. This section, explores different ways to obtain robust results regarding the changes in poverty and inequality in Mexico between 1992 and 2002. We will use dominance analysis or stochastic dominance, to check the sensitivity of the different poverty and inequality measures to the choice of measure and in the case of poverty, the choice of a defined poverty line *z* (Deaton: 1997:165). Finally, in order to focus on the sensitivity of the results to the different measures used, we will use only one concept of welfare for all the calculations: *per capita monthly current income* (ictpc2) in constant pesos of August 2002.

4.5.1. Cumulative Distribution Functions (CDFs)

In this section we will use Cumulative Distribution Functions CDFs as a way to check the robustness of poverty measures. As we just mentioned, it is not always desirable to make conclusions about the changes in poverty when these are based on an arbitrary poverty line. Firstly, we will use CDFs to check the robustness of the headcount index to the choice of a certain poverty line *z*. And secondly, we will plot also the area under the CDFs, known as *the poverty deficit curve*, to check the sensitivity of the poverty gap to the choice of different poverty lines *z*.

The CDFs are curves that show the proportion of persons that receive no more than a specific income/consumption, represented as a function of that income/consumption. For instance, looking at Figure 4.3 we can observe that setting the poverty line 3 at $1,348.84 monthly per capita pesos, a bit more than 60 percent of the population was poor in Mexico in 1992. Setting the poverty line 2 at $824.54 per capita monthly pesos, around 40% of the population was poor in the same year. Finally, with the food poverty line set at $672.27 per capita monthly pesos, in 1992 around 35% of the population were poor.[86]

Figure 4.3. Cumulative Distribution Functions for per capita monthly income, 1992-2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.
Per capita monthly income and poverty lines are in constant prices of August 2002.

Figure 4.3 above shows part of the CDFs for per capita income for 1992 and 2002. We plot only up to the cut-off point of $10,000 monthly per capita pesos, which is around 7.4 times higher than the most generous official urban poverty line of $1,348.84 pesos. We can see clearly that the 2002 distribution first-order stochastically dominates the 1992 one up to the value of $3,000 monthly pesos (around the double of the poverty line 3) and after this point the distributions are very close from each other. However, we plot detailed CDFs to examine in detail the right tail of the distribution and we found out that the distributions intersect around the cut-off point of $16,000 per capita monthly pesos.[87] Thus, we can conclude that up to the cut-off of point of $16,000 pesos per capita per month, no matter what poverty line we choose, there was a higher proportion of people in poverty in 1992 than in 2002. It is important to note that the $16,000

[86] All the income/consumption variables as well as the poverty lines used are in constant pesos of August 2002.
[87] These detailed figures are not reported, but are available upon request.

cut-off point is almost 12 times higher than the most generous official urban poverty line. Thus, if we are not interested in what happened at the top of the distribution, we can conclude that the 2002 distribution is preferable to that of 1992. That is, there is no strict stochastic dominance, but rather a partial result where the 2002 distribution first-order stochastically dominates the 1992 distribution up to poverty lines with a roughly value of $16,000 per capita monthly pesos. Then, all poverty lines up to $16,000 per capita monthly pesos will give a result for the Headcount index higher for the 1992 distribution when compared with the 2002 one. Since first-order stochastic dominance implies second-order stochastic dominance, we can also conclude that all poverty lines up to $16,000 per capita monthly pesos will give a result for the poverty gap higher for the 1992 distribution when compared with the 2002 one. This is an important result, since the official poverty lines have been criticized for not being generous enough. But our results show that poverty fell between 1992 and 2002 for poverty lines up to 12 times higher than the most generous urban poverty line.

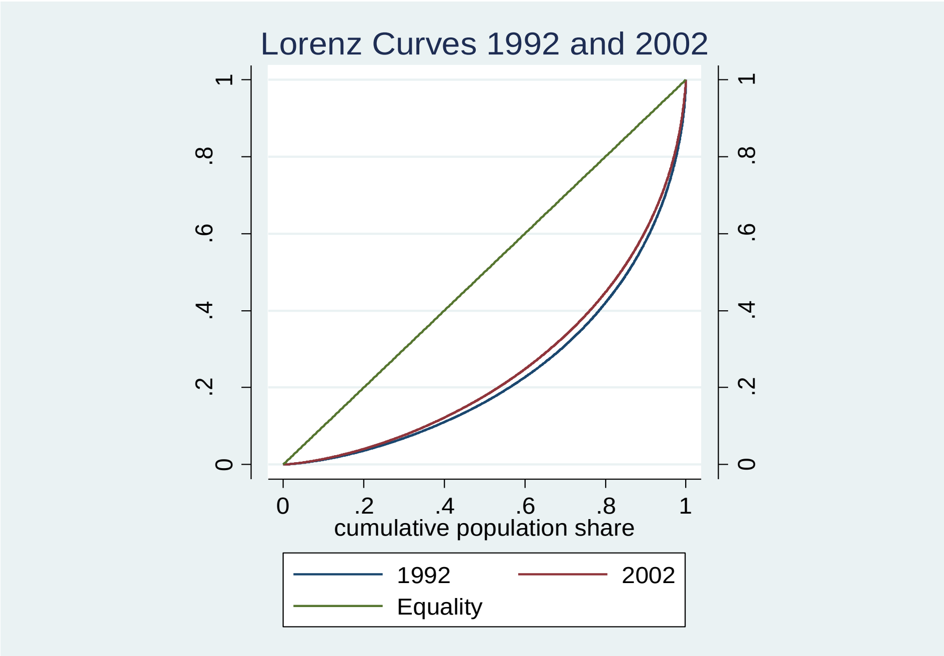
4.5.2. Lorenz curves

In this section we will plot Lorenz curves and Generalized Lorenz curves to check the robustness of different inequality measures. Since “when two Lorenz curves do not cross, the upper one represents an unambiguously more egalitarian distribution” Deaton (1997:159). Lorenz curves plot the cumulative population share in the x-axis, and the cumulative income/consumption share in the y-axis (in ascending order). The 45º degree line represents complete equality, and inequality increases the further the Lorenz curve is from the 45º line.

However, since Lorenz curves are unaltered by the mean of the distribution, we will use Generalized Lorenz curves (Shorrocks, 1983, cited in Deaton 1997:159) in order to rank distributions from the point of view of social welfare, by incorporating average living standards comparisons. The difference in the two curves lies in the y-axis, which is the cumulative share of income/consumption multiplied by the mean. Thus, a Generalized Lorenz curve is a Lorenz curve with a new scale but with the same shape. And when a generalized Lorenz curve in one period lies above a generalized Lorenz curve in another period it means that from a social welfare perspective, the first distribution will always be preferred, since average living standards will be higher and poverty lower.[88]

Figure 4.4 below shows the Lorenz curves for 1992 and 2002. We can see that the 2002 distribution is everywhere above the 1992 distribution. That is, the 2002 curve Lorenz dominates that of 1992. This means that the 2002 curve is unambiguously a more egalitarian distribution with a lower level of inequality (using measures that respect the principle of transfers).

Figure 4.4. Mexico: Lorenz curves for 1992 and 2002.



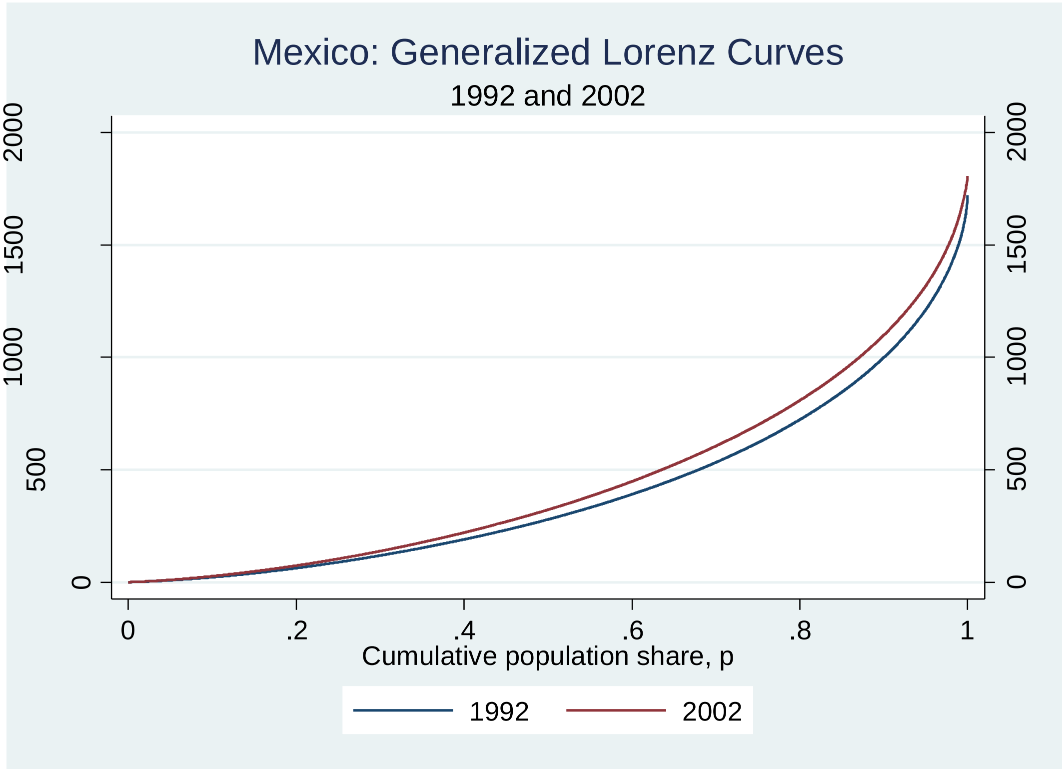
Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.

Figure 4.5 below shows the Generalized Lorenz curves for 1992 and 2002, using per capita income as the welfare indicator. As we can see, the 2002 curve lies above that of 1992. That is, the 2002 curve Lorenz dominates that of 1992. This result means that the 2002 distribution is preferable to that of 1992, since it implies that the poorest *p* percent of the population have more resources as a whole in 2002. Thus, the 2002 distribution will be always preferred from any equity respecting social welfare function (Deaton, 1997:159). Since it is harder

[88] If one Generalized Lorenz curve lies above the other, this implies poverty dominance by poverty gap measures (Jenkins, 2006:37).

to look at the bottom of the curve, we plot a snap shot of the very bottom that shows how the curves cross each other approximately at the .07% point of the cumulative population share. However, after that the curves never cross each other again.[89] That is, in 2002 from the .07% point onwards, the "size of the cake" is bigger, and not only the poorest person has more, indeed, there is more in aggregate and every decile is higher in this year compared to 1992. Thus, we can conclude that social welfare increased in Mexico from 1992 to 2002 irrespective on the way we measure inequality or our aversion towards it.

Figure 4.5. Mexico: Generalized Lorenz Curves, 1992 and 2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.

4.5.3. Stochastic dominance-- conclusions

The CDFs show that all poverty lines up to $16,000 per capita monthly pesos give a higher result for the Headcount Index for the 1992 distribution when compared with the 2002 one. The Lorenz curves show that the 2002 distribution Lorenz dominates that of 1992. This means that the 2002 distribution is

[89] Figure not presented, but available upon request.

unambiguously a more egalitarian distribution with a lower level of inequality (using measures that respect the principle of transfers). The Generalized Lorenz curves for 1992 and 2002 also give similar results. The 2002 distribution generalized Lorenz dominates the 1992 one. This means that the size of the cake is bigger in 2002 and not only the poorest person has more, but also there is more in general and every decile is higher in 2002.

We also used stochastic dominance analysis to check the robustness of our poverty and inequality measures. Stochastic dominance analysis showed that irrespective of the poverty line used (up to 12 times the most generous urban poverty line), the 2002 distribution is preferable to that of 1992. Indeed, the headcount index and the poverty gap measures are smaller in 2002 than in 1992. And from the inequality point of view, the 2002 distribution proved to be more egalitarian than the 1992 one. Thus, we arrived to the same conclusions than using specific poverty and inequality measures. That is, there was a fall in inequality and poverty in 1992-2002. However, with the dominance analysis we can say that these results are independent of the way we measure poverty or inequality and our aversion towards them. In order to continue testing the robustness of our results, we will apply dominance analysis to the changes in poverty and inequality for the entire data sets (1992-2008) in the following Chapter.

4.6. CONCLUSIONS

We started this first empirical chapter with the objective of testing the sensitivity of poverty and inequality results for Mexico to the use of different methodological decisions. As it was exposed in the literature review, there is a very interesting debate about the way to measure poverty and inequality. This chapter was not a quest to find “the perfect poverty and inequality methodology for Mexico”, it was more a quest to identify the sensitivity of a set of inequality and poverty measures to different methodological choices. After working separately in different methodological choices we would like now to point out which of them are driving the sensitivity of the welfare indicator and which others are not.

Firstly, it was pointed out that the inclusion of imputed rents has been highly polemical in recent studies. The most important reason for this has been that the questions for capturing this concept changed in 2002 onwards to increase the quality of the ENIGHs Household Surveys. The inclusion of imputed rents in the income/consumption variables has a big impact on them, particularly in the results for 2002. Indeed, the percentage change in the means of these concepts in the 1992-2002 period are three times higher for the variables that include imputed rents than for those that do not. The poverty measures also proved to be sensitive to the inclusion of imputed rents. When comparing the changes over the 1992-2002 period the variables that include imputed rents show a bigger fall in the incidence, depth and severity of poverty than those that exclude them. Finally, it was also recommended by the CTMP to exclude imputed rents when comparing ENGH household surveys from 2002 onwards with those of previous years. For all the above reasons, we believe that this component should not be taken into account when making comparisons over time. Since in this research we are looking at changes in the period of 1992-2008, we will not include it in our preferable concepts of income and consumption.

Secondly, we noticed that both, inequality and poverty measures, were highly sensitive to the economies of scale factor. For example, we obtained measures of the Headcount index ranging from zero to up to 38% for the rural population in 1992 just by varying the parameter for economies of scale. Thus, for the analysis in latter chapters we will set the economies of scale factor equal to 1 even though we recognize that this choice is arbitrary, it does facilitate comparisons with official results. Regarding the equivalence scales factor, we found that our inequality measures were not sensitive to the different costs of a child. Nevertheless, our poverty measures proved to be highly sensitive. The direction of the change was not that sensitive and we obtained consistent results from the threshold of setting the cost of a child to 20% of an adult or higher. However, we obtained consistent results for the magnitude of the change only when setting the cost of a child closer to that of an adult. It was mentioned that choosing a particular cost above the threshold was quiet arbitrary, but that we could apply that one found applying the Rothbarth and Engel methods in Mexico from Teruel *et al* (2005), which sets the cost of a child at 77% of an adult. Therefore, since it is obvious from our results that the incidence, depth and severity of poverty is always higher when using per capita measures as opposed to equivalised ones and the official results use per capita income for their poverty measures, we therefore believe that for the rest of the data sets we should use both, per capita measures and an equivalised income with the cost of a child being 77% of an adult and assume that there are no economies of scale.

Thirdly, our sensitivity analysis for the use of income or consumption in the case of our *inequality measures* showed that the direction of the change between 1992 and 2002 is always the same with either concept. Indeed, we observe a fall in inequality in the period regardless of the welfare indicator used. However, the magnitude of the change is always higher when using income as opposed of consumption for our three preferred inequality measures (Generalized Entropy, Atkinson and Gini). For the Generalized Entropy and the Atkinson Index the differences between income and consumption are exacerbated when focusing in the top of the distribution. Regarding our *poverty measures*, we observe a fall in the incidence, depth and severity of poverty between 1992 and 2002 when using the FGT index (α=0,1,2) regardless of the use of income or consumption. However, we observe a similar pattern than with our inequality measures with the magnitudes of the changes being almost always higher when using income as opposed to consumption. Finally, our stochastic analysis section showed that for the changes between 1992 and 2002, the use of income or consumption gives similar results. Thus, for the rest of the ENIGH household surveys from 1992 to 2008, the analysis will be based on income (to compare with the official measures) but results for a similar consumption variable will be given in an annex for comparison.

Fourthly, we used stochastic dominance analysis to check the robustness of our poverty and inequality measures. Stochastic dominance analysis showed that irrespective of the poverty line used (up to 12 times the most generous urban poverty line), the 2002 distribution shows lower poverty than that of 1992. From an inequality point of view, the 2002 distribution proved to be more egalitarian than the 1992 one. Thus, we arrived to the same conclusions than using specific poverty and inequality measures. That is, there was a fall in inequality and poverty between 1992 and 2002. Dominance analysis confirms the poverty and inequality ranking and allows us to generalize this finding for a wide range of poverty and inequality measures as well as a wide range of poverty lines. In order to continue testing the robustness of our results, we will apply dominance analysis to the changes in poverty and inequality for the entire data sets (1992-2008).

On the basis of all these findings, our preferable welfare indicator: a) will not include imputed rents; b) will adjust for the size of the family, that is will be reported in per capita terms; c) will also adjust for the differences in the cost of children and adults, using an equivalence scale factor of the cost of a child being 77% of an adult; d) will be based on income but results for a similar consumption variable will be given in an annex for comparison; e) will be used to measure poverty and inequality changes; and f) will also be used to make stochastic dominance analysis to check the robustness of our results in the changes over time in inequality and poverty regardless of a specific measure or a poverty line.

CHAPTER 5. LEVELS AND TRENDS IN POVERTY AND INCOME INEQUALITY IN MEXICO, 1992-2008: LOOKING FOR ROBUST RESULTS

5.1. INTRODUCTION

In this chapter, we will apply the recommendations on methodological choices that resulted from the previous chapter to measure the levels and trends of poverty and inequality in Mexico between 1992 and 2008. That is, 16 years of changes in the income and consumption levels of the Mexican population will be analyzed. As in the previous chapter this will be a microeconomic approach that will use data from the ENIGH household surveys.[90] As suggested, the preferable welfare indicator will be per capita income.[91] The main objective of the chapter is to obtain robust results in the changes over time in poverty and income inequality by applying best practice methods and testing for the statistical significance of changes over time. Obtaining robust results in the changes of poverty is very important in the case of Mexico, since until 2002 there were no official measurements. Thus, before 2002, each researcher applied a different methodology. Moreover, even when applying similar methodologies, different assumptions were made, and more often than we would like these decisions were not properly recorded or explained. As a result, the magnitude in the levels of poverty registered in different works is very diverse and the direction of the changes at crucial points varies among studies. Regarding inequality, although the trends of the Gini seem to be consistent over time, the Gini has an undesirable characteristic: it is more sensitive to changes in the distribution of income in the mean of the distribution than to those happening in the tails and it is not decomposable (Cowell, 2000). Therefore, it seems appropriate to use other inequality measures, such as the Generalized Entropy Measure.

We believe that being clear about the sensitivity of the data to some of the most common assumptions when making calculations about poverty and income inequality in Mexico should be the rule and not the exception. In this

[90] There is a new ENIGH household survey for 2008. But time constraints did not allow us to analyze all the information for that year. However, we include a complete analysis from section 2 onwards.
[91] The definition of income used is (ictpc2) per capita current income. But relevant results for per capita consumption and equivalised income will be briefly discussed and also included in the annex.

way, the manipulation of the data for political or any other use should be minimized, since once a researcher is familiarized with the data sets it becomes extremely easy to manipulate the results. Thus, the more transparent the methodology used, the less room for any manipulation and the easier to interpret the results.

The work of the CTMP and CONEVAL has been very important in creating a series of official poverty measurements using a clear and simple methodology. Nevertheless, the objective of keeping the methodology and the results as simple as possible has been, in our opinion, taken to the extreme more recently. Indeed, the official website of CONEVAL presents results for only one poverty measure, the Headcount index. However, some of its reports have a richer content and offer other poverty measures, such as FGT, with α=1,2 for selected years and only for the total population. This is a deviation from the Committee work and recommendations, which included all the FGT family indexes for rural/urban and the total population. In addition, no robustness check is proposed apart from the introduction of statistical inference to test the significance of changes in the levels of poverty. Moreover, income inequality was excluded from the discussion, thus, there are no official measurements apart from the Gini coefficient. This chapter was started once the methodology proposed by the CTMP was widely available. Thus, we would compare our results with the official ones. In addition, this chapter will try to fill some of the gaps in previous works, by using different poverty and inequality measures and by introducing stochastic dominance analysis to test the robustness of our results. The structure of the chapter is as follows.

Section 2 uses one of the most intuitive visual ways to look at the changes over time in both, poverty and inequality – a kernel density function, and it also introduces income shares among deciles. Section 3 focuses on a set of inequality measures, such as the Gini coefficient and the Generalized Entropy Measure in order to calculate the levels and changes of income inequality over the period of study. Section 4 focuses on welfare comparisons using three different welfare indicators and the Foster Greer Thorbecke (1984) family of poverty measures to calculate the incidence, depth and intensity of poverty in Mexico between 1992 and 2008. In these last two sections, bootstrapped standard errors and confidence intervals will be calculated to test if the changes over time in poverty and inequality are statistically significant. Since the inequality and poverty measures introduced in section two and three depend on the three official poverty lines, we introduce in section 5 stochastic dominance analysis, to check the robustness of our results. Section 6 introduces the final robustness check, which compares the results using income as opposed to consumption as the welfare indicator. Section 7 compares our results with those obtained by both, the CTMP and the CONEVAL. Finally, some conclusions are drawn.

5.2. VISUALIZING THE CHANGES OVER TIME IN THE LEVELS OF POVERTY AND INEQUALITY

5.2.1. Kernel Density Functions for the total population

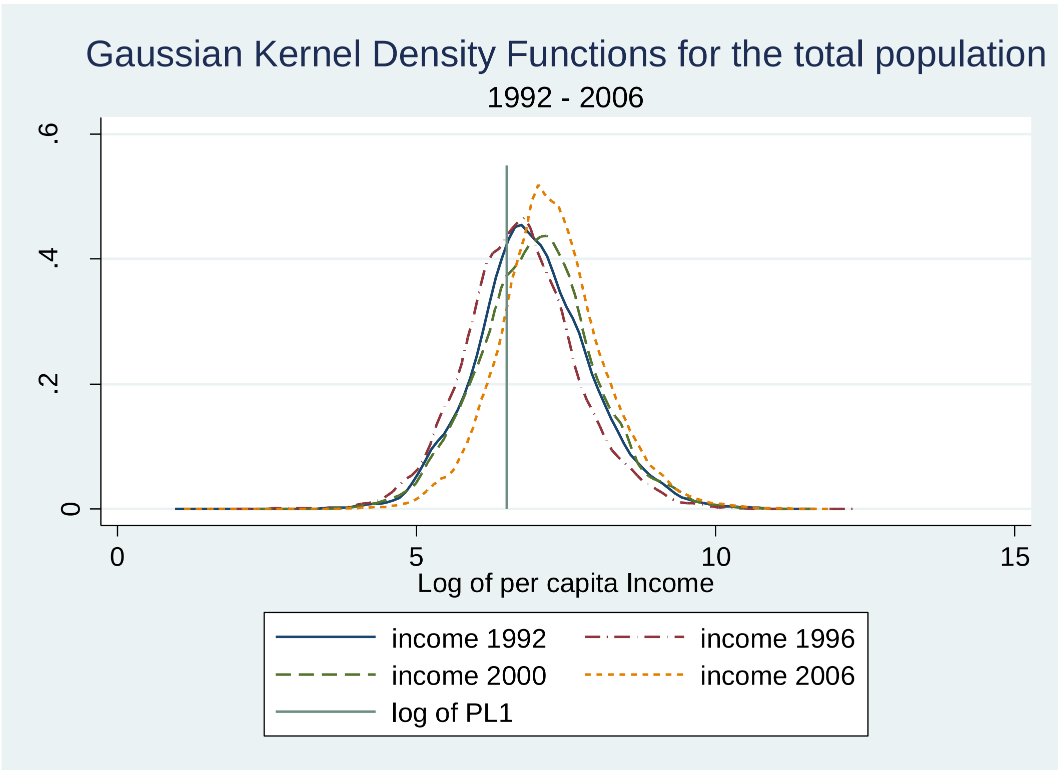
A first approach for visualizing the changes over time in both, the level of poverty and inequality is by plotting an estimated Kernel Density Function.[92] Changes in the shape of the curve refer to changes in inequality and the shifts in the curve show the changes in the level of poverty. Figure 1 below, shows a selected group of the approximately Gaussian Kernel density functions for the log of per capita income of Mexico between 1992 and 2006 and the food poverty line (PL1), which is very close to the $2 dollars per day used by several international organizations.

The first thing that we observe is a shift of the density towards the left from 1992 to 1996. Meaning that the absolute levels of poverty increased in this period. We can see that all the population below and above the three poverty lines suffered from this shock. In fact, Mexico suffered an economic crisis at the end of 1994. Since there is no ENIGH household survey for 1995, the 1996 survey is the first year for which we have available data after the crisis. Regarding inequality, we observe that the shape of the density in 1996 is very similar to the 1992 one, suggesting that the levels of inequality remained unchanged in this period.

[92] The kernel densities were calculated by using the "kdensity" command for STATA.

The 1998 density shifted towards the right of the 1996 one (see figure A5.1. in the annex), that is, income recovered between 1996 and 1998. However, this shift did not benefit the poorest of the poor, or those with an income that was around half of the food poverty line. It is not until 2000 that we observe a shift towards the right all across the density function, suggesting a fall in the absolute levels of poverty, making it possible to achieve pre-crisis poverty levels (see figure A5.2. in the annex). Comparing 2002 with 2000 (see figure A5.3. in the annex) shows a very small shift in the density that benefited those at the end of the left tail, which are the poorest of the poor, suggesting a fall in the levels of poverty for them. Since the rest of the density seems unchanged, this suggests an improvement in the levels of inequality.

Figure 5.1. Gaussian Kernel Density Functions for the total population, 1992-2006.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2006.

The 2004 density shows a small shift towards the right for the majority of the population. This suggests a small fall in the levels of poverty for that year, as compared with 2002 (see figure A5.4. in the annex). Actually, this shift was slightly bigger for those below the food poverty line, suggesting a small improvement in inequality for this group as compared with the rest of the population. The 2005 density is almost the same as the 2004 one, with only a very small shift towards the left for the poorest of the poor and a very small shift towards the right for some of the population near the mean (see figure A5.5. in the annex). This suggests that there was an increase in the absolute levels of poverty for the poorest of the poor and a small fall in poverty for a small part of the population near the mean. Finally, the 2006 density shifted towards the right of the 2005 one (see figure A5.6. in the annex), suggesting a fall in the absolute levels of poverty for that year. Indeed, this shift was bigger for the population below the mean, suggesting an improvement in the level of inequality of the bottom 50% of the population to the expense of the top 50%.

To conclude, 1996 appears to be the year with the highest levels of poverty. This gives the impression to be the result of the shock of the economic crisis or the *peso crisis* of December 1994. However, from 2000 onwards, there seems to be an improvement in the absolute levels of poverty reflected in the shifts of the kernel densities towards the right in 2004 and 2006. Interestingly, GDP annual rate of growth was very modest during this period. But, it is during this period when we observe low levels of inflation.

5.2.2. Rural and urban kernel densities

In this section, we will plot Gaussian kernel densities to have a first approximation to the changes in absolute poverty and the distribution of income in rural and urban areas. We can see on Figures 5.2 and 5.3 the urban and rural kernel density functions between 1992 and 2006.[93] Comparing urban/rural densities we observe that:

- a) The rural densities shift in the same direction as the urban ones.
- b) The shifts in the rural densities between 1992 and 1996 are slightly bigger than those of the urban ones, suggesting that the increase in the absolute levels of poverty was higher in rural areas than in urban ones after the peso crisis.

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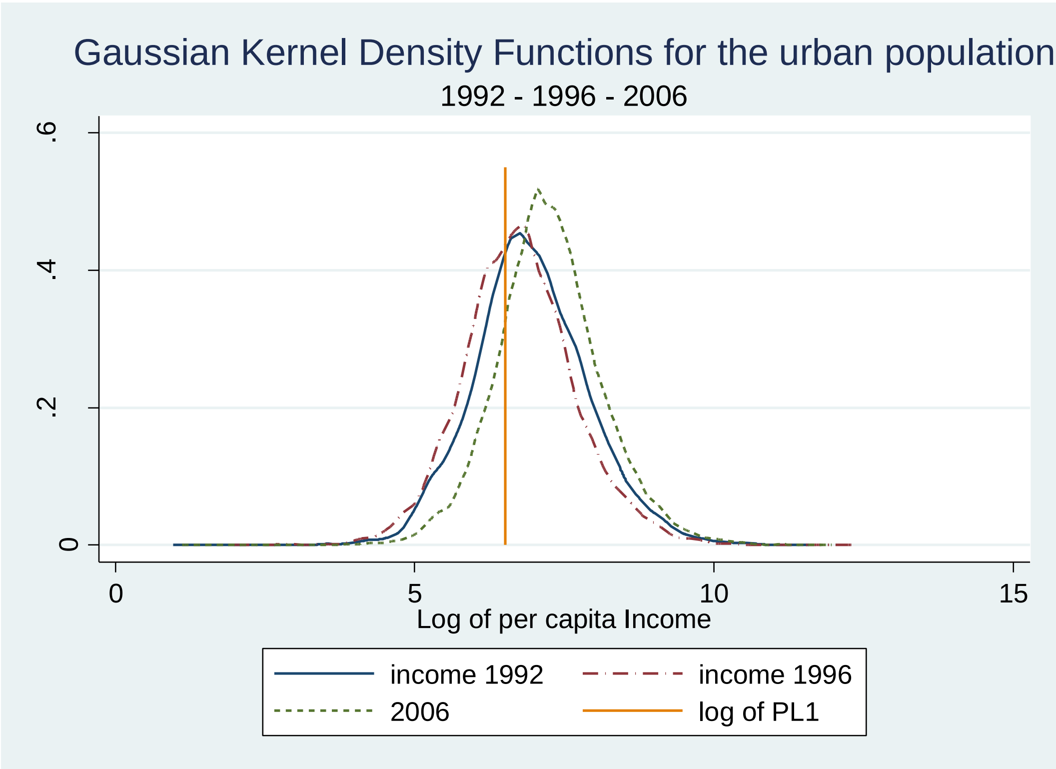
[93] Plots for each pair of years are available upon request.

- c) Between 1996 and 2006 we observe a shift to the right in both kernel densities, suggesting that the levels of income increased for all the population, thus, the levels of absolute poverty fell in both areas.
- d) Regarding redistribution between 1992 and 1996, we observe that the shape of the density function did not change much in both areas. In contrast, between 1996 and 2006 we observe that the shape of the density changed and that this change was higher for those below the mean. This indicates a fall in income inequality in this period.

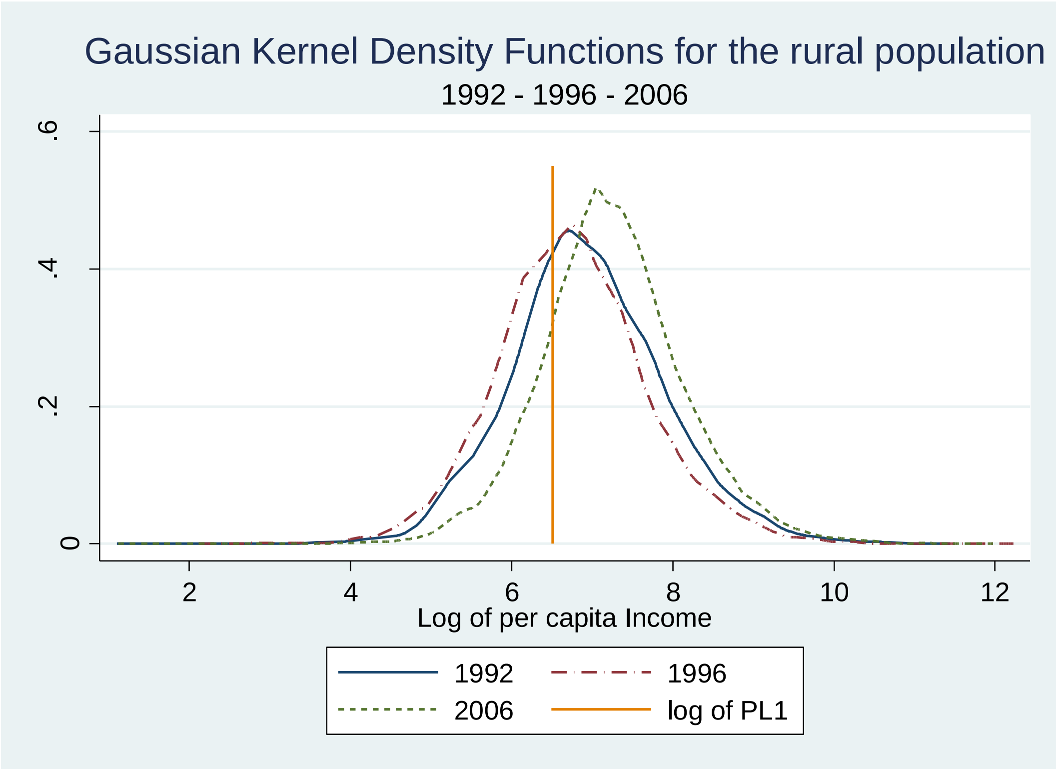
To conclude, the kernel densities suggest that poverty increased in both areas between 1992 and 1996 and decreased between 1996 and 2006. Regarding inequality, it shows that inequality did not change much between 1992 and 1996, but decreased for urban and rural areas between 1996 and 2006.

Figure 5.2. Gaussian Kernel Density Functions for the urban population, 1992-2006.



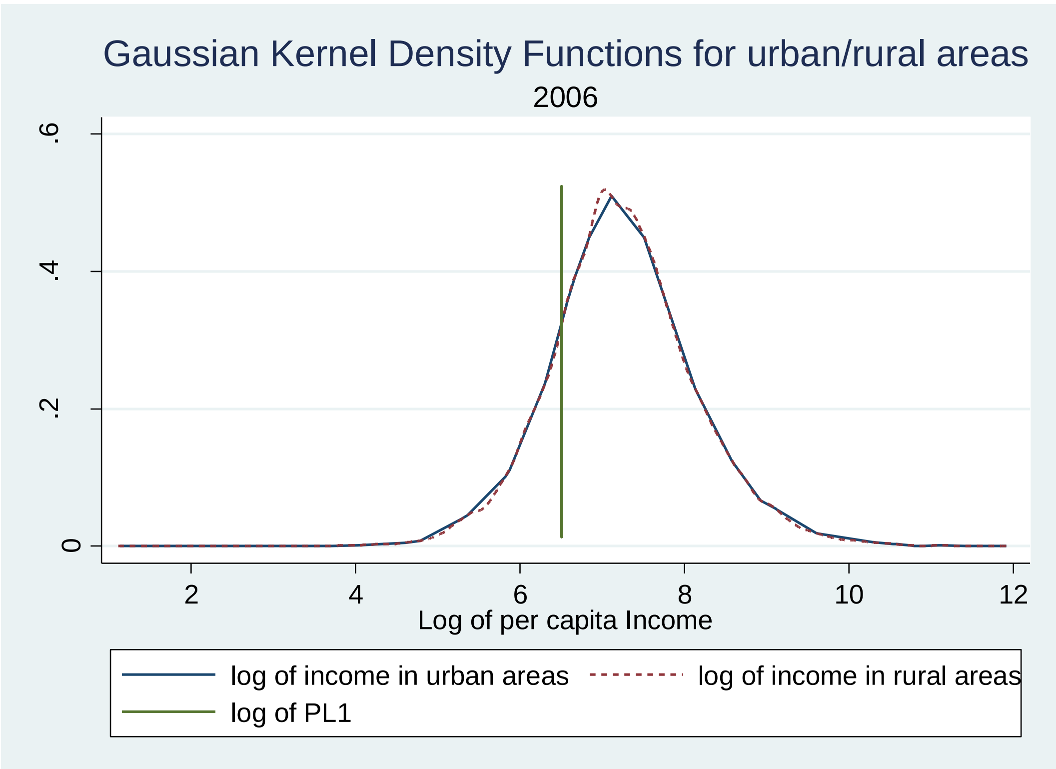
Source: Author’s calculations with data from the ENIGH Household Surveys, 1992-2006.

Figure 5.3. Gaussian Kernel Density Functions for the rural population, 1992-2006.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2006.

Figure 5.4. Gaussian Kernel Density Functions for the rural and urban population, 2006.



Source: Author's calculations with data from the ENIGH Household Survey 2006.

Table 5.1.

Summary statistics for urban and rural areas
1992-2006

	Area	Mean income	Std. Dev.
1992	Urban	2,448	3,395
	Rural	1,056	1,827
2002	Urban	2,267	2,662
	Rural	1,051	1,456
2006	Urban	2,694	3,739
	Rural	1,258	1,813

Source: Own calculations with ENIGH household surveys, 1992-2006.
a) The income variable used is ictpc2.

Finally, table 5.1 above presents summary statistics for urban and rural areas. As we can see, mean income is more than the double in urban areas as compared with rural ones. This indicates important between-group differences among rural and urban areas, an issue that would be explored in detail on chapter 6.

5.2.3. Income shares

A second approximation to look at what happened with the distribution of income during this period is by looking at the income shares by deciles. Tables 5.2 and 5.3 summarize the changes in the percentage income shares and cumulative shares by deciles between 1992 and 2008.[94] In a very simple way, this table highlights the high levels of inequality that characterize the Mexican society (see table A5.1. in the Annex for all the years). However, the levels of inequality could actually be higher, since the information regarding the very rich is not included in the ENIGH household surveys.

[94] The full results are given in the Annex, not only for the total population, but also for the urban/rural areas and for per capita consumption (see table A5.1 to A5.6). We can see in table A5.4 that the consumption results are not too different from those of per capita income. However, the results differ in three ways: 1) in 1992-1994 the poorest 5 deciles reduced their consumption share as compared with only the 3rd and 4th in the income results; 2) in 1998-2000 there were more losers when using consumption shares than when using income shares; and 3) in 2002-2004 only the poorest and the richest deciles reduced their consumption share as compared with 6 deciles in the income results.

Firstly, we can see that the poorest 10% of the population has an average income share of only 1.3% in the period of study. And that the bottom 50% of the population has an average cumulative income share of 17%. In contrast, the richest 10% of the population has an average income share of 40.7%. Secondly, in absolute terms we observe that the total population increased their "size of the cake" in the majority of the periods, by increasing their quantile in pesos. With the exceptions being 1994-1996 for all the deciles, 1996-1998 for the 1st decile, 2000-2002 for the 7th and 10th deciles, and 2004-2005 for the poorest 4 deciles. Thirdly, we observe that there are three periods where the poorest 5 deciles experienced an important fall in their income share: 1996-1998, 2004-2005 and 2006-2008. Indeed, the poorer the decile, the bigger the fall was in their income share. In contrast, the richest decile increased its income share during these same periods. For the 6th to the 9th deciles the story is different. In their case, the fall in their income share happened between 1992-1994, 2002-2004 and 2004-2005. Now in terms of increases in income shares, 2000-2002 and 2005-2006 are important periods for the poorest deciles of the population. Indeed, the poorest decile was the one that benefited the most with increases of 20 and 18% respectively. We also observe that these increases came at the expense of the richest decile between 2000 and 2002 and to the deciles 7th, 8th, and 10th between 2005 and 2006.

Table 5.3 below shows the winners and losers in these eight periods for the total, urban and rural population. This is just a first attempt to look at the changes in the distribution of income in urban and rural areas.[95] As we can see, the rural/urban areas tell a different story than those of the total population. We observe three patterns:

1) In absolute terms the urban population had losses only in 1994-1996, increasing their size of the cake the rest of the periods. In contrast, the rural population increased their size of the cake only in three periods 1992-1994, 1998-2000 and 2005-2006;

[95] Tables A5.2. and A5.3. in the Annex give the results for the urban/rural population and the changes in their distributional summary statistics by decile.

2) In relative terms, the rural poorest deciles had suffered more losses than the urban ones;

3) The relative changes in the income of the richest 10% of the population captured by the ENIGH household survey, have a big impact in the income shares of the rest of the population. Finally, we still do not know if these changes are statistically significant or not. In the following section we will calculate two inequality measures as well as bootstrapped standard errors and confidence intervals of their changes over time in order to determine if these changes are statistically significant or not.

Table 5.2. Mexico: Distributional summary statistics, 10 quantile groups
1992-2008

Quantile group	Quantile	% of median	Income Share, %	L(p), %	GL(p)	1992-1994 % change*	1994-1996 % change	1996-1998 % change	1998-2000 % change
1992									
1	319.3	32.1	1.3	1.3	21.7	5.7	0.2	**-16.3**	9.2
2	489.5	49.2	2.4	3.6	62.2	0.1	4.1	**-12.1**	6.2
3	639.6	64.3	3.3	6.9	118.6	**-2.2**	4.8	**-5.8**	3.3
4	797.2	80.1	4.1	11.0	189.9	**-0.9**	4.3	**-1.6**	0.8
5	994.8	100.0	5.2	16.2	278.9	0.0	4.9	**-1.6**	2.0
6	1,259.0	126.6	6.5	22.7	390.5	**-0.4**	3.1	0.3	2.9
7	1,633.3	164.2	8.3	31.0	532.7	**-0.6**	2.3	1.0	2.2
8	2,226.5	223.8	11.1	42.0	723.2	**-2.6**	1.8	1.0	0.3
9	3,494.5	351.3	16.1	58.1	999.8	**-2.3**	**-0.3**	2.7	0.0
10			41.9	100.0	1,721.0	1.8	**-2.9**	0.6	**-2.1**
						2000-2002 % change	**2002-2004 % change**	**2004-2005 % change**	**2005-2006 % change**
1998									
1	259.8	28.4	1.1	1.1	17.1	20.5	**-1.2**	**-10.5**	18.6
2	403.8	44.2	2.2	3.3	50.2	13.8	4.8	**-6.2**	8.8
3	566.3	62.0	3.2	6.4	98.7	8.8	4.2	**-4.5**	5.6
4	725.9	79.4	4.2	10.7	163.4	7.6	1.6	**-3.1**	4.2
5	913.7	100.0	5.3	16.0	245.3	3.3	1.8	**-1.3**	0.4
6	1,151.7	126.1	6.7	22.7	347.8	1.6	**-0.4**	**-0.2**	0.5
7	1,462.8	160.1	8.5	31.2	477.9	0.6	**-0.6**	**-0.2**	**-0.8**
8	1,998.0	218.7	11.1	42.3	647.9	1.0	**-1.1**	**-0.5**	**-0.4**
9	3,117.2	341.2	16.1	58.3	894.3	0.0	**-0.7**	**-1.8**	0.3
10			41.7	100.0	1,533.4	**-4.0**	**-0.3**	2.7	**-2.1**
						2006-2008 % change			
2006									
1	486.1	35.7	1.5	1.5	33.4	**-20.4**			
2	708.1	52.1	2.8	4.3	93.7	**-12.9**			
3	912.9	67.1	3.7	8.1	174.7	**-8.5**			
4	1,120.1	82.3	4.7	12.8	276.4	**-6.0**			
5	1,360.4	100.0	5.7	18.4	399.5	**-2.3**			
6	1,664.2	122.3	7.0	25.4	550.6	**-1.3**			
7	2,080.0	152.9	8.6	34.0	736.5	1.0			
8	2,762.9	203.1	11.0	45.0	975.2	1.7			
9	4,312.5	317.0	15.7	60.7	1,316.0	1.1			
10			39.3	100.0	2,166.6	2.7			

Source: Own calculations using the ENIGH household surveys from 1992 to 2008..
Share = quantile group share of total per capita income (ictpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(ictpc2)
* This is the percentage change in income shares.

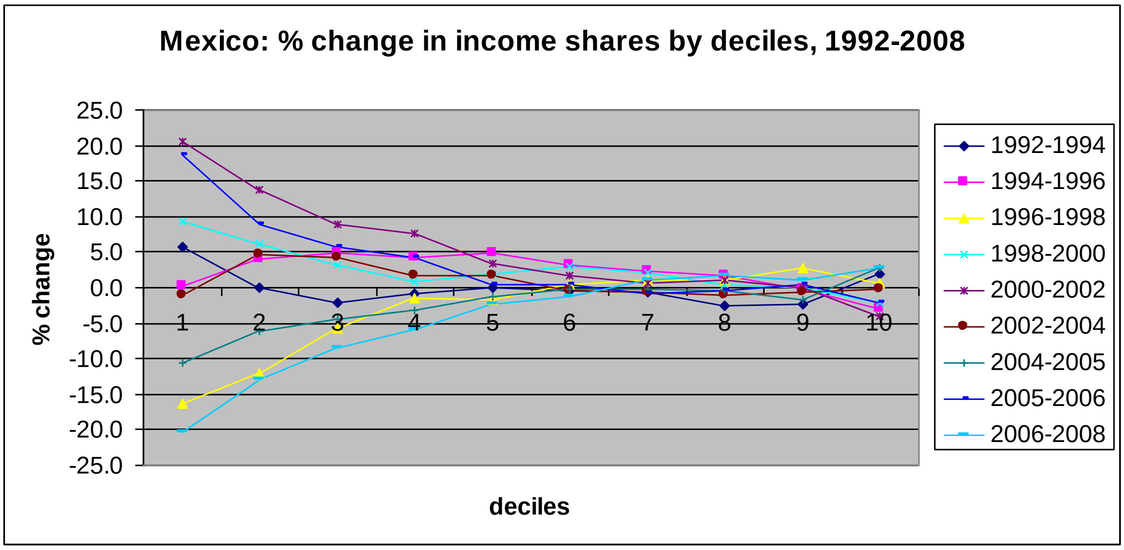
Table 5.3. Mexico: Winners and Losers for the total, urban and rural population (decile groups)
1992 - 2006

	1992-1994		1994-1996		1996-1998		1998-2000	
	Winners	**Losers**	**Winners**	**Losers**	**Winners**	**Losers**	**Winners**	**Losers**
Total population								
Absolute terms	1-10	None	None	1-10	2-10	1	1-10	None
Relative terms	1, 2,10	3,4, 6-9	1-8	9-10	6-10	1-5	1-9	10
Both	1, 2,10	None	None	9-10	6-10	1	1-9	None
Urban population								
Absolute terms	1-10	None	None	1-10	1-10	None	1-10	None
Relative terms	2-9	1,10	2-7	1, 8-10	1-9	10	1-8	9-10
Both	2-9	None	None	1, 8-10	1-9	None	1-8	None
Rural population								
Absolute terms	1-10	None	None	1-10	6-10	1-5	1-10	None
Relative terms	5, 10	1-4, 6-9	5-7, 10	1-4, 8-9	9-10	1-8	1-4, 10	5-9
Both	5, 10	None	None	1-4, 8-9	9-10	1-5	1-4, 10	None
	2000-2002		**2002-2004**		**2004-2005**		**2005-2006**	
	Winners	**Losers**	**Winners**	**Losers**	**Winners**	**Losers**	**Winners**	**Losers**
Total population								
Absolute terms	1-6, 8	7, 10	1-10	None	5-10	1-4	1-10	None
Relative terms	1-9	10	2-5	1, 6-10	10	1-9	1-6, 9	7, 8, 10
Both	1-6, 8	10	2-5	None	10	1-4	1-6, 9	None
Urban population								
Absolute terms	1, 2, 7	3-6, 8-10	3-10	1, 2	1-10	None	1-10	None
Relative terms	1-9	10	10	1-9	1, 2, 4, 5, 7,10	3, 6, 7, 8	1-3, 5-9	4, 10
Both	1, 2, 7	10	10	1, 2	1, 2, 4, 5, 7,10	None	1-3, 5-9	None
Rural population								
Absolute terms	1-10	None	1-10	None	None	1-10	1-10	None
Relative terms	1-8	9-10	2-9	1, 10	8, 10	1-7, 9	1-7	8-10
Both	1-8	None	2-9	None	None	1-7, 9	1-7	None

Source: Own calculations with data from tables A5.1., A5.2. and A5.3.
Absolute terms reffers to the changes in the quantile value.
Relative terms reffers to the % change of the income share.

The following figure synthesizes the changes over the years of income shares by deciles. The most striking pattern that we observe is that the poorest 4 deciles are the ones who have suffered the biggest relative changes through time. Indeed, it is the 1st decile the one that has experienced the biggest changes, ranging from a decrease of 20.4% between 2006 and 2008 to an increase of 20% between 2000 and 2002. In contrast, the richest deciles (from the 5th to the 10th) had experienced less dramatic changes in their income shares in the period of study. Being all of the changes in the range of minus or plus 5%. This suggests that when there is a shock in the economy, either positive or negative, the most affected are the poorest deciles of the population. This exposes the vulnerability of this sector of the population towards the changes in the economy. In absolute terms the picture is slightly different and although the changes in the bottom 4 deciles are still bigger than the 5th to the 8th deciles, they are smaller than the 9th and 10th deciles (see figure A5.7).

Figure 5.5. Mexico: Percentage changes in income shares by deciles, 1992-2008.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

That is, between 1996-1998 we observe how the most affected income shares are those of the poorest 5 deciles, with the poorest decile diminishing its share by 16%. This happens again between 2004-2005, when the poorest decile diminish its share by 10% and finally between 2006-2008, when its share falls by 20.4%. But during recovery years between 2000-2002 and 2005-2006, it is precisely the poorest deciles which benefited the most, with the poorest 10% of the population experiencing an increase in their income shares of around 20%. In contrast, we observe how the upper 5 deciles do not experience many changes. This result has very important policy implications. It shows that when income inequality decreases in Mexico, the most benefited, in relative terms, are the poorest of the population. The biggest winners in absolute terms are the 9th and 10th deciles. However, the bottom 4th deciles still benefit more than the 5th to the 8th deciles. Thus, reducing inequality in Mexico has a potential impact on the poor and this could eventually also reduce the absolute levels of poverty. However, it also shows the vulnerability of the poorest population, and how the government should do something to protect their income during crisis periods, since once we ignored the top 2 richest deciles, it is the poorest 4 deciles which bear the majority of the costs in absolute and relative terms.

5.3. Inequality Measures

In this section our preferred inequality measures will be used to calculate the levels and trends of inequality in Mexico between 1992 and 2008. Following the recommendations of chapter 1, we will firstly calculate two inequality measures: 1) the Gini coefficient; and 2) the Generalized Entropy Measures. Secondly, we will calculate bootstrapped standard errors to find out if these changes are statistically significant. Finally, several conclusions from these results will be pointed out.

5.3.1. Gini Coefficient

Table 5.4 below presents the trends in the Gini coefficient for per capita income and consumption between 1992 and 2006.[96] As we can observe, both welfare indicators behave very similarly, with the exception being 1992-1994 when the indicators moved in opposite directions. Using per capita income we observe: a) an increase in inequality between 1992-1994, 1996-1998 and 2004-2005; b) a fall in inequality between 1994-1996, 1998-2004 and 2005-2006. Nevertheless,

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[96] The Gini coefficient was calculated using the "ineqdeco" STATA command by Stephen P. Jenkins.

the only changes that are statistically significant at the 5% level[97] are those falls in inequality experienced between longer periods of time: between 1992-2002, 1992-2004, 1992-2006, 1994-2006, 1998-2002, 1998-2004, 1998-2006, 2000-2004, and 2000-2006. Thus, we can say with 95% confidence that the levels of inequality fell between the beginning of the period of study and three particular years: 2002, 2004 and 2006. Using per capita consumption gives very similar results, with the changes between 1992-2004 and 1992-2006 being statistically significant at the 5% level. Finally, using the Gini coefficient does not provide any evidence suggesting that the levels of inequality increased after the peso crisis. In the next section we are going to use our preferred inequality measure, the Generalized Entropy Measure (GE) which will give more detailed results of inequality changes across the distribution.

We used the bootstrapped technique in order to see if the changes in time are statistically significant or not. The bootstrapping technique executes a command multiple times by resampling observations (with replacement) from the data in memory, a required number of times. For instance, we calculate the Gini coefficient and then ask the STATA programme to execute this task a 100 times. By doing this, STATA provides results for the Gini Coefficient, its Bootstrapped standard errors, and confidence interval. Any value inside the confidence interval is a valid measure of the Gini. Thus, we can now compare the intervals in one year with another year and see if they overlap or not. Alternatively, we can use hypothesis testing to check if the changes are statistically significant or not.[98]

Using hypothesis testing is another way to make sure that the changes in time are statistically significant or not. We could alternatively use a Z test with the null hypothesis that the Gini remained unchanged and the alternative hypothesis that it is different in both years. If the value of the test statistic (Z) is higher than the value for 99% confidence, the null hypothesis is rejected.[99]

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[97] In order to check if these changes were statistically significant, we estimated bootstrapped standard errors and confidence intervals for per capita income and per capita consumption for the three periods. Tables A5.7. and A5.8. in the Annex report the complete results.

[98] For more details about the Bootstrapped technique see the help option in the STATA programme. For an introduction to hypothesis testing see Gujarati (2003) Basic Econometrics, McGraw Hill.

[99] Based on ECLAC (2004) Social Panorama of America Latina.

Test of significance approach:

Ho: $Gini_{1992} = Gini_{2002}$
Ha: $Gini_{1992} \neq Gini_{2002}$

$$Z = \frac{Gini_{2002} - Gini_{1992}}{\sqrt{S^2_{G2002} + S^2_{G1992}}}$$

It is also important to mention that the test of significance probably cannot be relied on since the sample design was not taken into account when estimating the standard errors. As mentioned before, both, stratification and clustering were not taken into account. From these two, clustering might have had the biggest impact on standard errors and could have made them too small (see discussion on pages 76 and 77).

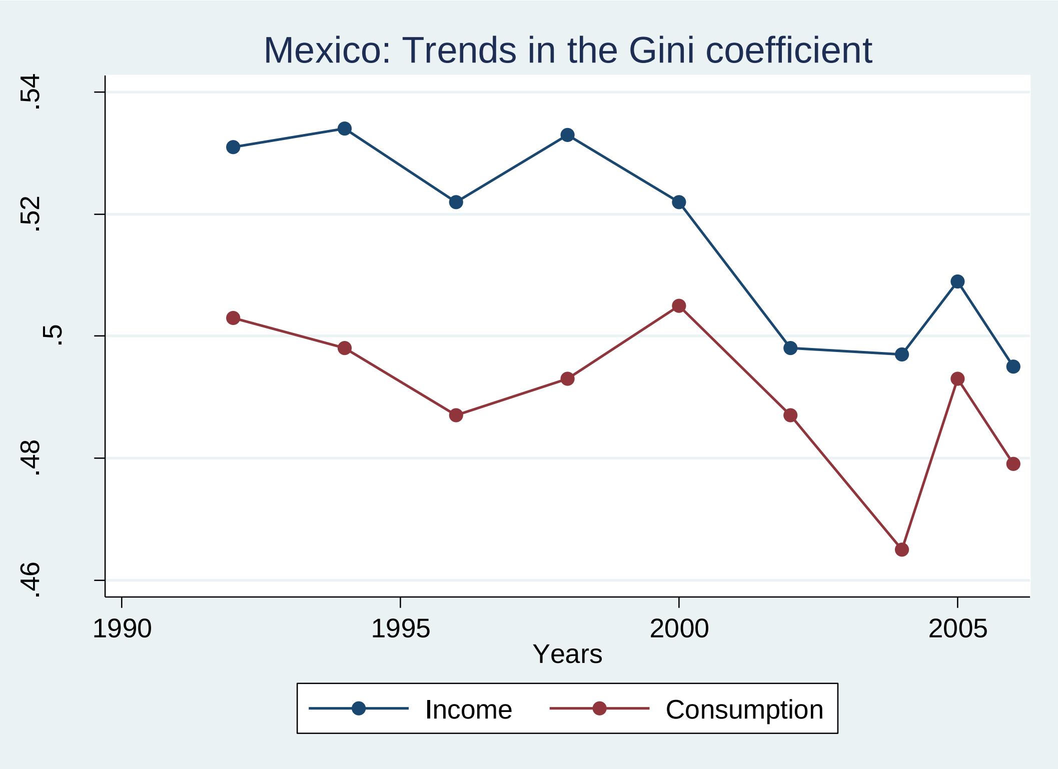
Table 5.4.

Mexico: Levels and trends in the Gini coefficient
1992 - 2006

	per capita income	per capita consumption	Per capita income, % change		
			1992-1994	**1994-1996**	**1996-1998**
1992	0.531	0.503	0.535	-2.299	2.156
1994	0.534	0.498	**1998-2004**	**2004-2005**	**2005-2006**
1996	0.522	0.487	-6.810*	2.504	-2.828
1998	0.533	0.493			
2000	0.522	0.505	**Per capita consumption, % change**		
2002	0.498	0.487	**1992-1994**	**1994-1996**	**1996-1998**
2004	0.497	0.465	-0.903	-3.211	1.354
2005	0.509	0.493	**1998-2004**	**2004-2005**	**2005-2006**
2006	0.495	0.479	-5.671*	5.876*	-2.788
2008	0.515	0.451			

Source: Own calculations using the 1992 - 2008 ENIGH Household Surveys.
* Means that the change is statistically significant at the 5% level. The standard errors were calculated using the bootstrapped technique.

Figure 5.6. Mexico: Trends in the Gini coefficient, 1992-2006



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2006.

5.3.2. Generalized Entropy Measure

Now, we are going to explore the levels and trends in inequality using the Generalized Entropy Measure (GE).[100] But in this case, the results will be provided for the urban, rural and total population. Firstly, by dividing the population in urban/rural subgroups we observe that the majority of the Mexican population lives in urban areas as compared with rural ones, and that this trend has intensified during the last 14 years. On average, 60% of the population lived in urban areas during 1992-2006, with the remaining 40% living in rural areas (see table A5.9 in the Annex). Secondly, we can see that the urban areas have a disproportionate big income share (bigger than their population share), with an average of 78% during the period of study, as compared with a 22% for the rural areas. Thirdly, mean per capita income in rural areas is less than half of

[100] The Generalized Entropy Measure was calculated using the "ineqdeco" STATA command by Stephen P. Jenkins.

that of the urban areas. Indeed, mean per capita income in rural areas ranges from 38 to 46% of the urban ones.

Turning to the changes through time, we can observe in a visual way the trends in the GE for the urban, rural and total populations. By looking at figures 5.7 - 5.9 below and figures A5.8-A5.10 in the Annex, it becomes clear that: a) inequality has been more stable in the urban areas as compared with the rural areas; b) inequality increased in the rural areas between 1994 and 1998, but remained the same in the urban areas; c) inequality fell considerably in the urban areas between 1998-2002 and between 2000-2002 in the rural ones; d) inequality in the rural areas increased so much after the peso crisis, that even after 14 years these areas had been unable to go back to pre-crisis inequality levels; e) in contrast, the urban areas have at the end of the period, that is in 2008, lower inequality levels than at the beginning of the period of study; and f) we observe an increase in inequality in rural and urban areas between 2006-2008, reflected also in the results for the total population, this result captures the first negative results of the world economic financial crisis of 2008.

Nevertheless, these changes might or might not be statistically significant. That is why, bootstrapped standard errors and confidence intervals were calculated in order to determine if the changes throughout time were statistically significant or not. A summary of the results is given in table 5.5 below (the results for the changes are at the bottom of the table).[101] Thus, we can say with 95% confidence that:

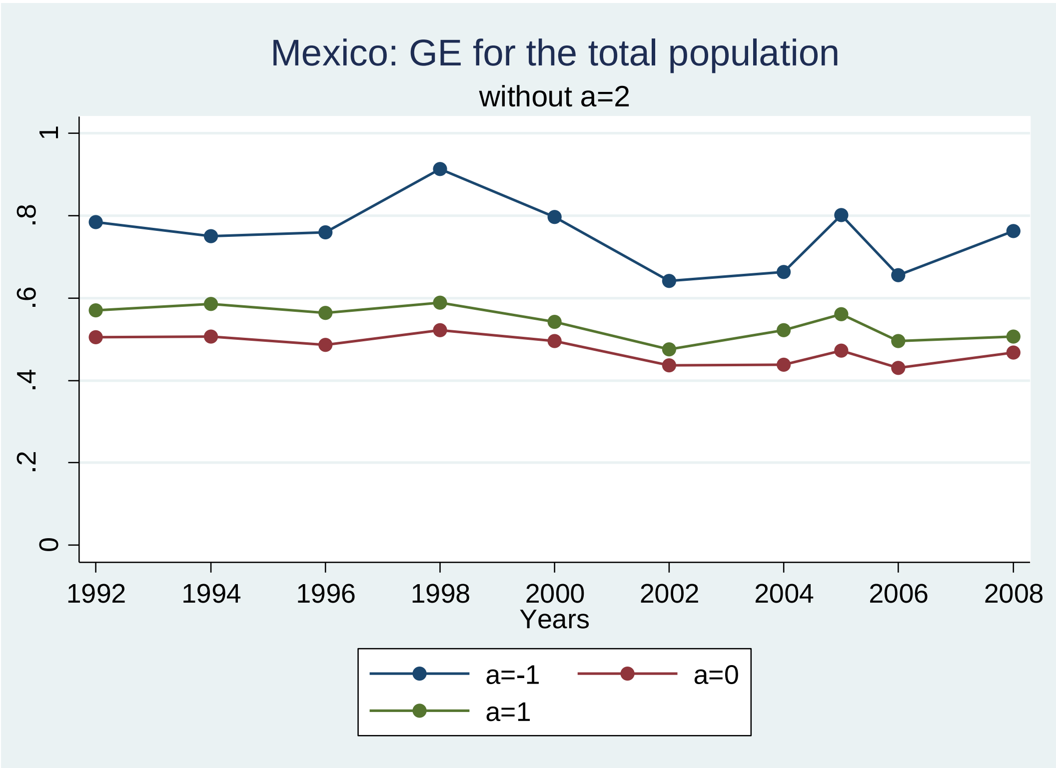
1. Inequality increased markedly in rural areas between 1994 and 1998, while decreasing in urban areas from 1996 onwards. This is a very important result, since the changes in the Gini in the same period are not statistically significant. Thus, dividing the population by rural/urban groups gives different results than when focusing on the total population only.[102]
2. Even after 14 years of the *peso crisis*, the rural areas had been incapable of recovering from this negative shock. Indeed, between

[101] Tables A5.10.-A5.12. in the Annex show the complete results of the bootstrapped standard errors and confidence intervals for the urban/rural and total population. We also include in the Annex the results using per capita consumption (table A5.14), which in general shows more stable levels of inequality than per capita income.
[102] This was one of the motivations for calculating inequality trends by using a different measure than the Gini coefficient.

1994 and 1998 the poorest of the poor in the rural areas increased their level of inequality by almost 60%, while the poor by 33%. And by 2006 they had reduced their inequality levels by only 32% and 20% respectively. That is, 12 years had not been enough for the rural areas to achieve pre-crisis levels of inequality. In contrast, the levels of inequality in urban areas have not changed much during the last 16 years.

3. After the world financial crisis of 2008, inequality increased once more for the poor population in rural areas, while remaining unchanged in urban ones. Indeed, inequality increased in rural areas by 15% for the poor population and by 28% for the poorest of the poor. Thus, rural areas seem to be more susceptible to adverse shocks in the economy.[103]

Figure 5.7. Mexico: Generalized Entropy Measure for the total population, excluding a=2.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

[103] These results are capturing the start of the world financial crisis only, the results for the next ENIGH household survey in 2010 might indicate an even more negative scenario.

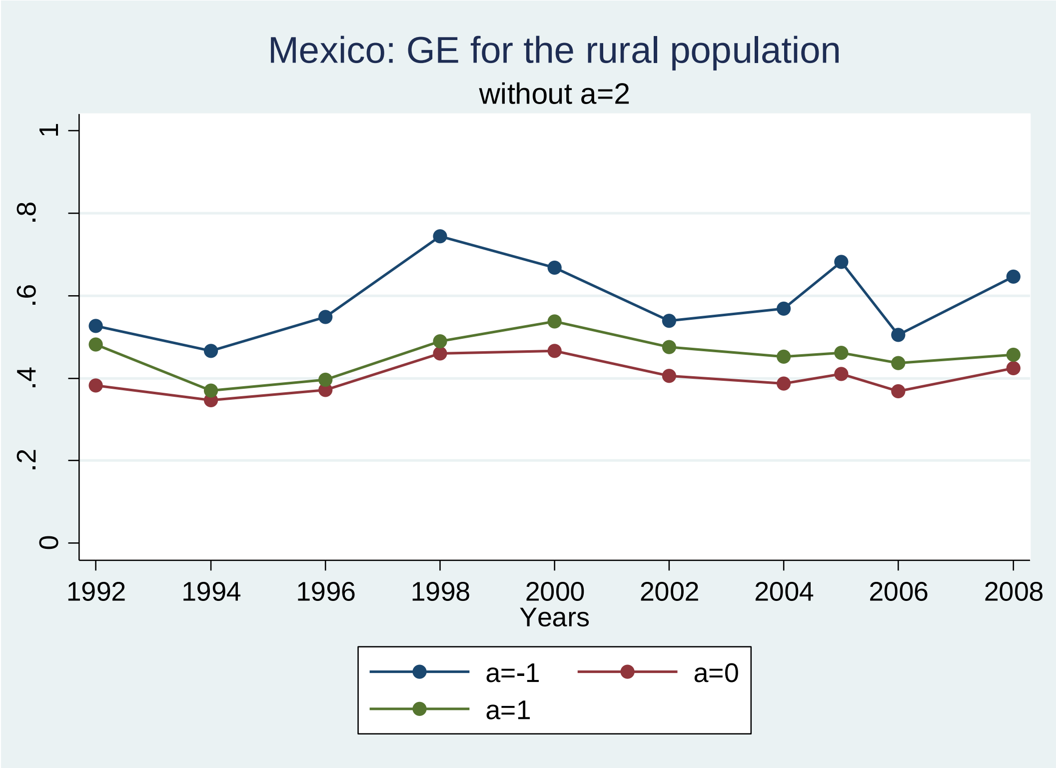
Table 5.5. Mexico: Generalized Entropy Measure for the urban, rural and total population
1992 - 2008

Generalized Entropy1				Generalized Entropy				Generalized Entropy			
a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992 urban				**1992 rural**				**1992 total**			
0.560	0.420	0.482	0.985	0.527	0.382	0.482	1.695	0.785	0.505	0.571	1.305
1994 urban				**1994 rural**				**1994 total**			
0.563	0.435	0.522	1.220	0.467	0.346	0.370	0.599	0.757	0.506	0.586	1.458
1996 urban				**1996 rural**				**1996 total**			
0.567	0.424	0.516	1.431	0.548	0.372	0.396	0.665	0.759	0.486	0.564	1.606
1998 urban				**1998 rural**				**1998 total**			
0.550	0.416	0.514	1.994	0.744	0.460	0.490	0.911	0.913	0.522	0.588	2.230
2000 urban				**2000 rural**				**2000 total**			
0.491	0.383	0.453	0.960	0.668	0.467	0.538	1.218	0.797	0.495	0.542	1.179
2002 urban				**2002 rural**				**2002 total**			
0.457	0.358	0.404	0.687	0.539	0.405	0.476	0.960	0.643	0.437	0.476	0.845
2004 urban				**2004 rural**				**2004 total**			
0.494	0.383	0.478	2.375	0.568	0.387	0.453	1.651	0.664	0.440	0.522	2.545
2005 urban				**2005 rural**				**2005 total**			
0.507	0.388	0.502	1.687	0.682	0.411	0.462	1.229	0.802	0.472	0.561	1.902
2006 urban				**2006 rural**				**2006 total**			
0.520	0.370	0.442	0.963	0.505	0.368	0.436	1.038	0.655	0.431	0.496	1.122
2008 urban				**2008 rural**				**2008 total**			
0.529	0.388	0.445	0.895	0.646	0.424	0.457	0.923	0.762	0.467	0.507	1.048

% change urban				% change rural				% change total			
1992-1998				**1992-1994**				**1992-1998**			
-1.82	-1.09	6.75	102.30	-11.54	-9.60	-23.20	-64.66	16.28	3.38	3.08	70.88
1998-2002				**1994-1998**				**1998-2002**			
0.65*	-2.51*	-1.17**	17.33	59.49*	32.94*	32.44*	52.03*	-29.65*	-16.33*	-19.07*	-62.10
2002-2005				**1998-2005**				**2002-2005**			
11.03	8.46	24.30**	145.79*	-8.30	-10.57	-5.75	34.94	24.86*	7.90	17.77**	125.01*
2005-2006				**2005-2006**				**2005-2006**			
2.57	-4.73	-12.07	-42.93	-26.01*	-10.51	-5.68	-15.54	-18.39**	-8.65	-11.54	-41.02
2006-2008				**2006-2008**				**2006-2008**			
1.74	4.99	0.85	-7.09	28.02*	15.31**	4.98	-11.10	16.44*	8.51*	2.22	-6.54

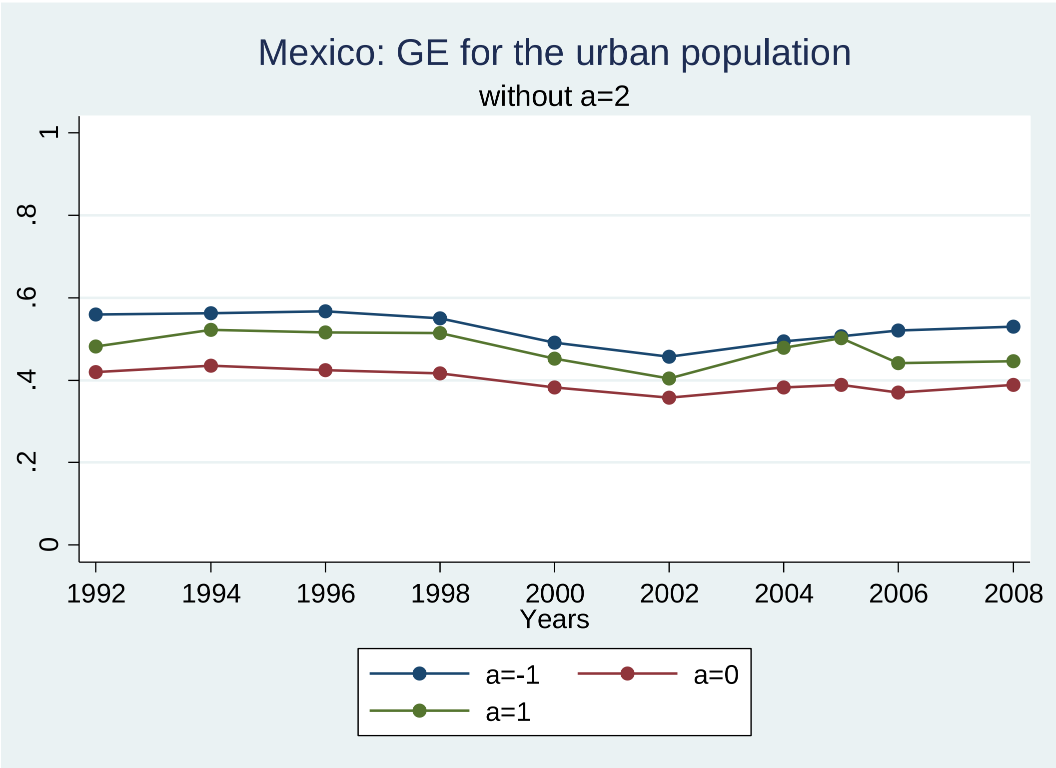
Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005, 2006 and 2008.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher end of the distribution when a=2.
* means statistically significant at the 5% level.
** means statistically significant at the 10% level.

Figure 5.8. Mexico: Generalized Entropy Measure for the rural population, excluding a=2.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Figure 5.9. Mexico: Generalized Entropy Measure for the urban population, excluding a=2



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

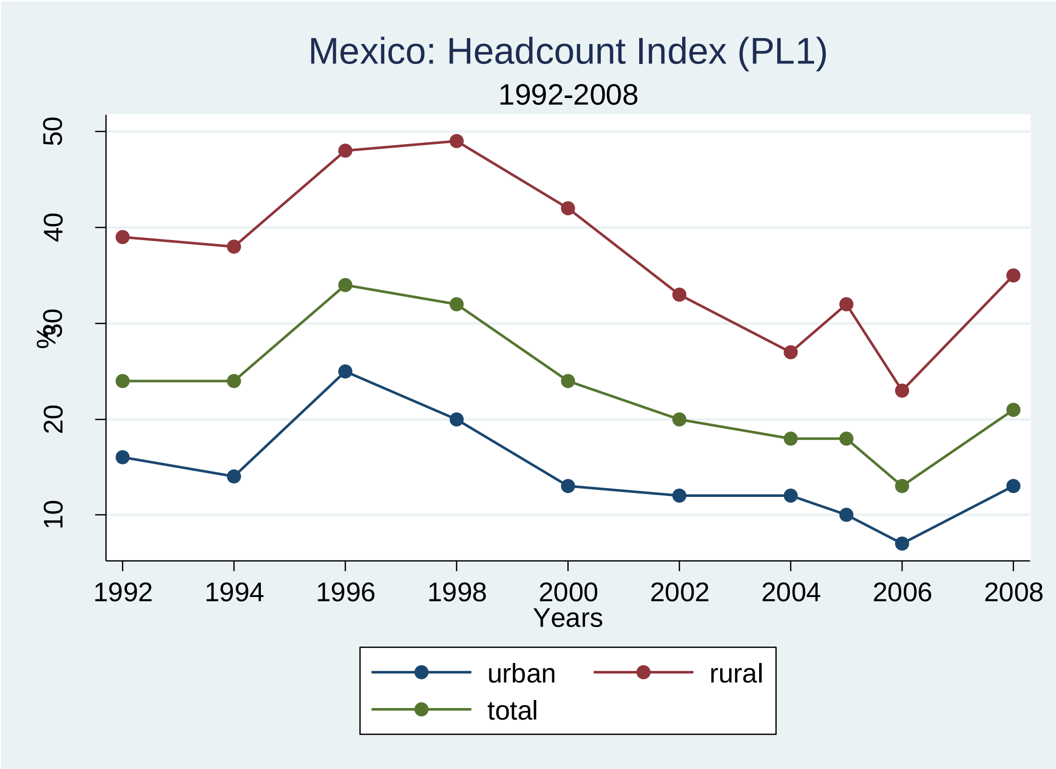
5.4. Welfare Comparisons 1992 – 2008

In this section, we explore the levels and trends in the incidence, depth and severity of poverty between 1992 and 2008. In order to do so, we calculate the *Foster-Greer-Thorbecke* (1984) family of poverty indexes using our preferred welfare indicator, *per capita income*. The FGT index can be given specific values to its parameter (α) to obtain different poverty measures. We assigned three of the most common values: α=0 to obtain the Headcount index; α=1 to obtain the Poverty Gap; and α=2 to obtain the squared Poverty Gap. The welfare indicator is per capita monthly income (ictpc2) and the measures use the food poverty line (PL1). The following paragraphs describe the levels and trends in these three poverty measures between 1992 and 2008.

Figures 5.10 to 5.12 below show the trends of the Headcount Index, the Poverty Gap and the Squared Poverty Gap in Mexico for the urban, rural and total population. There are some patterns that we can observe in these figures:

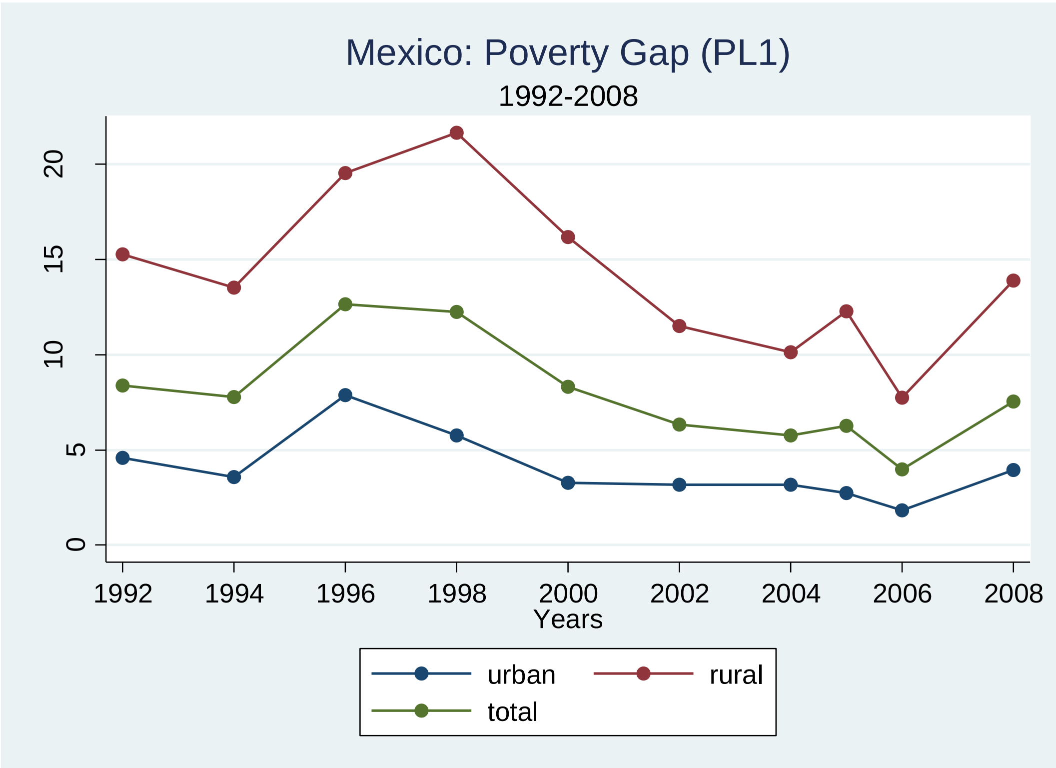
- The rural, urban and total population trends are very similar.
- But in each poverty measure the rural population has the highest levels of poverty (see table A5.18 in the Annex).
- Although there are more people living in urban areas, the number of rural population living under the food and capabilities poverty lines is always higher in rural areas than in urban ones (see figure 5.13 below and table A5.17 in the Annex).
- There is a visible and marked increase in the three poverty measures in both, urban and rural population, after the peso crisis of December 1994.
- After the shock of the peso crisis, the Headcount Index starts to fall until 1996-1998, while the Poverty Gap and Squared Poverty Gap start to fall until two years later in 1998-2000.
- It takes roughly 6 years (until 2000) for the urban/rural population to go back to pre-crisis poverty levels.
- 1994-1996, 1996-1998, 2004-2005 and 2006-2008 seemed to be the periods that experienced increases in the three poverty measures.
- During the beginning of the world financial crisis in 2008, we observe a sharp increase in the three poverty measures in both, urban and rural areas.

Figure 5.10. Mexico: Headcount Index, 1992-2008.



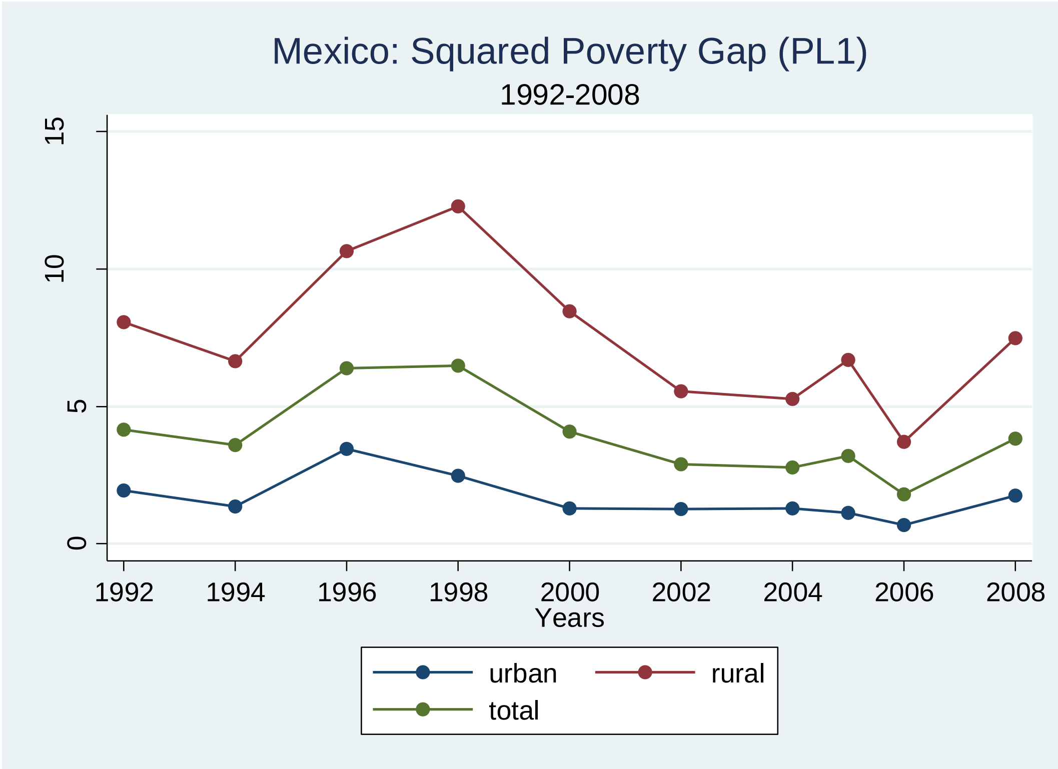
Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Figure 5.11. Mexico: Poverty Gap, 1992-2008.



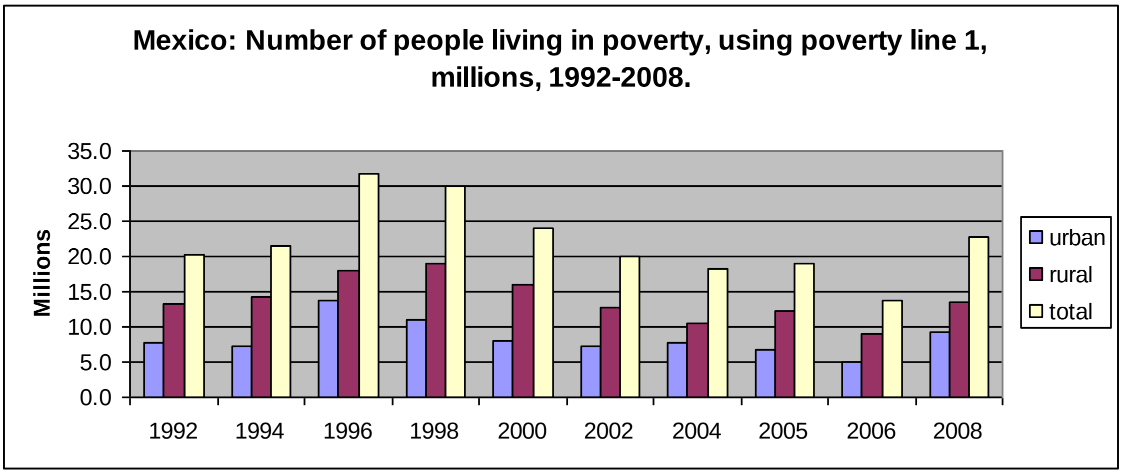
Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Figure 5.12. Mexico: Squared Poverty Gap, 1992-2008.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Figure 5.13. Mexico: Number of people living in poverty, using poverty line 1, millions, 1992-2008.



Source: Own calculations with data from ENIGH household surveys from 1992 to 2008.

Table 5.6. Mexico: Eight sub-periods of changes in the levels of poverty, 1992-2008.

	1992-1994	1994-1996	1996-1998
Urban	Poverty remained unchanged.	Markedly increases in FGT. Using PL1: α=0 increased 76% α=1 increased 120%	Fall in FGT using the three poverty lines. α=0 fell 21%, using PL1 α=1 fell 27%, using PL1
Rural	Poverty remained unchanged.	Markedly increases in FGT. Using PL1: α=0 increased 27% α=1 increased 40%	Poverty remained unchanged.
	1998-2000	**2000-2004**	**2004-2005**
Urban	Fall in FGT using the three poverty lines. α=0 fell 33%, using PL1 α=1 fell 43%, using PL1 α=2 fell 48%, using PL1	Poverty remained unchanged.	Fall in FGT using PL3 Fall in Headcount using PL1 The rest measures remained unchanged
Rural	Fall in FGT using the three poverty lines. α=0 fell 15%, using PL1 α=1 fell 25%, using PL1 α=2 fell 31%, using PL1	Fall in FGT using the three poverty lines. α=0 fell 34%, using PL1 α=1 fell 37%, using PL1 α=2 fell 38%, using PL1	Increase in FGT using the three poverty lines. Using PL1: α=0 increased 16% α=1 increased 21%
	2005-2006	**2006-2008**	
Urban	Important falls in FGT using the three poverty lines Using PL1: α=0 fell 28%	Markedly increases in FGT. using the three poverty lines Using PL1: α=0 increased 82% α=1 increased 117%	
Rural	Important falls in FGT using the three poverty lines Using PL1: α=0 fell 27% α=1 fell 37%	Markedly increases in FGT. using the three poverty lines Using PL1: α=0 increased 50% α=1 increased 79%	

Source: Table 5.7.

In order to find out if these changes are statistically significant, we calculated bootstrapped standard errors and confidence intervals at the 95% confidence level for our three preferred poverty measures using per capita income (ictpc2) as the welfare indicator (table 5.7 presents all the results).[104]

Table 5.6 above, summarizes the trends in the incidence, depth and severity of poverty between 1992 and 2008 for the urban, rural and total population. The table only presents the results that are statistically significant in their changes. The period is divided in 8 sub-periods to facilitate the analysis. The most important results are as follows:

- The sub-period after the peso crisis, 1994-1996, seem to be one of the worst sub-periods in terms of poverty measures for urban/rural areas in

[104] Tables A5.20-A5.22 in the Annex show all the bootstrapped results for the FGT index.

the whole period of study (only comparable to the increases observed in the aftermath of the world financial crisis of 2008).

- Although the increases in poverty in urban areas were higher after the peso crisis, they recovered much faster than the rural areas. And between 1996 and 2000 the urban population experienced a fall in all of the three poverty measures. The rural areas experienced something similar but at a later time, between 1998 and 2002.
- The period of 2005-2006 seemed to be a very important year in terms of poverty results. Indeed, during this year there were markedly high poverty reductions in the three poverty measures for the population under the three poverty lines in urban and rural areas.
- 2006-2008 is one of the worst sub-periods in terms of poverty increases and we observe how the negative effects of the global financial crisis of 2008 translated into sharp increases in the incidence, depth and severity of poverty in both, urban and rural areas. We observe similar increases in the urban areas' levels of poverty as those observed after the peso crisis. Moreover, the rural areas were more affected during this sub-period than the sub-period after the peso crisis.

To conclude, 1994-1996 and 2006-2008 seemed to be the worst sub-periods for urban/rural areas in the whole period of study. During the first one, there were markedly increases in the Headcount Index, the Poverty Gap and the Squared Poverty Gap for the population living under the three official poverty lines. There are several factors that could have affected these results. As already mentioned in earlier chapters, 1995 was a very difficult year for the Mexican economy. Indeed, the GDP fell by -6.17%, the accumulated inflation rate was 52% and the real minimum wage fell by -13.19%. Although there is not such a reliable statistic of unemployment, the fall in GDP surely translated in more unemployment and an increase in informal employment. As already mentioned, the majority of Mexicans cannot afford to be unemployed. That is, in the absence of personal savings and unemployment insurance, workers are forced to look for any type of job in the informal sector. Thus, forcing workers to take jobs with salaries below the minimum wage, usually not related to their skills and under inadequate conditions of work (Salas & Zepeda, 2003). Thus, during

1995 a proportion of people lost their jobs as a result of the peso crisis. In addition, those that remained employed experienced a fall in the purchasing power of their wages, since the rate of inflation was higher than the increments in their nominal wages.

Although the increases on poverty in urban areas were higher after the peso crisis, they recovered much faster than the rural areas. The urban population experienced a fall in all of the three poverty measures between 1996 and 2000. The rural areas experienced something similar but at a later time, between 1998 and 2002. The different paces for recovery between urban and rural areas could be explained by the different reasons behind these changes. Thus, with the increases in GDP growth after the peso crisis, urban areas recovered fast, while the shock in rural areas was deeper and of other nature, taking them much longer to recover. As already mentioned in the introduction, after the peso crisis, urban households were hit by the fall in real wages, while rural households were primarily hit by the 70% fall in cocoa and coffee international prices during 1984-1994. This decrease mostly affected the indigenous population, which accounts for 65% of all coffee producers, producing one-third of Mexico's coffee output (Bouillon, *et al* 1998).

According to the 2008 ENIGH 10.9% of the total population in Mexico was indigenous. In rural areas this percentage doubles to 22%. The headcount index using the food poverty line was 34% for the total population in rural areas; 29% for the non-indigenous population in rural areas; and 56% for the indigenous population in rural areas. Finally, the poverty "share" of the non-indigenous population in rural areas was 67% and for the indigenous population in rural areas was 32%.[105] This last percentage could be regarded as the contribution of indigenous population to rural poverty.

In addition, there was a retreat of the state in the *ejido* sector that started under the Salinas administration, but without any private institution taking the role of the state to service it. As a result, the *ejidatarios* were left without access to credit, insurance, technical assistance, fertilizers, seeds, water and basic infrastructure (de Janvry, et al, 1996). In addition to these shocks, NAFTA was

[105] The Headcount index and poverty share were calculated using the Povdeco command for STATA. The calculations were done for 2008 since it is the only ENIGH household survey that includes a variable to identify indigenous households.

enacted in 1994. And although two major programmes were put in operation to assist Mexican farmers after the implementation of NAFTA, these have many limitations. Thus, with these precarious conditions in the rural sector, NAFTA has only exacerbated the already vulnerable conditions of poor rural farmers by promoting an unfair competition with large and heavily subsidized American farmers.

The period of 2005-2006 seemed to be a very important year in terms of poverty results. Indeed, during this year there were markedly high poverty reductions in the three poverty measures for the population under the three poverty lines in urban and rural areas. However, these results are highly atypical. For example, the percentage changes in 2005-2006 of those under the food poverty line in urban areas represent roughly 45% of the changes of the whole recovery period of 1996-2006, and around 61% in the rural areas. That is, in only one year the three measures of urban poverty fell roughly the same percentage points than in the last 9 years together. Rural poverty diminished even more in just one year than in the previous 9 years. However, as already mentioned, this result is not consistent with the results gathered by the same Institute (INEGI) but for the National Accounts (see discussion in the data chapter). It remains a puzzle the discrepancies between the two data sources and caution has been advised when interpreting the results for 2006.

We also observe that the shock of the global financial crisis of 2008 on the changes of poverty in Mexico so far is similar to that experienced with the peso crisis of December 1994 for the urban areas and higher for the rural ones. Unfortunately, the negative shock on GDP growth and unemployment has continued over 2009 and it is expected to remain until late 2010. Thus, this negative trend in urban and rural poverty is expected to continue for at least two more years.

Finally, as previously mentioned, the inequality and poverty results depend on the choice of measure and the poverty results depend also on the poverty lines chosen. That is why, as recommended in the previous chapter, in the next section we will use dominance analysis or to check the sensitivity of the different poverty and inequality measures to the choice of measure and in the case of poverty, the choice of a defined poverty line.

Table 5.7. Mexico: Trends in the incidence, depth and severity of poverty using per capita income as the welfare indicator, 1992-2008.

	FGT1 α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Poverty line used	% change urban			% change rural			% change total		
1992-1994									
Food poverty line	-9.16	-22.34	-29.66**	-2.75	-11.43	-17.66**	0.11	-7.33	-13.87**
Capabilities poverty line	-12.15	-17.60**	-23.37**	-4.52	-8.31	-13.86**	-1.29	-3.91	-9.06
Assets poverty line	-4.82	-9.73	-13.78	-3.62	-5.23	-7.96	0.03	-0.74	-2.58
1994-1996									
Food poverty line	76.37*	120.88*	154.45*	26.82*	44.32*	60.42*	42.43*	62.63*	78.35*
Capabilities poverty line	61.86*	93.71*	122.42*	19.90*	36.70*	50.46*	35.32*	53.45*	68.05*
Assets poverty line	29.77*	52.33*	71.21*	9.84*	22.31*	32.26*	19.05*	34.26*	46.07*
1996-1998									
Food poverty line	-20.84*	-26.86*	-28.37*	2.05	10.81**	15.50**	-7.81*	-3.05	1.49
Capabilities poverty line	-16.56*	-23.31*	-26.28*	-0.44	7.14	12.43**	-8.09*	-5.43	-1.86
Assets poverty line	-9.58*	-15.04*	-19.01*	-3.55	1.29	5.42	-6.78*	-6.71*	-5.76**
1998-2000									
Food poverty line	-32.62*	-43.07*	-48.28*	-14.71*	-25.25*	-31.23*	-23.05*	-32.22*	-37.20*
Capabilities poverty line	-30.32*	-36.89*	-42.82*	-11.87*	-21.50*	-27.70*	-21.20*	-28.42*	-33.84*
Assets poverty line	-18.38*	-27.60*	-32.63*	-6.04*	-14.11*	-19.64*	-13.20*	-21.32*	-26.18*
2000-2004									
Food poverty line	-10.53	-3.60	0.86	-33.86*	-37.48*	-37.67*	-26.98*	-30.54*	-31.71*
Capabilities poverty line	-6.11	-6.59	-3.58	-28.84*	-35.39*	-37.07*	-20.63*	-27.61*	-29.97*
Assets poverty line	-1.08	-3.21	-4.31	-16.12*	-27.32*	-32.16*	-8.90*	-17.67*	-22.58*
2004-2005									
Food poverty line	-13.26*	-13.64	-12.77	15.89*	21.40*	26.80*	3.19	8.77	14.56
Capabilities poverty line	-9.11	-11.96	-12.79	15.57*	19.17*	23.60*	3.45	6.12	10.27
Assets poverty line	-6.46*	-8.71*	-9.83*	7.55**	13.87*	17.67*	-0.47	2.05	4.39
2005-2006									
Food poverty line	-28.40*	-33.65*	-40.02*	-27.31*	-37.00*	-44.39*	-27.99*	-36.42*	-43.74*
Capabilities poverty line	-20.89*	-28.84*	-34.38*	-25.45*	-33.12*	-39.99*	-23.75*	-31.96*	-38.74*
Assets poverty line	-10.91*	-17.11*	-22.44*	-15.85*	-24.67*	-30.61*	-13.34*	-21.37*	-27.48*
2006-2008									
Food poverty line	81.99*	117.40*	160.21*	49.98*	79.37*	101.37*	60.29*	88.69*	113.33*
Capabilities poverty line	51.49*	87.02*	120.37*	40.34*	66.07*	86.67*	44.54*	72.25*	95.13*
Assets poverty line	21.94*	41.24*	59.67*	22.25*	41.40*	56.96*	21.79*	40.75*	57.33*

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005, 2006 and 2008.
(*) means that the change is statistically significant at the 5% level; and (**) at the 10% level. These results appear in bold.
1) When α=0 the FGT index refers to the Headcount Index; when α=1 is the Poverty Gap; and when α=2 is the Squared Poverty Gap.

5.5. STOCHASTIC DOMINANCE ANALYSIS

In the previous section we used different poverty and inequality measures to measure the levels and changes throughout time of poverty and inequality. However, not all of the changes that we observed were statistically significant. Moreover, some of the inequality results depend on the measure that we used (e.g. GE and Gini coefficient). We will use stochastic dominance analysis in this section in order to try to obtain robust results regarding the changes in poverty and inequality over time. This technique will allow us to check the sensitivity of the different poverty and inequality measures to the choice of measure and in the case of poverty, to the choice of different poverty lines.[106] The first part focuses on poverty results and the second part on the inequality ones.

5.5.1. Stochastic dominance analysis and poverty results

5.5.1.1. The cumulative distribution function CDF

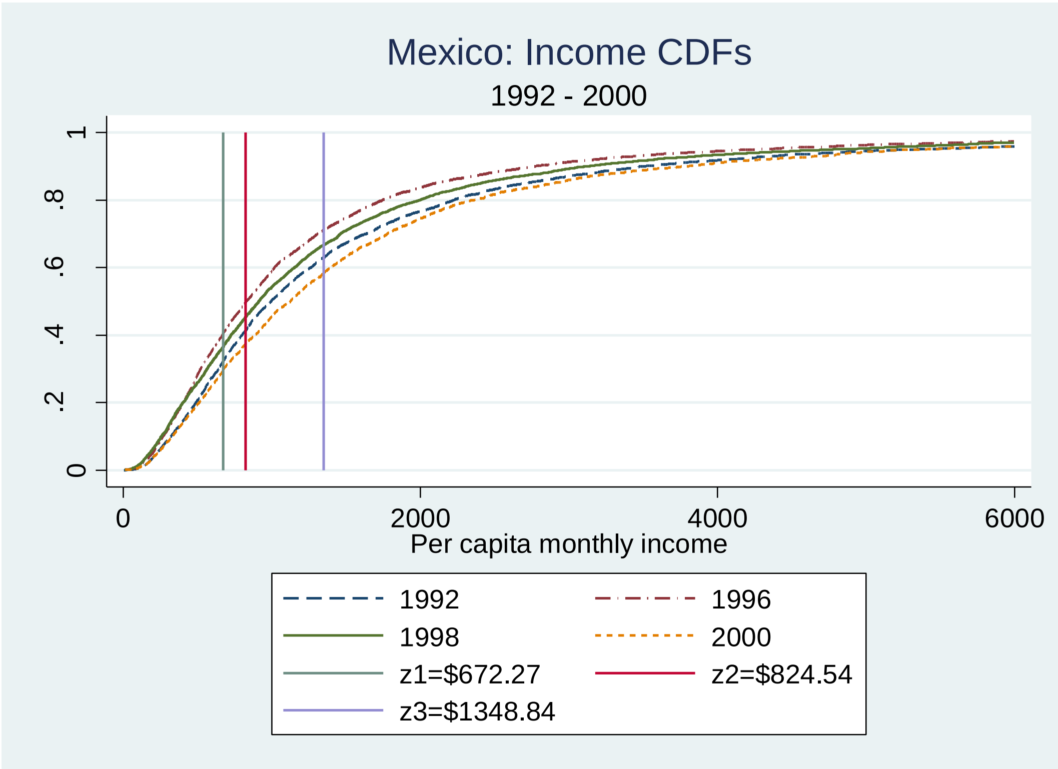
The first analysis will be based on the Cumulative Distribution Functions or CDFs of relevant changes in the 1992-2008 period. In the previous section we calculated the incidence, depth and severity of poverty using the 3 official poverty lines. In this section, we will firstly plot the CDFs to check the robustness of the headcount index to the choice of these 3 official poverty lines. We will also plot the area under the CDFs known as the *poverty deficit curve*, to check the sensitivity of the poverty gap to the choice of these 3 official poverty lines. We will focus on those households below a certain level of welfare. That is, we will plot the curves up to a certain level of income, leaving out the upper right tail of the curve. Finally, we will break the period in two sub-periods: 1992-2000 and 2000-2008 to facilitate the visualization of the CDFs.

As we mentioned in the methodology chapter, a CDF is a curve that shows the proportion of persons that receive no more than a specific income/consumption, represented as a function of that income/consumption. In

[106] For a more detailed introduction to dominance analysis see the methodology chapter and Deaton, A (1997).

figure 5.14 we can see that: a) the 2000 CDF lies below the 1992, 1996 and 1998 distributions; b) the 1992 CDF lies below both, the 1996 and the 1998 distributions; and c) after the cut off of $400 per capita monthly pesos (which is around 60% of the food poverty line) the 1996 CDF lies above the 1998 one. It is difficult to observe with precision the points where the CDFs cross each other. That is why, we took a closer look at each pair of CDFs. These figures are not presented here, but are available upon request.

Figure 5.14. Mexico: Cumulative Distribution Functions, 1992-2000.



Source: Author's calculations with data from the ENIGHs 1992-2000.

We observe that the 1992 distribution lies above the 1994 distributions at all points. That is, the Headcount index was higher in 1992 than in 1994 regardless of the poverty line used. The 1994 CDF lies above the 1996 and 1998 ones. Thus, regardless of the poverty line chosen, the Headcount index was lower in 1994 as compared with 1996 and 1998.[107] The 1998 CDF lies above the 2000 one at all points. Therefore, the proportion of people living in poverty was higher in 1998 as compared with 2000 regardless of the poverty line. Thus, we can say

[107] The 1996 and 1998 CDFs cross each other at the bottom of the distribution, around the cut-off point of $400 per capita monthly pesos (which is around 60% of the food poverty line), but they do not cross each other at the top.

that for all poverty lines the headcount index was: a) higher in 1992 as compared with 1994; b) higher in 1996 and 1998 as compared with 1994; and c) higher in 1998 as compared with 2000.[108] The next paragraphs focus on the next period 2000-2006.

Figure 5.15 shows CDFs for 2000-2008. Looking at this figure, it becomes difficult to observe with precision the points where the CDFs cross each other. That is why, a closer look at each pair of CDFs was done again, and although not all these figures are presented in the Annex, the rest are available upon request. We observe that it was difficult to obtain robust results by analyzing the changes that occurred every two years.[109] However, when looking at the changes between *2000-2004* we obtain robust results about the changes in poverty (see figure A5.15 in the Annex). Indeed, the 2004 distribution first stochastically dominates the 2000 one. But the distributions cross each other around the value of $4,000 per capita monthly pesos (which is around 3 times the value of the most generous poverty line). Thus, we can say that with poverty lines up to 3 times the value of the assets poverty line, poverty was lower in 2004 as compared with 2000. In *2004-2005* the results really depend on the poverty line chosen. Indeed from up to the value of $1,050 per capita monthly pesos (around 78% of the poverty line 3) there was more poverty in 2005 than in 2004. But then the CDFs cross each other once more between $1,050 and $1,100 per capita monthly pesos. After $1,100 the CDFs do not cross each other again until $3,000. Thus, from $1,100 to $3,000 there is more poverty in 2004 as compared to 2005. In short, the results will depend on the poverty line used. So, there are no robust results for the changes in these two years.

[108] The per capita consumption and the equivalised income variables show very similar results: a) the 2000 CDF lies below 1992, 1996 and 1998 distributions; b) the 1992 CDF lies below the 1996 and 1998 one; and c) the 1998 consumption CDF lies below the 1996 one after the cut-off point of roughly $400 per capita monthly pesos (see figures A5.10 – A5.13 in the Annex).

[109] When dividing in two sub-periods 2000-2004 we observe that in *2000-2002,* up to the cut-off point of $1,600 per capita monthly pesos (a slightly higher value of the most generous poverty line) there were higher levels of poverty in 2000 as compared to 2002. However, after the $1,600 cut-off point the distributions cross each other several times, making the results dependable of the poverty line chosen. Thus, we can only say that for poverty lines up to the value of $1,600 per capita monthly pesos poverty was higher in 2000 as compared to 2002. The *2002-2004* CDFs cross each other at the very bottom, at $20 and $250 per capita monthly pesos. Then the distributions cross several times at the top, starting at the cut-off point of $5,500. Thus we can say that after $250 and before $5,500 per capita monthly pesos (that is between 37% of the food poverty line and 4 times more the most generous poverty line), there were lower levels of poverty in 2004 as compared with 2002. But for the upper part of the distribution, from around 4 times more the most generous poverty line, the results will depend of the poverty line used.

However, when looking at the changes between *2004-2006*, we observe that after the cut-off point of $50 per capita monthly pesos (7.4% of the food poverty line), the 2006 distribution first stochastically dominates the 2004 one (see figure A5.16 in the Annex). Thus, we can say that after this cut-off value, the Headcount index in 2004 was higher than in 2006 regardless of the poverty line used. Between *2005-2006* the CDFs cross each other once around the cut-off point of $18 per capita monthly pesos (2.7% of the food poverty line). But after this value, the 2006 distribution first order stochastically dominates that of 2005. Thus, we can say that after this cut-off point, the proportion of people living in poverty was higher in 2005 as compared in 2006 regardless of the poverty line used.

Finally, we observe that after the cut-off point of $55 per capita monthly pesos (8% of the food poverty line), the 2006 distribution first order stochastically dominates that of 2008 (see figure 5.15 below). That is, after this cut-off point the proportion of poor in 2008 was higher than in 2006 regardless of the poverty line used. Thus, we observe how in only two years (2006-2008) the proportion of people living in poverty increased so dramatically, that it went back almost to the levels observed in 2000. We obtained then robust results that show how the global financial crisis deeply affected the Mexican population, increasing the proportion of poor regardless the poverty line used.

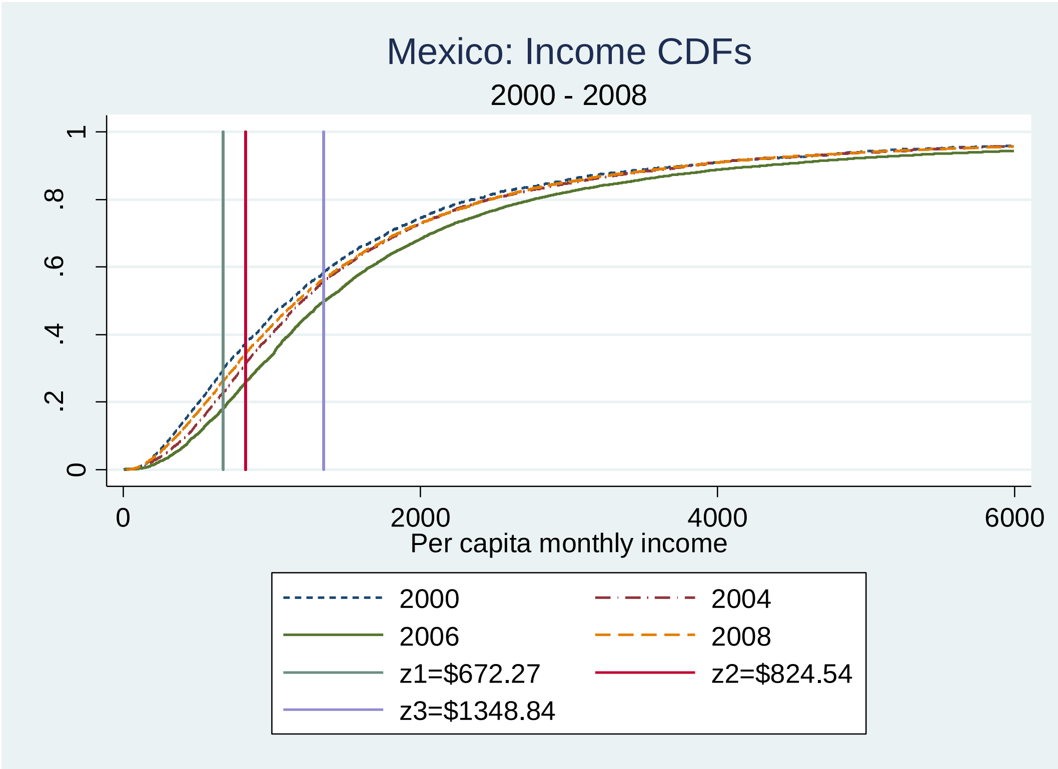
To conclude, we observed that for all poverty lines the Headcount index:

1. Fell between 1992-1994.
2. Increased between 1994-1996.
3. Increased between 1994-1998.
4. Fell between 1998-2000.

For all poverty lines above 7.4% of the food poverty line and below 3 times the value of the most generous poverty line, the Headcount index:

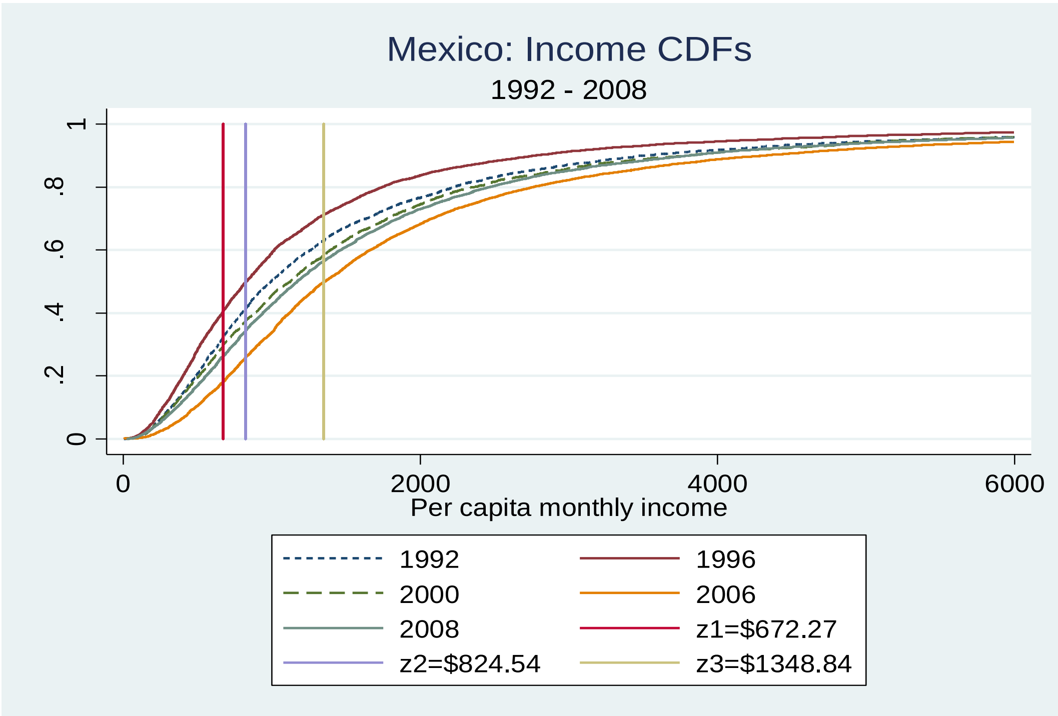
1. Fell between 2000-2004 and between 2004-2006.
2. Increased between 2006-2008.
3. And last but not least important, we observe that these results confirmed those obtained with the FGT index (α=0) in the previous section.

Figure 5.15. Mexico: Cumulative Distribution Functions, 2000-2008.



Source: Author's calculations with data from the 2000-2008 ENIGHs.

Figure 5.16. Mexico: Cumulative Distribution Functions, 1992-2008.



Source: Author's calculations with data from the 1992-2008 ENIGHs.

5.5.2. Stochastic dominance analysis and inequality results

5.5.2.1. Lorenz curves

In this section we will use more familiar curves to analyze the distribution of income: the Lorenz curves[110] and the Generalized Lorenz curves. We will use Lorenz curves to check the robustness of different inequality measures. Since when we have two Lorenz curves that do not cross each other, the curve that is closer to the 45° ray will always be a more egalitarian distribution than the other one, that will show a lower level of inequality using any inequality measure that respects the principle of transfers.[111] In order to incorporate average living standards we will use Generalized Lorenz curves.

When analyzing the results for all the years, we observed that inequality across time changes very slightly. Indeed, there is no change from 1992 until 2002, where inequality fell. Later on, it seems that inequality increased in 2008. Figure 5.17 below shows the Lorenz curves for 1992, 2002 and 2008. As we can see, the 2002 and 2008 curves are closer to the 45° equality ray than the 1992 curve. And the 1992 curve does not cross with the 2002, but it does at the bottom 10% of the population with the 2008 one. The 2008 curve is further away from the equality ray than the 2002 curve for the bottom 70% of the population, while being at the same distance for those at the top 30% of the distribution (see figure 5.18 below).

Thus, we can say that: a) the 2002 distribution Lorenz dominates the 1992 curve, that is, 2002 is unambiguously a more egalitarian distribution than that of 1992; b) the 2002 and 2008 distributions will show a lower level of inequality than 1992 when using any inequality measure that respects the principle of transfers for all the deciles (with the exception of the poorest 10% for 2008); c) inequality increased in 2008 as compared with 2002 for the

[110] As we mentioned in the methodology section, in a Lorenz curve, equality is represented by the 45° ray. Thus, inequality increases the further a Lorenz curve is from the 45° ray.
[111] Deaton (1997:159).

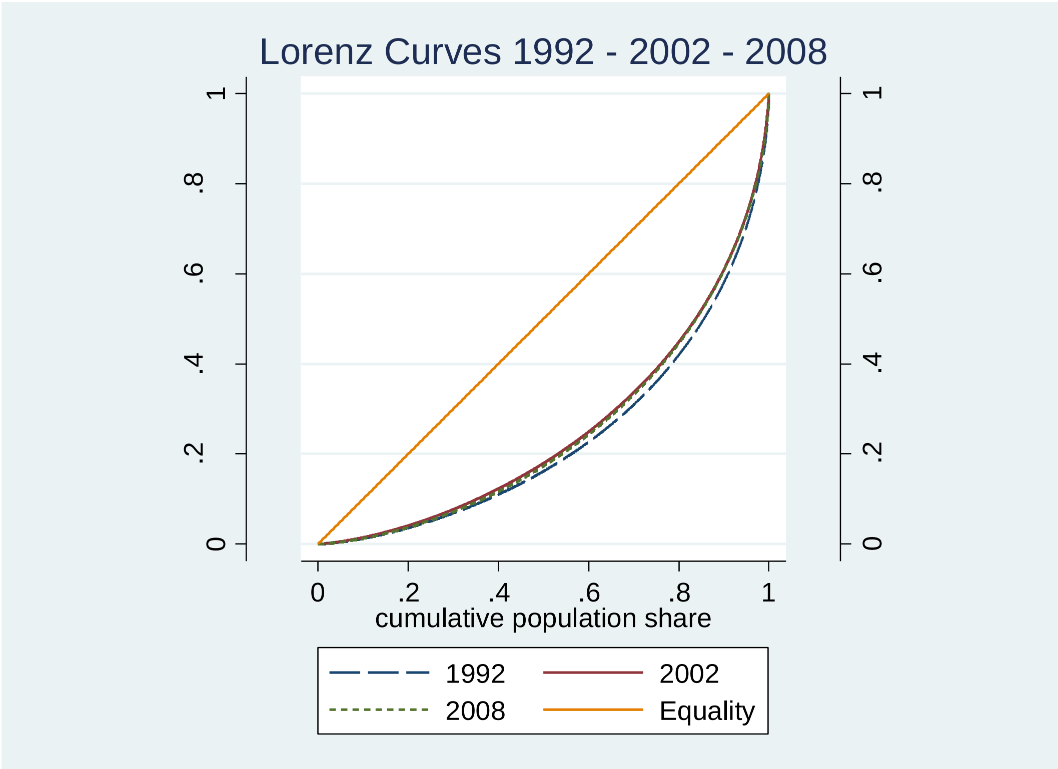
majority of the population; and c) the 2002 and 2008 distributions show very similar levels of inequality at the top 30% of the distribution.[112]

Figure 5.19 below shows the Generalized Lorenz curves for selected years during 1992-2008, using per capita income as the welfare indicator. We observe that: a) the 2006 curve Lorenz dominates the rest of the curves; b) the 2000 Lorenz dominates the 1992 and 1996 ones; c) the 1992 Lorenz dominates the 1996 one; and d) 2008 Lorenz dominates all the curves with the exception of 2006. This is a summary of what happened in 1992-2008.

We plot curves for each pair of years, which are not reported, but are available upon request. In these figures we observe that: a) after the extremely small value of 0.04% point of the cumulative population share onwards, the 1994 curve Lorenz dominates the 1992 one; b) the 1994 curve Lorenz dominates the 1996 one; c) the 1996 and 1998 curves give mixed results, since they cross each other around the 30% point of the cumulative population share; d) the 2000 curve Lorenz dominates the 1998 one; e) the 2002 curve Lorenz dominates the 2000 one; f) from the 8% point onwards, the 2004 curve Lorenz dominates the 2002 one; g) up to the value of 66% point the 2005 curve lies below the 2004 one, but after they cross and then 2005 goes on top of the 2004 one; h) after the very small value of .04% point of the cumulative population share, the 2006 curve Lorenz dominates the 2004 one; i) after the extremely low value of .025% point of the cumulative population share, the 2006 curve Lorenz dominates the 2005 one; and j) after the value of .05% point of the cumulative population share, the 2008 curve Lorenz dominates the rest of the curves with the exception of the 2006 one.

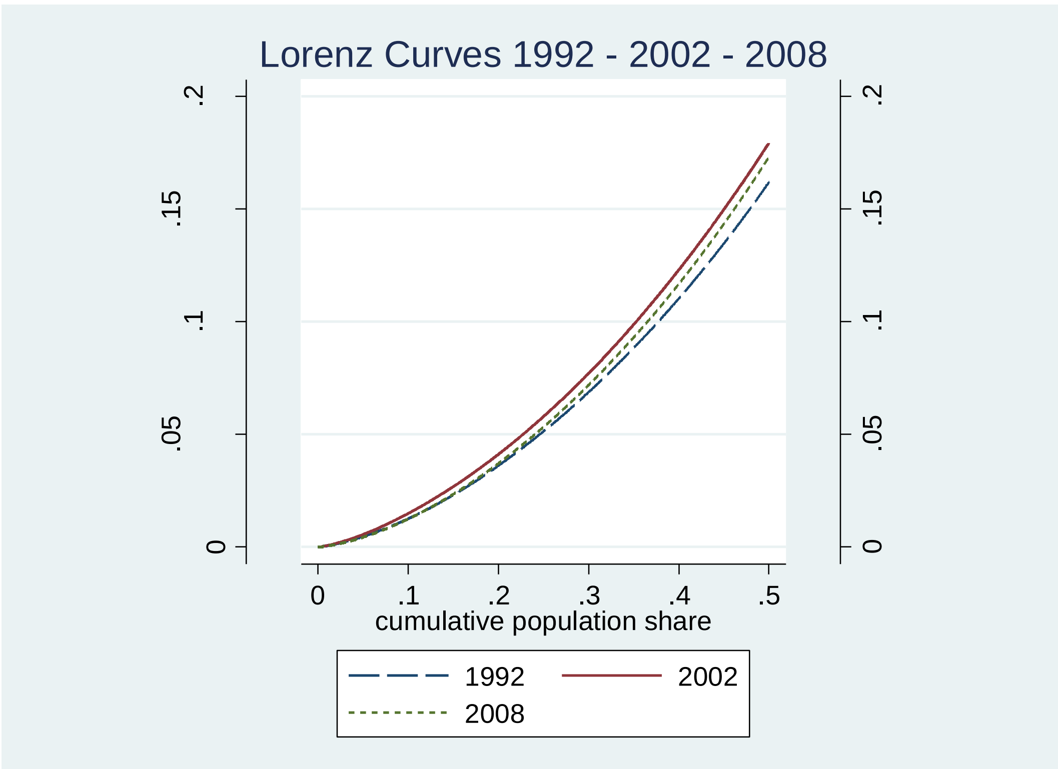
[112] Using per capita consumption as the welfare variable gives similar results. The 2002 and 2006 curves overlap each other and seem to have the same level of inequality. And for all the deciles up to the 7th, inequality seems to be smaller in 2002 and 2006 as compared to 1992. However for the top 3 deciles, inequality seems the same in the three periods (see figure A5.24 in the Annex). Lorenz curves using equivalised income are also given in the Annex (see figure A5.25) and we can see that the results are very similar than when using per capita income, with inequality falling in 1992-2002, but remaining the same in 2002-2006.

Figure 5.17. Mexico: Lorenz curves 1992-2008.



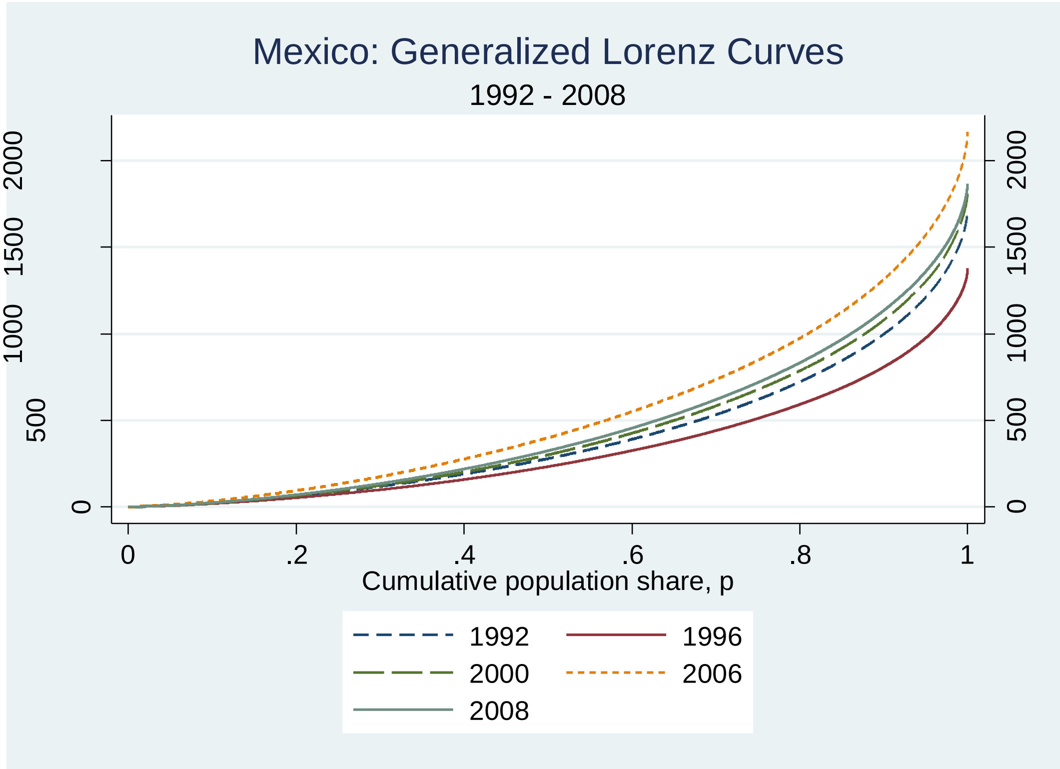
Source: Author’s calculations with data from 1992-2008 ENIGHs.

Figure 5.18. Mexico: Lorenz curves, the bottom of the curves, 1992-2008.



Source: Author’s calculations with data from 1992-2008 ENIGHs.

Figure 5.19. Mexico: Generalized Lorenz Curves, 1992-2008.



Source: Author's calculations with data from 1992-2008 ENIGHs.

Thus we can say that between 1992-1994, 1998-2000 (recovery after peso crisis), 2000-2002, 2002-2004 and 2005-2006 (Fox administration): a) the "size of the cake" grew, meaning that on average, each decile had a higher income at the end of each period as compared to the beginning; and b) social welfare increased in Mexico at the end of each sub-period irrespective of the inequality measure used or our aversion towards it. In contrast, the opposite was true for 1994-1996, 1994-1998 (peso crisis) and 2006-2008 (world financial crisis). That is, unlike the Lorenz curves, the generalized Lorenz curves show a decrease in social welfare after the peso crisis, since they focus on both, the share of the cake and its size.[113] Finally, the generalized Lorenz curves show decreases in the levels of social welfare during the period that captures the global financial crisis of 2008.

[113] Using per capita consumption and equivalised income as the welfare variables give very similar results. (see figures A5.26 and A5.27 in the Annex).

5.6. INCOME VS. CONSUMPTION

Our final robustness check refers to the use of different welfare indicators. We used per capita consumption and equivalised income as welfare indicators instead of per capita income for the most important calculations through out this chapter. The results for these two variables were not part of the main discussion of the chapter, but were presented in reference notes and in the Annex. A summary of the results using equivalised income and per capita consumption is given in the following paragraphs.

Regarding the *income shares*, we observed that the consumption results are not too different from those of per capita income. However, the results differ in three ways: 1) in 1992-1994 the poorest 5 deciles reduced their consumption share as compared with only the 3rd and 4th in the income results; 2) in 1998-2000 there were more losers when using consumption shares than when using income shares; and 3) in 2002-2004 only the poorest and the richest deciles reduced their consumption share as compared with 6 deciles in the income results.

For the *Gini coefficient*, when using consumption most of the results are the same as when using income, with the exception being that the increase in inequality between 2004-2005 becomes statistically significant when using per capita consumption. Inequality trends seem even more stable when using per capita consumption when calculating the *Generalized Entropy Measure*. Indeed, none of the urban/rural changes were statistically significant this time. But the total population showed the following statistically significant changes: a) a decrease in 2000-2004 for the poorest of the poor and the poor; b) an increase between 2004-2005 for the poorest of the poor and the poor; and c) a decrease between 2005-2006 for the poorest of the poor.

The per capita consumption results for the *FGT index* are very similar from 1992 to 2002. However, from 2002 onwards, these results differ from the per capita income ones. Between 2002-2004 we observed a fall in the FGT index (α=0,1,2) not only for the rural population, but for the urban population as well. Later between 2004-2005, we observed an increased in the FGT index (α=0,1,2) for both, rural and urban areas (with per capita income we observed an increase in rural areas and a fall in the FGT index in urban areas). And the magnitude of the increase is higher for urban areas. Finally, between 2005 and 2006 we observed a fall in the FGT index, but the magnitude of the fall is smaller as compared with the results for per capita income.[114]

Regarding the results for the *CDFs*, using equivalised income gives very similar results than using per capita income between 1992-2006. Moreover, the results for per capita consumption are very similar between 1992-2000 to the per capita income ones. However, there are differences between 2000 and 2006. The main two differences are that in this case the 2004 CDF dominates entirely the 2005, and that the year with the lowest levels of poverty was 2004 (with per capita income was 2006). Per capita consumption results are also very similar, with the exception being 2006, where the fall in poverty is not as pronounced as when using per capita income.

In the case of the *Lorenz curves*, we obtained very similar results when using equivalised income and per capita consumption instead of per capita income. But, when using per capita consumption as the welfare indicator, the Lorenz curves moved in the same direction but were closer from each other. Meaning that the changes in inequality through time were not as big as when using per capita income. Finally, the results for the *generalized Lorenz curves* using per capita consumption and equivalised income were extremely similar than those of per capita income.

To conclude, we did not find that our results were very sensitive to the use of different welfare indicators. Using equivalised income gives extremely similar results as compared with per capita income. In the case of per capita consumption, results are very similar. However, inequality seems more stable throughout time as compared with the per capita income results. Finally, the poverty results are very similar for most of the years, 2006 being the exception, where the fall in the FGT index is not as pronounced when using consumption as opposed to income.

[114] The full results for the FGT index using per capita consumption are given in table A5.18 in the Annex.

5.7. OUR RESULTS VS. THE OFFICIAL ESTIMATIONS

In this section we will compare the official poverty estimations made by the CTMP and CONEVAL with our results. As already mentioned, as opposed with the poverty measures, there is no consensus regarding the methodology to measure income inequality. Indeed, the official estimates include only the Gini coefficient, but they do not provide any of the Generalized Entropy Measures. In the case of the poverty measures, the CTMP calculates the FGT family of poverty indexes, but CONEVAL gives results mainly for the Headcount index.

Table 5.8 below compares the official results for poverty and inequality measures with the author's calculations. It compares the FGT family of poverty indexes as well as the Gini coefficient. We observe the following:

- The direction of the changes in the poverty measures are the same for the official and the author's calculations.
- The magnitude of the poverty levels in the author's calculations is generally a bit higher than the official results. But this difference is never bigger than 5 percentage points.
- Regarding the Gini coefficient (the only available official result for inequality), we observe that the levels are very similar, but the direction of the changes differs from 2000 onwards.
- It was impossible to compare our preferred inequality measure, the Generalized Entropy Measure, with the official results, since the government does not make any calculations of other inequality measures apart from the Gini coefficient.
- Finally, no stochastic analysis is made by the government, thus, we cannot compare the results of the second part of the chapter with the official results.

Table 5.8. Mexico: Comparison of official poverty and inequality results with the author's calculations, using the food poverty line

	1992			1994			1996			1998		
Official results												
FGT index	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	22.5	5.7	2.6	21.1	5.3	2.5	37.1	10.2	5.0	33.9	10.2	5.3
Urban	13.5	2.8	1.2	9.7	1.9	0.8	26.5	6.1	2.7	21.3	4.9	2.2
Rural	35.6	10.4	5.0	36.8	10.5	5.1	52.4	16.9	8.9	52.1	18.8	10.4
Author's results												
	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	24.0	8.4	4.2	24.0	7.8	3.6	34.3	12.6	6.4	31.6	12.3	6.5
Urban	15.6	4.6	1.9	14.1	3.6	1.4	25.0	7.9	3.5	19.8	5.8	2.5
Rural	38.7	15.3	8.1	37.6	13.5	6.6	47.7	19.5	10.6	48.7	21.7	12.3
Difference	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	1.5	2.7	1.5	2.9	2.5	1.1	-2.8	2.5	1.4	-2.3	2.1	1.2
Urban	2.1	1.8	0.7	4.4	1.6	0.6	-1.5	1.7	0.8	-1.5	0.9	0.3
Rural	3.1	4.9	3.0	0.8	3.1	1.6	-4.7	2.6	1.7	-3.4	2.8	1.9

Official results	2000			2002			2006			2008		
FGT index	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	24.2	6.2	3.0	20.3	6.3	3.2	13.8	4.2	1.9	18.2	5.8	2.7
Urban	12.6	2.6	1.1	11.4	2.8	1.1	7.5	n.a.	n.a.	10.6	n.a.	n.a.
Rural	42.4	12.5	6.3	34.8	12.2	6.6	24.5	n.a.	n.a.	31.8	n.a.	n.a.
Author's results												
	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	24.3	8.3	4.1	19.9	6.3	2.9	13.2	4.0	1.8	21.1	7.5	3.8
Urban	13.3	3.3	1.3	11.8	3.2	1.3	7.4	1.8	0.7	13.5	3.9	1.8
Rural	41.5	16.2	8.5	32.9	11.5	5.5	23.1	7.7	3.7	34.7	13.9	7.5
Difference	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Total	0.1	2.1	1.1	-0.4	0.0	-0.3	-0.6	-0.2	-0.1	2.9	1.7	1.1
Urban	0.7	0.7	0.1	0.4	0.4	0.2	-0.1	n.a.	n.a.	2.9	n.a.	n.a.
Rural	-0.9	3.7	2.1	-1.9	-0.7	-1.0	-1.4	n.a.	n.a.	2.9	n.a.	n.a.

Gini coefficient	**1992**	**1994**	**1996**	**1998**	**2000**	**2002**	**2004**	**2005**	**2006**	**2008**
Official results	0.529	0.539	0.524	0.535	0.535	0.535	0.507	0.501	0.509	0.496
Author's results	0.531	0.534	0.522	0.533	0.522	0.498	0.497	0.509	0.495	0.515

Source: Official poverty calculations, 1992-2002 from Sékely, M. (Ed) (2005) Números que mueven al mundo: la medición de la pobreza en México. 2006-2008 from www.coneval.gob.mx.Official inequality results from www.coneval.gob.mx. Author's results, own calculations from ENIGH household surveys 1992-2008.

5.8. Conclusions

In this chapter, the levels and trends in income inequality and poverty were calculated for Mexico between 1992 and 2008. The main objective was to arrive to *robust results* about these changes. The methodological decisions applied in this chapter follow the recommendations of the previous chapters. We explored the changes of poverty and inequality by calculating a set of poverty and inequality measures and later by using stochastic dominance analysis. We found robust results regarding the changes in poverty and income inequality in Mexico in the period of study. Indeed, the stochastic dominance analysis results confirmed those of the FGT index and the Generalized Entropy Measure. Our poverty and inequality results exposed how seriously the economic turmoil of December 1994 and the world financial crisis of 2008 affected the poverty and inequality trends during the period of study. However, inequality levels have not changed much as compared with poverty ones. The following paragraphs present the main findings.

The kernel densities suggest that 1996 was the year with the highest levels of poverty. Unfortunately, we observe that this trend was not reversed until 2000, nearly 6 years after the shock of the peso crisis. From 2000 onwards, there seems to be an improvement in the absolute levels of poverty reflected in the shifts of the kernel densities towards the right in 2004 and 2006. A second approximation to the distribution of income was given by the income shares by deciles. We observed that the poorest 10% of the population has an average income share of only 1.3% in the period of study, and that the bottom 50% of the population has an average cumulative income share of 17%. In contrast, the richest 10% of the population has an average income share of 40.7%. We also observed that there are three periods where the poorest 5 deciles experienced an important fall in their income share: 1996-1998, 2004-2005 and 2006-2008. In terms of increases in income shares, 2000-2002 and 2005-2006 are important periods for the poorest deciles of the population. When dividing the distribution in urban/rural groups we observe that the rural areas had suffered more relative and absolute losses than the urban ones. Finally, we observed that the poorest 4 deciles are the ones which have experienced dramatic changes in their income shares through time. In contrast, the 5^{th} to the 10^{th} deciles have enjoyed a more stable income share throughout the last 16 years. This pattern exposes the vulnerability of the poorest sector of the population towards the changes in the economy.

Two inequality measures were calculated: the Gini coefficient and the Generalized Entropy Measure (GE). The GE was calculated also for rural and urban areas. Using the Gini coefficient we found that the only changes that were statistically significant at the 5% level were a fall in inequality between the beginning of the period of the study (1992) and 2002, 2004 and 2006. Thus, we can say with 95% confidence that inequality fell slightly in the period of study. Using our preferred inequality measure, the GE, we arrived to the following results and we can say with 95% confidence that: a) inequality increased markedly in the rural areas after the peso crisis (1994-1998), while remaining unchanged in the urban ones (this is an important result, since it shows that the urban/rural results are different from those of the total population); b) inequality has remained unchanged in the rural areas from 1998 to 2006, but there had been some small changes in the urban areas between 1998-2002 (a fall for the poor) and between 2002-2005 (an increase for the rich); c) inequality increased in rural areas for the poor and the poorest of the poor between 2006-2008; and d) even after 16 years of the peso crisis, the poor population in the rural areas has been incapable of recovering from the negative shock. In contrast, the levels of inequality for the urban population have remained very stable throughout the last 16 years.

The next step was to calculate our preferred poverty measures: the FGT family index with (α=0,1,2). We present here only the results that are statistically significant at 95%. We observe that the years after the *peso crisis*, 1994-1996, seemed to be one of the worst sub-periods for urban/rural areas in the period of study. With markedly increases in the Headcount Index, the Poverty Gap and the Squared Poverty Gap in the urban, rural and therefore, the total population living under the three official poverty lines. After the peso crisis, the urban regions managed to recover faster than the rural ones, and between 1996-2000 the urban population experienced a fall in all of the three poverty measures. The rural areas experienced something similar but at a later time, between 1998-2002. However, while the urban population did not experience any increases in the poverty measures between 1996-2006, the rural population experienced an increase between 2004-2005. In contrast, the 2005-2006 sub-period seemed to be a very important year in terms of positive poverty results. Indeed, during this year there were markedly high poverty reductions in the three poverty measures for both, rural and urban areas. Finally, it became evident that the world financial crisis of 2008 affected markedly the levels of poverty in both, urban and rural areas. Indeed, the negative effect on the rural areas was even deeper that the one experienced after the peso crisis. However, since the levels of poverty were much lower in 2006 than in 1994, the final result was not as severe in 2008 as compared with 1996.

Since our inequality results depend on the measures that we used and our poverty results not only on the measures but also on the poverty lines. In order to check for the robustness of these results, we used stochastic dominance analysis to try to find a hierarchy in the order of preference of one distribution over the others, irrespective of the inequality and poverty measure and the poverty lines used. The first robustness check was for the Headcount index and its sensitivity to the use of different poverty lines. By plotting the CDFs for each year, we observed that for all poverty lines the Headcount index: a) fell between 1992-1994; b) increased between 1994-1996 and between 1994-1998; and c) fell between 1998-2000. For all poverty lines above 7.4% of the food poverty line and below 3 times the value of the most generous poverty line, the Headcount index: a) fell between 2000-2004 and between 2004-2006; and b) increased between 2006-2008. These results are very important, since the official poverty lines have been criticized on the basis that they are not generous enough. However, the changes over time in the Headcount index could be generalized for all poverty lines in the 1990's and for poverty lines above 7.4% of the food poverty line and up to almost 3 times higher than the most generous official poverty line for 2000 onwards.

Our second robustness check was intended for our inequality measures. We used Lorenz curves to check the robustness of different inequality measures. When we have two Lorenz curves that do not cross each other, the curve that is closer to the 45° ray will always be a more egalitarian distribution than the other one. We observed that inequality across time changed very slightly. Indeed, there is no change from 1992 until 2002, where inequality fell. Later on, it seems that inequality increased slightly in 2005; then inequality fell and went back to the 2002 levels in 2006; to finally increase again in 2008 for the bottom 70% of the distribution. These changes confirmed those obtained with the GE for the total population. Thus, we obtained robust results irrespective of the inequality measures used.

The third robustness check was intended also for our inequality measures. We used Generalized Lorenz curves in order to incorporate average living standards to the Lorenz curve. When one curve lies above another one, shows that "the size of the cake" is bigger on average. Thus, there is more for everybody in the upper distribution as compared with the lower one. After plotting the Generalized Lorenz Curves we observe that: a) the "size of the cake" grew between 1992-1994, 1998-2000, 2000-2002, 2002-2004 and 2005-2006. Meaning that on average, each decile had a higher income at the end of each period as compared to the beginning. Thus, social welfare increased in Mexico at the end of each sub-period irrespective of the inequality measure used or our aversion towards it. The opposite was true for 1994-1996, 1994-1998 and 2006-2008.

We also compared our results with the official estimations of CTMP and CONEVAL. We found that the direction of the changes in the poverty measures were the same for the official and the author's calculations. However, the magnitude of the poverty levels in the author's calculations is generally higher than the official results. But this difference was never larger than 5 percentage points. Regarding the Gini coefficient, we observe that the levels of inequality were similar in both sources, but the direction of the changes differed from 2000 onwards. For instance, the author's calculations show an increase in inequality between 2006 and 2008 as measured by the Gini coefficient, while the official estimates show a decrease. However, our results using the GE, Lorenz curves and Generalized Lorenz curves confirm that there was a robust increase in inequality between 2006 and 2008 for the bottom 70% of the distribution.

Our final robustness check used per capita consumption and equivalised income as welfare indicators instead of per capita income when analyzing the *trends* in poverty and inequality. We did not find that our results were very sensitive to the use of different welfare indicators. Using equivalised income gives extremely similar results as compared with per capita income. In the case of per capita consumption, results are very similar. However, inequality seems more stable throughout time as compared with the per capita income results. Finally, poverty trends are very similar for most of the years, being the exception 2006, where the fall in the FGT index is not as pronounced when using consumption as opposed to income.

To sum up, we found robust results regarding the trends in inequality and poverty between 1992 and 2008. We observed that inequality for the total population has not changed much during the last 16 years. In contrast, the levels of poverty have changed markedly during the period of study, especially after the *peso crisis* and the world financial crisis (when we observe sharp increases). We found very useful to separate the inequality analysis by rural and urban areas, since our results show that the trends in both areas move differently. Indeed, urban inequality has remained very stable during the period of study while the levels of inequality in rural areas increased markedly after the peso crisis and once again with the global financial crisis of 2008. Regarding income shares, we observed that the poorest 4 deciles are the ones which have experienced dramatic changes in their income shares through time. This pattern exposes the vulnerability of the poorest sector of the population towards the changes in the economy. But it also highlights the potential of redistribution, since when income inequality decreases in Mexico, the most benefited are the poorest of the population. Thus, reducing inequality in Mexico has a high potential impact on the poor and this could eventually also reduce the absolute levels of poverty. Regarding poverty levels, it was shown that urban areas recovered much faster than rural ones after the *peso crisis*. It was argued that the shock in rural areas was deeper and of other nature, since they were hit not only by the negative effects of the peso crisis, but also by: a) the 70% fall in cocoa and coffee international prices during 1984-1994; b) the retreat of the state from servicing the *ejido* sector; and c) finally by the implementation of NAFTA and with it the promotion of unfair competition of Mexican rural farmers with large and heavily subsidized American farmers.

This chapter documented the levels and trends of poverty and income inequality in Mexico between 1992 and 2008 using best practice techniques. It also mapped these changes into periods of crisis, recovery and reforms. Nevertheless, it does not provide information about the possible factors behind these levels and trends. That is why in the next chapter we will use a different set of methodologies to decompose the levels and trends of income inequality in Mexico and will try to map these, to changes in the underlying population characteristics (e.g. education). Understanding the causes of income inequality remains important, since although it seems that the levels of inequality in Mexico have not changed much since 1992, its magnitude remains very high. Finally, since inequality levels in rural areas have changed more than in urban ones, it would be really important to explore rural/urban divisions when making the decompositions.

CHAPTER 6. "ACCOUNTING FOR INCOME INEQUALITY AND ITS CHANGES IN MEXICO BETWEEN 1992-2008"

6.1. INTRODUCTION

The previous chapters tell the story of the levels and trends of poverty and income inequality in Mexico. In contrast, this chapter is devoted to try to find the potential 'culprits' behind the high levels of income inequality. The aim of this chapter is try to understand the different factors affecting the evolution of income inequality. In the following pages, different methodologies will be used to analyze the determinants of the levels and trends of income inequality in Mexico between 1992 and 2008. Understanding these causes remains an important issue from a policy maker perspective. In the case of Mexico, understanding the causes of income inequality remains more important, since the literature about it is not abundant.[115] In contrast with other studies that focus on wage differentials and on urban households with a household head that is employed (e.g. Lopez-Acevedo and Salinas:2000), this study focuses on the population as a whole (urban and rural) and includes those who are unemployed and the not-economically active (such as students and housewives).

Literature on income inequality in Mexico is abundant, but is predominantly descriptive (e.g. Cortés:2000, Hernández-Laos and Velázquez-Roa:2003, Székely:2005). However, other studies have explored the determinants of income inequality (e.g. Székely:1998, Bouillon *et al*:1998, Lopez-Acevedo and Salinas:2000, De Hoyos:2003, De Hoyos:2007). Inequality decomposition methods can be divided in two main groups: those which use an arithmetic decomposition (e.g. Shorrocks:1982, Mookherjee and Shorrocks:1982, Cowell and Jenkins:1995, Jenkins:1995), and those who use regression based decomposition (e.g. Oaxaca:1973, Fields:2002, Wan:2004). Income[116] or its logarithm is used as the dependent variable and a number of

[115] Three relevant studies are: Székely (1998) and De Hoyos (2003, 2007). However, there is an important part of the literature that focuses on wage differentials that have applied inequality decomposition techniques, using wages as the welfare indicator and using a smaller sample that refers to the urban population only (e.g. Lopez-Acevedo and Salinas:2000).

[116] Income from different sources is normally used, including earnings, that is, income from employment.

variables or proxies are introduced as the independent variables. The work by Oaxaca (1973) is one of the earliest examples on this late type of methodology. This chapter will use both, arithmetic decomposition (sub-group and income-source) as well as regression based decomposition to explore the determinants of inequality in Mexico during the period 1992-2008. The methodologies proposed by Mookherjee and Shorrocks (1982), Shorrocks (1982), Jenkins (1995), Cowell and Jenkins (1995) and Fields (2002) will be applied in order to establish if the results are robust or depend on the different methodologies used. To our knowledge, there is no published study that has used all these types of methodologies to study the determinants of income inequality in Mexico. Moreover, the methodology proposed by Fields (2002) attempts to correct for some of the problems and restrictions generated by earlier works and seems to be a natural choice to study the determinants of inequality in Mexico. In addition, this chapter will briefly describe two key factors that have influenced inequality in Mexico over the last 20 years: the link between trade liberalization and wage differentials and the unequal distribution of education among the Mexican population.

The empirical papers about these types of decomposition methods in the case of Mexico are not abundant. Indeed, most of the available literature explores wage inequality (e.g. Lopez-Acevedo and Salinas:2000) rather than income inequality. However, there are a few articles that have used similar methodology to decompose inequality to the one that will be applied in this chapter, but related to previous periods of study (Székely:1998, De Hoyos:2003, and De Hoyos:2007). This literature, has aimed to explore the impacts of the structural changes that the Mexican economy went through during the 1980s and 1990s, especially those linked to free trade agreements such as NAFTA and GATT as well as the wide spread privatization of the economy and its financial liberalization. Indeed, the Mexican economy has experienced several structural changes and shocks during the last decades. This was made evident in chapter 1 where a brief economic history of Mexico during the last decades was presented. Our period of study starts in 1992, thus, we will not analyze the “lost decade” of the 1980s. However, our data sets cover very important years in terms of economic and political reforms as well as the *peso crisis*. Among those we have: the recovery period of the early 1990s; the *peso crisis* of December 1994 which had a deep impact on the levels of poverty; the before and after scenario of the implementation of the North American Free Trade Agreement (NAFTA here after) in January 1994; the years of the Fox *sexenio* when the opposition won after more than 70 years of ruling of the PRI party; and the unfolding of the 2008 world financial crisis.

The main contributions of this chapter to the existing literature are as follows:

- To our knowledge there is no published work that combines arithmetic inequality decompositions – sub-group and income-source – and regression-based inequality decompositions to explain both, the levels and changes in income inequality in Mexico for the period of 1992-2008.
- Regarding inequality *arithmetic* decompositions, the only complete study that exists, Székely (1998), covers two decades ago (1982-1992). There is a more recent study by De Hoyos (2003) that covers 1992-2000, but it only creates two sub-groups. In contrast, our chapter focuses on a more recent period 1992-2006 and it creates five different subgroups: education, occupation, industry, rural/urban and region, and also explores eight different sources of income.
- Regarding *regression-based* inequality decompositions, to our knowledge there is no other published work that uses Fields (2002) to decompose both, the levels and changes of inequality in Mexico between 1992-2008. This chapter uses Fields (2002) as a way to overcome the main drawbacks of using arithmetic decomposition (that is, controlling for the correlation among different factors). It includes ten different personal and household characteristics as independent variables that were selected as a result of both, the results of our own arithmetic decompositions and those of other studies that have applied Fields style decomposition for other countries. There is a study by De Hoyos (2007) that covers the 1990s that applies a similar regression-based decomposition (that of Murdoch and Sicular 2002), but only for the levels of inequality and includes only half of the regressors that we do, leaving out of the income-generating equations important variables such as living in an urban/rural area and the type of industry where the household head works (variables that are included in our regressions).

- Also regarding our Fields style decompositions, we also ran separate regressions for rural and urban areas. To our knowledge, there is no published work that has done that even for previous years. We believe that the differences between urban and rural areas in Mexico are so striking, that a deeper and separate examination of the two was needed.

The following paragraphs describe in more detail the differences of our work with the other studies mentioned above. The methodology that we will use in the first part of the chapter – arithmetic decomposition – is similar to that applied by Székely (1998) and De Hoyos (2003). But it will differ in the covered years and the sub-groups created. Székely's work is very complete regarding arithmetic decompositions, since it includes nine sub-groups and detailed income-source decompositions, but it covers only 1984 to 1992. The most recent results regarding arithmetic decomposition are those presented by De Hoyos (2003), which cover 1989 to 2000. The income-source decompositions that he presents are similar to those of Székely. But his sub-group analysis includes only two sub-groups (occupation and industry). Therefore, he does not include two of the groups that we suspect will be very important to explain the levels and changes in inequality: education and rural/urban. In order to fill these gaps from the arithmetic decompositions, ours will include, detailed income source decompositions, and the following sub-groups decompositions: education, occupation, industry, rural/urban and region for 1992-2006.

Regarding the second part of the chapter, we apply Fields (2002) methodology to decompose the levels and changes of income inequality in Mexico between 1992 and 2008. To our knowledge, there is no published study that uses the same methodology for this period of study. De Hoyos (2007) uses a similar approach, but uses income instead of its logarithmic transformation as the dependent variable in the income generating equations.[117] We agree with Krstić *et al* (2007:102) in that the use of the logarithmic specification is based on "a strong labour economics tradition that provides a sound theoretical basis for such a form". In addition, our study covers 1992-2008, while De Hoyos focuses on the previous decade (1989-2000). Our study also includes a broader set of

[117] Indeed, all of the rest of the empirical studies that we reviewed on table 13 use the logarithm of per capita income or consumption as the dependent variable.

household head characteristics as independent variables in the income generating equations, which will prove to be important explaining the levels and changes of income inequality (e.g. industry and urban). Moreover, De Hoyos does not calculate the dynamic decomposition, while our study does. We believe that decomposing the changes in income inequality is as important as decomposing its levels. Indeed, the period of study will be subdivided in 5 sub-periods.

Our regression-based decompositions also differ from the majority of the studies available, in the sense that it uses a much broader definition of income (that includes monetary and non-monetary sources) in both urban and rural areas, including the not-economically active. Moreover, since previous chapters made obvious the striking differences between urban and rural areas, our research also runs separate regressions for each of these regions. Finally, to our knowledge, there is no other published study that combines these three different methodologies – sub-group decompositions, income by source decompositions and regression-based decompositions – to calculate both, the levels and changes in income inequality in Mexico between 1992 and 2008.[118] We believe that the combination of these three methodologies will not only shed a light on finding the culprits behind the levels and changes in income inequality in Mexico for the last 16 years, but it will also make possible to compare results from different methodologies and therefore test the robustness of our results.

This chapter, as the previous ones, uses ENIGH household surveys as the primary source of information, collected every two years between 1992 and 2008. The surveys are representative at the National level and for urban and rural areas. It is possible to identify every household member and the different sources of income for the household (monetary and non-monetary) as well as the levels of consumption. In addition, the surveys give information about education, occupation, age, gender, type of industry, union membership, region, marital status and several other relevant variables.[119]

Section **1** above, described the contribution of this chapter to the existing literature. Section **2** briefly describes two key issues that have been linked to

[118] For the regression-based decompositions we also included the newest ENIGH household survey of 2008. Although some key results are given in previous chapters, there was no sufficient time to update all the results for all the chapters. The arithmetic decomposition results are presented up to 2006 only.
[119] For a full detail about the ENIGH household surveys, see the Data section in Chapter 3.

changes in inequality over time in Mexico: 1) trade liberalization and wage differentials; and 2) education and inequality in Mexico. The rest of the chapter presents the actual results for the different inequality decompositions. It starts with the two arithmetic decompositions – population sub-groups and income-source – and it finishes with the regression-based decomposition results. Specifically, section **3** presents the results for population sub-group decompositions. It provides several explanations to the levels and trends in income inequality in Mexico between 1992 and 2006 focusing on the following variables: education, type of industry, occupation, region, and rural/urban. Section **4** presents the static and dynamic results for the income-source decompositions. Section **5** presents the results for our regression-based decompositions for Mexico between 1992-2008. It presents also a brief literature review on empirical work that applies Fields style decompositions. Finally, section **6** presents a summary and some concluding remarks for the whole chapter.

6.2. THE EFFECTS OF WAGE DIFFERENTIALS AND EDUCATION ON INEQUALITY IN MEXICO

6.2.1. Trade liberalization and wage differentials

Mexico went through a rapid unilateral trade liberalization in the mid 1980's as part of the stabilization programmes that were implemented after the debt crisis of 1982, and also with its adherence to the GATT in 1986. Later in 1994 trade liberalization deepened when the North American Free Trade Agreement (NAFTA) that was signed with the USA and Canada came into force.[120] After more than 20 years of the beginning of trade liberalization in Mexico, several authors have studied the impact of these policies on the Mexican economy. In particular, the link between trade liberalization and wage inequality increases in Mexico has been extensively researched theoretically and empirically.[121] Although there is agreement in the observed wage differentials among skilled and unskilled workers after trade liberalization, there is no agreement in finding a culprit. Thus, we have articles finding trade liberalization as the main source of the increasing wage differentials (see Hanson & Harrison, 1999), others pointing at technological change as the main culprit (Esquivel & Rodríguez-López, 2003), and others pointing at a combination of the two, plus other changes in the global availability of cheap labour (Wood, 1997). Studying the link between wage inequality and trade liberalization remains important, since regardless of the culprit for the observed increasing wage gaps of skilled vs. unskilled workers, the changes in overall inequality had been linked to changes in wage inequality (see Alarcón & McKinley, 1997).

At the heart of the debate there is empirical evidence showing contradictory results to what Wood (1997) calls the conventional wisdom. This refers to the Heckscher-Ohlin model of comparative advantage, with two countries, two factors (skilled and unskilled labour), two goods (e.g. computers and textiles) and given technology. The model predicts that when trade barriers are removed among these two countries, each country will export goods that

[120] See the section on *Important changes in trade liberalization 1980-2009* on Chapter 1 for a more complete view on this issue.
[121] This section is only an introduction to the topic, for a review of the debate see Hanson (2003).

use intensively abundant factors of production and import goods that are relatively scarce at home. An increase in trade will result in an increase in exports in both countries. In the labour-abundant country, the prices of textiles – labour-intensive good – will increase (since demand increased) and the prices for computers – capital intensive good – will decrease (since supply increased). The latter, tends to increase unskilled wages and to lower skilled wages and hence to narrow the gap between them. The link between prices and wages is known as the Stolper-Samuelson theorem, which is valid since technology is given in the model (Wood, op. cit). After making a survey of the empirical evidence in East Asia (mainly Hong Kong, Korea, Taiwan and Singapore) and Latin America (Argentina, Chile, Costa Rica, Colombia, Uruguay and Mexico), Wood (op. cit) found that the East Asian experiences seem to support the conventional wisdom, while all the Latin American ones seem to contradict it. And two possible explanations are given for these differences between East Asian and Latin American countries. The first is the entrance of low income Asian countries (e.g. China and India) into world markets, and the subsequent increase in supply of cheap labour; and the second is a change in technology during the 1980s that demanded more skilled labour, thus increasing the relative demand of skilled labour.

Regarding Mexico, there are consistent results on empirical research showing an increase in wage differentials after trade liberalization in 1985 and 1994, associated with increasing returns to skill. For instance using data from over 2,500 Mexican manufacturing plants over 1984-1990, Hanson and Harrison (1999) calculate the gap between blue-collar and white-collar workers in Mexico, finding that the ratio of average hourly wages of white-collar workers in 1984 was 1.9 higher than those of blue-collar workers, and that it increased to 2.5 by 1999. This was the result of a fall in real wages related to blue-collar workers and an increase in real wages for white-collar workers. Using ENIGH household surveys, Alarcón & McKinley (op. cit) found that in 1994 blue-collar real wages in manufacturing were only 72% of the value of 1980, while white-collar real wages actually increased 6% in the same period.

As for looking for explanations behind these changes, there are several results. Hanson and Harrison (op. cit.) found that the observed wage differential in this period is due to the fact that unskilled-related sectors were highly protected through a system of tariffs before trade liberalization. Thus, before trade liberalization, Mexico was protecting the sectors where it had a comparative advantage (cheap labour) and when trade liberalization was implemented, these sectors where precisely the most affected. Other explanations include Hanson (2003), who stresses the influence of FDI on wages through two channels: firstly by increasing the relative demand for high-skilled workers in *maquiladora*[122] regions (North of Mexico); and secondly by increasing wages in the North of the country and decreasing wages in the centre and south. In a related research, Esquivel and Rodríguez-López (2003) separated the effects of technology and trade liberalization on wage inequality, finding that the two affected wages in opposite directions. While trade liberalization tended to decrease wage inequality, technological change increased it. But being the effect of technological change larger than that of trade liberalization, the outcome was a wider inequality in wages. Thus, even after more than 10 years of research in this topic, there is still no agreement regarding the source for the widening wage inequality observed after trade liberalization in Mexico.

Finally, it seems surprising that Hanson and Harrison (1999) found that the allocation of employment across industries has changed very little after trade reforms. This result could be explained by the unequal distribution of education among Mexicans, where access to university education is mainly reserved for the richest 20% of the population in urban areas, and for the richest 10% in rural ones (see table 6.4). Thus, even with higher salaries in skilled jobs, unskilled workers cannot access these types of jobs, at least not until access to higher levels of education becomes more accessible. The next section summarizes the distribution of education between different groups: female/male, by deciles, rural/urban and among different industries.

[122] *Maquiladoras* are export assembly plants that bring parts from the USA to be assemble in Mexico and then returned to the USA market. In these factories, the only value added in Mexico is cheap labour.

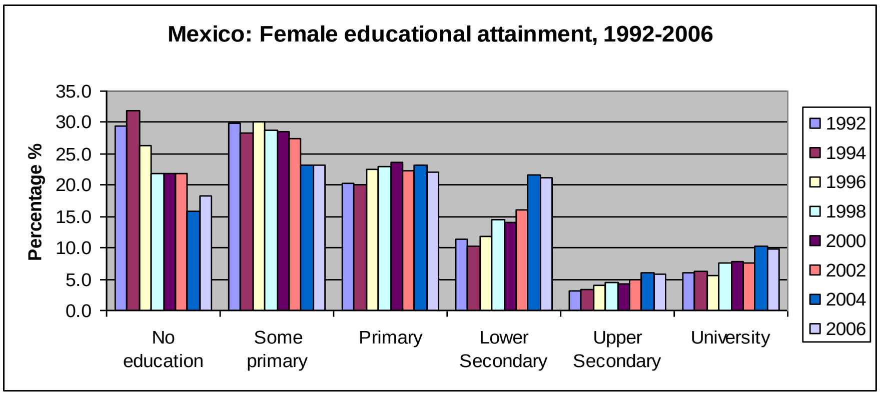
6.2.2. Education and income inequality

The literature about inequality decomposition in Mexico is not very abundant. However, the majority of these studies found education to be the most important variable behind both, the levels and changes in inequality during the 1980's and 1990's (Székely, 1998; Bouillon *et al*, 1998; Lopez-Acevedo and Salinas, 2000; Legovini *et al*, 2001; De Hoyos, 2007). Therefore, it seems natural to present some statistics about the distribution of this variable among the Mexican population before presenting the actual inequality decomposition results. In this section we will look at the distribution of education by gender, industry, deciles, and urban/rural divisions. What will emerge from these figures and tables is the picture of a country with striking divisions among its population. Divisions that show that the access to education will vary according to gender, level of income and if the household lives in an urban or rural area.

6.2.2.1. Gender and access to education

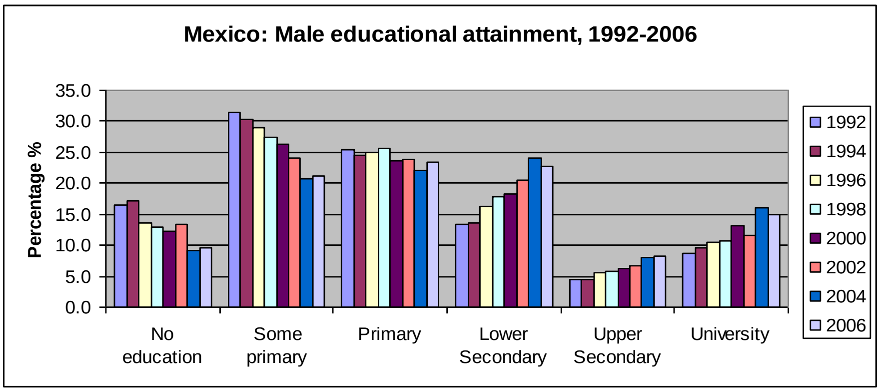
Table A6.1. in the Annex and figures 6.1 and 6.2 below, show the levels of educational attainment by gender for 1992-2006. As a reference, in 2006, 15,744 household heads were male and 5,131 were female. Thus, male household heads are roughly three times more common than female ones. The table and figures present the information for household heads only, since all the inequality decompositions use household heads personal characteristics (e.g. educational attainment, gender, age) for the calculations. It is important to mention that the majority of the household heads are male. For instance, in 2006 only 25% of household heads were female. The results for the whole population are very similar and are reported in table A6.7 in the Annex. We observe several patterns: a) there is a gap in the level of education attained by women and men in Mexico, with men having higher levels of education in all years, as compared with women; b) the percentage of female and male household heads without education or with some primary education has been falling in the period, especially during the most recent years; c) the gap between men and women appears to have a tendency to close from primary level onwards; d) in 1992 the percentage of female population with primary level or less was 79% as compared with 73% of men, but in 2006 these percentages went down to 63 and 54%. This percentage is really high for the level of GDP per capita that the country has and it helps us to understand how unequal the Mexican society is, with most of the resources being held by a small percentage of the population and the majority of the population not having sufficient resources to invest in education. Even without tuition fees, there are several costs attached to it, such as, books, transport, uniforms, notebooks, and for the poorest families, the opportunity cost of child labour.

Figure 6.1.



Source: Table A6.1.

Figure 6.2.



Source: Table A6.1.

6.2.2.2. Type of Industry and education

Now we do a similar analysis but by industry. Table 6.1 below, shows the employment share within economic sectors by level of education in 2006. We observe how agriculture and the not economically active are the two sectors where the majority of the population have either no education or some primary education only. Interestingly, the Manufacturing sector does not show a high percentage of high-skilled workers (only 10%). A similar trend is observed for the Construction, Commerce and Transport industries. Finally, the only sectors with a high proportion of high-skilled workers are Mining & Electricity, Financial services and the Rest of services. However, there seems to be a very clear division inside these industries, among workers with only Lower Secondary and those with University education.

Table 6.1. Mexico: Proportion of household heads working on each economic sector by level of education, 2006.

	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
Agriculture	24.3	38.6	23.0	10.4	2.0	1.7	100
Mining & Electricity	1.8	7.4	13.3	34.4	13.0	24.9	100
Manufacturing	6.2	14.5	26.7	32.1	9.4	10.1	100
Construction	9.5	28.0	31.7	19.1	4.7	6.5	100
Commerce	7.5	15.9	24.8	29.0	11.2	11.4	100
Transport	1.7	10.5	27.0	37.4	14.2	8.8	100
Financial services	0.9	1.8	3.6	20.7	17.1	49.5	100
Rest of services	5.5	12.4	17.8	25.7	10.6	23.4	100
Not economically active	20.9	29.5	23.4	14.0	3.7	7.5	100

Source: Own calculations with data from the ENIGH 2006.
Primary includes incomplete secondary; Secondary includes incomplete Preparatory; and Superior includes some Superior, Superior and Postgraduate.

6.2.2.3. Education by income decile

Table 6.2 below, shows the share of educational level by income decile within income groups in 1992 and 2006. Highlighted are the highest percentage shares for each group. As we can see, the majority of the poorest 20% of the population had either no education or some primary education in 1992. This situation improved somehow in 2006. Nevertheless, 56% of the Mexican population drop out of school with only primary level or less. The situation for the deciles 3rd to the 8th is somehow better, with the majority of their population achieving lower secondary or less education by 2006. Finally, we observe the contrast of the previous results, with that of the richest 10% of the population, where the majority of population has university education (54%). Thus, it becomes evident how the level of education is closely related with the level of income in the case of Mexico.

Table 6.2. Mexico: Shares of educational level by income decile within income group, for the total population, 1992-2006

1992

Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	36.7	44.8	14.9	3.0	0.5	0.0	100
2	29.4	45.5	19.6	4.1	1.0	0.4	100
3	23.9	39.3	25.6	9.5	1.2	0.5	100
4	20.8	38.1	28.1	9.2	2.1	1.6	100
5	17.2	32.0	32.5	14.0	2.3	1.9	100
6	14.9	32.5	30.7	15.6	3.6	2.6	100
7	15.8	27.4	28.5	17.8	4.8	5.6	100
8	12.0	25.6	25.5	18.9	7.5	10.6	100
9	7.4	18.5	24.5	22.2	9.7	17.7	100
10	3.8	9.1	16.5	17.3	10.8	42.4	100
Total	18.2	31.3	24.6	13.2	4.4	8.3	100

2006

Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	29.0	38.1	22.4	8.9	1.3	0.4	100
2	20.0	31.0	27.3	17.1	3.1	1.4	100
3	15.3	26.8	27.7	23.2	5.5	1.4	100
4	13.8	27.2	28.0	23.1	4.9	2.9	100
5	10.7	21.9	28.7	26.7	7.1	4.8	100
6	8.7	21.2	26.1	27.8	8.5	7.6	100
7	7.8	20.0	23.7	26.2	10.5	11.9	100
8	6.3	15.1	21.2	27.1	11.8	18.7	100
9	3.9	9.6	16.8	25.7	11.5	32.5	100
10	1.6	5.3	9.5	17.5	11.6	54.5	100
Total	11.7	21.6	23.1	22.3	7.6	13.6	100

Source: Own calculations with data from the ENIGHs 1992 and 2006.
Primary includes incomplete lower secondary; Secondary includes incomplete upper Secondary; and University includes Incomplete University, University and Postgraduate.

Table 6.3. Mexico: Shares of educational level by income decile within income group, for urban and rural areas, 1992

Urban areas

Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	25.0	45.7	24.1	4.3	0.9	0.0	100
2	17.2	41.2	29.4	8.0	2.9	1.3	100
3	14.9	32.4	33.2	15.9	2.2	1.4	100
4	14.0	30.3	34.7	14.2	4.0	2.7	100
5	10.5	24.5	40.1	18.7	2.6	3.6	100
6	8.3	28.4	35.6	18.8	5.0	3.8	100
7	11.4	23.0	30.6	22.1	5.6	7.5	100
8	7.7	20.7	25.8	22.9	9.4	13.5	100
9	5.2	15.0	24.9	24.3	10.2	20.4	100
10	2.4	5.8	15.7	18.5	10.6	47.0	100
Total	9.1	22.1	28.6	19.1	6.6	14.4	100

Rural areas

Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	41.8	41.4	13.9	2.5	0.4	0.0	100
2	34.7	48.2	13.3	3.4	0.4	0.0	100
3	33.6	46.6	16.8	2.3	0.4	0.2	100
4	29.7	49.3	14.9	5.5	0.6	0.0	100
5	29.6	38.7	26.1	4.8	0.6	0.2	100
6	26.1	46.1	22.3	4.8	0.2	0.4	100
7	25.2	40.1	23.5	9.0	2.1	0.0	100
8	24.4	40.0	23.6	9.7	1.9	0.4	100
9	25.0	35.5	22.7	9.9	3.2	3.8	100
10	14.9	31.4	24.2	12.2	8.2	9.1	100
Total	28.5	41.7	20.1	6.4	1.8	1.4	100

Source: Own calculations with data from the ENIGHs 1992 and 2006.
Primary includes incomplete lower secondary; Secondary includes incomplete upper Secondary; and University includes Incomplete University, University and Postgraduate.

6.2.2.4. Rural/urban divisions and education

Table 6.3 above, shows the shares of educational level by income decile within income group for urban and rural areas in 1992. The first pattern that we observe is the similarity between the distribution of education among deciles in urban areas and that observed for the total population in the same year. This suggests that the results for the total population are highly influenced by those of the urban areas. We also observe that the first 7 deciles have their majority of their population with up to primary school only and that the only decile with a majority of household heads with University education is the 10th. Now we turn to the results for the rural areas in the same year. There is a striking difference between the pattern observed for the urban areas and the one of rural ones. The majority of rural household heads up to the 9th decile have only some primary education. Even the richest decile (10th) has the majority of its population with only up to primary education. Indeed, in 1992 only 1.4% of the rural household heads had University education. With these results we would expect from the sub-groups and Fields (2002) decompositions to find education a very important variable explaining the levels of income inequality in the country, and also for education to be a bigger contributor towards income inequality in urban areas than in rural ones.

Now let us compare the latter results with the distribution of 2006. The results are given in table A6.2. in the Annex. We observe an improvement in both, urban and rural areas. In both groups we observe that all deciles have now one higher level of education as compared with 1992. Nevertheless, the gap between rural and urban regions remains big. Indeed, 50% of the rural population has no education or some primary education only. In contrast, only 23% of the urban population belongs to this category. Regarding University education, which is the one with the highest returns, we note that there were improvements in both areas. In 1992 only 1.4% of rural household heads had University education, but by 2006 this percentage increased to 4.7%. In urban areas, household heads with University education in 1992 amounted 14.4%, but in 2006 were 18.7%.

To sum up, the gap in the educational attainments between urban and rural areas in Mexico is embarrassing for a country with such a level of GDP. Unfortunately for those living in the rural areas, the challenges seem even more difficult and it seems that in order to narrow the gap between rich and poor, any investments in human capital should be much higher in poor rural areas than in the rest of the country.

6.3. ARITHMETIC INEQUALITY DECOMPOSITION: POPULATION SUB-GROUP DECOMPOSITIONS – WITHIN-GROUP AND BETWEEN-GROUP INEQUALITY

The first step towards finding the ‘culprits’ of the levels and changes in income inequality will be done by decomposing our preferred inequality index (GE) into its different population subgroups and income source, by following Mookherjee and Shorrocks (1982), and Cowell and Jenkins (1995). A detailed exposition of these methodologies is given in Chapter 3. The decompositions will be made for specific years (static) and for the trends in inequality (dynamic) for 1992-2006.

As mentioned by Cowell and Jenkins (1995:421) “the issue of the ‘explanation’ of inequality is not just a matter of computational procedure but can significantly affect our understanding of economic inequality and can potentially guide the design of economic policy”. Indeed, the changes in each of these variables could actually shade some light on: a) the effects of some reforms introduced by the Mexican Government in the early 1990’s, such as the NAFTA free trade agreement; b) the effects of the 1994 economic crisis; and c) the absence of reforms of the Fox administration. That is why, different sub-groups where created to test how changes in each of them accounted for changes in aggregate inequality.

6.3.1. Static decomposition results

Following Mookherjee and Shorrocks (1982) and Cowell and Jenkins (1995), we decomposed the levels of inequality in 1992-2006 using the following subgroups for several household head characteristics: a) education; b) industry; c) occupation; d) conditions of work; e) region; f) rural/urban; g) age; h) employment status; i) sex; j) type of household; and k) ownership of the house. In particular, we calculated the percentage of total inequality due to between-group inequality or $\mathbf{R_B}$, and also $\mathbf{R_W}$ which is a residual that shows the percentage of total inequality due purely to within-group inequality. The following paragraphs present our results for the static decomposition.

Our exploratory results showed that the variables[123] with the highest R_B explanatory value of total G(1) in average in 1992-2006 were: Education-explaining 33%; Industry- 11%; Occupation- 28%; Region – 8%; Rural/urban- 13%; and Conditions of work- 5%. The variables with a low or negligible explanatory power, using data from 1992 were: Age- 0.35%; Employment status- 0.18%; Sex- 0.35%; Type of household- 1.75%; and Ownership of the house- 0.16%. According to these results we used the following variables for our analysis: education, industry, occupation, region, and rural/urban.[124] The results are presented in table 6.4 below.

Table 6.4. Mexico: The percentage of inequality explained (R_B) using the Generalized Entropy Measure -- Static decomposition 1992 - 2006

	1992			1994			1996		
	a=0	a=1	a=2	a=0	a=1	a=2	a=0	a=1	a=2
Education	33.2	34.2	19.6	35.3	35.1	18.5	33.5	33.7	15.5
Occupation	33.4	33.1	18.7	33.8	32.8	17.0	25.4	23.6	9.8
Industry	14.0	11.7	5.3	17.0	13.7	5.7	12.7	10.0	3.3
Ruran/urban	19.9	15.5	6.2	21.1	16.1	5.9	17.1	13.2	4.3
Region	6.6	5.9	2.7	8.6	7.9	3.4	7.9	7.2	2.7
All	**62.1**	**64.8**	**55.5**	**62.7**	**64.2**	**45.4**	**60.1**	**64.3**	**66.7**
	1998			**2000**			**2002**		
	a=0	a=1	a=2	a=0	a=1	a=2	a=0	a=1	a=2
Education	32.8	33.6	11.6	34.9	36.2	21.2	35.0	36.2	25.5
Occupation	27.5	26.0	8.2	34.5	32.2	17.3	31.9	30.8	20.6
Industry	13.7	10.7	2.6	18.3	14.2	6.2	16.1	12.5	6.3
Ruran/urban	16.7	13.2	3.2	15.7	12.8	5.4	13.9	11.6	6.0
Region	10.7	9.6	2.5	9.4	8.9	4.4	10.8	9.9	5.8
All	**61.1**	**63.3**	**29.3**	**64.6**	**65.6**	**47.9**	**60.2**	**61.4**	**51.1**
	2004			**2005**			**2006**		
	a=0	a=1	a=2	a=0	a=1	a=2	a=0	a=1	a=2
Education	32.3	31.7	8.4	31.6	30.6	11.7	31.2	31.3	17.6
Occupation	24.6	21.9	5.2	27.3	25.0	9.2	24.9	23.8	12.7
Industry	11.5	8.8	1.7	13.5	11.4	4.1	9.7	8.0	3.5
Ruran/urban	12.6	9.7	1.8	15.9	11.9	3.2	14.3	11.2	4.6
Region	7.7	6.8	1.5	9.8	9.1	3.1	6.6	6.1	2.9
All	**55.4**	**52.1**	**16.1**	**55.7**	**56.9**	**36.9**	**54.8**	**53.6**	**35.4**

Source: Own calculations using the ENIGH Household Surveys from 1992 to 2006.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

[123] A complete list with the different subgroups for each variable is given in the Annex.
[124] The conditions variable, which captures the differences between working in the formal/informal sectors was not included in the analysis to facilitate the calculations for the Subgroup1 that includes all of the preferable variables. All the calculations were done using *ineqdeco*, a program designed by S. Jenkins to use in STATA.

The main results of the static decomposition are as follows:

- **Education** seems to be the variable with the highest explanatory power, explaining between 30 to 36% of total inequality.
- **Occupation** is the variable with the second highest explanatory power, ranging from 21 to 33%. However, occupation seems to be correlated with other variables (such as education and industry), since when it is added to the subgroup it does not add the same explanatory power that it has on its own.[125]
- Inequality between **urban and rural** areas across Mexico explains between 9 to 16% of total inequality. The **regional** divisions' explanatory power ranges between 6 and 10%.
- The other remaining two variables, **industry** and **conditions of work** explain between 8 and 14% and between 3 and 7% respectively.
- The explanatory power of age, employment status, sex, ownership of the house and type of household is negligible.
- When each variable is taken separately[126], the amount of "unexplained inequality" remains higher than the "explained" inequality. But when the 5 variables are taken together, they account for 52-65% of the observed total inequality.
- The explanatory power of each variable and all the variables together remained high in 1992-2002. But it seemed to have decreased in more recent years 2004-2006. Meaning that total inequality in recent years is explained more by the differences inside each group, as compared with the differences between groups.

The amount of "explained inequality" remains higher than the one observed in the United States by Cowell and Jenkins (1995:428), where sex, race, age and employment status accounted between 25-30% of total inequality in 1986. Indeed, the results for Mexico are also higher than those found for Chile by

[125] Thus, caution should be applied when including the occupation variable in the calculations. This problem has been already documented by López-Acevedo and Salinas (2000). And it will be confirmed latter with the econometric results.
[126] The full results for each variable are given in tables A6.8 to A6.13 in the Annex.

Ferreira and Litchfield (1998:14), where age, education, region, urban/rural, gender and race explained between 26-52% of total inequality in 1990. However, our results are similar to those obtained by Székely (1998) which by using a similar methodology finds that for Mexico, the joint contribution of nine characteristics in 1984-1992 ranges from 55.4% to 64.9%, with education and occupations being the most important variables.[127] Indeed, our results also confirmed that the differences between *educational levels* or *skills* among Mexicans have played a key role explaining the levels of income inequality in Mexico over the last 14 years. The Mexican economy has been through one economic crisis, short periods of recovery, and periods of low economic growth during the last 2 decades. However, there is something that remains unchanged through out the whole period: the different levels of education among Mexicans remain the most important factor explaining the levels of inequality in the country.

6.3.2. Dynamic decomposition results

In the previous section we presented a static decomposition of inequality by subgroups. In contrast, in this section we will present the decomposition results for the *changes* in inequality. It is important to notice that the variables that are important explaining the *levels* of income inequality could be different than those explaining the *changes* in inequality. Therefore, in this section, we will use Mookherjee and Shorrocks (1982) dynamic decomposition formulas to calculate the trends in inequality by subgroups. Table 6.5 below presents the dynamic decomposition results for 1992-2006. As explained in the methodology chapter (page 103), A is the "pure inequality" (or unexplained inequality), B and C refer to the effects of changes in population shares on within and between inequality, and D is the effect on the changes of total inequality due to relative changes in the subgroup means. The period of analysis was divided in three sub-periods.

In the first sub-period, *1992-1998*, there was an increase in inequality (measured by G(0)) and we observe that the component A (the unexplained or

[127] Other variables by Székely include: rural/urban, regions, sector of activity, labour market status, household size, age and gender.

pure inequality) was the main culprit. Since even the sum of the allocation and income effects put together was smaller than the ‘unexplained or pure inequality’ effect. We also observe that the effect of changes in the mean incomes (D) of the different subgroups was the second in importance. And that the effect of the population shares towards total inequality was very small. However, we can see that the sign of the component A is always positive, while the allocation and income effects are primary negative. Thus, it seems that the ‘explained inequality’ contributed to offset the effect of the increases in inequality from the ‘pure inequality’ component, particularly in the occupation and rural/urban variables. Without this offsetting effect, the observed increase in inequality would have been higher.[128] A high value of D reflects more dispersion among the mean incomes of different subgroups. In the case of the occupation, region and urban/rural variables, we observe a high value of the term D. In principle, this could be an incentive to move from one occupation to another or from one region to another or from the rural sector to the urban one. However, we observed that there is not much *net* mobility among the household heads, since the population shares remained in both cases quite unchanged. This could be signalling rigidities from the household heads to move from rural areas to urban ones, from the south region to the north, and from one occupation to another.

Between *1998-2002* there was an important decrease in total inequality. But unfortunately, 67-100% of this change remains unaccounted for by the changes in the subgroups that we presented in table 6.5. The component A still remains the most important of all. Indeed, the ‘pure’ inequality (A) is again bigger than the sum of the other three components for all the variables. Nevertheless, the joint effect of the allocation and income effects remains somehow important, being 33% for the urban/rural subgroups, 22% for education, 10% for occupation and 3% for industry. Regarding the dispersion of mean incomes (D component), we observe some differences with respect to the previous period. Firstly, the dispersion of mean incomes decreased for the occupation and region subgroups, while increased for the education and

[128] The case of the *regional* variable is different, since its D component is the most important and the sum of the allocation and income effects accounts for 84% of the changes in total inequality for the regional variable in this period.

rural/urban ones and remained the same for the industry. But this time, the changes in the population shares for the occupational and industry subgroups were higher. These results suggest that the labour market was more responsive in this period than in the one before. Indeed, we observe a fall in the percentage of household heads that work in the agricultural sector, falling from 24% in 1992, to 21, 18 and 14% in 1998, 2002 and 2006 respectively (see Appendix) – suggesting an increased mobility of household heads between industries. We can also observe the changes in the agricultural sector in the occupational variable, with a decreasing population share in the occupation (10) agricultural and primary sector workers. However, this decreasing population share in agriculture goes hand by hand with an increase in occupation (11) the unemployed and non-economically active. Thus, more attention needs to be put, since instead of an increase in labour mobility, we could be observing both, a shift from the agricultural workers to other sectors combined with an increase in unemployment for those unable to move.

The fall in inequality observed in the previous period continues in *2002-2006*, but at a moderate rate. In this case we observe that the 'pure' inequality (A) is no longer the main force driving this change. Indeed, the sum of the allocation and income effects is higher than the component A for all the variables (with the exception of the rural/urban one). Moreover, while the 'pure' inequality remains a disequalizing effect, the allocation and income effects have the opposite sign and offset the effect of the A component. And since the values of the latter are higher, we end up with a fall in total inequality in the period.[129] Suggesting that the fall in inequality in this period comes from the equalizing effect that the subgroup mean incomes had over total inequality. As mentioned before, high values of the component D mean a higher dispersion in the mean incomes and therefore, an opportunity for workers to gain from these differences when moving from one sector to another. However, we continue observing some rigidities in the labour market with the sum of the allocation effects being really small. Thus, the observed higher incomes in certain industries, occupations, and regions, were not translated into an influx of people into them.

[129] The rural/urban variable behaves in a completely opposite way, with a negative and bigger value for the component A.

To conclude, it seems that the pure or unexplained component was the main one responsible for the changes in inequality in the first two sub-periods. However, there was a contribution from the mean incomes (D) from education, industry and region in the first sub-period and from education and rural/urban in the second one. In contrast, in the last sub-period total inequality can be mainly accounted for by the changes in the subgroup mean incomes of the education, occupation, industry and region variables. This is the end of the sub-group inequality decompositions section. In the following section we use a different methodology to decompose the contribution of different income sources towards the levels and changes of income inequality.

Table 6.5. Mexico: Subgroup dynamic decomposition of the changes in total income inequality 1992-2006

	1992-1998				**1998-2002**			
	% change in I_0 due to changes in				% change in I_0 due to changes in			
	Wthin-group inequality **(A component)**	Population shares **(B component)**	**(C component)**	Subgroup mean incomes **(D component)**	Wthin-group inequality **(A component)**	Population shares **(B component)**	**(C component)**	Subgroup mean incomes **(D component)**
Education	3.1	-0.5	0.2	0.5	-12.4	-0.1	1.5	-4.9
Occupation	8.4	-0.2	-0.4	-4.6	-14.3	-0.9	-2.5	1.8
Industry	3.8	-0.7	-1.4	1.5	-15.4	-0.3	-1.7	1.6
Ruran/urban	5.9	0.0	-0.1	-2.6	-10.7	-0.2	-0.5	-4.5
Region	0.5	-0.1	-0.3	3.1	-16.0	0.0	0.0	0.0
% change in G(0)	**3.2**				**-15.9**			

	2002-2006				**1992-2006**			
	% change in I_0 due to changes in				% change in I_0 due to changes in			
	Wthin-group inequality **(A component)**	Population shares **(B component)**	**(C component)**	Subgroup mean incomes **(D component)**	Wthin-group inequality **(A component)**	Population shares **(B component)**	**(C component)**	Subgroup mean incomes **(D component)**
Education	2.6	-0.1	-1.5	-2.8	-7.7	-0.5	0.9	-6.7
Occupation	6.2	-0.5	0.1	-7.7	-0.3	2.6	-1.9	-10.3
Industry	5.1	-0.3	-1.6	-5.2	-6.8	-2.0	-3.7	-2.2
Ruran/urban	-1.9	0.0	-0.2	0.3	-7.3	0.2	-0.9	-6.8
Region	2.6	-0.1	-0.2	-4.1	-13.7	-0.2	-0.3	-0.6
% change in G(0)	**-1.8**				**-14.8**			

Source: Own calculations using the ENIGH 1992, 1998, 2002 and 2006 household surveys and ineqdeco results from STATA9.
The Generalized Entropy Measure is equally sensitive across the distribution when a=0.
A is the impact of changes in within-subgroup inequality or pure inequality changes.
B is the effect of changes in the population shares on the within-group.
C is the impact of changes in the population shares of the between-group component
D is the effect resulting from relative changes in the incomes of different groups

6.4. Arithmetic Inequality Decomposition: Income Source Decompositions

In this section, we use the methodology proposed by Shorrocks (1982) and Jenkins (1995) to decompose the contribution of different income sources to total inequality. These decompositions are made for specific years (static) and for the trends in inequality (dynamic).

6.4.1. Static decomposition results

Following our preferred income definition (per capita income), eight sources of income were created. With the first five defining monetary income and the last three belonging to non-monetary income: 1) Wages; 2) Cooperatives; 3) Business rents; 4) Property rents; 5) Transfers; 6) Self-consumption; 7) In-kind payments; and 8) In-kind presents.

Table 6.6 presents the results for the static decomposition using the Coefficient of Variation CV as the preferred inequality index.[130] This table shows: 1) the absolute contribution of each source of income towards total inequality (Sf); 2) the proportional contribution of each factor to total inequality (sf); 3) the income shares (mf); and 4) the correlations of each factor with total income. Let us focus on the proportional contributions of each factor towards total inequality:

- Firstly, we can see that Business rents and Wages are the two main contributors to total inequality. This is expected from wages, since they represent around 55% of total income. On the contrary, business income only has around 20% of total income, but its contribution towards total inequality is so high because its individual CV and a high correlation with total income.
- Secondly, *wages income* decreased its proportional contribution towards total inequality in the years after the economic crisis of 1994, while at the same time *business rents* increased theirs. However, this change cannot be entirely explained by the small decrease in the wages income shares, but mostly by the changes observed in the factors correlations.

[130] Using I_2 gave very similar results, but these are not reported.

- Thirdly, we observe that *wages income* regained importance in its contribution towards total inequality each year until 2002, then its contribution falls again until reaching in 2006 similar levels than back in 1994.
- Fourthly, the income shares of each factor have remained more or less stable throughout the years. However, we observe an increase in the *wages* share in recent years, accompanied by a decrease in the *business* one.
- Fifthly, the third important factor is *transfers*, which roughly have a 10% share of total income and which had increased their correlation with total income in recent years.

6.4.2. Dynamic decomposition results

Now, let us focus on the dynamic decomposition by income source. Table 6.7 below presents the results for each of the eight income sources. As we can see, income from *business rents* is the main force explaining the changes in total inequality. Although business rents represent only around 20% of total income, they are a key factor explaining not only the levels of total inequality in each year, but also the changes in total inequality through time. Indeed, business rents were the most disequalizing force in the post-*peso crisis* period (1994-1998) and then again in 2004-2005. In addition, business rents played an important role as an equalizing force during the recovery period (1998-2002) and more recently in 2005-2006.[131] The second most important factor contributing towards the changes in total income inequality are *wages*. This result is somehow expected, since wages represent an average of 56% of total income. Nevertheless, wages income has diminished its contribution towards the changes in total inequality through time. Finally, it has been a disequalizing force most of the periods, apart from 1994-1996 and 2002-2004 were it was an equalizing force.

[131] The contributions of business rents towards total inequality remain high since its CV_f is much higher than the total CV and its correlation with total income is very high as well.

The third most important contributor towards the changes in income inequality is income from *transfers.* Transfers show an increase in its contributions towards the changes in income inequality from 1998 onwards, reaching its highest contribution in 2002-2004, where it becomes the most disequalizing force. Looking carefully at the sources of transfers in that period (see table A6.15. in the annex) we observe that this raise is mainly due to the increases in the proportional contribution of income from remittances towards total inequality. Indeed, the results for the variable transfers depend completely from those of the remittances source, that while maintaining the same level of income shares, increased both, its inequality within the factor and its correlation with total income in 2004 as compared in 2002 to finally return to previous levels in 2005. That is, income from remittances became more dispersed in 2004. But it came back to previous levels during the next year, becoming the most equalizing force in 2004-2005. The rest of the income sources have a very marginal contribution towards the changes in income inequality, with property rents becoming a bit more important from 2002 onwards.

Finally, since Business income is the most important source of income inequality in Mexico it would be desirable to look closely at its components. It is possible to do so only for the ENIGH household surveys for 1992-2000, since the questionnaire changed for more recent years. Table 6.8 below, shows the income shares of the different sources inside Business income. As we can see, Industry Income accounts for a very small percentage of total business income inequality over the 1990s. In contrast, income from commerce, services and agriculture seem to account for a higher percentage of total business income inequality. By 1996, after the peso crisis, we observe an important increase in inequality from Agricultural income. But this result does not come from an increase in the income share of Agriculture, but rather an increase in both, its individual CV and its correlation with total income. Thus, income from agricultural business became more dispersed after the peso crisis, but it returned shortly to pre-crisis levels. Income from Services had the opposite trajectory, decreasing its contribution towards total Business income inequality after the peso crisis, but returning to pre-crisis levels after.[132] Finally, we

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[132] We observe that this result comes from a decrease in its correlation with total income, rather than a decrease in its income share.

observe that income from Commerce became less dispersed in 1994, but this was reversed in the following years, thus, increasing its contribution towards total business income inequality.

Table 6.6. Mexico: Inequality decomposition by income source using the Coefficient of Variation 1992-2006

	Absolute contribution to Total inequality (100 Sf)								
	1992	**1994**	**1996**	**1998**	**2000**	**2002**	**2004**	**2005**	**2006**
Total income	136.3	142.1	152.0	157.0	128.0	106.6	168.7	150.3	122.3
Wages	45.6	68.4	44.2	46.4	50.6	58.2	45.2	51.1	53.7
Cooperatives	0.1	3.0	0.1	0.0	0.1	0.1	0.4	0.1	0.1
Business rents	72.6	59.6	92.3	95.3	56.7	32.5	40.8	73.6	40.1
Property rents	1.9	3.2	3.9	4.3	3.0	3.5	17.4	11.3	4.6
Transfers	6.3	2.2	3.8	5.5	12.1	5.8	56.1	4.9	7.9
Self-consumption	1.0	0.5	0.6	0.5	1.2	0.5	0.1	0.2	0.3
In kind payment	4.3	2.0	2.5	2.1	1.4	2.0	3.6	2.3	2.2
In kind presents	4.6	3.2	4.7	2.9	3.0	4.2	5.1	6.9	13.4
	Proportional contribution to Total Inequality(%) (100 sf)								
Total income	100	100	100	100	100	100	100	100	100
Wages	33	48	29	30	40	55	27	34	44
Cooperatives	0	2	0	0	0	0	0	0	0
Business rents	53	42	61	61	44	30	24	49	33
Property rents	1	2	3	3	2	3	10	8	4
Transfers	5	2	2	4	9	5	33	3	6
Self-consumption	1	0	0	0	1	1	0	0	0
In kind payment	3	1	2	1	1	2	2	2	2
In kind presents	3	2	3	2	2	4	3	5	11
	Income Shares (mf)								
	1992	**1994**	**1996**	**1998**	**2000**	**2002**	**2004**	**2005**	**2006**
Total income	100	100	100	100	100	100	100	100	100
Wages	55	57	55	55	55	58	59	59	57
Cooperatives	0	0	0	0	0	0	0	0	0
Business rents	24	22	23	24	23	20	18	19	18
Property rents	1	2	1	1	1	1	2	2	2
Transfers	7	8	9	10	10	10	11	10	11
Self-consumption	3	2	2	1	1	1	1	1	1
In kind payment	3	2	3	2	2	2	2	2	2
In kind presents	7	7	7	6	7	8	7	6	9
	Correlations of each factor *f* with total income								
	1992	**1994**	**1996**	**1998**	**2000**	**2002**	**2004**	**2005**	**2006**
Total income	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wages	0.57	0.69	0.53	0.54	0.61	0.72	0.52	0.57	0.66
Cooperatives	0.01	0.14	0.03	0.00	0.03	0.02	0.04	0.02	0.03
Business rents	0.72	0.64	0.77	0.77	0.66	0.53	0.49	0.70	0.57
Property rents	0.15	0.18	0.19	0.21	0.19	0.25	0.35	0.32	0.23
Transfers	0.20	0.10	0.14	0.18	0.31	0.21	0.59	0.16	0.25
Self-consumption	0.09	0.05	0.07	0.08	0.16	0.09	0.03	0.05	0.07
In kind payment	0.23	0.17	0.18	0.18	0.15	0.19	0.21	0.16	0.18
In kind presents	0.21	0.18	0.21	0.16	0.18	0.24	0.21	0.23	0.35

Source: Own calculations using the ENIGH Household Surveys from 1992 to 2006.
1) Using per capita income as the welfare indicator.

Table 6.7. Mexico: Dynamic decomposition by income source

	% changes in source contributions (100sj * (%ΔSf))							
	Stability	*Peso crisis*		*Recovery*	*Fox administration (moderate GDP growth)*			
	1992-1994	**1994-1996**	**1996-1998**	**1998-2000**	**2000-2002**	**2002-2004**	**2004-2005**	**2005-2006**
Wages	16.7	-17.1	1.5	2.7	5.9	-12.2	3.5	1.7
Cooperatives	2.0	-2.0	-0.1	0.1	-0.1	0.3	-0.2	0.0
Business rents	-9.5	23.0	2.0	-24.6	-18.9	7.9	19.4	-22.3
Property rents	1.0	0.5	0.2	-0.8	0.4	13.1	-3.6	-4.4
Transfers	-3.0	1.1	1.1	4.2	-4.9	47.2	-30.4	2.0
Self-consumption	-0.4	0.1	0.0	0.4	-0.5	-0.4	0.1	0.1
In kind payment	-1.7	0.3	-0.2	-0.5	0.4	1.6	-0.8	-0.1
In kind presents	-1.0	1.1	-1.2	0.1	0.9	0.9	1.0	4.4
% change in aggregate inequality (CV)	4.2	6.9	3.3	-18.4	-16.7	58.2	-10.9	-18.6

Source: Own calculations using the ENIGH Household Surveys from 1992 to 2006.
1) Using per capita income as the welfare indicator.

Table 6.8. Mexico: Static decomposition by income source for Business income, proportional contribution to Business income Inequality

	1992	**1994**	**1996**	**1998**	**2000**
Total business income	53.3	41.9	60.7	60.7	44.3
Industry Income	9.5	3.4	4.6	3.4	7.8
Commerce Income	13.3	5.7	9.2	24.9	13.9
Service Income	12.4	31.0	11.0	28.4	19.6
Agricultural Income	18.1	0.6	36.0	3.6	2.2

Source: Own calculations using the ENIGH Household Surveys from 1992 to 2000.
1) Using per capita income as the welfare indicator.

To sum up, we observe that in the stability period before the *peso crisis*, inequality grew mainly by the disequalizing effect of wages. But just after the peso crisis, it was Business rents, specifically income from agriculture, the main culprit for the increases in inequality, while wages had an equalizing effect. This shock in agriculture is also reported by De Hoyos (2003). In the recovery period after the peso crisis (1998-2000), we observe that now Business rents are behind the fall in inequality while wages have a small but disequalizing effect. From 2000 to 2006 we observe a fall in the contribution of wages towards the changes in inequality and an increase in the business rents one. Finally, there is a shock in transfers in 2002-2004, when they became more dispersed, but they come back to normal levels in the following period.

Finally, it is important to mention relevant policy factors that might have shaped poverty and inequality during the period of study. The periods from 2000 to 2002 and from 2005 to 2006 were particularly important for poverty reduction. We observe an increase in the incomes of the poor at a time when the Mexican economy was stagnated. In order to explore more about what happened during these periods, we calculated the rates of growth of income by source for poor rural/urban households. As we can see on table 6.9 below there are three sources of income that grew a lot between 1992 and 2006 in rural areas: 1) labour income (113%); b) Transfers (558%); and c) In kind presents (305%). When looking at Transfers in detail, we observe that Oportunidades, Scholarships and Remittances have had very important increases. Indeed, income from Scholarships increased 227%, Remittances by 331% and Oportunidades represented around 50% of total Transfers in 2006.[133] The increases in urban areas are bigger than those observed in rural ones. From 1992 to 2002 In kind presents experienced the biggest changes (an increase of 181%), then Transfers (154%) and finally Property rents, Business income and Labour income with around 100% increase each. Looking at Transfers in detail, we observe that the source that experienced the biggest increase is income from Scholarships (1,975%), then Pensions and insurances (289%) and Remittances (113%). From 2002 to 2006 it is Transfers the income source with the highest increases (129%). In kind presents and Self-consumption follow Transfers with increases of 87% and 79% respectively. Looking at Transfers in detail, we observe that the greatest increases came from Oportunidades (948%), Remittances (163%) and Presents (110%). These increases have also been documented by other studies (e.g. World Bank, 2004 and CONEVAL, 2008), although none of these studies gives results for the poor urban households.

To conclude, the income source decomposition methodology suggests that the changes in total inequality in Mexico between 1992 and 2006 have been mainly driven by three factors: business income, wages income and income transfers. All factors have been both, equalizing or disequalizing forces in different periods. The rest of the income sources contribute in a very marginal way. Thus, it seems that the main contributors towards the changes in total inequality are the factors that come from monetary income. It was expected that wages were going to have a big influence on income inequality, since these are the main source of income (an average of 56%). However, the contributions of business income and transfers come from their high CV_f and high correlation

[133] We cannot give the rate of growth for Oportunidades, since the programme started latter on and the ENIGHs included an specific question about it until 2000. But we can see that from 2002 to 2006 it increased 47%.

with total income. That is, business income is highly dispersed among Mexicans, much more than wages. Indeed income from business represents a widely diverse group, which contains small, medium and large enterprises. And it certainly contains the income from the richest families in the country. A lot of studies have been made about wage differentials in Mexico after trade liberalization. However, our results suggest that business income has a much bigger influence on income inequality, and further research should be made on this subject. Regarding policy factors, we observed that Oportunidades, Remittances and Scholarships played a very important role increasing the income of poor households in urban and rural areas at two crucial periods for poverty reduction. It seems that the increases in the Oportunidades programme and the amount of scholarships given to poor households had a very positive impact from 1992 to 2006. In addition, the Fox administration reached an agreement to reduce the transaction costs associated with remittances from the USA to Mexico, decreasing the amount paid for the service and also by introducing an ID issued by the Mexican Consulates in the USA that helped many illegal workers to open a bank account. However, the increases in remittances could be mainly a reaction to the deterioration of the living standards that the majority of Mexican households experienced after the peso crisis and with the low GDP growth observed during the 2000s.

Table 6.9. Mexico: Rates of growth of income by source in poor rural and urban households, 1992-2006

	Rates of growth					
	Rural areas			Urban areas		
Incomne Source	1992-2002	2002-2006	1992-2006	1992-2002	2002-2006	1992-2006
Labour income	33%	60%	113%	95%	43%	178%
Business income	-3%	15%	11%	109%	44%	201%
Property rents income	-28%	77%	28%	128%	38%	214%
Transfers	382%	36%	558%	154%	129%	481%
Pensions and insurances	20%	51%	81%	289%	37%	431%
Scholarships	60%	105%	227%	1975%	55%	3112%
Presents	52%	6%	61%	68%	110%	253%
Remittances	119%	97%	331%	113%	163%	460%
Oportunidades	N.A.	47%	N.A.	N.A.	948%	N.A.
Procampo	N.A.	-6%	N.A.	N.A.	-18%	N.A.
Self-consumption	-46%	14%	-39%	29%	79%	131%
In kind payments	-8%	-35%	-40%	36%	-30%	-4%
In kind presents	168%	51%	305%	181%	87%	424%

Source: Own calculations with data from the ENIGH household surveys of 1992, 2002 and 2006.
a) The calculations used up to the 33 percentile of rural households, which corresponds to the percentage of people living under the food poverty line in rural areas in 2002. In the case or urban areas, we used up to the 12 percentile, which corresponds to the percentage of population living under the food poverty line in 2002.
b) The increment of Oportunidades is captured by the Transfers' total for the whole period, since it did not exist in 1992.

We have presented so far two different arithmetic exact decompositions – sub-group and income source. But as mentioned by Jenkins (1995:40) although the main advantage of them is that they decompose “succinctly into an exact sum of changes in the contributions of the various factor components, which in turn depend on the key summary features of each source of distribution – the correlations, factor shares and factor inequalities” their main disadvantage is that they “do not appear to correspond to an intuitive counterfactual experiment”. A disadvantage created by the interdependence of factor income sources and that it is shared by the sub-group decompositions. Jenkins (1995) proposed to overcome this problem by introducing shift-share analysis. However, as Mookherjee and Shorrocks (1982:886) pointed out, using shift-share analysis for inequality decomposition has many more disadvantages than the exact arithmetic decompositions. These disadvantages include: a) being difficult to recognize the inequality contributions of each factor; b) difficulties in the assessment of each factor relative importance to total inequality; and c) the fact that it is not an exact decomposition and the sum of the parts most probably will not sum to total inequality. For the above reasons, in the following section a different methodology will be use to try to overcome the disadvantages of the sub-group and income source inequality decompositions.

6.5. Regression-based Decompositions

As it was highlighted in the previous section, arithmetic decompositions give exact decompositions, where the sum of the contributions of each factor equals the total levels/changes in inequality. Nevertheless, the main problem with these decompositions is the interdependence of factor income sources (a problem shared by both the sub-group and income source decompositions). That is, the decompositions "do not appear to correspond to an intuitive counterfactual experiment" (Jenkins, 1995:40). In order to overcome these problems, some researchers have used shift-share analysis. As already mentioned, shift-share analysis has been criticized on the basis of the difficulties that it presents to: a) recognize the inequality contributions of each factor; b) assess the relative importance of each factor towards total inequality; and c) the fact that the sum of the parts usually does not sum to total inequality (Mookherjee and Shorrocks,1982:886). Another way to overcome these problems is by using regression-based decompositions.

Among the regression-based decompositions, the methodology proposed by Fields (2002) has been widely used by researchers on the basis that: a) it is derived using Shorrocks (1982) axioms or decomposition rules; b) it is not over complicated to apply it even when introducing many independent variables for several years; and c) it is possible to decompose both, the levels and changes in income inequality. Using Shorrocks axioms to decompose the levels in inequality means that the results will be the same irrespective of the inequality measure used. In addition to this powerful result, we can also derive exactly how much of the inequality levels/changes is accounted by each factor. That is, this type of decomposition shares the main advantages of the Shorrocks (1982) sub-group and income-source decompositions, while at the same time overcomes its main disadvantage of not being a counterfactual experiment. Indeed, by using econometrics to obtain an income-generating equation, we can now control for the interdependence of the different factors that contribute to total inequality and isolate the contribution of each variable.[134]

[134] The advantages and disadvantages of the Fields style decomposition are given with more detail in the data and methodology chapter.

The calculations are made in two steps, the first one consisting in creating income-generating equations with income/earnings/wages as the dependent variable and a set of household head and household characteristics as the independent variables under an Ordinary Least Squares (OLS) framework. The second step consists in decomposing the levels and/or changes of inequality using the OLS results. Finally, the calculations for this type of decomposition are not very demanding, which is another important advantage when the methodology is intended to be applied to 10 different household surveys with a long set of variables.

For the above reasons and those mentioned with detail in the data and methodology chapter, we will apply Fields (2002) decompositions to 10 ENIGH household surveys, in order to identify the most important variables that explain both, the levels and changes in income inequality in Mexico in 1992-2008. The decomposition results are important from a policy prescription point of view, since knowing which variables are behind the levels and changes in income inequality could help policy makers to tackle more efficiently income inequality. The results from the previous section and the literature review showed that education has played a key role in explaining income inequality in Mexico during the last 25 years. But by using econometrics in this section, we will be able to control for the rest of the variables and make our calculations closer to a counterfactual experiment. Finally, we will also compare these results with those from the previous section in order to check for their robustness.

Section 6.5.1. presents a small survey of empirical work that applies Fields-style inequality decomposition. Section 6.5.2 presents the OLS results of the income-generating equations for Mexico. Section 6.5.3. presents the empirical results for the static decomposition. Section 6.5.4. presents the empirical results for the static decomposition for urban/rural areas separately. Section 6.5.5. presents the empirical results for the dynamic decomposition. And finally, section 6.5.6. presents a deeper analysis of the most influential variable: education.

6.5.1. Empirical work that applies Fields-style inequality decompositions

The methodology proposed by Fields (2002) has been applied by several authors, using as the dependent variable: log of per capita income, log of per capita consumption, and log of monthly labour earnings.[135] The independent variables or factors included varied as well. Table 6.10 below presents a summary of different OLS regression decompositions used in different studies that follow Fields (2002) or previous versions of his paper. As we can see, the variable education (measured as years of schooling or by maximum level of education attained) has been found the most important variable or factor explaining the levels and changes of inequality in different countries. It is important to mention that regarding the changes in inequality, the returns to education – rather than the changes in its distribution – are found to be behind them. For instance, Fields and Yoo (2000) found that the most important factor behind the fall in labor income inequality in Korea between 1986 and 1993 was years of education, and looking closely they found that this was due to the fall over time in the returns to education. We observe similar results for Colombia, Costa Rica and the USA (see the last column of table 6.10), where the returns to education appeared to be behind the changes in inequality in each country.[136] While years of schooling remain the most important variable explaining the levels and changes in income inequality in the studies presented in table 6.10, the power of explanation varies for each country. When decomposing the levels of inequality in higher income countries (USA and Korea) the variable education explains up to 16% of total inequality, since education is more equally distributed. But in the Latin American cases, the percentage of total inequality levels explained by the variable education is much bigger, ranging from 24% in Mexico to 80% in Bolivia.[137]

[135] The study about Mexico uses per capita income instead of its logarithmic transformation. We included this study since it applies a similar methodology, that of Murdoch and Siclair (2002).
[136] Between 1976-1986 income inequality decreased in Colombia, there was a fall in the returns to education accompanied by an increase in the dispersion of education. Between 1980-1985 income inequality fell in Costa Rica, mainly through the impact of a fall in the returns to education.
[137] It is important to mention that the study case about Mexico refers to income inequality, whereas the one of Bolivia refers to labor income inequality.

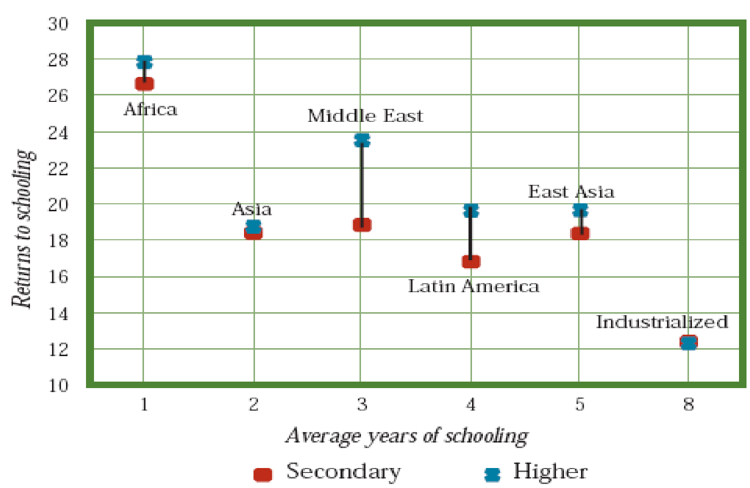
Table 6.10. Empirical work that applies Fields style decomposition

Author(s)	**Year**	**Country**	**Dependent Variable**	**Independent variables**		**Most important variables accounting for inequality *levels***	**Most important variables accounting for inequality *changes***
Arcos	1996	Ecuador	log of per capita consumption	Schooling Experience Experience Sq.	Gender Household size Urban/rural	Household head's years of schooling (Asymetries in their allocation) Household size Sector	NA
Fields, et al.	1998	Bolivia	log of monthly labour market earnings	Education Experience Region Formal	Gender Ethnicity Training Union	Education - Highest grade completed (Asymetries in its allocation)	NA
Núñez & Sánchez	1998	Colombia	log of labour earnings	Schooling Gender Sector Part time job Tenure	Marital status Occupation Region Industry Gender	Years of schooling (Asymetries in their allocation) Highest level of education attained Occupation	Years of schooling (the returns) Highest level of education (its returns) Occupation
Fields & Yoo	2000	Korea	log of labour income per worker	Education Marital status Union Gender Working hours Tenure	Firm size Regions Industry Occupation Potential experience	Job tenure Gender Occupation Years of Education	Years of education (the returns) Potential experience Industry Occupation
Fields	2002	USA	log of labour earnings	Gender Race Experience Schooling	Occupation Industry Region	Highest level of education Occupation Experience Gender	Schooling (the returns) Occupation
Gindling & Trejos	2005	Costa Rica	log of monthly labour earnings	Education Gender Urban Public	Firm size Experience Industry	NA	Years of education (the returns) Hours worked (changes in its variance)
Krstic, et al.	2007	Serbia	log of monthy labour market earnings	Experience Education Marital status Settlement Region	Nationality Private Industries Hours (log)	Educational qualifications (asymetries in their allocation) Industries	Educational qualifications (does not specify what it is behind) Industries
De Hoyos	2007	Mexico	per capita monthly income	Schooling Experience Experience Sq. Gender	Household Size Dep. Ratio Region	Years of Schooling (their returns) Household size Dependency ratio	NA

Source: With information from each study. For a full detail on each source see the bibliography section.

In a related report, the Inter American Development Bank (1998:39) concludes that "educational differences are the main factor in labor income inequality in Latin America". The report focuses on four main problems regarding inequality and education in the region: 1) there is a very low percentage of the population with secondary education; 2) although a very high percentage of the population enrol in primary education, a high percentage of children from poor families desert before the fifth year; 3) the returns to primary and secondary education had decreased in recent years; and 4) the quality of education received by low-income families is much lower than those who can afford private schools. Regarding secondary education, the report stresses that since its returns are not very different from those of primary education, students continue to secondary education only if the possibility to continue to higher education exist. Indeed, the low enrolment figures in secondary education are the main difference between Latin America and East Asia (see table A6.18 in the Annex). Indeed, in the case of Mexico in 2006, 33% of the household heads had some primary education only and 23% had primary education only. That is, 56% of the population drop out of school with a primary level of education or less. Only 22% continued towards lower secondary level; 7.6% to upper secondary; and only 13.6% to University (see table 6.3).

Figure 6.3. Returns to education and years of schooling



Source: Figure 2.23 from IADB (1998) Facing up to Inequality in Latin America: Economic and Social Progress in Latin America. 1988-1999 Report, Washington.

Figure 6.3 above, compares the returns to education and average years of schooling of Latin America with other regions. We can see that the returns to education are much higher than those observed in industrialized countries, but much lower than those observed in Africa. We also can see how there is a big gap between the returns to secondary education and higher education in the region, and that this gap is only surpassed by that observed in the Middle East.

But why education is important in explaining income inequality? Education matters since when is unequally distributed, it creates big income differences among households. And the more dispersed the distribution of education, the sharper the income differences. In addition, if skills are poorly distributed among the population, an increase in the demand of skilled workers (as that experienced in Mexico alongside periods of trade liberalization) could easily increase the returns to higher education if the supply of skilled workers is low. Thus, inequality would increase by two channels: an initial high dispersion in the distribution of education, plus a subsequent increase in the returns to higher education due to changes in the supply/demand of skilled workers.

Therefore, although the distribution of education seems important everywhere, it remains a very important problem in Mexico and in the majority of the Latin American countries because of the high inequality of access to education. The problem seems to be exacerbated by the observed low returns to secondary education. And with parents keeping children at school only when they have the possibility to continue paying until they reach higher levels of education, it is not surprising to observe such high rates of desertion during primary levels. Then, what can be done to prevent students to drop out of school? Answering this question is not easy, since it would require not only to pay for all the expenses related to study (such as tuition, books, uniforms, transport, books, notebooks, etc) but also to compensate financially for the opportunity cost of child labour. Moreover, it will require also to increase the quality of state-run (public) schools in order to prepare students at the high levels observed in private schools.

To sum up, it seems that the years of education and/or the maximum level of education attained are the most important variables explaining both, the levels and changes of income inequality across different studies. Regarding the levels of education, the decompositions do not offer further details about what is behind them. But when looking at the changes in income inequality, further decompositions show that it is the returns to education which are responsible for them. Thus, an initial high inequality level in the distribution of education has serious repercussions in the levels of inequality, while its returns mainly affect the changes through time. Finally, other important variables explaining income/earnings inequality include: household size, occupation, gender, and industry. For our own decompositions, we choose a mix of household head characteristics and household characteristics based on both, our results using sub-group decompositions as well as those presented on table 6.10 above.

6.5.2. OLS results of the income-generating equations for Mexico

As already mentioned, the first step of the Field's style decomposition involves an income generating equation.[138] The dependent variable is in this case the logarithm of *per capita monthly income.* And based on the empirical findings of the previous section as well as from other studies, the regressors include 6 household head characteristics: a set of dummy variables for the educational level, industry, marital status, gender and formal sector, and a continuous variable for age; and 4 household characteristics: a dummy variable for households living in urban areas, household size, dependency ratio and region.[139] The regression results are shown in tables 6.11 and 6.12 below. We observe that the fits of the equations are good with the independent variables explaining over 50% of the dependent variable. All of the coefficients of the independent variables are highly statistically significant and with the expected sign, being the exception the gender variable "male" coefficient, which is not significant the majority of the years. In the cases where

[138] Since we are regressing total household income with both, personal characteristics and household characteristics, the sample for the decompositions includes household heads only. But we use the original sample weights and inflate them by multiplying them by the household size to make the results representative for the whole population.
[139] This ratio is calculated as follows: dratio=(number of children + number of elderly)/ number of adults

part of the dummy variables coefficients where not statistically significant, we ran an F test and they were statistically significant as a group.

As already suggested by our summary statistics, we observe that household heads with more education tend to have higher incomes. For instance, in 1992 being a household head without education decreased mean income by 33% as compared with a household head with primary education (the base). In contrast, being a household head with University education increased mean income by 162% as compared with a household head with primary education only. Lower secondary education increases mean income by 25% and upper secondary by 63% as compared with having only primary education. These results hold for the rest of the years, with very minor changes across time.[140]

We also observe that household heads working in the financial sector have higher mean incomes as compared with the rest of the sectors, being the exception the Mining sector (which includes petrol). In contrast, household heads working in agriculture are the ones with the lowest incomes, being their incomes even smaller than the not economically active and unemployed. For instance, in 2006 working in the Agricultural sector decreased mean income of household heads by 40% as compared with working in the Financial sector. In 2008 the gap between the Financial sector and the rest of the sectors increased. In addition, the mean income of the unemployed and not economically active household heads was much lower (53%) than those working in the Financial sector. The rest of the sectors do not show such a big contrast, with most of them reducing mean income by 20% to 30% as compared with the base.

Being a divorced or single household head increases mean income as compared with being married. In contrast, being in a free union decreases mean income around 9%. Age has an expected positive sign and one more year increases per capita monthly income by an average of 0.9% in the period of study. Working in the formal sector increases mean income by an average of 13%. This

[140] Since the model is a log-linear one, to interpret the coefficients of the dummy variables we use Halvorsen and Palmquist shortcut: "take the antilog (to base e) of the estimated dummy coefficient and subtract 1 from it and multiply the difference by 100" (Gujarati, 2003: 321). For the continuous variables their coefficients show the percentage change in the dependant variable for a unit change in the independent variable.

percentage remains stable until 2008, where the increase in mean income is only 3%. This result suggests that the job market was affected in such a way with the unfolding of the world financial crisis of 2008, that working in the formal sector did not guarantee a much higher income in that year. Finally we observe that for the population as a whole, the coefficient of the gender variable "male" is not statistically significant most of the years.[141]

Now we turn briefly to the household characteristics. The first important result refers to the regional variable. Living in the South and Centre of the country also diminishes mean income of a household as compared with a household living in the North. However, the gap between the regions seems to be closing down across time, especially between the Centre and the North. For example, in 2002 a household living in the South had a 24% lower mean income than one living in the North. A household living in Mexico City and in the Centre had 4 and 8% lower mean income, respectively, as compared to the base. Thus, living in the North of the country or in Mexico City appears to give households with otherwise similar characteristics, a higher mean income. Indeed, the South of the country has always been the poorest area. But what these results suggest is that households with similar characteristics have a lower mean income than their counterparts living in the rest of the regions of Mexico just because they live in the South.

The second important result here is related with the urban/rural division. In Mexico living in an urban area increases the mean income of households by an average of 27% during the period of study, conditional to other variables in the model. The Dependency Ratio is also a very important factor explaining per capita

[141] But there is something peculiar about the years when it is actually significant, and it refers to the sign of its coefficient. We observe that in 1992 and 1994 the sign is negative and in 2000 and 2002 is positive. At first sign this result is counterintuitive, since although the gender variable is not expected to capture gender bias, it usually has a positive sign, which indicates that household heads which are male have higher mean per capita income than those with a woman as the household head (as the positive signs in 2000 and 2002 indicate). In order to explore this result, we looked carefully at the income-generating equations by urban/rural divisions. Interestingly, we observe that when the male variable is statistically significant, it is significant in urban areas mostly. We also calculated income-generating equations by industry and the equations show that the results in 1992 and 1994 are driven by female household heads working in the Services sector in urban areas. Suggesting that in those two years female household heads working in the Services sector had a higher mean income than their male counterparts. Nevertheless, we should have in mind that when the coefficient of the male variable is statistically significant in urban areas, it mostly has a positive sign, suggesting that male household heads had a higher mean per capita monthly income than their female counterparts. And when calculated for the rural areas only, the coefficient of the male variable is actually not significant.

monthly income. Indeed, an increase of one unit in this ratio will decrease per capita income by an average of 24%. As expected, household size also affects negatively per capita monthly income. Adding one person to a household decreases per capita monthly income by an average of 10%. Thus, smaller households with fewer dependants earn significantly more as compared with bigger households with more children and elderly members.

Since the urban/rural division appeared to be very important, we decided to calculated income-generating equations for urban and rural areas separately.[142] The results show a higher R squared for the urban areas than for the rural ones in the 1990s, but similar R squared for the rest of the years. As with the total population, the regressors for the urban and rural divisions are statistically significant. There are some results that deserve to be mentioned here: a) having University education in rural areas increases mean income of the household heads more than in urban areas; b) household heads working in any other sector than Agriculture earn significantly higher than those who work in Agriculture c) in 1996, just after the peso crisis, in urban areas the income from those household heads working in the financial sector (the base dummy) fell so much, that the individual dummy variables for the rest of the industries are not statistically significant; d) being divorced in the rural areas does not increase mean income as compared with those household heads which are married (the base), as it does in urban areas; e) having a formal job has a higher positive impact in rural areas than in urban ones; and f) in rural areas the male variable is not statistically significant in almost any year.

[142] The results for the rural/urban divisions are given in tables A6.16 and A6.17 in the Annex.

Table 6.11. Mexico: OLS income generating equation results for the total population 1992-2000

	1992		1994		1996		1998		2000	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Household Head characteristics:										
Educational level										
No education	-0.404**	(0.024)	-0.401**	(0.020)	-0.379**	(0.021)	-0.397**	(0.025)	-0.414**	(0.025)
Some primary	-0.185**	(0.019)	-0.185**	(0.016)	-0.187**	(0.016)	-0.190**	(0.019)	-0.225**	(0.019)
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.230**	(0.022)	0.190**	(0.020)	0.246**	(0.018)	0.192**	(0.020)	0.157**	(0.020)
Upper Secondary	0.494**	(0.037)	0.539**	(0.030)	0.534**	(0.027)	0.469**	(0.031)	0.423**	(0.032)
University	0.965**	(0.030)	0.941**	(0.026)	0.969**	(0.024)	0.951**	(0.027)	0.871**	(0.027)
Industry										
Agriculture	-0.679**	(0.081)	-0.553**	(0.099)	-0.334**	(0.087)	-0.446**	(0.081)	-0.581**	(0.089)
Mining	-0.370**	(0.093)	-0.402**	(0.103)	0.058	(0.097)	-0.015	(0.094)	-0.139	(0.099)
Manufacturers	-0.476**	(0.080)	-0.400**	(0.097)	-0.190*	(0.086)	-0.254**	(0.080)	-0.349**	(0.087)
Construction	-0.545**	(0.081)	-0.417**	(0.099)	-0.252**	(0.087)	-0.334**	(0.082)	-0.390**	(0.088)
Commerce	-0.402**	(0.081)	-0.312**	(0.098)	-0.131	(0.087)	-0.188*	(0.080)	-0.293**	(0.087)
Transport	-0.359**	(0.083)	-0.298**	(0.100)	-0.049	(0.089)	-0.140	(0.082)	-0.244**	(0.091)
Financial	B	B	B	B	B	B	B	B	B	B
Other	-0.463**	(0.079)	-0.340**	(0.097)	-0.159	(0.085)	-0.252**	(0.078)	-0.331**	(0.085)
Unemployed	-0.537**	(0.083)	-0.436**	(0.099)	-0.224*	(0.088)	-0.295**	(0.082)	-0.345**	(0.088)
Marital status										
Divorced	NA	NA	NA	NA	0.093**	(0.028)	0.096**	(0.031)	0.103**	(0.029)
Single	NA	NA	NA	NA	0.196**	(0.031)	0.204**	(0.036)	0.173**	(0.034)
Union	NA	NA	NA	NA	-0.116**	(0.018)	-0.097**	(0.021)	-0.101**	(0.020)
Married	NA	NA	NA	NA	B	B	B	B	B	B
Age	0.007**	(0.001)	0.008**	(0.001)	0.009**	(0.001)	0.008**	(0.001)	0.008**	(0.001)
Male	-0.088**	(0.023)	-0.053**	(0.019)	-0.004	(0.028)	0.031	(0.031)	0.078**	(0.028)
Formal sector	0.112**	(0.017)	0.142**	(0.015)	0.157**	(0.014)	0.157**	(0.016)	0.154**	(0.017)
Household Characteristics:										
Urban	0.292**	(0.017)	0.276**	(0.015)	0.219**	(0.014)	0.322**	(0.016)	0.231**	(0.016)
Household Size	-0.085**	(0.003)	-0.096**	(0.003)	-0.103**	(0.003)	-0.103**	(0.004)	-0.111**	(0.004)
Dependency Ratio	-0.266**	(0.011)	-0.264**	(0.009)	-0.242**	(0.009)	-0.241**	(0.011)	-0.237**	(0.011)
Region										
Mexico City	-0.086**	(0.025)	0.012	(0.022)	-0.025	(0.025)	-0.156**	(0.024)	-0.010	(0.033)
North	B	B	B	B	B	B	B	B	B	B
Center	-0.148**	(0.016)	-0.149**	(0.014)	-0.151**	(0.014)	-0.210**	(0.017)	-0.111**	(0.017)
South	-0.237**	(0.020)	-0.262**	(0.017)	-0.233**	(0.016)	-0.317**	(0.019)	-0.331**	(0.017)
Constant	7.841**	(0.090)	7.768**	(0.102)	7.218**	(0.094)	7.357**	(0.092)	7.602**	(0.097)
R-squared	0.5095		0.5341		0.5232		0.5243		0.5169	
Sample size	10168		12515		13664		10569		9828	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.
"B" means the base category.

Table 6.12. Mexico: OLS income generating equation results for the total population 2002-2008

	2002		2004		2005		2006		2008	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Household Head characteristics:										
Educational level										
No education	-0.377**	(0.018)	-0.452**	(0.018)	-0.462**	(0.018)	-0.441**	(0.018)	-0.388**	(0.018)
Some primary	-0.143**	(0.014)	-0.175**	(0.014)	-0.191**	(0.014)	-0.186**	(0.014)	-0.194**	(0.013)
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.181**	(0.015)	0.201**	(0.013)	0.193**	(0.013)	0.195**	(0.013)	0.202**	(0.012)
Upper Secondary	0.485**	(0.022)	0.463**	(0.019)	0.412**	(0.019)	0.402**	(0.019)	0.445**	(0.017)
University	0.879**	(0.020)	0.948**	(0.017)	0.896**	(0.017)	0.904**	(0.018)	0.988**	(0.016)
Industry										
Agriculture	-0.500**	(0.103)	-0.656**	(0.061)	-0.547**	(0.075)	-0.513**	(0.064)	-0.706**	(0.046)
Mining	-0.052	(0.109)	-0.050	(0.069)	0.053	(0.080)	-0.003	(0.072)	-0.046	(0.057)
Manufacturers	-0.244*	(0.102)	-0.379**	(0.060)	-0.305**	(0.074)	-0.247**	(0.063)	-0.353**	(0.044)
Construction	-0.225*	(0.102)	-0.379**	(0.061)	-0.271**	(0.074)	-0.212**	(0.064)	-0.289**	(0.045)
Commerce	-0.182	(0.102)	-0.326**	(0.060)	-0.278**	(0.074)	-0.224**	(0.063)	-0.350**	(0.044)
Transport	-0.155	(0.103)	-0.316**	(0.062)	-0.224**	(0.075)	-0.221**	(0.065)	-0.322**	(0.048)
Financial	B	B	B	B	B	B	B	B	B	B
Other	-0.196	(0.101)	-0.311**	(0.059)	-0.242**	(0.073)	-0.197**	(0.062)	-0.257**	(0.044)
Unemployed	-0.268**	(0.103)	-0.364**	(0.061)	-0.288**	(0.074)	-0.254**	(0.064)	-0.769**	(0.047)
Marital status										
Divorced	0.096**	(0.021)	0.020	(0.018)	0.026	(0.017)	0.066**	(0.017)	0.026	(0.015)
Single	0.153**	(0.026)	0.135**	(0.021)	0.107**	(0.021)	0.123**	(0.021)	0.125**	(0.020)
Union	-0.115**	(0.015)	-0.078**	(0.014)	-0.091**	(0.013)	-0.089**	(0.013)	-0.102**	(0.013)
Married	B	B	B	B	B	B	B	B	B	B
Age	0.009**	(0.000)	0.009**	(0.000)	0.009**	(0.000)	0.009**	(0.000)	0.010**	(0.000)
Male	0.076**	(0.021)	-0.012	(0.016)	-0.019	(0.016)	0.001	(0.016)	0.023	(0.013)
Formal sector	0.157**	(0.012)	0.151**	(0.011)	0.173**	(0.011)	0.140**	(0.011)	0.032**	(0.009)
Household Characteristics:										
Urban	0.306**	(0.012)	0.243**	(0.012)	0.300**	(0.011)	0.258**	(0.012)	0.289**	(0.011)
Household Size	-0.109**	(0.003)	-0.116**	(0.003)	-0.115**	(0.003)	-0.115**	(0.003)	-0.090**	(0.003)
Dependency Ratio	-0.234**	(0.008)	-0.223**	(0.008)	-0.228**	(0.008)	-0.217**	(0.008)	-0.270**	(0.007)
Region										
Mexico City	-0.046*	(0.020)	-0.016	(0.014)	0.031	(0.021)	0.005	(0.020)	-0.026	(0.017)
North	B	B	B	B	B	B	B	B	B	B
Center	-0.087**	(0.012)	-0.118**	(0.011)	-0.103**	(0.011)	-0.069**	(0.011)	-0.058**	(0.011)
South	-0.276**	(0.013)	-0.274**	(0.013)	-0.211**	(0.012)	-0.197**	(0.013)	-0.221**	(0.012)
Constant	7.336**	(0.107)	7.610**	(0.066)	7.500**	(0.079)	7.569**	(0.069)	7.365**	(0.052)
R-squared	0.5433		0.5338		0.5231		0.5185		0.4692	
Sample size	16786		22562		23128		20851		29751	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.
"B" means the base category.

6.5.3. Static decomposition results

Table 6.13 below, shows the results for the Fields Decomposition for the total population in 1992-2008 using equation (3.27). This equation decomposes the contributions of each independent variable towards total inequality. Firstly, we observe that the results obtained with the regression-based decomposition are very similar to those obtained with the sub-group decompositions. However, the regression-based results have a higher unexplained component that is reflected in a lower R squared than their counterparts. This was expected since the Shorrocks style decomposition does not control for the rest of the variables, inflating the explanatory power of the model.[143] Nevertheless, the amount of inequality explained by the factors remains high ranging from 47 to 54% (see figure 6.4 below for an example for 2006). This high explanatory power is not uncommon in Latin American countries. For instance, Núñez and Sánchez (1998) obtained an average R squared of 50% when applying a Fields style decomposition to earnings inequality in urban Colombia in 1976-1997; using years of schooling, experience, gender, private sector, full-time job, marital status, occupation, region and industry as regressors. In a different paper using data from Ecuador, Arcos (1998) applies a Fields style decomposition using a consumption-generating function and years of schooling, experience, experience squared, gender, household size and urban/rural division as factors, and finds that in 1994 these factors explained 51% of total inequality in Ecuador.

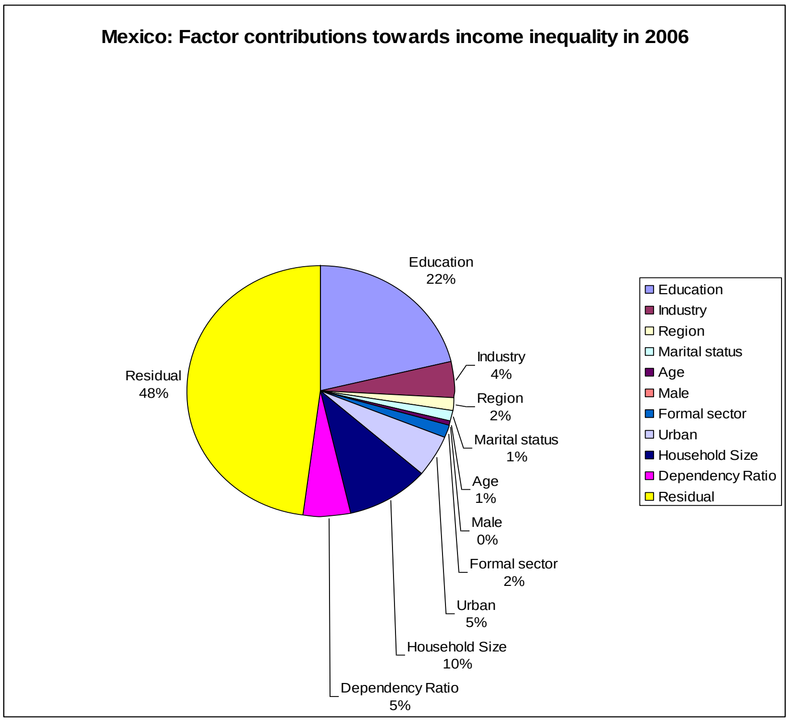
Table 6.13. Mexico: Factor inequality shares for per capita monthly income, total population 1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Education	20.0	20.9	20.8	19.9	20.5	19.7	22.9	21.3	21.5	20.8
Industry	4.6	3.9	3.3	3.8	4.5	5.3	4.9	4.6	4.5	5.9
Region	1.5	2.4	2.1	2.2	2.4	2.3	2.6	1.8	1.6	1.4
Marital status	NA	NA	1.5	1.4	1.4	1.4	0.9	1.0	1.3	0.9
Age	0.0	0.0	0.1	0.1	-0.2	0.3	0.6	0.4	0.6	0.6
Male	0.3	0.2	0.0	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.0
Formal sector	1.5	2.0	2.3	2.2	2.1	2.3	1.9	2.2	1.8	0.1
Urban	6.7	6.3	4.5	6.9	4.7	7.0	4.5	6.1	5.1	5.5
Household Size	8.6	10.2	11.1	9.7	10.4	10.1	9.7	9.7	10.2	5.7
Dependency Ratio	7.7	7.5	6.6	6.3	6.0	6.1	5.2	5.3	5.4	5.9
Residual	49.1	46.6	47.7	47.6	48.3	45.7	46.6	47.7	48.2	53.1

Source: Own calculations using expression 3.27 in the text.

[143] Indeed, this was one of the reasons for using regression-based decompositions in the final part of the chapter.

Figure 6.4.



Source: Table 6.13.

Now coming back to our decompositions, the most important results are as follows:

1. Education is the most important factor explaining income inequality in Mexico. Indeed, the educational dummies as a whole explain an average of 20% of total inequality (or 40% of the explained level of inequality). Incidentally, at the end of the chapter we look further into this variable and found that the returns to education are behind the changes in this variable, rather than the distribution of education. We also observe that the explanatory power of this variable remains stable during the period of study. Looking at the individual educational dummies[144], we observe that University education is the dummy that accounts over a half of the explanatory power of the variable as a whole. Moreover, this explanation power has been increasing through time. The second most important source of inequality in the individual dummies is having no education, which accounts for an average of 3.5% of total inequality. Thus, there are rising gaps between household heads with university education and

[144] The results for the individual dummies for the total, urban, and rural population are given in tables A6.19-A6.21 in the Annex.

those with only primary and secondary education. Thus, there is a high premium for highly skilled workers.

2. The second most important factors are household characteristics, the sum of living in an urban area, household size, dependency ratio and region. As a group they explain an average of 23.5% of total income inequality (or 46% of the explained level of inequality). But we also observe a decrease in the percentage of inequality explained by these factors in the most recent years, particularly in 2008. The factor Region accounts an average of 2% of total inequality. With the South dummy being responsible for all of its disequalizing force.
3. The third most important factor is type of industry, which accounts for an average of 4.5% of total inequality (or 9% of the explained level of inequality). Looking at the individual dummies it becomes clear that Agriculture is the most disequalizing factor accounting for an average of 8% of total inequality (or 16% of the explained inequality). This negative effect is offset by the equalizing results of most of the rest of the industry variables.
4. Working in the formal sector accounts for an average of 2% of total inequality. But, in 2008 it only accounted for 0.1%. Marital status accounts an average of 1% of total inequality. Finally, age and male have a very small contribution explaining total inequality.

6.5.4. Urban/rural differences

After calculating the income-generating equations for urban and rural areas separately (we can see the results in the tables 6.14 and 6.15 below), we also calculated their inequality decompositions and the main results are as follows. *Firstly*, we observe that for the majority of the years the amount of unexplained inequality is higher in rural areas. This result suggests that unobservable factors appear to be more important in rural areas as compared with urban ones. *Secondly*, education is indeed the most important variable in both areas, but it seems to be twice as important in urban areas. Interestingly, the percentage of education accounting for inequality has remained stable in urban areas while it appears to be increasing in rural ones. *Thirdly,* we observe that the disequalizing force of the industry variable is much higher in rural areas. This result is driven by the income gap between household heads working in the Agriculture sector and those working in the rest of the industries. *Fourthly,* the contribution of the region group variable towards total inequality is much higher in rural areas, with the South dummy having a very high disequalizing effect, confirming that the South of Mexico remains the poorest region in the country. *Lastly*, as we would have expected from the regression results, working in the formal sector seems to explain more of the inequality observed in rural areas as opposed to urban ones. Indeed, the coefficients for the formal sector variable in the rural areas where the double of those observed in urban areas.[145]

Thus, these results suggest that we know less about the culprits of the levels of inequality in rural areas than in urban ones. But from what we know, it becomes obvious that even though education is not as important in explaining inequality in rural areas as it is in urban ones, the gap is closing down in recent years. Finally, working in the agricultural sector and living in the South are factors that have been highly disequalizing.

Table 6.14. Mexico: Factor inequality shares for per capita monthly income, urban population 1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Education	23.1	25.0	24.4	23.5	23.5	21.5	23.8	22.0	23.0	22.2
Industry	1.6	1.4	0.8	0.7	1.0	0.7	1.2	0.8	0.6	1.6
Region	0.9	1.4	0.8	1.2	2.1	1.3	1.4	1.0	0.6	0.5
Marital status	NA	NA	1.7	1.8	1.6	1.4	1.3	1.1	1.6	1.2
Age	0.2	0.6	0.5	1.0	0.2	0.6	0.8	0.9	1.0	0.9
Male	0.3	0.1	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Formal sector	0.6	0.8	1.5	0.9	1.0	1.1	1.2	1.3	1.0	0.5
Household Size	9.3	10.8	12.2	11.0	9.2	11.2	9.8	9.9	11.0	6.2
Dependency Ratio	7.3	7.4	6.5	6.7	5.1	6.7	5.2	5.4	5.3	6.0
Residual	56.8	52.5	51.6	53.3	56.4	55.6	55.4	57.5	55.9	60.9

Source: Own calculations using expression 3.27 in the text.

[145] This suggest, that household heads in rural areas with a job in the formal sector have a higher mean income that those working in the informal sector. Therefore, a job in the formal sector might function as a kind of "insurance" against negative changes in the job market and the economy as a whole.

Table 6.15. Mexico: Factor inequality shares for per capita monthly income, rural population 1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Education	9.2	8.7	10.6	9.1	11.4	11.5	14.9	15.7	14.4	11.8
Industry	3.4	3.0	3.3	3.5	4.7	5.6	6.7	5.9	5.6	8.4
Region	2.9	3.5	3.6	4.3	4.3	3.7	4.6	2.5	2.8	2.6
Marital status	NA	NA	1.2	1.0	1.0	1.3	0.2	0.8	0.8	0.4
Age	0.9	0.7	0.9	0.5	0.5	1.9	1.1	0.6	0.9	0.7
Male	0.0	0.1	0.2	-0.1	-0.1	-0.3	0.0	0.1	0.1	0.0
Formal sector	1.6	2.4	2.4	3.2	3.1	3.0	2.6	2.9	2.7	-0.1
Household Size	9.0	11.7	11.3	10.5	12.5	11.1	11.5	10.8	10.7	5.6
Dependency Ratio	8.7	8.6	7.0	6.4	7.3	6.1	5.3	5.4	5.7	6.0
Residual	64.2	61.4	59.5	61.6	55.4	56.1	52.9	55.4	56.2	64.5

Source: Own calculations using expression 3.27 in the text.

6.5.5. Dynamic decomposition results

Tables 6.16 and 6.17 below and tables A6.22 to A6.25 in the Annex, present the results from the decomposition of the changes in income inequality using equations (3.29) and (3.30). We divided the whole period in 5 sub-periods in order to locate the most important variables behind the changes observed through time. We also used different inequality measures for the decompositions in order to check the sensitivity of the exercise to the inequality measure used. We present results for the Coefficient of Variation, the Gini coefficient, and the Generalized Entropy Measure for *a* values ranging from (-1) to (2).

Table 6.16. Mexico: Contribution of factors to changes in income inequality, 1992-1998

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.2296	0.4325	0.2052	0.2237	0.2260	0.2014
Industry	-0.2666	-2.3800	-0.0126	-0.2054	-0.2293	0.0264
Region	0.2839	2.0979	0.0658	0.2314	0.2519	0.0324
Age	0.0539	0.4200	0.0099	0.0434	0.0475	0.0032
Male	-0.0421	-0.3479	-0.0054	-0.0333	-0.0367	0.0003
Formal sector	0.2649	1.9494	0.0624	0.2161	0.2352	0.0313
Urban	0.1703	0.8691	0.0863	0.1501	0.1580	0.0735
Household Size	0.6852	4.7335	0.1986	0.5680	0.6139	0.1240
Dependency Ratio	-0.4186	-3.7676	-0.0161	-0.3217	-0.3596	0.0457
Residual	0.0395	-3.0071	0.4057	0.1277	0.0932	0.4619
∑	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.

Firstly, we observe that the directional effect that the factors have on inequality is mostly consistent (with the exception of some results regarding the GE(2)). However, the magnitude of the effects is sensitive to the inequality measure used. Secondly, variables that are responsible for widening income inequality in one sub-period, are also the ones that narrow income inequality in other sub-periods. Thus, there are almost no variables responsible for widening (or narrowing) income inequality persistently (being the exception the variable age, which contributed always to increase inequality in all sub-periods). Thirdly, education and the urban dummy, are variables that are important almost all of the sub-periods in explaining either the increase or the fall in income inequality. Thus, education in Mexico seems to be a very important variable explaining not only the levels of inequality in the country, but also its changes through time.

6.17. Mexico: Contribution of factors to changes in income inequality, 1998-2006

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.0120	-0.0144	0.1569	0.1211	0.1100	0.1820
Industry	-0.0331	-0.0433	0.0223	0.0086	0.0044	0.0319
Region	0.0979	0.1086	0.0392	0.0537	0.0582	0.0291
Marital status	0.0287	0.0308	0.0172	0.0200	0.0209	0.0152
Age	-0.0511	-0.0585	-0.0105	-0.0205	-0.0237	-0.0035
Male	-0.0109	-0.0124	-0.0032	-0.0051	-0.0057	-0.0018
Formal sector	0.0614	0.0670	0.0306	0.0382	0.0405	0.0253
Urban	0.2825	0.3127	0.1170	0.1579	0.1706	0.0885
Household Size	0.0393	0.0311	0.0842	0.0731	0.0696	0.0919
Dependency Ratio	0.1642	0.1786	0.0854	0.1048	0.1109	0.0718
Residual	0.4093	0.3999	0.4608	0.4481	0.4442	0.4697
$\sum$	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.

Table 6.18 below summarizes the results of the dynamic decomposition. Unfortunately, in the case of Mexico, it seems that unobservables (the residual) are very important explaining the changes in income inequality in the sub-periods (being the exception 1992-1998). From the observable variables, education has played a key role in explaining the changes in income inequality. The only other variable that persistently appears to be important in explaining these changes is the urban dummy. This result is similar to that observed in the sub-group dynamic decompositions at the beginning of this chapter, where the pure inequality component (A) was found the most important for the majority of the sub-periods. Focusing on larger periods of inequality, we firstly observe that the main variables behind the increase in inequality observed from 1992 to 1998 were: household size, region, education, formal and the urban dummy.

Secondly, the most important variables behind the fall in inequality observed from 1998 to 2006 were: the urban dummy, education and dependency ratio.

Table 6.18. Mexico: Changes in income inequality and the main variables responsible for them, 1992-2008

Periods of widening inequality	Responsible variables	Periods of narrowing inequality	Responsible variables
1992-1998	Household size Region Formal sector Education Urban	1998-2002	Residual Education Dependency ratio Household size Urban
2002-2005	Residual Education	2005-2006	Residual Urban Education Formal sector Industry Region
2006-2008	Residual Industry Dependency ratio Urban Education	1998-2006	Urban Education Dependency ratio

Source: With information from table 6.16 and 6.17 and A6.20 to A6.25 In the Annex.

6.5.6. A deeper look at education

In order to understand better the changes in the variable education, we also ran regressions using years of schooling instead of the educational attainment dummies.[146] The coefficient of the years of schooling is also called the returns to education. As expected, this coefficient is highly statistically significant and positive. One year of school increases per capita monthly income by an average of 8%. Looking at the results of the regressions it became obvious that the movements of the returns to education were the ones responsible for the results in the dynamic decomposition. That is, every time that the education variable contributed towards a fall in income inequality, we observe a fall in the

[146] The results for these regressions are not reported, since they are extremely similar to the ones in the Annex.

returns to education; and each time that education widened inequality in a sub-period, there was an increase in the returns to education. In contrast, the distribution of years of education does not always move in the same direction than the changes in inequality. For instance, between 1998 and 2002 there was a fall in inequality, and we observe a fall in the returns to education and an increase in the standard deviation in the years of schooling. That is, although the distribution of years of schooling became more unequal during this period, the variable education still contributed towards the observed fall in inequality but through a decrease in its returns. Thus, the changes that we observe in the education variable are driven mainly by changes in the returns to schooling, rather than its distribution (see table 6.19 below). This particular result has been documented by other authors for earlier years. For instance, Legovini *et al* (2001) found that the changes in the returns to education in 1984-1994 accounted for 24% of the observed increase in inequality, as measured by the Gini coefficient.

When looking at the results for the levels of education, we observe that the University and upper secondary dummies were the ones with the highest market returns as compared with having only primary school, for both, urban and rural areas. However, education seems to be twice as important in urban areas than in rural areas. This was expected from the results shown by the distribution of education by deciles in Mexico at the beginning of this chapter that show a rather unequal distribution of educational attainments within and between urban and rural areas.

Table 6.19. Mexico: Inequality changes and the influence of the education variable

ΔG(1)	Δcoefficient o schooling	ΔStd. Dev. of schooling	ΔG(1)	Δcoefficient o schooling	ΔStd. Dev. of schooling	ΔG(1)	Δcoefficient o schooling	ΔStd. Dev. of schooling
1992-1998			**1998-2002**			**2002-2005**		
3.08	1.01	2.22	-19.07	-8.61	3.11	17.77	7.14	4.71
2005-2006			**2006-2008**					
-11.54	-1.95	-0.78	2.22	6.55	-1.66			

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
G(1): Generalized Entropy Measure with a=1

6.6. SUMMARY AND CONCLUSIONS

In this chapter we have tried to investigate the factors behind the levels and changes of income inequality in Mexico. Using three different methodologies, the evolution of income inequality was decomposed using 10 different household surveys from 1992 to 2008. The objective was to compare the results and see if we could find robust results. Although strictly speaking, the income-source decompositions are not completely comparable with the other two decompositions, their results added interesting insights into this search. These results, although mainly descriptive, could potentially guide the design of economic policy. The following paragraphs summarize the main findings of this chapter.

Analysing between-group inequality is related to a much broader literature on horizontal inequality that we will not discuss here, see Stewart (2002) for an introduction to the topic. We already know that Mexico is a country with high inequality levels. But this chapter shows that it is also a country with horizontal inequalities (inequality between groups). In this polarized society, those inequalities can be found among: urban/rural areas, the North and Centre vs. the South of the country, educational attainments, and among those working in the agricultural sector – a sector where the majority of the poorest 20% of the population work – and the rest of the industries. Of all those factors, we found that the attained level of education is the most important one. Nevertheless, these results should be taken with caution, since we did not use a regional price index. Therefore, lower incomes in some regions could be actually associated with higher standards of living if prices are lower. However, some results such as those of education still stand regardless of the use or not of a regional price index – unless there are very strong regional differences in education.

The results that we obtained using arithmetic and regression-based methodologies confirmed that the differences between educational levels, and therefore skills, among Mexicans have played a key role explaining the levels and changes of income inequality in Mexico from 1992 to 2008. More precisely, widening returns are associated with an increase in inequality, and narrowing returns are associated with a fall in inequality. That is, the relative position of people at higher levels of education is the one behind the observed changes in inequality.

Access to education in Mexico is very unequal, and the subgroup decompositions link this result with the high levels of inequality observed in Mexico between 1992 and 2006. Indeed, our results suggest that the attained level of education is the most important variable explaining the levels of income inequality over the whole period of study (accounting for up to 36% of the levels of total inequality). Occupation was the second most important variable. Other key variables include: the urban/rural division, regional divisions, type of industry, and conditions of work. Regarding the dynamic results, it seems that the unexplained component was the one responsible for the changes in inequality in the first two sub-periods. In contrast, in the last sub-period, total inequality can be mainly accounted for by the changes in the subgroup mean incomes of the education, occupation, industry, and region variables.

It seems that the skills obtained through education have a high impact on the income of the Mexican households. Having more skills translate into higher incomes. The latter, could be the result of higher wages or higher business income. This result is linked with the income-source decompositions, in which business income and wages were found to be the most influential sources of income on the levels and changes of income inequality (explaining up to 61 and 55% respectively, of the levels of total inequality observed). Among the two, it is business income that has exerted the biggest influence. This suggests that wages, although unequally distributed, are less dispersed than income from business, which contains not only the income from small businesses, but medium and large enterprises from families at the top of the distribution.

In order to overcome the main limitations of the arithmetic decompositions, we introduced a regression-based decomposition following Fields (2002). Although most of the variables included in the model were found to be statistically significant determinants of income, the decomposition results show big differences in their explanatory power. As expected, the variable education was found to be the most important explaining both, the levels and changes in inequality in Mexico between 1992 and 2008.

Our results suggest that the main factors behind the *levels* of inequality are: 1) education; 2) household characteristics (the sum of urban/rural, household size and dependency ratio); and 3) type of industry. They explained, respectively, 20%, 21% and 4.5% of total inequality. Among the individual dummies, the Agriculture one was a highly disequalizing factor accounting for an average of 8% of total inequality. The rest of the variables have a much smaller impact on total inequality.

Because of the significant difference observed between urban and rural areas, we ran separate OLS regressions for each group and the results lead us to the three following observations. Firstly, unobservable factors appear to be more important in rural areas as compared with urban ones. Secondly, education seems to be twice as important in urban areas than in rural areas, but the gap is closing down in more recent years. Thirdly, the contribution of the region group variable towards total inequality is much higher in rural areas, with the South dummy having a very high disequalizing effect, confirming that the South of Mexico remains the poorest region in the country.

We also decomposed the *changes* in inequality using the Fields style regression-based approach. To our knowledge, there is no published work that has done this for Mexico. It seems that unobservables (the residual) are very important explaining the changes in income inequality in most sub-periods. From the observable variables, education and the urban dummy have played a key role in explaining the changes in income inequality. By looking closely to the educational variable, it was found that the changes in this variable come from changes in its market returns rather than its distribution.

Education is important since when is unequally distributed, it creates gaps between the income of different families. The more dispersed this distribution is, the bigger the income differences among families. If skills are poorly distributed among the population, a higher demand of skilled workers (due to trade liberalization) in a country with a low supply of them would increase the returns to higher education. Then, although the distribution of education seems important everywhere, it remains a very important problem in Mexico and in the majority of the Latin American countries because of the high inequality of educational attainments. We observe an initial high dispersion in the distribution of education, which at least in the case of Mexico, has been aggravated by a fall in the returns of primary and secondary education accompanied by an increase in the returns to high levels of education.

But why education is so unequally distributed in Latin America, including Mexico? As already mentioned, the returns to secondary education are very similar to those observed for primary education. Therefore, parents keep their children at school only if they can afford to pay for higher education. This particular result is the main difference between the educational levels of Latin America and East Asia, where a higher percentage of students continue up to secondary level. This pattern exacerbates the inequality of education and therefore income inequality. It would be desirable to increase the investment in education at all levels. However, increasing the supply of schools and teachers is not a panacea, since at least in Latin America, access to education does not seem to be the main problem, but rather an early desertion from primary education. Thus, the real problem is to prevent students to drop out of school. And the latter would require not only paying for all the expenses related to study (such as tuition, books, uniforms, transport, notebooks, etc) but also to monetary compensating for the opportunity cost of child labour. And finally, if we were to prepare these students for a fair competition, the quality of the education provided by public schools should also be improved, to make it closer to that observed in private ones.

The income of the poorest families needs to increase for education to become an affordable option for these households. In order to achieve this, an increase in investment in rural infrastructure and the South of the country is desperately needed, since living there, *ceteris paribus*, decreases the income of a household. And since the majority of the poorest rural households have a household head working in the agricultural sector, another policy prescription is for the government to invest in infrastructure in this sector as well as increasing the amount of credit available, especially to small farmers or *ejidatarios*, which lack access to private credit. Moreover, in the presence of such striking asymmetries among NAFTA agricultural producers on access to new technologies, credit and subsidies, the Mexican government should work more directly with poor Mexican producers to help them to move towards more profitable crops. An increase in coverage of the *Alianza para el Campo* programme could be a good start to provide access to credit and new technologies to poor Mexican farmers.

The wage gap between skilled and unskilled workers grew after trade liberalization periods. It has been suggested that Mexico does no longer has a comparative advantage of unskilled workers, and that India and China now dominates this market. Thus, Mexico should aim to educate its population in order to compete for the mid-skilled manufacturers market, which is the type of skills necessary to integrate with the U.S.A. which is its most important trade partner. Indeed, the opening up of the economy to free trade and foreign investment caught the Mexican economy unprepared. In such a polarized country, some households/regions were in a better position to take advantage of the new opportunities created by a privileged access to one of the biggest markets in the world, while at the same time the majority of the Mexican families were left behind, especially those working in the agricultural sector and those living in the South of the country.

From a policy maker perspective, our results suggest that making more equal the distribution of education might help to decrease the levels of income inequality. By increasing the percentage of population with secondary and university education, the levels of education will be less dispersed and with the extra supply of skilled workers the gap observed among different returns to education might decrease, and in turn, the levels of income inequality might also fall. To sum up, increasing the educational levels of the Mexican population will increase the opportunities of the Mexican families and the income of households across the country, while decreasing inequality and the wage gap, and making Mexico more competitive. Skills are a better way to improve the opportunities of Mexican households than any cash transfer *per se*, since they have a permanent and long term positive impact among household members.

Finally, our OLS results made it clear that there is still much unanswered when trying to explain the levels and changes of income inequality in Mexico. With a residual of roughly 50%, there is still much that we ignore about these processes. There may be unobservables that are not capturable by the model such as ability, entrepreneurship, as well as discrimination against certain groups. But unfortunately the data does not capture these variables. The use of econometrics helped us to overcome some of the problems of the arithmetic decompositions. However, the quest for inequality decomposition techniques seems far from over.

CHAPTER 7. CONCLUSIONS

This thesis documented and analyzed the evolution of poverty and inequality in Mexico over the period 1992 to 2008. It applied best practice techniques and in doing so, aimed to reconcile the differences that emerge between studies that use the same data. It also investigated and identified some of the underlying processes and factors driving high levels of poverty and inequality; mapping these on to periods of crisis, reform and recovery and also to changes in the underlying population characteristics (e.g. education). The thesis adopted a microeconomic approach that used household survey micro-data, available for every other year since 1992 and representative at a national and rural/urban level.

The income inequalities observed in Mexico are only surpassed by a few countries. Regarding poverty rates, Mexico ranks just below the average of the region. However, around half of Latin America's poor live in the two largest countries of the region: Brazil and Mexico.[147] Indeed, our results for 2008 show that 22.7 million Mexicans did not have enough income to buy the minimum requirements of food; 30.4 million could not afford to pay for the minimum requirements of food, health and education; and 54.6 million were unable to acquire the minimum requirements of food, health, education, shelter, clothes and public transport. Regarding inequality, we observed that the poorest 10% of the population had an average income share of only 1.3% in the period of study, and that the bottom 50% of the population had an average cumulative income share of 17%. In contrast, the richest 10% of the population had an average income share of 40.7%.

Using sensitivity analysis we showed that in the Mexican case, poverty and inequality measures are highly sensitive to some methodological choices (e.g. economies of scale) but less sensitive to others (such as the choice of poverty line). We obtained robust results regarding the evolution of poverty and income distribution in Mexico between 1992 and 2008, which showed that periods of crisis have had a very negative impact on the majority of the population. Indeed, poverty levels increased markedly in urban and rural areas after the peso crisis of December 1994 and the world financial crisis of 2008.

[147] Puryear and Jewers (2009).

The trends in income inequality in urban areas have remained very stable during the period of study. In contrast, rural areas have seen their levels of inequality increase after periods of crisis and reforms. We also observed that in terms of poverty estimates, urban areas recovered much faster from the negative shock of the peso crisis than rural areas. Finally, the thesis also explored a number of the underlying factors behind levels and changes in inequality, and identified education gaps to be highly important. The following paragraphs present the main findings of the thesis, policy implications, limitations of the methodologies used and future possibilities for research.

Chapter 1 introduced the motivations for studying the levels and trends of poverty and income inequality in Mexico. It also presented a literature review of empirical works about the topic, explaining their contributions and limitations. There was a general agreement among the literature presented that Mexico has high levels of inequality, and that the levels of poverty are also high for a middle income country. But there was a lot of disagreement on specific estimates and crucially on trends on poverty measures. Inequality trends seemed more stable, but they were calculated with the Gini coefficient only, thus, were presented only for the total population, ignoring differences between urban and rural areas or between other sub-groups. It was also made evident that the economic history of Mexico since the 1980s has been convoluted. The debt crisis of 1982 set the country into what it is now known as the ‘lost decade’. At the end of the 1980s and during the 1990s the economy also went through fierce privatizations, financial deregulation and trade liberalization. The country recovered during the early 1990s but suffered from another crisis in December 1994 – the peso crisis. The economy stabilized in the late 1990s but economic growth has been elusive during the 2000s, when the annual average real rate of growth has been 1.6%. Recovery seems even more elusive at the end of the 2000s, with the unfolding of the 2008 world financial crisis. The review was useful to identify periods of crisis and recovery so that changes in inequality and poverty can be place into a broader economic context.

Chapter 2 made it clear that poverty and inequality are complex phenomena. We discussed about the interesting debate concerning their concepts or the way they are aggregated into a single measure. We concluded that different concepts of measuring welfare (e.g. monetary vs. basic needs) are not considered to be alternative ways to identify the same thing. Indeed, they do tend to identify different groups as poor. The rest of the chapter explored a set of methodological choices, such as the adjustment done for underreporting. It was concluded that such adjustment should not be done in the case of Mexico, since it is impossible to know if the differences among the information from the ENIGH and the National Accounts are due to underreporting or to truncation of the sample. Regarding the rest of the methodological choices (e.g. equivalence scales, economies of scale, income vs consumption), it was decided to test the sensitivity of the results in an empirical way.

Chapter 3 described the main data sources used in this thesis – the ENIGH household surveys – introducing the survey design, comparability among surveys, number of observations, changes in the questionnaires, the reference period, and the urban/rural definitions. Chapter 3 also described the different income and consumption concepts used in the empirical chapters. The three official poverty lines were also introduced here. The chapter then moved to the concept of stochastic dominance analysis. Finally, the different methodologies applied in Chapter 6 about inequality decomposition were presented in detail.

Chapter 4 is the first empirical chapter and aimed to demonstrate how sensitive estimates of poverty and inequality are to methodological choices made in their estimation. The analysis was conduced on two years of data, 1992 and 2002, so as to illustrate which methodological choices gave rise to the greatest variation in estimates. This is a very important issue, since once the researcher is familiarized with the data sets, the results can be easily manipulated through their choice of different methods. Therefore, being clear about the way that our methodological choices affect the results seems extremely important when analyzing the evolution of poverty and inequality in Mexico.

The first methodological choice in Chapter 4 concerned the inclusion of *imputed rents* in the official poverty measures. Our poverty estimates showed that the FGT index was very sensitive to the inclusion or exclusion of imputed rents. Since the questions in the 2002 ENIGH regarding this source of income changed as compared with previous surveys, we decided to exclude imputed rents from our welfare indicators to ensure comparability of the welfare definition over time. Secondly, we noticed that both inequality and poverty measures, were highly sensitive to the *economies of scale factor*. We decided to assume no economies of scale for our calculations in later chapters to enable comparison with official estimates. Regarding the *equivalence scales factor*, we found that our inequality measures were not sensitive to this adjustment. Nevertheless, our poverty measures proved to be highly sensitive, but we obtained more stable estimates as the costs of a child approach those of an adult. But since the official estimations are calculated in per capita terms, we decided to use *per capita income* in later chapters primarily but to report results for another income concept that takes into account the cost of children. Thirdly, we found that our inequality and poverty measures were not that sensitive to the use of *income vs. consumption* as the welfare indicator. But since the magnitude in the poverty and inequality changes was always higher when using income, we decided to report results for income in the later empirical chapters, but also to report results for consumption in the footnotes for reference.

The second part of Chapter 4 was dedicated to apply *stochastic dominance analysis* to check the robustness of our poverty and inequality measures. Indeed, we arrived to the same conclusions in this section than when using specific poverty and inequality measures between 1992 and 2002. But more important than the specific results, this section showed the usefulness of dominance analysis to check the robustness of our results. Dominance analysis confirms the poverty and inequality ranking and allows us to generalize this finding for a wide range of poverty and inequality measures as well as a wide range of poverty lines. Thus, we decided to apply dominance analysis in the later chapters to the changes in poverty and inequality for the entire data sets (1992-2008).

The main objective of **Chapter 5** was to arrive at *robust results* about the changes in poverty and inequality in the period of 1992-2008. That is, we were looking for results that would be less sensitive to a set of methodological choices such as any specific poverty and inequality measures used and in the case of poverty, to the choice of poverty line. The methodological decisions applied in this chapter follow the recommendations of previous chapters. We explored the changes of poverty and inequality by calculating a set of poverty and inequality measures and later by using stochastic dominance analysis. We found robust results regarding the changes in poverty and income inequality in Mexico in the period of study. Indeed, the stochastic dominance analysis results confirmed those of the FGT index and the Generalized Entropy Measure. Our poverty and inequality results exposed how seriously the economic turmoil of December 1994 and the world financial crisis of 2008 affected the poverty and inequality levels during the period of study. However, inequality levels did not change as much as poverty ones.

Looking at income shares by deciles, we observed that there are three periods where the poorest 5 deciles experienced an important fall in their income share: 1996-1998, 2004-2005 and 2006-2008. After the *peso* crisis of December 1994 GDP recovered fast and by 1996 its annual real rate of growth was 5.2%. However, inflation rates remained very high and by 1996 it reached nearly 30%. In addition, real minimum wages continued deteriorating between 1996 and 1998. Between 2004 and 2005 we observe a fall in the annual real rate of growth. Lastly, the 2006-2008 period is capturing the unfolding of the world financial crisis. In terms of increases in income shares, 2000-2002 and 2005-2006 are important periods for the poorest deciles of the population. It is interesting to note that it is precisely during the presidency of Fox that we observe two periods of income redistribution. During this administration economic growth was elusive. However inflation rates were really low and stable and real minimum wages stabilized for the first time since the debt crisis of 1982. When dividing the distribution in urban/rural groups we observe that the rural areas had suffered more relative and absolute losses than the urban ones. Finally, we observed that the poorest 4 deciles are the ones which have experienced dramatic changes in their income shares through time. In contrast, the top 6 deciles have enjoyed a more stable income share throughout the last 16 years. This pattern exposes the vulnerability of the poorest sector of the population towards the changes in the economy. Nevertheless, it also shows the possibilities of redistribution, since every time there was a period of income redistribution, it was precisely the 4 poorest deciles which benefited the most.

Using our preferred inequality measure, the GE, we can say with 95% confidence that inequality has remained very stable in *urban areas* during the period of 1992 to 2008. In contrast, inequality increased markedly in *rural areas* between 1994 and 1998 and after the unfolding of the world financial crisis between 2006 and 2008. After 16 years, the poor population in the rural areas has been incapable of recovering from this negative shock. In contrast, the levels of inequality for the urban population have remained very stable throughout the same period. We found very useful to separate the inequality analysis by rural and urban areas, since our results show that the trends in both areas move differently. Official estimations only report results for the Gini coefficient, which in this case proved to be misleading. Indeed, the Gini estimations for the total population show no statistically significant change in inequality after the negative shocks that affected the rural population between 1994 and 1998.

Regarding poverty measures, we can say with 95% of confidence that the years after the *peso crisis*, 1994-1996, seemed to be the worst sub-period for urban/rural areas in the period of study. However, the urban regions managed to recover faster than the rural ones from this negative shock, and between 1996 and 2000 the urban population experienced a fall in all of the three poverty measures. The rural areas experienced something similar but at a later time, between 1998 and 2002. Urban areas recovered much faster than rural ones after the *peso crisis*, since the shock in rural areas was deeper and of other nature, since they were hit not only by the negative effects of the peso crisis, but also by: a) the 70% fall in cocoa and coffee international prices during 1984-1994; b) the retreat of the state from servicing the *ejido* sector; and c) by the implementation of NAFTA and with it the promotion of unfair competition of Mexican rural farmers with large and heavily subsidized American farmers. In contrast, there were important poverty reductions in the three poverty measures for both, rural and urban areas during 2005-2006. But discrepancies between the ENIGH results and the National Accounts advise caution with these results. It really remains a puzzle the extraordinary falls in poverty observed in just one year, since per capita GDP growth was 3.8% in 2006, but with the data of the 2006 ENIGH household survey we obtain a per capita mean income rate of growth of 10.4%. Finally, we observe an important increase in the levels of poverty in both, urban and rural areas as a result of the world financial crisis of 2008. Indeed, the magnitude of the changes in poverty measures in rural areas between 2006 and 2008 was bigger than the one experienced after the peso crisis. However, since the levels of poverty were much lower in 2006 than in 1994, the final result in 2008 was not as severe as the aftermath of the peso crisis.

The robustness checks using stochastic dominance analysis confirmed our poverty and inequality results. Firstly, the changes over time in the Headcount index could be generalized for all poverty lines in the 1990s and for poverty lines above 7.4% of the food poverty line and up to almost 3 times higher than the most generous official poverty line for 2000 onwards. Secondly, Lorenz Curves confirmed results obtained with the GE for the total population. Thus, we obtained robust results irrespective of the inequality measures used. Fourthly, we found that the direction of the changes in the poverty measures were the same for the official and the author's calculations. However, the magnitude of the poverty levels in the author's calculations is generally higher than the official results. But this difference was never larger than 5 percentage points. Fifthly, we found that inequality and poverty *trends* were not very sensitive to the use of different welfare indicators. Using equivalised income gives extremely similar results as compared with per capita income. In the case of per capita consumption, results are very similar as well. Finally, one of the main limitations of Chapter 5 is that we found robust results regarding poverty and inequality *changes*. However the *levels* still depend on the specific measures used. Another limitation arises from the sensitivity analysis, since it was done for the total population results only.

Relevant policy prescriptions arise from Chapter 5. The first one is related to the deterioration of living standards for all the population after periods of economic crisis. The Mexican government should install safety nets to protect the most vulnerable population. Temporary work schemes could help vulnerable families to overcome difficult times. Another possibility could be a training scheme that could provide an extra income in the form of a scholarship during the training period and the extra qualifications obtained at the end of the scheme. The use of cash transfers such as OPORTUNIDADES could help as well. But cash transfers cannot overcome the importance of wages as the main source of income for Mexican families.

The second policy prescription is related to the gap between urban and rural areas. We observed that poverty measures were always higher in rural areas than in urban ones. In addition, we observed that urban areas tend to recover faster from negative shocks. Regarding inequality, we observed that urban levels have been very stable while rural ones have increased markedly in two occasions. It is very important to understand the processes behind the trends in poverty and inequality. Once we understand them, we would be able to be in a better position to implement policies to help closing this gap between urban and rural areas. The negative shock observed in rural areas between 1994 and 1998 was from a different nature than the one affecting urban areas. Thus, the recovery of the economy with increases in GDP annual growth, low inflation and lower unemployment were not sufficient conditions to trigger a recovery in rural areas. When the government stopped servicing the *ejido* sector, other mechanisms should have been in place to prepare this sector for the fierce competition with the heavily subsidized American farmers, to help the most productive farmers to compete in a fairer way and the not so productive ones to move to other sectors.

The final policy prescription is linked to redistribution. Our results show that the poorest 4 deciles are the ones that have benefited the most during periods of income redistribution. Thus, reducing inequality in Mexico has a high potential impact on the poor and this could eventually also reduce the absolute levels of poverty.

In **Chapter 6** we investigated the factors behind the levels and changes of income inequality in Mexico. Using three different methodologies, the evolution of income inequality was decomposed using 10 different household surveys from 1992 to 2008. These results, although mainly descriptive, could potentially guide the design of economic policy. The previous chapter showed that Mexico is a country with high inequality levels. But the results of Chapter 6 suggest that Mexico is also a country with horizontal inequalities (inequality between groups). In this polarized society, those inequalities can be found between: urban/rural areas, the North and Centre vs. the South of the country, people with different educational attainments levels, and among those working in the agricultural sector and the rest of the industries. Of all those factors, we found that the attained level of education is the most important one in explaining the level of inequality in any given year.

An exploration of the changes in different income sources of rural and urban poor households showed which sources accounted for the increases observed in the incomes of the poor. Regarding policy factors, we observed that Oportunidades, Remittances and Scholarships played a very important role increasing the income of poor households in urban and rural areas at two crucial periods for poverty reduction. It seems that the increases in the Oportunidades programme and the amount of scholarships given to poor households had a very positive impact from 1992 to 2006. In addition, the Fox administration reached an agreement to reduce the transaction costs associated with remittances from the USA to Mexico, decreasing the amount paid for the service and also by introducing an ID issued by the Mexican Consulates in the USA that helped many illegal workers to open a bank account.

The results that we obtained using arithmetic and regression-based methodologies confirmed that the differences between educational levels, and therefore skills, among Mexicans have played a key role explaining the levels and changes of income inequality in Mexico from 1992 to 2008. Different educational attainments accounted for up to 36% of the levels of total inequality of the former methodology and 20% of the latter. More precisely, our regression-based decompositions suggest that widening returns are associated with an increase in inequality, and narrowing returns are associated with a fall in inequality. That is, the relative position of people at higher levels of education is the one behind the observed changes in inequality.

Other key variables of the *sub-group decomposition* included: the urban/rural division, regional divisions, type of industry, and conditions of work. Key variables for the *regression-based decomposition* included: household characteristics (the sum of urban/rural, household size, dependency ratio and region); type of industry; and the agricultural dummy. They explained, respectively, 23.5%, 4.5% and 8% of total inequality.

Education is indeed a very unequally distributed asset among Mexicans. By exploring the ENIGHs we found that educational attainments are highly related to income levels. Indeed, the majority of the poorest 20% of the population had either no education or some primary education in 2006. Moreover, 56% of the Mexican population drop out of school with only primary level or less. The situation for the deciles 3^{rd} to the 8^{th} is somehow better, with the majority of their population achieving lower secondary or less education by 2006. Finally, we observed that among the richest 10% of the population, the majority has university education (54%). We also found striking differences in educational attainments between rural and urban areas. Indeed, 50% of the rural population has no education or some primary education only. In contrast, only 23% of the urban population belongs to this category. Finally there is a gap in the level of education attained by women and men in Mexico, with men having higher levels of education in all years, as compared with women.

Although we found similar results with the sub-group decompositions and the regression-based decompositions, the former methodology has some shortcomings. The first issue refers to the main drawback of using sub-group decompositions, namely that they are not counterfactual experiments. In contrast, by using econometrics, we controlled for the interdependence of the different factors that contribute to total inequality and isolate the contribution of each variable. For this reason, the subgroup methodology worked better when exploring the inequalities between and within each variable, rather than when we included all the variables in the calculations. Finally, the calculations for the subgroup decompositions created a problem in the number of variables that could be included in the model at the same time.

Although the income-source decompositions are not fully comparable with the subgroup and regression-based ones, we found their results interesting. These decompositions showed that business income and wages were the most influential sources of income on the levels and changes of income inequality, explaining up to 61 and 55% respectively, of the levels of total inequality observed. It was pointed out that an important number of study cases have been dedicated to the wage gap among Mexican workers. However, more attention should be given to the most influential income-source on the levels and changes of inequality: business income.

Since we observed many disparities between urban and rural areas, we ran separate OLS regressions for each group. We found that unobservable factors appeared to be more important in rural areas as compared with urban ones. In addition, the variable education seemed to be twice as important in urban areas than in rural ones. Finally, we found that the Agricultural and South dummies had a very disequalizing effect, confirming that living in the South, *ceteris paribus*, diminishes median income of the household as compared with households living in other regions of the country and the same is true for those household heads working in the agricultural sector as compared with those working in other sectors. The disequalizing effects of the South and Agricultural dummies suggest that any investment in the South of the country and in the agricultural sector could benefit an important proportion of the poorest families in Mexico. From a policy maker perspective, poor Mexican households that work in the Agricultural sector could benefit from: a) higher investments in infrastructure in the Agricultural sector; b) increasing the access to credit available to small farmers; and c) increasing the access to new technologies.

We also decomposed the *changes* in inequality using the Fields style regression-based approach. To our knowledge, there is no published work that has done this for Mexico. It seems that unobservables (the residual) are very important explaining the changes in income inequality in most sub-periods. From the observable variables, education and the urban dummy have played a key role in explaining the changes in income inequality. By looking closely to the educational variable, it was found that the changes in this variable come from changes in its market returns rather than its distribution.

It was also argued that when education is unequally distributed, it creates gaps between the incomes of different families. In the case of Mexico, we observe an initial high dispersion in the distribution of education, which has been aggravated by a fall in the returns of primary and secondary education accompanied by an increase in the returns to high levels of education. Since the returns to primary and secondary education are very similar, parents keep their children at school only if they can afford to pay for higher education. This pattern exacerbates the inequality of education and therefore income inequality. It was mentioned that access to education was not the main problem, but rather an early desertion from primary school. Therefore, any policies to promote higher educational attainments should be implemented. But since poor families do not have a sufficient income to pay for the costs attached to keeping children at school, the income of these families needs to increase for education to become an affordable option for these households. In this direction, the OPORTUNIDADES programme aims to give a cash transfer to poor families with the condition that children remain at school and visit a doctor regularly for checkups. As it was mentioned, the programme covers mostly rural areas, but urban areas are partially covered since 2009. But despite being highly praised worldwide, the scheme operates in an environment of poor investment in infrastructure, rural development, communications, access to credit and transport, reducing potential multiplier effects.[148]

From a policy maker perspective, our results suggest that making more equal the distribution of education might help to decrease the levels of income inequality. By increasing the percentage of population with secondary and university education, the levels of education will be less dispersed and with the extra supply of skilled workers the gap observed among different returns to education might decrease, and in turn, the levels of income inequality might also fall. In addition, by increasing the educational attainments of its population Mexico could compete for the mid-skilled manufacturer market, the type of market that will help the country to integrate with its most important trade partner, the U.S.A. To sum up, increasing the educational levels of the Mexican population will increase the opportunities of the Mexican families and the income of households across the country, while decreasing inequality and the wage gap, and making Mexico more competitive. Skills are a better way to improve the opportunities of Mexican households than any cash transfer *per se*, since they have a permanent and long term positive impact among household members.

Although the use of regression-based decompositions helped us to overcome some of the limitations of the subgroup decompositions, our OLS results made it clear that even by using relatively sophisticated methodologies, we still do not know much about the factors behind the levels of inequality in Mexico (our model had a residual of roughly 50%). It was mentioned that the

[148] de Janvry and Sadoulet, 2005:8.

data provided by the ENIGH household surveys does not include variables that could help us to increase the explained part of the model, such as: discrimination, ethnic minorities, social exclusion and insecurity. The inclusion of such variables in future surveys might help to improve our understanding of the processes behind the levels and trends of income inequality.

Future possibilities for research include to use a similar regression-based methodology but to explore the factors behind the levels and changes of poverty. Although some variables might play a similar role than in the inequality decompositions, we believe that a dedicated study to poverty is very relevant. In addition, new methodologies for income inequality decomposition could become available in the following years, and they could be use to compare the results presented here that use Fields style decompositions. The newest ENIGH for 2008 includes a section on qualitative information and new variables such as: if the person speaks an indigenous language; if any member of the family skipped a meal for lack of money to buy food; if any member of the family went to bed with hunger; if there is a person with any disability in the household; leisure time; health condition; required time to get into a hospital in case of an emergency; and if they go to see a doctor or not when they need to. We believe that from 2008 onwards, these new set of variables could help to increase our understanding on poverty and inequality levels in Mexico and that new studies should try to incorporate the new information in their analysis. For instance, this new information could be used to calculate a multidimensional poverty measure in the style of Bourguignon and Chakravarty (2003), specifying a poverty line for each dimension and considering a person to be poor when she/he falls below at least one of the poverty lines.

Another next step in the inequality decompositions would be to analyze the distribution by quantiles. In this methodology, the dependant variable (e.g. per capita income) is divided in quantiles in order to observe which independent variables have more of an influence on the dependent variable at different parts of the distribution. For example, we could analyze how the educational levels account for the inequality levels of the poorest 20% of the population, for those around the mean and for the rich. Lopez-Acevedo and Salinas (2000) use quantile regressions to study wage differentials in Mexico between 1988 and

1997. They found that not only have the returns to education increased in the period, but that they have increased more for Upper Secondary and University education, particularly for the upper part of the distribution. Our results show that the first two tendencies continued during the next decade. But we need to look at quantile regressions to observe the changes at certain parts of the distribution. In addition, urban/rural areas regressions could be calculated, since from our results, we know that education is more unequally distributed in rural areas as compared with urban ones. Finally, different independent variables could be use for different quantiles to capture which factors affect the rich and which the poor.

One of the earliest examples of regression-based methodology is the Oaxaca-Blinder (1973). This methodology estimates a wage equation for two groups (e.g. female/male), with the dependent variable being the natural logarithm of the hourly wage rate of the i-th worker. The dependent variables are individual characteristics plus the error term. After assuming that the absence of discrimination would lead for females and males with the same characteristics to earn the same, wage differential can be decomposed into two effects: 1) the difference in endowments or individual characteristics; and 2) the effects of discrimination. Discrimination is calculated as the residual left after subtracting the effects of differences in individual characteristics from the overall wage differential. The residual assumes that all the sex differentials after controlling for individual characteristics are due to discrimination, but this might not be true. This methodology is good to decompose inequality/poverty between two groups, for instance, urban/rural, men/female. That is, to decompose the effects of individual characteristics in explaining the differences between two groups. But you need to identify first the factor(s) that might affect inequality, such as rural/urban differences, female/male differentials or different educational levels. Thus, this methodology does not help to find the factors that are driving the high levels of inequality, rather, it helps to understand better these factors, once they are already located by means of another methodology. Future research could use the results from this study to apply a Oaxaca-Blinder decomposition for the different educational levels or for rural/urban areas or for any of the variables that were found to have an important influence on the levels and changes of inequality in Mexico.

Another alternative for future research is to apply a Micro-simulation in the style of Bourguignon *et al* (2005). Legovini *et al* (2005) apply this methodology to Mexico. The simulation decomposes the changes in income inequality by source, identifying separately the contribution of the changes in the returns from those of household characteristics. The micro-simulation is done in three steps: 1) Household income equations are estimated for two years; 2) a simulation is carried out for the distribution of income which would have been observed in year 1(or 2) if the returns would have equalled those of year 2(or 1); and 3) the contribution of changes in the endowments, returns and the residual term to the changes in income inequality are calculated (Legovini *et al*, 2005:282). The main results are that the main contributors to the increased inequality observed in Mexico between 1984 and 1994 were household characteristics, with education, working, age, and male explaining 48% of the change and with the Southern region accounting for 9% of the increased. One limitation of this methodology is that it is only interested in the changes over time. Thus, it cannot be used to make an exact decomposition of the levels of inequality. Another limitation is that the methodology is very time-consuming, since the replacing is done for each parameter and each independent variable. Finally, according to Cowell and Fiorio (2009) it is path dependant, that is, it matters which counterfactual is computed first.

Shorrocks (1999) attempts to integrate different decomposition techniques within a common framework by applying the Shapley-value decomposition. The idea behind this methodology is that a particular inequality or poverty measure could be express as the sum of a set of contributory factors. The marginal impact of each of the factors are calculated and eliminated in sequence, and then the average of the marginal contributions of all the possible elimination sequences is calculated (Shorrocks, 1999:29). However, as mentioned by Shorrocks (1999) and Cowell and Fiorio (2009) this decomposition is dependent on the aggregation level of remaining income components. For instance, the Shapley-value does not guarantee that the contribution from Transfers to total inequality will be the same as the sum of the individual contributions of the components of Transfers (Remittances, Oportunidades, Presents, etc). In the same direction, Cowell and Fiorio (2009) method extends that of Fields (2002) by dividing the population in sub-groups.

The purpose of this methodology is to unify the sub-group methodology with the regression-based one. In their article they use the Luxemburg Income Study (LIS) data set to analyze inequality changes in the U.S. and Finland. By running separate regressions for two subgroups, female-male and educational attendance, their model allows to find out the effect that each variable has over inequality changes in each subgroup.

Finally, given that we found important spatial variations, a more careful study of spatial differences using regional price indexes could be done. This thesis used the same national itemized price indexes used by the official poverty estimations. But future research could use the regional price indexes instead in order to explore more carefully the variations found in this thesis, such as those between urban and rural areas, the North and Centre vs. the South of the country, educational attainments, and among those working in the agricultural sector.

To conclude, we hope that the findings of this thesis will contribute to a better knowledge of some of the underlying processes and factors driving the high levels of poverty and inequality observed in Mexico in the period of 1992 to 2008. Nevertheless, the more that we explored and documented about these issues, the more that we realized how little we actually know about them. Thus, more research regarding these topics is needed, especially in documenting what it is that makes poverty and inequality levels so high in the country and which policies could help us to decrease them.

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ANNEX CHAPTER 3

The following is an extract from the do file for the STATA program that refers to the way to change nominal income into real income. The variables **ing1d** to **ing6d** are in *real* prices and **ing1** to **ing6** are in *nominal* prices. The variable **ing1** refers to income from the last month; the variable **ing2** refers to income from the previous month; the variable **ing3** refers to income from the month before the previous month and so on. The numbers refer to the CPI used in each case. Looking at the first row, we are generating a new variable called **'ing1d'** which is real income, which equals nominal income divided by the CPI of July, since the last month ('umes') is 7.

```
gen double ing1d=ing1/1.1669732 if umes==7
replace ing1d=ing1/1.1729284 if umes==8
replace ing1d=ing1/1.1847691 if umes==9
replace ing1d=ing1/1.1899488 if umes==10
gen double ing2d=ing2/1.1637819 if umes==7
replace ing2d=ing2/1.1669732 if umes==8
replace ing2d=ing2/1.1729284 if umes==9
replace ing2d=ing2/1.1847691 if umes==10
gen double ing3d=ing3/1.1627778 if umes==7
replace ing3d=ing3/1.1637819 if umes==8
replace ing3d=ing3/1.1669732 if umes==9
replace ing3d=ing3/1.1729284 if umes==10
gen double ing4d=ing4/1.1679773 if umes==7
replace ing4d=ing4/1.1627778 if umes==8
replace ing4d=ing4/1.1637819 if umes==9
replace ing4d=ing4/1.1669732 if umes==10
gen double ing5d=ing5/1.1662673 if umes==7
replace ing5d=ing5/1.1679773 if umes==8
replace ing5d=ing5/1.1627778 if umes==9
replace ing5d=ing5/1.1637819 if umes==10
gen double ing6d=ing6/1.1648059 if umes==7
replace ing6d=ing6/1.1662673 if umes==8
replace ing6d=ing6/1.1679773 if umes==9
replace ing6d=ing6/1.1627778 if umes==10
```

Now we do the same for the consumption variable. But the process is a bit different, since in the case of income we use the general consumer price index, and for the consumption variable we use a specific price index for each of the 16 different groups created. For example, the Group 1 refers to food and non-alcoholic drinks consumed inside and outside the household, which is collected on a weekly basis. To change from nominal to real prices we use a specific CPI, the SP509. As we can see the value of the CPI is not always the same, since we use a specific CPI for each "decena" or period of collection of information. That is, for "decena" 1 and 2 we use the CPI SP509 for August; for "decena" 3, 4 and 5, we use the CPI SP509 for September; for "decena" 6, 7 and 8 we use the CPI SP509 for October; and for "decena" 9 we use November.

```
*****Group 1 (Weekly): Food and non-alcoholic beverages consumed inside and
outside the household.
gen alimentom=gasm/1.2183355 if alimento==1 & decena==1
replace alimentom=gasm/1.2183355 if alimento==1 & decena==2
replace alimentom=gasm/1.2585174 if alimento==1 & decena==3
replace alimentom=gasm/1.2585174 if alimento==1 & decena==4
replace alimentom=gasm/1.2585174 if alimento==1 & decena==5
replace alimentom=gasm/1.2708810 if alimento==1 & decena==6
replace alimentom=gasm/1.2708810 if alimento==1 & decena==7
replace alimentom=gasm/1.2708810 if alimento==1 & decena==8
replace alimentom=gasm/1.2593891 if alimento==1 & decena==9
```

Now we can have a look at Group 4, which is collected monthly and refers to the 'Housing, home improvement, electricity, gas and other fuels'. In this case, we use the CPI SP13. For "decena" 1 we use the CPI SP13 of July; for 2-4 of August; for 5-7 September; and for 8-9 October.

```
*****Group 4 (Monthly): Housing, home improvement, electricity, gas
and other fuels
gen   viviendam=gasm/1.1757092 if vivienda==1 & decena==1
replace viviendam=gasm/1.1787139 if vivienda==1 & decena==2
replace viviendam=gasm/1.1787139 if vivienda==1 & decena==3
replace viviendam=gasm/1.1787139 if vivienda==1 & decena==4
replace viviendam=gasm/1.1805745 if vivienda==1 & decena==5
replace viviendam=gasm/1.1805745 if vivienda==1 & decena==6
replace viviendam=gasm/1.1805745 if vivienda==1 & decena==7
replace viviendam=gasm/1.1887928 if vivienda==1 & decena==8
replace viviendam=gasm/1.1887928 if vivienda==1 & decena==9
```

The Group 3 'Clothes and shoes' has a period of reference of three months and it uses the specific CPI SP12. For the groups that refer to a consumption of the last three months we use an average of those months. For "decena" 1 we used the average of May, June and July; for 2-4 the average of June, July and August; for 5-7 the average of July, August and September; and for 8-9 the average of August, September and October.

```
*****Group 3 (Three months): Clothes and shoes
gen  vestcalzm=gasm/1.0372654 if vestcalz==1 & decena==1
replace vestcalzm=gasm/1.0376639 if vestcalz==1 & decena==2
replace vestcalzm=gasm/1.0376639 if vestcalz==1 & decena==3
replace vestcalzm=gasm/1.0376639 if vestcalz==1 & decena==4
replace vestcalzm=gasm/1.0386369 if vestcalz==1 & decena==5
replace vestcalzm=gasm/1.0386369 if vestcalz==1 & decena==6
replace vestcalzm=gasm/1.0386369 if vestcalz==1 & decena==7
replace vestcalzm=gasm/1.0405397 if vestcalz==1 & decena==8
replace vestcalzm=gasm/1.0405397 if vestcalz==1 & decena==9
```

Finally, let us present an example of a group that has a period of six months, Group 7 'Household appliances and furniture' that uses the CPI SP531. This group refers to a consumption of the last six months so we use an average of the last six months. For "decena" 1 we used the average of February to July; for 2-4 the average of March to August; for 5-7 the average of April to September; and for 8-9 the average of May to October.

```
*****Group 7 (Six months): Household appliances and furniture.
gen  enseresm=gasm/1.0031034  if enseres==1 & decena==1
replace enseresm=gasm/1.0025430 if enseres==1 & decena==2
replace enseresm=gasm/1.0025430 if enseres==1 & decena==3
replace enseresm=gasm/1.0025430 if enseres==1 & decena==4
replace enseresm=gasm/1.0024651  if enseres==1 & decena==5
replace enseresm=gasm/1.0024651  if enseres==1 & decena==6
replace enseresm=gasm/1.0024651  if enseres==1 & decena==7
replace enseresm=gasm/1.0030586 if enseres==1 & decena==8
replace enseresm=gasm/1.0030586 if enseres==1 & decena==9
```

Table A3.1.

Mexico: Distributional summary statistics for non-monentary income, urban and rural areas, 2006.

	Rural Areas		Urban Areas	
Quantile group	Quantile	% Share	Quantile	% Share
1	0.0	0.0	0.0	0.0
2	19.4	0.0	0.0	0.0
3	115.6	0.9	86.8	0.3
4	209.2	2.3	219.7	1.5
5	344.3	3.7	383.1	2.9
6	506.1	5.8	603.3	4.7
7	730.7	8.4	884.6	7.1
8	1090.8	12.2	1381.1	10.7
9	1790.1	18.9	2270.1	16.9
10		47.8		56.0

Source: Own calculations with data from the 2006 ENIGH household survey.

ANNEX CHAPTER 4

Table A 4.1.

Mexico: Changes in the income/consumption share of different concepts of income and consumption by deciles
1992 and 2002

	intpc[a](base)			intpc2 (excluding imputed rents)			(excluding durable goods)			(no durable goods no imputed rents)		
deciles	1992	2002	%change	1992	2002	%change	1992	2002	%change	1992	2002	%change
1%	0.06	0.07	25.45	0.05	0.06	16.33						
5%	0.13	0.14	13.49	0.12	0.14	13.22						
10%	1.27	1.43	12.37	1.24	1.37	10.69						
20%	2.33	2.51	7.65	2.30	2.47	7.43						
30%	3.26	3.45	5.90	3.25	3.48	7.09						
40%	4.17	4.47	7.25	4.14	4.49	8.58						
50%	5.20	5.61	7.72	5.15	5.61	8.93						
60%	6.43	6.94	7.84	6.43	6.90	7.28						
70%	8.20	8.60	4.90	8.15	8.72	6.88						
80%	10.87	11.23	3.32	10.85	11.17	2.87						
90%	15.84	16.09	1.60	15.88	16.06	1.08						
100%	42.43	39.68	-6.48	42.61	39.75	-6.71						
	gntpc[b](base)			gntpc2			gntpc3			gntpc4		
1%	0.07	0.08	11.27	0.07	0.07	6.06	0.08	0.08	3.95	0.07	0.07	2.86
5%	0.15	0.16	8.78	0.15	0.16	9.59	0.17	0.17	1.21	0.16	0.16	0.00
10%	1.50	1.62	8.48	1.47	1.60	8.41	1.57	1.68	6.93	1.56	1.67	6.92
20%	2.62	2.71	3.13	2.63	2.76	4.87	2.76	2.81	1.81	2.76	2.88	4.16
30%	3.56	3.67	3.06	3.56	3.73	4.60	3.73	3.80	1.98	3.76	3.89	3.62
40%	4.53	4.66	2.83	4.53	4.72	4.08	4.73	4.82	1.82	4.74	4.91	3.69
50%	5.59	5.73	2.56	5.58	5.77	3.44	5.83	5.92	1.44	5.85	6.01	2.72
60%	6.94	6.95	0.23	6.91	7.00	1.29	7.18	7.16	-0.36	7.16	7.26	1.37
70%	8.67	8.65	-0.24	8.64	8.62	-0.31	8.95	8.82	-1.41	8.93	8.85	-0.90
80%	11.29	11.12	-1.51	11.25	11.10	-1.28	11.55	11.31	-2.04	11.54	11.31	-2.02
90%	15.98	15.74	-1.46	15.94	15.75	-1.20	16.17	15.75	-2.55	16.13	15.85	-1.73
100%	39.33	39.15	-0.46	39.49	38.96	-1.32	37.54	37.94	1.06	37.59	37.39	-0.53
	ictpc[c](base)			ictpc2			ictpc3			ictpc4		
1%	0.06	0.07	29.82	0.05	0.06	20.75						
5%	0.12	0.15	27.12	0.12	0.15	18.70						
10%	1.29	1.51	17.74	1.26	1.47	16.55						
20%	2.38	2.60	9.25	2.36	2.60	10.25						
30%	3.28	3.52	7.41	3.28	3.56	8.53						
40%	4.20	4.55	8.23	4.16	4.58	10.06						
50%	5.19	5.63	8.58	5.19	5.63	8.54						
60%	6.54	6.98	6.82	6.48	6.99	7.79						
70%	8.30	8.67	4.51	8.27	8.72	5.52						
80%	11.09	11.22	1.23	11.12	11.24	1.08						
90%	16.11	16.10	-0.03	16.03	16.07	0.31						
100%	41.64	39.20	-5.84	41.85	39.13	-6.50						
	gctpc[d](base)			gctpc2			gctpc3			gctpc4		
1%	0.07	0.08	13.89	0.07	0.08	9.86	0.08	0.09	10.39	0.08	0.08	8.00
5%	0.15	0.16	9.40	0.15	0.16	9.40	0.16	0.17	9.55	0.15	0.17	14.00
10%	1.48	1.64	11.16	1.49	1.65	11.10	1.56	1.70	9.51	1.55	1.72	10.36
20%	2.61	2.78	6.31	2.60	2.82	8.59	2.73	2.88	5.61	2.73	2.93	7.32
30%	3.55	3.70	4.14	3.55	3.76	5.83	3.70	3.82	3.44	3.71	3.92	5.55
40%	4.51	4.70	4.17	4.54	4.73	4.14	4.71	4.85	2.80	4.79	4.91	2.51
50%	5.58	5.76	3.25	5.55	5.83	5.04	5.80	5.94	2.43	5.72	6.05	5.63
60%	6.93	6.99	0.81	6.90	7.01	1.57	7.15	7.19	0.60	7.15	7.24	1.23
70%	8.64	8.68	0.54	8.60	8.63	0.34	8.87	8.80	-0.88	8.84	8.83	-0.18
80%	11.37	11.14	-2.08	11.33	11.17	-1.40	11.57	11.34	-1.98	11.58	11.37	-1.81
90%	16.31	15.80	-3.11	16.29	15.80	-3.02	16.48	15.80	-4.12	16.44	15.78	-4.02
100%	39.02	38.81	-0.53	39.16	38.61	-1.40	37.44	37.68	0.65	37.48	37.27	-0.56

Soruce: Own calculations using the data from the 1992 and 2002 ENIGHs.
a) *per capita* total net income (total current income minus presents given to other households)
b) *per capita* total net consumption (total current consumption minus presents given to other households)
c) *per capita* total current income
d) *per capita* total current consumption
The 2 at the end of the income/consumption variables means that it does not include imputed rents. The 3 at the end means that the variable does not include durable goods. And the 4 means that the variable does not include imputed rents and durable goods. See table 4.1 in the text.

Table A 4.2

Mexico: Sensitivity of inequality measures to the use of different equivalised incomes
1992 - 2002

	Gini Coefficient			Generalized Entropy 1992				Generalized Entropy 2002				Generalized Entropy % change				Atkinson 1992			Atkinson 2002			Atkinson %change		
	1992	2002	% change	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	ε=0.5	ε=1	ε=2	ε=0.5	ε=1	ε=2	ε=0.5	ε=1	ε=2
intpc	0.533	0.507	-4.965	0.788	0.509	0.579	1.342	0.667	0.454	0.494	0.890	-15.282	-10.748	-14.741	-33.701	0.237	0.399	0.612	0.211	0.365	0.572	-10.865	-8.475	-6.548
gntpc	0.501	0.494	-1.372	0.649	0.442	0.488	0.932	0.592	0.425	0.479	0.917	-8.700	-3.722	-1.943	-1.524	0.207	0.357	0.565	0.202	0.347	0.542	-2.509	-2.984	-3.982
ictpc2*	0.531	0.500	-5.879	0.785	0.505	0.571	1.305	0.654	0.441	0.479	0.851	-16.726	-12.791	-16.117	-34.832	0.234	0.397	0.611	0.205	0.356	0.567	-12.466	-10.155	-7.247
gctpc2	0.503	0.488	-2.903	0.642	0.445	0.490	0.939	0.572	0.414	0.467	0.904	-10.958	-6.856	-4.710	-3.705	0.208	0.359	0.562	0.197	0.339	0.534	-5.260	-5.526	-5.111
Y02	0.471	0.442	-6.248	0.563	0.390	0.435	0.851	0.488	0.340	0.356	0.544	-13.343	-12.859	-18.205	-36.074	0.185	0.323	0.530	0.159	0.288	0.494	-13.793	-10.781	-6.755
Y04	0.467	0.438	-6.228	0.542	0.382	0.429	0.845	0.470	0.333	0.352	0.543	-13.180	-12.824	-18.007	-35.821	0.182	0.318	0.520	0.157	0.283	0.485	-13.702	-10.794	-6.793
Y06	0.468	0.439	-6.141	0.538	0.382	0.432	0.861	0.468	0.334	0.356	0.554	-13.005	-12.663	-17.656	-35.624	0.183	0.318	0.518	0.158	0.284	0.483	-13.452	-10.655	-6.718
Y08	0.473	0.445	-5.966	0.551	0.391	0.443	0.897	0.480	0.342	0.367	0.578	-12.823	-12.362	-17.144	-35.491	0.186	0.323	0.524	0.162	0.290	0.490	-13.032	-10.353	-6.542
Y01	0.482	0.454	-5.691	0.582	0.407	0.460	0.953	0.508	0.358	0.384	0.615	-12.647	-11.922	-16.478	-35.444	0.193	0.334	0.538	0.169	0.301	0.504	-12.448	-9.899	-6.272
Y22	0.475	0.445	-6.329	0.574	0.397	0.442	0.868	0.494	0.345	0.361	0.554	-13.871	-13.077	-18.334	-36.221	0.188	0.327	0.534	0.161	0.292	0.497	-13.934	-10.938	-6.976
Y24	0.473	0.443	-6.368	0.560	0.393	0.441	0.875	0.481	0.341	0.361	0.560	-14.152	-13.214	-18.212	-35.941	0.187	0.325	0.528	0.161	0.289	0.490	-13.947	-11.071	-7.216
Y26	0.476	0.445	-6.346	0.560	0.396	0.448	0.898	0.480	0.343	0.367	0.579	-14.349	-13.213	-17.911	-35.568	0.188	0.327	0.528	0.162	0.291	0.490	-13.799	-11.058	-7.322
Y28	0.481	0.451	-6.242	0.575	0.405	0.460	0.938	0.492	0.352	0.380	0.608	-14.454	-13.067	-17.433	-35.151	0.193	0.333	0.535	0.167	0.297	0.496	-13.475	-10.881	-7.287
Y21	0.491	0.461	-6.061	0.604	0.422	0.479	0.998	0.517	0.368	0.399	0.652	-14.473	-12.769	-16.797	-34.751	0.200	0.344	0.547	0.174	0.308	0.508	-12.990	-10.548	-7.117
Y42	0.477	0.447	-6.351	0.582	0.401	0.447	0.882	0.500	0.348	0.365	0.562	-14.161	-13.167	-18.385	-36.354	0.189	0.330	0.538	0.163	0.294	0.500	-13.980	-10.989	-7.083
Y44	0.478	0.448	-6.407	0.576	0.401	0.451	0.901	0.491	0.348	0.369	0.576	-14.703	-13.370	-18.270	-36.090	0.190	0.331	0.535	0.164	0.294	0.496	-14.021	-11.164	-7.417
Y46	0.483	0.452	-6.392	0.584	0.408	0.461	0.935	0.496	0.354	0.379	0.602	-15.132	-13.417	-17.932	-35.620	0.194	0.335	0.539	0.167	0.298	0.498	-13.863	-11.166	-7.599
Y48	0.490	0.459	-6.296	0.607	0.422	0.478	0.987	0.513	0.366	0.395	0.641	-15.431	-13.296	-17.380	-35.001	0.200	0.344	0.548	0.173	0.306	0.506	-13.518	-10.995	-7.616
Y41	0.501	0.470	-6.112	0.644	0.442	0.501	1.060	0.544	0.384	0.418	0.697	-15.604	-13.017	-16.632	-34.318	0.209	0.357	0.563	0.181	0.319	0.521	-12.988	-10.655	-7.473
Y62	0.479	0.449	-6.362	0.588	0.405	0.451	0.894	0.504	0.351	0.368	0.568	-14.351	-13.215	-18.422	-36.483	0.191	0.333	0.541	0.164	0.296	0.502	-14.005	-11.015	-7.147
Y64	0.482	0.451	-6.417	0.590	0.409	0.459	0.925	0.501	0.354	0.375	0.589	-15.057	-13.448	-18.303	-36.276	0.194	0.336	0.541	0.166	0.298	0.501	-14.038	-11.190	-7.521
Y66	0.489	0.457	-6.392	0.607	0.420	0.474	0.972	0.512	0.363	0.389	0.624	-15.615	-13.495	-17.926	-35.796	0.199	0.343	0.548	0.171	0.305	0.506	-13.854	-11.174	-7.715
Y68	0.499	0.467	-6.282	0.640	0.438	0.495	1.040	0.537	0.379	0.410	0.675	-16.017	-13.359	-17.305	-35.113	0.207	0.355	0.561	0.179	0.316	0.518	-13.460	-10.967	-7.718
Y61	0.512	0.480	-6.076	0.690	0.463	0.524	1.136	0.578	0.403	0.438	0.746	-16.267	-13.051	-16.467	-34.343	0.217	0.371	0.580	0.189	0.332	0.536	-12.868	-10.579	-7.543

Table A4.2 Continues…

	Gini Coefficient			Generalized Entropy 1992				Generalized Entropy 2002				Generalized Entropy % change				Atkinson 1992			Atkinson 2002			Atkinson %change		
	1992	2002	% change	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	ε=0.5	ε=1	ε=2	ε=0.5	ε=1	ε=2	ε=0.5	ε=1	ε=2
Y80	0.480	0.450	-6.245	0.603	0.407	0.449	0.878	0.521	0.355	0.367	0.559	-13.528	-12.832	-18.289	-36.384	0.191	0.335	0.547	0.165	0.299	0.510	-13.777	-10.673	-6.624
Y82	0.481	0.450	-6.365	0.594	0.408	0.455	0.905	0.508	0.354	0.371	0.574	-14.483	-13.247	-18.448	-36.606	0.192	0.335	0.543	0.165	0.298	0.504	-14.018	-11.024	-7.185
Y84	0.486	0.455	-6.414	0.602	0.415	0.467	0.947	0.510	0.359	0.381	0.602	-15.289	-13.477	-18.318	-36.469	0.196	0.340	0.546	0.169	0.302	0.505	-14.031	-11.182	-7.565
Y86	0.494	0.463	-6.371	0.628	0.431	0.486	1.009	0.528	0.372	0.399	0.646	-15.910	-13.502	-17.899	-36.013	0.203	0.350	0.557	0.175	0.311	0.514	-13.803	-11.122	-7.734
Y88	0.506	0.475	-6.231	0.673	0.453	0.512	1.096	0.563	0.393	0.424	0.709	-16.342	-13.322	-17.208	-35.322	0.213	0.365	0.574	0.185	0.325	0.530	-13.344	-10.854	-7.687
Y81	0.522	0.490	-5.991	0.738	0.484	0.547	1.219	0.615	0.422	0.458	0.798	-16.603	-12.958	-16.293	-34.549	0.226	0.384	0.596	0.197	0.344	0.552	-12.684	-10.393	-7.443
Y12	0.483	0.452	-6.362	0.599	0.410	0.458	0.914	0.511	0.356	0.373	0.579	-14.579	-13.263	-18.466	-36.721	0.194	0.337	0.545	0.166	0.299	0.506	-14.023	-11.024	-7.209
Y14	0.489	0.458	-6.399	0.614	0.421	0.473	0.968	0.519	0.364	0.387	0.613	-15.439	-13.477	-18.320	-36.659	0.199	0.344	0.551	0.171	0.305	0.509	-14.009	-11.153	-7.576
Y16	0.499	0.468	-6.332	0.649	0.440	0.497	1.045	0.544	0.381	0.408	0.667	-16.078	-13.461	-17.855	-36.239	0.207	0.356	0.565	0.179	0.317	0.521	-13.728	-11.037	-7.697
Y18	0.514	0.482	-6.159	0.705	0.468	0.529	1.153	0.589	0.406	0.439	0.743	-16.497	-13.220	-17.100	-35.570	0.219	0.374	0.585	0.190	0.334	0.541	-13.204	-10.694	-7.577
Y11*	**0.531**	**0.500**	**-5.879**	**0.785**	**0.505**	**0.571**	**1.305**	**0.654**	**0.441**	**0.479**	**0.851**	**-16.726**	**-12.791**	**-16.117**	**-34.832**	**0.234**	**0.397**	**0.611**	**0.205**	**0.356**	**0.567**	**-12.466**	**-10.155**	**-7.247**
Y765	0.494	0.463	-6.362	0.626	0.430	0.485	1.008	0.526	0.372	0.399	0.647	-15.904	-13.485	-17.773	-35.745	0.203	0.349	0.556	0.175	0.310	0.513	-13.751	-11.113	-7.748
Y77	0.497	0.465	-6.335	0.635	0.435	0.491	1.026	0.533	0.376	0.405	0.661	-16.017	-13.453	-17.618	-35.576	0.205	0.352	0.559	0.177	0.314	0.516	-13.648	-11.059	-7.750
Y775	0.499	0.468	-6.301	0.645	0.440	0.497	1.046	0.541	0.381	0.411	0.676	-16.116	-13.408	-17.443	-35.397	0.207	0.356	0.563	0.179	0.317	0.520	-13.535	-10.996	-7.741
Y771	**0.520**	**0.489**	**-6.006**	**0.731**	**0.481**	**0.544**	**1.206**	**0.610**	**0.419**	**0.455**	**0.790**	**-16.569**	**-12.977**	**-16.318**	**-34.511**	**0.225**	**0.382**	**0.594**	**0.196**	**0.342**	**0.549**	**-12.712**	**-10.428**	**-7.466**
Y772	0.481	0.450	-6.366	0.593	0.407	0.454	0.903	0.507	0.353	0.370	0.573	-14.466	-13.244	-18.444	-36.588	0.192	0.335	0.543	0.165	0.298	0.504	-14.021	-11.024	-7.180
Y774	0.485	0.454	-6.414	0.601	0.414	0.466	0.944	0.509	0.359	0.380	0.600	-15.259	-13.474	-18.317	-36.440	0.196	0.339	0.546	0.168	0.301	0.504	-14.034	-11.182	-7.561
Y776	0.494	0.462	-6.375	0.625	0.429	0.484	1.004	0.526	0.371	0.397	0.642	-15.875	-13.504	-17.905	-35.979	0.203	0.349	0.556	0.175	0.310	0.513	-13.813	-11.134	-7.735
Y778	0.505	0.474	-6.241	0.668	0.451	0.510	1.088	0.559	0.391	0.422	0.704	-16.308	-13.332	-17.223	-35.288	0.212	0.363	0.572	0.184	0.324	0.528	-13.366	-10.875	-7.698
Y779	0.512	0.481	-6.135	0.697	0.465	0.526	1.142	0.582	0.404	0.438	0.743	-16.457	-13.176	-16.795	-34.898	0.218	0.372	0.582	0.190	0.332	0.538	-13.064	-10.672	-7.604
Mean	**0.492**	**0.462**	**-6.044**	**0.626**	**0.427**	**0.480**	**0.991**	**0.533**	**0.373**	**0.399**	**0.651**	**-14.768**	**-12.747**	**-17.000**	**-34.303**	**0.201**	**0.347**	**0.555**	**0.175**	**0.311**	**0.515**	**-13.092**	**-10.510**	**-7.151**
Min	**0.467**	**0.438**	**-6.417**	**0.538**	**0.382**	**0.429**	**0.845**	**0.468**	**0.333**	**0.352**	**0.543**	**-16.726**	**-13.504**	**-18.466**	**-36.721**	**0.182**	**0.318**	**0.518**	**0.157**	**0.283**	**0.483**	**-14.038**	**-11.190**	**-7.750**
Max	**0.533**	**0.507**	**-1.372**	**0.788**	**0.509**	**0.579**	**1.342**	**0.667**	**0.454**	**0.494**	**0.917**	**-8.700**	**-3.722**	**-1.943**	**-1.524**	**0.237**	**0.399**	**0.612**	**0.211**	**0.365**	**0.572**	**-2.509**	**-2.984**	**-3.982**

Source: Own calculations using the 1992 and 2002 ENIGHs.

a) 'Y61' means P=0.6 and F=1 from formula 2.5 $(A+PK)^F$. 'Y44' means P=0.4 and F=0.4.

b) The first two concepts are per capita net income and consumption, which are the official definitions where the cost of a child is the same of an adult and there are no economies of scale.

c) The third and fourth concepts are our preferred income and consumption definitions, where the cost of a child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

d) 'Y771' is the adjustment recommended by the Mexican literature, with the cost of a child being 77% of an adult, and no adjustment for household size. That is, P=0.77 and F=1.

e) All the adjustments from Y02 onwards have as base ict2, which is Total household current income, which is the same as our preferred definition, but in household terms, not per capita.

*ictpc2 and Y11 represent per capita income or the extreme adjustment where the cost of an additional child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

Table A4.3

Mexico: Sensitivity of poverty indexes to the use of different equivalence scales and economies of scale
1992-2002

	1992 urban FGT			1992 rural FGT			1992 total FGT			2002 urban FGT			2002 rural FGT			2002 total FGT			% change urban			% change rural			% change total		
	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
intpc	0.167	0.048	0.021	0.414	0.166	0.088	0.252	0.090	0.045	0.114	0.028	0.011	0.348	0.122	0.066	0.203	0.063	0.032	-5.242	-2.036	-0.984	-6.679	-4.430	-2.213	-4.982	-2.688	-1.374
gntpc	0.188	0.051	0.021	0.460	0.171	0.087	0.281	0.094	0.045	0.129	0.032	0.012	0.374	0.127	0.059	0.222	0.068	0.030	-5.864	-1.896	-0.879	-8.529	-4.385	-2.716	-5.921	-2.534	-1.460
ictpc2	0.156	0.046	0.019	0.387	0.153	0.081	0.240	0.084	0.042	0.121	0.033	0.013	0.340	0.120	0.059	0.204	0.066	0.030	-3.504	-1.303	-0.607	-4.643	-3.259	-2.194	-3.631	-1.790	-1.118
gctpc2	0.177	0.049	0.019	0.427	0.161	0.081	0.263	0.088	0.042	0.154	0.040	0.015	0.372	0.132	0.064	0.237	0.075	0.033	-2.302	-0.928	-0.446	-5.488	-2.913	-1.766	-2.650	-1.376	-0.819
Y02	0.002	0.001	0.000	0.013	0.004	0.002	0.006	0.002	0.001	0.002	0.001	0.001	0.009	0.002	0.001	0.005	0.001	0.001	-0.006	0.048	0.053	-0.438	-0.158	-0.089	-0.190	-0.034	-0.003
Y04	0.004	0.001	0.000	0.021	0.005	0.002	0.010	0.003	0.001	0.002	0.001	0.001	0.014	0.003	0.001	0.006	0.002	0.001	-0.176	0.035	0.053	-0.691	-0.193	-0.107	-0.370	-0.056	-0.010
Y06	0.006	0.001	0.001	0.033	0.009	0.004	0.016	0.004	0.002	0.006	0.002	0.001	0.029	0.006	0.002	0.014	0.003	0.002	-0.035	0.021	0.047	-0.360	-0.235	-0.132	-0.146	-0.076	-0.022
Y08	0.013	0.003	0.001	0.054	0.015	0.006	0.028	0.007	0.003	0.010	0.003	0.001	0.055	0.013	0.005	0.027	0.007	0.003	-0.324	-0.028	0.028	0.064	-0.175	-0.145	-0.141	-0.064	-0.027
Y01	0.023	0.006	0.002	0.091	0.026	0.011	0.049	0.013	0.006	0.022	0.005	0.002	0.090	0.025	0.010	0.048	0.013	0.005	-0.096	-0.051	0.000	-0.083	-0.100	-0.123	-0.100	-0.054	-0.032
Y22	0.002	0.001	0.000	0.016	0.004	0.002	0.008	0.002	0.001	0.002	0.001	0.001	0.010	0.002	0.001	0.005	0.001	0.001	-0.006	0.043	0.051	-0.631	-0.200	-0.105	-0.274	-0.055	-0.010
Y24	0.004	0.001	0.000	0.024	0.007	0.003	0.012	0.003	0.001	0.002	0.001	0.001	0.019	0.004	0.002	0.008	0.002	0.001	-0.214	0.025	0.049	-0.555	-0.292	-0.159	-0.352	-0.104	-0.034
Y26	0.010	0.002	0.001	0.046	0.012	0.005	0.022	0.006	0.003	0.007	0.002	0.001	0.039	0.009	0.003	0.019	0.005	0.002	-0.292	-0.013	0.038	-0.646	-0.354	-0.218	-0.320	-0.145	-0.064
Y28	0.018	0.004	0.002	0.084	0.023	0.010	0.043	0.012	0.005	0.016	0.004	0.002	0.080	0.020	0.007	0.040	0.010	0.004	-0.225	-0.096	0.000	-0.401	-0.372	-0.275	-0.308	-0.191	-0.098
Y21	0.036	0.009	0.004	0.155	0.045	0.020	0.080	0.023	0.010	0.030	0.007	0.003	0.135	0.038	0.016	0.070	0.019	0.008	-0.653	-0.187	-0.059	-1.923	-0.669	-0.371	-1.075	-0.369	-0.171
Y42	0.002	0.001	0.000	0.018	0.005	0.002	0.008	0.002	0.001	0.002	0.001	0.001	0.011	0.002	0.001	0.005	0.002	0.001	-0.012	0.041	0.050	-0.702	-0.235	-0.121	-0.307	-0.070	-0.018
Y44	0.006	0.001	0.000	0.028	0.009	0.004	0.014	0.004	0.002	0.004	0.001	0.001	0.021	0.005	0.002	0.010	0.003	0.001	-0.201	0.015	0.046	-0.679	-0.346	-0.202	-0.398	-0.133	-0.055
Y46	0.013	0.003	0.001	0.063	0.017	0.007	0.032	0.008	0.003	0.009	0.002	0.001	0.053	0.012	0.004	0.025	0.006	0.002	-0.478	-0.045	0.025	-0.966	-0.468	-0.290	-0.607	-0.211	-0.103
Y48	0.024	0.007	0.002	0.130	0.035	0.015	0.065	0.017	0.007	0.020	0.005	0.002	0.106	0.028	0.011	0.052	0.014	0.005	-0.478	-0.172	-0.038	-2.384	-0.742	-0.429	-1.212	-0.388	-0.187
Y41	0.061	0.014	0.006	0.225	0.071	0.032	0.118	0.036	0.016	0.047	0.011	0.004	0.185	0.055	0.024	0.099	0.028	0.012	-1.370	-0.350	-0.143	-3.953	-1.572	-0.815	-1.826	-0.798	-0.401
Y62	0.002	0.001	0.000	0.018	0.005	0.002	0.008	0.002	0.001	0.002	0.001	0.001	0.012	0.003	0.001	0.006	0.002	0.001	-0.006	0.040	0.049	-0.659	-0.260	-0.133	-0.285	-0.082	-0.024
Y64	0.006	0.001	0.001	0.033	0.010	0.005	0.017	0.005	0.002	0.004	0.001	0.001	0.027	0.006	0.002	0.013	0.003	0.001	-0.193	0.007	0.041	-0.617	-0.384	-0.236	-0.378	-0.155	-0.071
Y66	0.016	0.004	0.001	0.081	0.022	0.010	0.040	0.011	0.004	0.011	0.003	0.001	0.065	0.016	0.006	0.032	0.008	0.003	-0.490	-0.080	0.009	-1.561	-0.627	-0.364	-0.868	-0.299	-0.144
Y68	0.036	0.009	0.003	0.164	0.050	0.022	0.083	0.024	0.010	0.026	0.006	0.003	0.134	0.037	0.015	0.067	0.018	0.007	-1.046	-0.248	-0.080	-2.931	-1.230	-0.655	-1.597	-0.623	-0.305
Y61	0.091	0.023	0.009	0.282	0.098	0.047	0.156	0.050	0.023	0.072	0.017	0.007	0.239	0.075	0.034	0.135	0.039	0.017	-1.967	-0.596	-0.260	-4.288	-2.295	-1.318	-2.074	-1.130	-0.650

Table A4.3. Continues…

	1992 urban FGT			**1992 rural FGT**			**1992 total FGT**			**2002 urban FGT**			**2002 rural FGT**			**2002 total FGT**			**% change urban**			**% change rural**			**% change total**		
	α=0	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**	**α=0**	**α=1**	**α=2**
Y82	0.002	0.001	0.000	0.020	0.006	0.002	0.009	0.003	0.001	0.002	0.001	0.001	0.012	0.003	0.001	0.006	0.002	0.001	-0.036	0.038	0.048	-0.757	-0.283	-0.144	-0.333	-0.093	-0.029
Y84	0.007	0.002	0.001	0.042	0.011	0.005	0.021	0.005	0.002	0.005	0.001	0.001	0.035	0.007	0.003	0.016	0.004	0.002	-0.249	-0.002	0.038	-0.689	-0.411	-0.264	-0.459	-0.173	-0.085
Y86	0.020	0.004	0.002	0.101	0.028	0.012	0.050	0.013	0.006	0.013	0.003	0.002	0.082	0.020	0.007	0.039	0.010	0.004	-0.618	-0.112	-0.008	-1.896	-0.773	-0.442	-1.008	-0.380	-0.187
Y88	0.049	0.012	0.005	0.199	0.064	0.029	0.103	0.032	0.014	0.036	0.008	0.003	0.165	0.048	0.020	0.085	0.023	0.010	-1.351	-0.395	-0.134	-3.337	-1.633	-0.903	-1.798	-0.839	-0.433
Y81	0.130	0.034	0.014	0.335	0.126	0.064	0.200	0.067	0.032	0.094	0.024	0.010	0.290	0.098	0.046	0.169	0.052	0.023	-3.521	-0.940	-0.416	-4.486	-2.819	-1.781	-3.123	-1.434	-0.884
Y12	0.002	0.001	0.000	0.020	0.006	0.003	0.009	0.003	0.001	0.002	0.001	0.001	0.013	0.003	0.001	0.006	0.002	0.001	0.004	0.038	0.048	-0.690	-0.300	-0.155	-0.287	-0.100	-0.034
Y14	0.009	0.002	0.001	0.048	0.013	0.006	0.024	0.006	0.003	0.005	0.002	0.001	0.038	0.008	0.003	0.018	0.004	0.002	-0.363	-0.012	0.035	-1.001	-0.449	-0.288	-0.660	-0.195	-0.098
Y16	0.022	0.005	0.002	0.120	0.034	0.015	0.059	0.016	0.007	0.019	0.004	0.002	0.096	0.024	0.009	0.048	0.012	0.005	-0.324	-0.138	-0.023	-2.437	-0.944	-0.526	-1.103	-0.463	-0.232
Y18	0.065	0.016	0.006	0.237	0.079	0.037	0.126	0.039	0.018	0.049	0.011	0.004	0.192	0.059	0.026	0.103	0.029	0.012	-1.553	-0.520	-0.201	-4.543	-1.990	-1.144	-2.275	-1.021	-0.559
Y11	**0.156**	**0.046**	**0.019**	**0.387**	**0.153**	**0.081**	**0.240**	**0.084**	**0.042**	**0.121**	**0.033**	**0.013**	**0.340**	**0.120**	**0.059**	**0.204**	**0.066**	**0.030**	**-3.504**	**-1.303**	**-0.607**	**-4.643**	**-3.259**	**-2.194**	**-3.631**	**-1.790**	**-1.118**
Y765	0.021	0.005	0.002	0.110	0.031	0.013	0.054	0.015	0.006	0.016	0.004	0.002	0.092	0.023	0.009	0.045	0.011	0.004	-0.447	-0.138	-0.018	-1.780	-0.813	-0.465	-0.921	-0.403	-0.200
Y77	0.026	0.007	0.002	0.132	0.038	0.016	0.066	0.019	0.008	0.020	0.005	0.002	0.107	0.028	0.011	0.053	0.014	0.005	-0.561	-0.177	-0.041	-2.431	-0.976	-0.544	-1.286	-0.487	-0.243
Y775	0.033	0.008	0.003	0.159	0.047	0.020	0.079	0.023	0.010	0.023	0.006	0.002	0.129	0.035	0.014	0.063	0.017	0.007	-0.940	-0.237	-0.069	-2.935	-1.202	-0.647	-1.552	-0.604	-0.298
Y771	**0.123**	**0.032**	**0.013**	**0.331**	**0.122**	**0.061**	**0.192**	**0.064**	**0.031**	**0.091**	**0.023**	**0.009**	**0.283**	**0.094**	**0.044**	**0.164**	**0.050**	**0.022**	**-3.205**	**-0.883**	**-0.390**	**-4.814**	**-2.741**	**-1.716**	**-2.836**	**-1.383**	**-0.850**
Y772	0.002	0.001	0.000	0.020	0.005	0.002	0.009	0.003	0.001	0.002	0.001	0.001	0.012	0.003	0.001	0.006	0.002	0.001	-0.036	0.038	0.048	-0.777	-0.280	-0.143	-0.340	-0.091	-0.028
Y774	0.007	0.001	0.001	0.040	0.011	0.005	0.020	0.005	0.002	0.005	0.001	0.001	0.035	0.007	0.002	0.016	0.004	0.002	-0.239	-0.001	0.039	-0.515	-0.407	-0.261	-0.381	-0.171	-0.083
Y776	0.018	0.004	0.002	0.100	0.027	0.012	0.049	0.013	0.005	0.013	0.003	0.001	0.081	0.019	0.007	0.039	0.009	0.004	-0.475	-0.108	-0.005	-1.853	-0.747	-0.430	-0.983	-0.367	-0.180
Y778	0.048	0.012	0.005	0.195	0.062	0.028	0.101	0.031	0.014	0.033	0.008	0.003	0.163	0.046	0.019	0.082	0.023	0.009	-1.520	-0.374	-0.125	-3.194	-1.583	-0.866	-1.841	-0.811	-0.413
Y779	0.077	0.020	0.008	0.257	0.088	0.042	0.138	0.045	0.021	0.060	0.014	0.005	0.215	0.067	0.030	0.119	0.034	0.015	-1.699	-0.571	-0.236	-4.251	-2.160	-1.240	-1.966	-1.090	-0.612
Mean	**0.039**	**0.010**	**0.004**	**0.128**	**0.043**	**0.021**	**0.071**	**0.023**	**0.010**	**0.030**	**0.008**	**0.003**	**0.108**	**0.033**	**0.015**	**0.059**	**0.017**	**0.008**	**-0.959**	**-0.277**	**-0.098**	**-2.051**	**-1.048**	**-0.618**	**-1.200**	**-0.530**	**-0.286**
Min	**0.002**	**0.000**	**0.000**	**0.010**	**0.003**	**0.001**	**0.005**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.006**	**0.001**	**0.000**	**0.003**	**0.001**	**0.001**	**-3.521**	**-1.303**	**-0.607**	**-4.814**	**-3.259**	**-2.194**	**-3.631**	**-1.790**	**-1.118**
Max	**0.156**	**0.046**	**0.019**	**0.387**	**0.153**	**0.081**	**0.240**	**0.084**	**0.042**	**0.121**	**0.033**	**0.013**	**0.340**	**0.120**	**0.059**	**0.204**	**0.066**	**0.030**	**0.004**	**0.048**	**0.053**	**0.064**	**-0.100**	**-0.068**	**-0.100**	**-0.022**	**0.005**

Source: Own calculations using ENIGH household surveys for 1992 and 2002.

a) 'Y61' means P=0.6 and F=1 from formula 2.5 $(A+PK)^F$. 'Y44' means P=0.4 and F=0.4.

b) The first two concepts are per capita net income and consumption, which are the official definitions where the cost of a child is the same of an adult and there are no economies of scale.

c) The third and fourth concepts are our preferred income and consumption definitions, where the cost of a child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

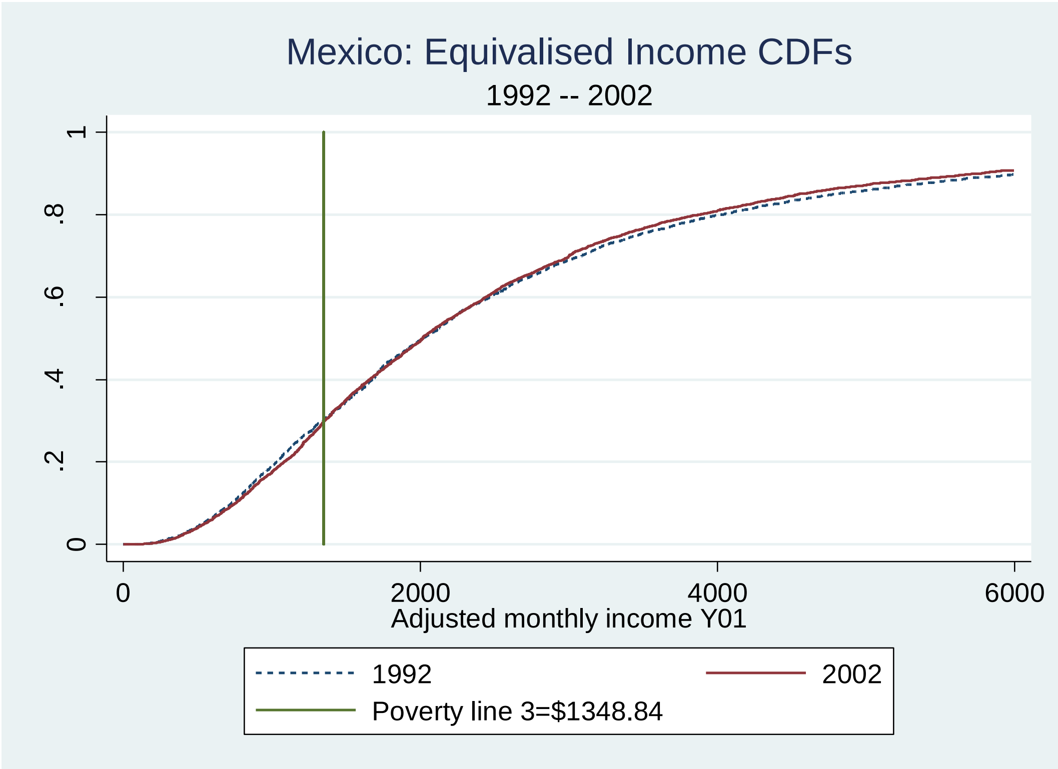
d) 'Y771' is the adjustment recommended by the Mexican literature, with the cost of a child being 77% of an adult, and no adjustment for household size. That is, P=0.77 and F=1.

e) All the adjustments from Y02 onwards have as base ict2, which is Total household current income, which is the same as our preferred definition, but in household terms, not per capita.

f) ictpc2 and Y11 represent per capita income or the extreme adjustment where the cost of an additional child is the same of an adult and there are no economies of scale. That is, P=1 and F=1.

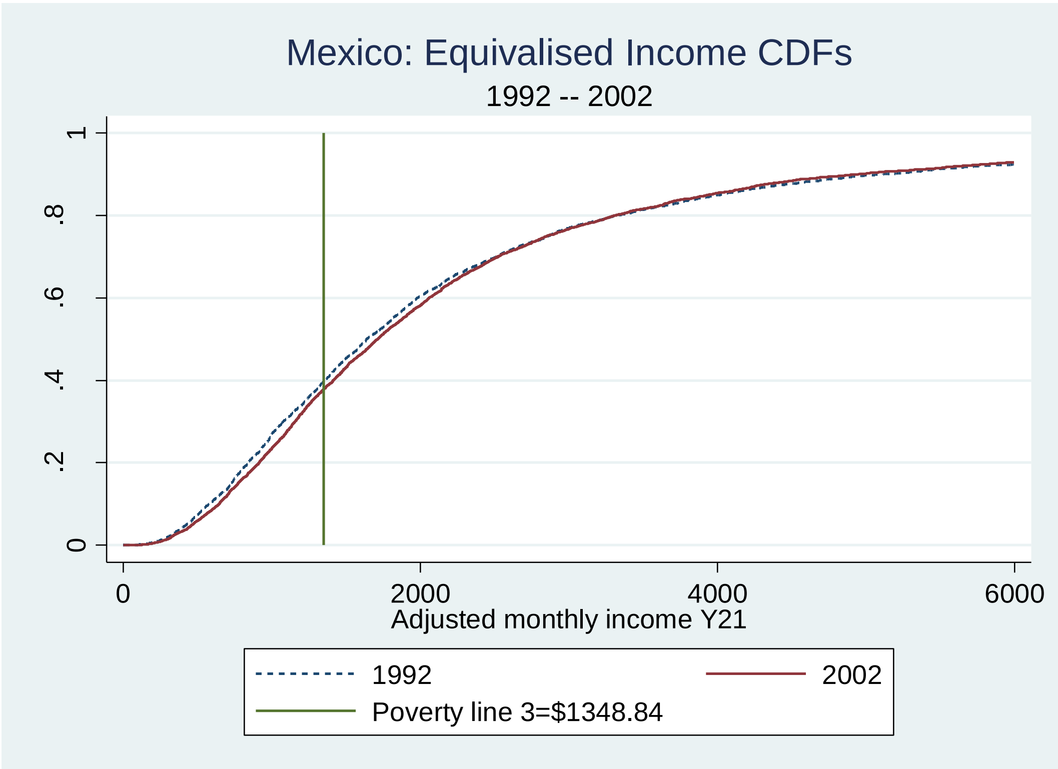
g) The results with a shade refer to changes in the direction of the change with respect with the rest of the results.As we can observe, the most sensitive are the results for urban areas.

Figure A4.1. Mexico: Cumulative Distribution Functions for Equivalised Income, 1992 and 2002.



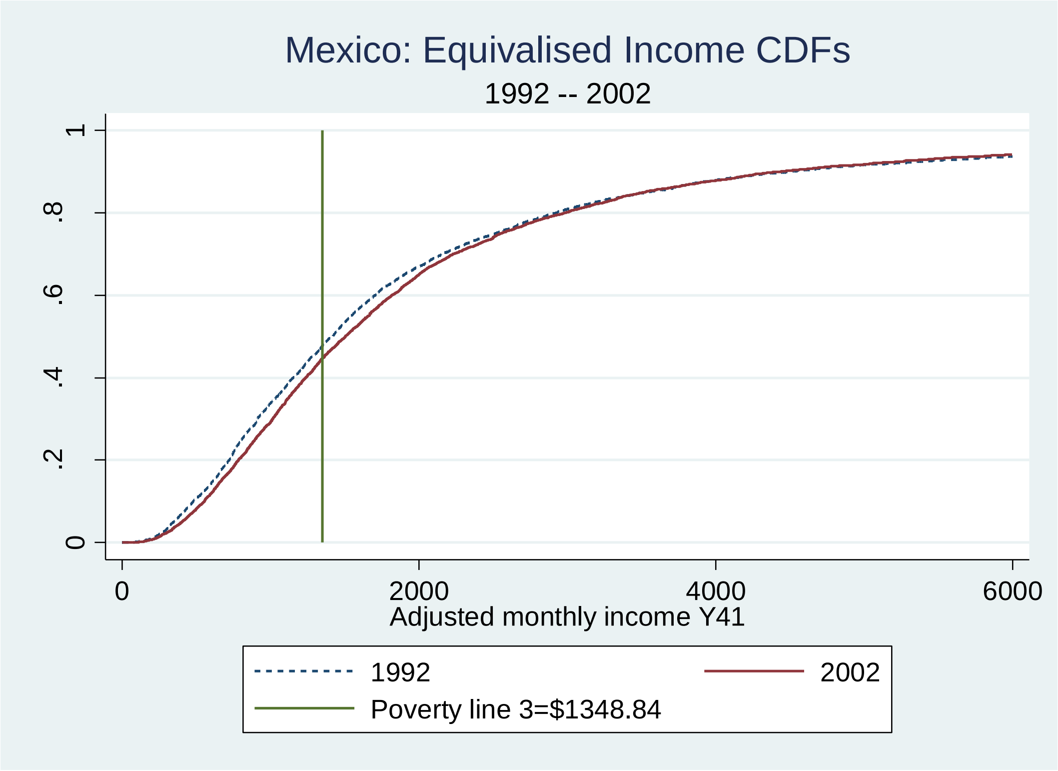
Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.

Figure A4.2. Mexico: Cumulative Distribution Functions for Equivalised income Y21, 1992 and 2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.

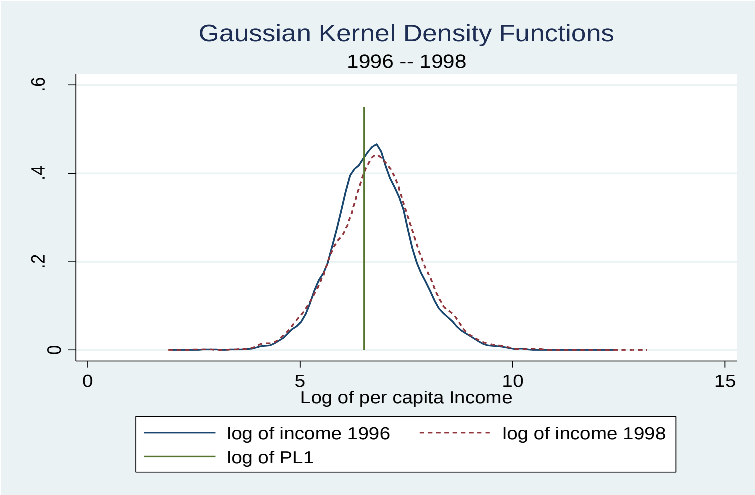
Figure A4.3. Mexico: Cumulative Distribution Functions for Equivalised income Y41, 1992 and 2002.



Source: Own calculations with data from the ENIGH household surveys 1992 and 2002.

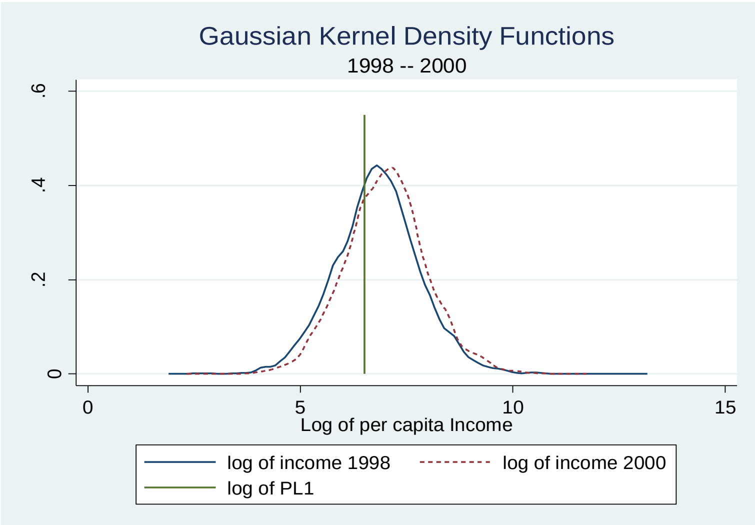
ANNEX CHAPTER 5

Figure A5.1.Gaussian Kernel Density Functions, 1996-1998.



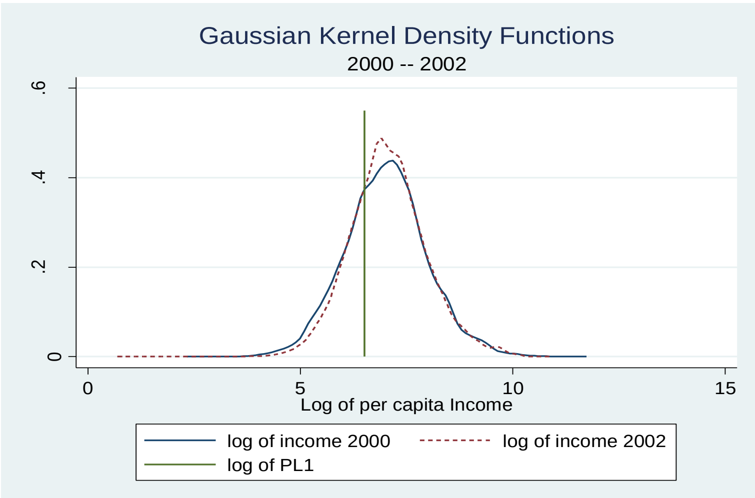
Source: Own calculations with data from 1996 and 1998 ENIGH household surveys.

Figure A5.2.Gaussian Kernel Density Functions, 1998-2000.



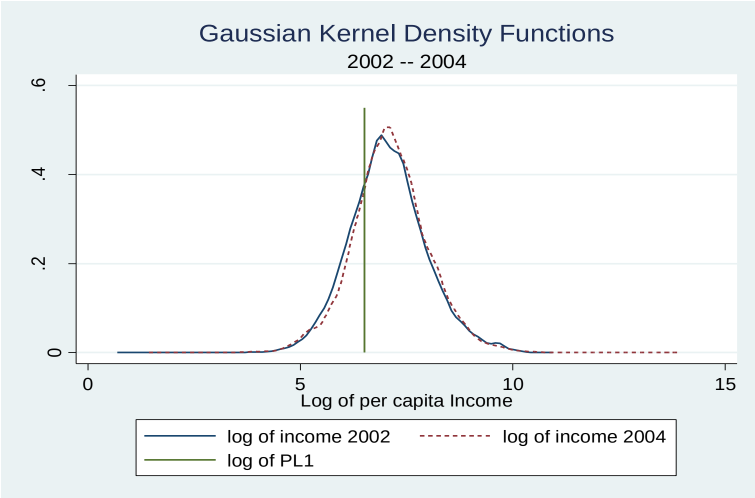
Source: Own calculations with data from 1998 and 2000 ENIGH household surveys.

Figure A5.3.Gaussian Kernel Density Functions, 2000-2002.



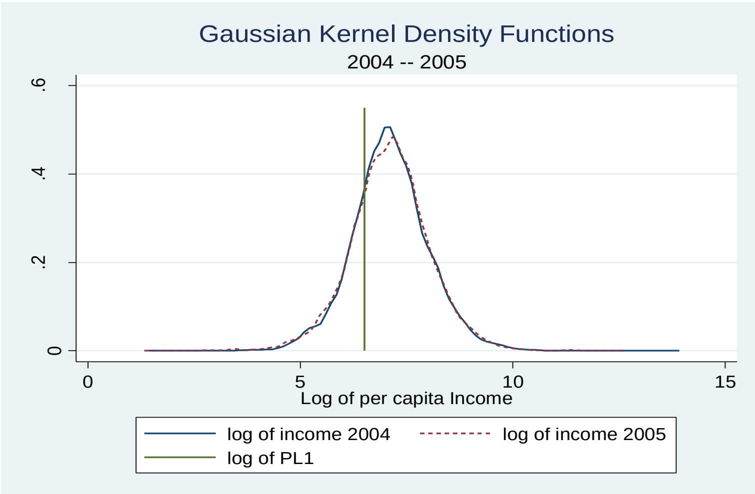
Source: Own calculations with data from 2000 and 2002 ENIGH household surveys.

Figure A5.4.Gaussian Kernel Density Functions, 2002-2004.



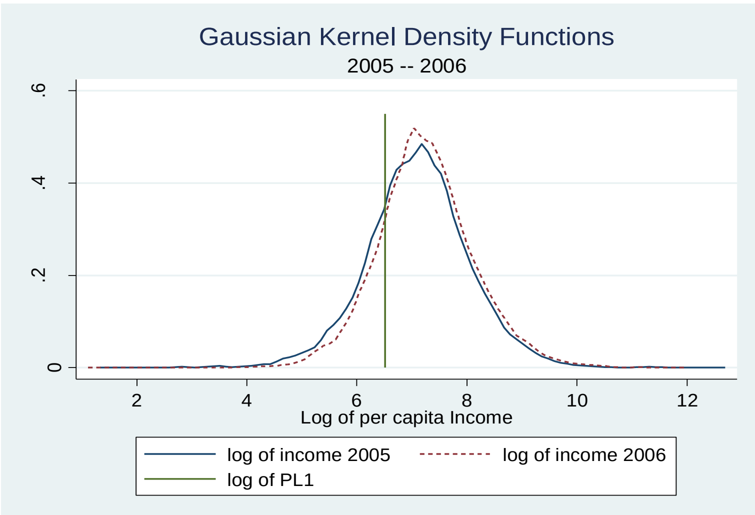
Source: Own calculations with data from 2002 and 2004 ENIGH household surveys.

Figure A5.5.Gaussian Kernel Density Functions, 2004-2005.



Source: Own calculations with data from 2004 and 2005 ENIGH household surveys.

Figure A5.6.Gaussian Kernel Density Functions, 2005-2006.



Source: Own calculations with data from 2005 and 2006 ENIGH household surveys.

Table A.5.1.

Mexico: Distributional summary statistics, 10 quantile groups
1992-2006

Quantile group	Quantile	% of median	Income Share, %	L(p), %	GL(p)	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change
1992									
1	319.3	32.1	1.3	1.3	21.7	5.7	0.2	**-16.3**	9.2
2	489.5	49.2	2.4	3.6	62.2	0.1	4.1	**-12.1**	6.2
3	639.6	64.3	3.3	6.9	118.6	**-2.2**	4.8	**-5.8**	3.3
4	797.2	80.1	4.1	11.0	189.9	**-0.9**	4.3	**-1.6**	0.8
5	994.8	100.0	5.2	16.2	278.9	0.0	4.9	**-1.6**	2.0
6	1,259.0	126.6	6.5	22.7	390.5	**-0.4**	3.1	0.3	2.9
7	1,633.3	164.2	8.3	31.0	532.7	**-0.6**	2.3	1.0	2.2
8	2,226.5	223.8	11.1	42.0	723.2	**-2.6**	1.8	1.0	0.3
9	3,494.5	351.3	16.1	58.1	999.8	**-2.3**	**-0.3**	2.7	0.0
10			41.9	100.0	1,721.0	1.8	**-2.9**	0.6	**-2.1**
						2000-2002 % change	**2002-2004 % change**	**2004-2005 % change**	**2005-2006 % change**
1994									
1	346.3	33.0	1.3	1.3	24.2	20.5	**-1.2**	**-10.5**	18.6
2	506.7	48.3	2.4	3.7	67.0	13.8	4.8	**-6.2**	8.8
3	661.1	63.0	3.2	6.9	125.2	8.8	4.2	**-4.5**	5.6
4	835.3	79.6	4.1	11.0	199.7	7.6	1.6	**-3.1**	4.2
5	1,049.3	100.0	5.2	16.2	293.6	3.3	1.8	**-1.3**	0.4
6	1,305.2	124.4	6.5	22.6	410.8	1.6	**-0.4**	**-0.2**	0.5
7	1,693.3	161.4	8.2	30.8	559.9	0.6	**-0.6**	**-0.2**	**-0.8**
8	2,288.9	218.1	10.8	41.6	755.6	1.0	**-1.1**	**-0.5**	**-0.4**
9	3,660.1	348.8	15.7	57.3	1,040.6	0.0	**-0.7**	**-1.8**	0.3
10			42.7	100.0	1,815.2	**-4.0**	**-0.3**	2.7	**-2.1**
1996									
1	267.8	32.3	1.3	1.3	18.4				
2	401.7	48.5	2.5	3.8	52.3				
3	519.1	62.7	3.4	7.1	98.6				
4	666.5	80.5	4.3	11.4	157.8				
5	828.0	100.0	5.4	16.9	232.7				
6	1,016.1	122.7	6.7	23.5	324.6				
7	1,307.8	158.0	8.4	31.9	440.6				
8	1,746.0	210.9	11.0	42.9	592.1				
9	2,768.8	334.4	15.7	58.6	808.1				
10			41.4	100.0	1,380.1				
1998									
1	259.8	28.4	1.1	1.1	17.1				
2	403.8	44.2	2.2	3.3	50.2				
3	566.3	62.0	3.2	6.4	98.7				
4	725.9	79.4	4.2	10.7	163.4				
5	913.7	100.0	5.3	16.0	245.3				
6	1,151.7	126.1	6.7	22.7	347.8				
7	1,462.8	160.1	8.5	31.2	477.9				
8	1,998.0	218.7	11.1	42.3	647.9				
9	3,117.2	341.2	16.1	58.3	894.3				
10			41.7	100.0	1,533.4				
2000									
1	326.4	29.0	1.2	1.2	22.3				
2	509.7	45.3	2.3	3.5	64.0				
3	677.3	60.2	3.3	6.8	123.6				
4	884.4	78.6	4.3	11.0	201.2				
5	1,125.8	100.0	5.4	16.5	300.6				
6	1,395.2	123.9	6.9	23.4	426.0				
7	1,776.3	157.8	8.7	32.0	584.1				
8	2,358.5	209.5	11.1	43.1	787.1				
9	3,801.1	337.6	16.1	59.2	1,080.2				
10			40.8	100.0	1,824.2				
2002									
1	380.1	33.7	1.5	1.5	26.6				
2	555.0	49.2	2.6	4.1	73.6				
3	732.5	65.0	3.6	7.6	137.9				
4	914.6	81.1	4.6	12.2	220.5				
5	1,127.0	100.0	5.6	17.8	322.2				
6	1,406.9	124.8	7.0	24.8	448.4				
7	1,762.4	156.4	8.7	33.5	605.9				
8	2,366.5	210.0	11.2	44.8	808.9				
9	3,644.9	323.4	16.1	60.8	1,099.1				
10			39.2	100.0	1,806.6				
2004									
1	424.2	35.2	1.5	1.5	27.9				
2	613.9	51.0	2.7	4.2	80.3				
3	800.3	66.5	3.7	7.9	151.4				
4	995.8	82.7	4.7	12.5	240.7				
5	1,204.3	100.0	5.7	18.3	350.6				
6	1,486.1	123.4	7.0	25.2	484.2				
7	1,860.1	154.5	8.7	33.9	650.5				
8	2,462.1	204.4	11.1	45.0	863.8				
9	3,822.2	317.4	16.0	61.0	1,170.1				
10			39.0	100.0	1,919.6				
2005									
1	396.6	32.1	1.3	1.3	25.5				
2	592.4	47.9	2.6	3.9	75.8				
3	789.1	63.8	3.5	7.4	145.2				
4	986.3	79.8	4.5	11.9	233.7				
5	1,236.6	100.0	5.7	17.6	344.7				
6	1,504.3	121.6	6.9	24.5	481.0				
7	1,899.1	153.6	8.7	33.2	650.9				
8	2,521.3	203.9	11.1	44.2	868.0				
9	3,842.5	310.7	15.7	59.9	1,175.8				
10			40.1	100.0	1,963.3				
2006									
1	486.1	35.7	1.5	1.5	33.4				
2	708.1	52.1	2.8	4.3	93.7				
3	912.9	67.1	3.7	8.1	174.7				
4	1,120.1	82.3	4.7	12.8	276.4				
5	1,360.4	100.0	5.7	18.4	399.5				
6	1,664.2	122.3	7.0	25.4	550.6				
7	2,080.0	152.9	8.6	34.0	736.5				
8	2,762.9	203.1	11.0	45.0	975.2				
9	4,312.5	317.0	15.7	60.7	1,316.0				
10			39.3	100.0	2,166.6				

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita income (ictpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(ictpc2)

Table A5.2.

Mexico: Distributional summary statistics, 10 quantile groups -- urban areas
1992-2006

Quantile group	Quantile	% of median	Income Share, %	L(p), %	GL(p)	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change
1992									
1	543.5	39.2	1.7	1.7	40.2	**-4.1**	**-0.6**	0.2	8.9
2	740.9	53.4	2.8	4.6	105.4	0.8	0.3	4.1	3.4
3	920.5	66.4	3.6	8.2	188.5	0.1	2.4	1.7	5.2
4	1,153.5	83.2	4.5	12.7	292.2	1.1	3.2	0.2	6.0
5	1,386.6	100.0	5.5	18.2	419.4	2.5	3.3	0.4	4.8
6	1,743.3	125.7	6.8	25.0	575.5	3.6	4.4	0.1	3.3
7	2,233.6	161.1	8.6	33.6	773.7	6.1	3.6	0.6	1.4
8	3,013.9	217.4	11.3	44.9	1,033.3	5.8	**-0.1**	2.8	0.5
9	4,656.4	335.8	16.1	61.1	1,404.5	2.9	**-1.1**	0.7	**-0.1**
10			38.9	100.0	2,300.4	**-4.8**	**-2.0**	**-1.7**	**-3.5**
						2000-2002 % change	**2002-2004 % change**	**2004-2005 % change**	**2005-2006 % change**
1994									
1	593.4	40.5	1.8	1.8	44.9	3.5	**-4.3**	0.6	5.6
2	797.7	54.5	2.8	4.6	114.3	6.8	**-3.9**	0.1	2.4
3	985.5	67.3	3.6	8.2	203.4	4.0	**-2.5**	**-0.1**	1.0
4	1,211.4	82.7	4.5	12.7	313.3	1.6	**-1.2**	0.4	**-0.3**
5	1,464.4	100.0	5.4	18.1	446.4	3.5	**-3.8**	0.4	0.3
6	1,779.6	121.5	6.5	24.6	608.0	1.7	**-1.6**	**-0.4**	0.0
7	2,252.7	153.8	8.1	32.8	808.5	2.4	**-2.7**	0.0	0.9
8	3,089.7	211.0	10.7	43.4	1,071.5	0.9	**-0.7**	**-1.2**	1.8
9	5,047.0	344.6	15.7	59.1	1,458.4	1.3	**-1.5**	**-2.3**	3.2
10			40.9	100.0	2,467.3	**-3.5**	3.5	1.2	**-2.6**
1996									
1	436.9	39.2	1.8	1.8	32.7				
2	587.0	52.6	2.8	4.6	83.7				
3	748.0	67.0	3.7	8.3	150.6				
4	915.1	82.0	4.6	12.9	233.7				
5	1,115.9	100.0	5.6	18.5	334.4				
6	1,363.5	122.2	6.8	25.3	458.1				
7	1,696.6	152.0	8.4	33.8	610.3				
8	2,232.9	200.1	10.7	44.4	802.9				
9	3,570.8	320.0	15.5	59.9	1,083.5				
10			40.1	100.0	1,808.1				
1998									
1	503.5	40.4	1.8	1.8	36.7				
2	675.3	54.2	2.9	4.8	96.0				
3	845.0	67.8	3.8	8.5	172.0				
4	1,019.4	81.8	4.6	13.1	265.1				
5	1,245.7	100.0	5.6	18.7	378.2				
6	1,525.0	122.4	6.8	25.6	516.5				
7	1,930.4	155.0	8.5	34.0	687.7				
8	2,559.7	205.5	11.0	45.0	909.1				
9	3,918.0	314.5	15.6	60.6	1,224.9				
10			39.4	100.0	2,021.3				
2000									
1	609.8	40.4	2.0	2.0	46.4				
2	821.5	54.5	3.0	5.0	117.7				
3	1,028.5	68.2	4.0	9.0	210.5				
4	1,254.9	83.2	4.9	13.9	325.2				
5	1,508.0	100.0	5.9	19.7	462.9				
6	1,813.7	120.3	7.1	26.8	628.9				
7	2,224.3	147.5	8.6	35.4	830.6				
8	3,003.1	199.1	11.0	46.4	1,089.1				
9	4,622.2	306.5	15.6	62.0	1,455.6				
10			38.0	100.0	2,348.1				
2002									
1	628.5	41.8	2.0	2.0	46.5				
2	846.2	56.3	3.2	5.3	120.3				
3	1,023.5	68.1	4.1	9.4	213.8				
4	1,249.1	83.1	5.0	14.4	326.7				
5	1,503.9	100.0	6.1	20.4	464.8				
6	1,786.0	118.8	7.2	27.6	628.5				
7	2,228.9	148.2	8.8	36.4	828.5				
8	2,937.2	195.3	11.1	47.5	1,081.3				
9	4,438.7	295.1	15.8	63.3	1,440.8				
10			36.7	100.0	2,274.8				
2004									
1	624.0	41.1	2.0	2.0	46.5				
2	844.7	55.6	3.1	5.1	120.5				
3	1,060.9	69.9	4.0	9.1	215.6				
4	1,269.6	83.6	4.9	14.0	332.1				
5	1,518.0	100.0	5.8	19.8	470.7				
6	1,841.6	121.3	7.1	26.9	638.8				
7	2,268.4	149.4	8.6	35.5	842.0				
8	3,046.8	200.7	11.0	46.5	1,104.0				
9	4,619.6	304.3	15.6	62.1	1,473.8				
10			37.9	100.0	2,374.4				
2005									
1	663.5	41.7	2.0	2.0	49.0				
2	883.3	55.5	3.1	5.1	126.6				
3	1,105.8	69.4	4.0	9.1	226.2				
4	1,335.9	83.9	4.9	14.0	348.7				
5	1,592.4	100.0	5.9	19.9	494.5				
6	1,922.5	120.7	7.1	26.9	670.0				
7	2,364.4	148.5	8.6	35.5	883.0				
8	3,120.5	196.0	10.9	46.4	1,154.4				
9	4,679.2	293.8	15.2	61.6	1,533.0				
10			38.4	100.0	2,488.3				
2006									
1	747.4	43.3	2.1	2.1	56.0				
2	980.7	56.8	3.2	5.3	142.1				
3	1,196.7	69.3	4.0	9.3	250.9				
4	1,454.0	84.1	4.9	14.2	383.2				
5	1,727.9	100.0	5.9	20.1	541.6				
6	2,089.2	120.9	7.1	27.2	731.7				
7	2,602.8	150.6	8.6	35.8	964.3				
8	3,473.2	201.0	11.1	46.9	1,263.4				
9	5,256.4	304.2	15.7	62.6	1,686.5				
10			37.4	100.0	2,694.3				

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita income (ictpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(ictpc2)

Table A5.3.

Mexico: Distributional summary statistics, 10 quantile groups -- rural areas
1992-2006

Quantile group	Quantile	% of median	Income Share, %	L(p), %	GL(p)	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change
1992									
1	208.8	34.2	1.7	1.7	15.5	**-10.9**	**-13.1**	**-17.4**	8.0
2	305.5	50.0	2.9	4.7	41.3	**-5.4**	**-3.7**	**-17.4**	3.1
3	402.8	66.0	4.0	8.7	77.0	**-2.1**	**-3.3**	**-14.9**	0.9
4	509.4	83.4	5.1	13.8	122.5	**-1.9**	**-3.8**	**-14.6**	0.2
5	610.7	100.0	6.4	20.3	179.6	5.2	0.9	**-11.6**	**-1.5**
6	728.4	119.3	7.3	27.6	244.7	**-2.2**	0.6	**-7.1**	**-4.7**
7	888.4	145.5	9.1	36.7	325.6	**-0.9**	1.2	**-3.6**	**-4.8**
8	1,141.2	186.9	11.4	48.1	426.5	**-5.3**	**-1.5**	**-0.5**	**-8.5**
9	1,719.9	281.7	15.8	63.9	566.6	**-5.2**	**-3.9**	2.5	**-3.3**
10			36.1	100.0	886.6	5.9	3.9	9.6	5.6
						2000-2002 % change	**2002-2004 % change**	**2004-2005 % change**	**2005-2006 % change**
1994									
1	232.3	37.2	2.0	2.0	18.0	16.4	**-11.7**	**-5.8**	20.6
2	330.2	52.8	3.1	5.0	46.3	16.3	0.0	**-3.4**	10.0
3	426.5	68.2	4.1	9.1	84.0	15.1	2.2	**-3.4**	5.8
4	511.4	81.8	5.2	14.4	132.1	9.7	7.8	**-2.2**	5.1
5	625.4	100.0	6.1	20.5	188.3	8.0	7.9	**-3.6**	4.1
6	752.0	120.2	7.5	28.0	257.4	5.0	6.2	**-0.6**	4.9
7	946.3	151.3	9.2	37.2	342.0	2.0	5.4	**-1.2**	0.7
8	1,266.1	202.5	12.0	49.3	452.5	1.4	4.7	0.9	**-2.6**
9	1,895.6	303.1	16.7	65.9	605.6	**-5.3**	6.5	**-0.4**	**-3.9**
10			34.1	100.0	918.7	**-4.5**	**-7.9**	2.1	**-2.2**
1996									
1	186.2	36.2	1.7	1.7	12.9				
2	262.3	50.9	3.0	4.7	35.5				
3	342.7	66.5	4.0	8.6	65.7				
4	426.0	82.7	5.0	13.7	104.0				
5	515.1	100.0	6.2	19.9	150.9				
6	634.9	123.3	7.6	27.4	208.4				
7	793.0	154.0	9.3	36.7	279.3				
8	1,003.5	194.8	11.8	48.6	369.4				
9	1,538.1	298.6	16.0	64.6	491.2				
10			35.4	100.0	760.3				
1998									
1	164.6	32.0	1.4	1.4	11.6				
2	239.7	46.6	2.5	3.9	31.9				
3	314.7	61.2	3.4	7.2	59.9				
4	398.4	77.4	4.3	11.5	95.4				
5	514.5	100.0	5.5	17.0	140.6				
6	660.3	128.3	7.0	24.0	198.7				
7	842.7	163.8	9.0	33.0	273.0				
8	1,133.7	220.4	11.8	44.8	370.5				
9	1,668.4	324.3	16.4	61.2	506.3				
10			38.8	100.0	827.2				
2000									
1	206.4	34.1	1.5	1.5	15.2				
2	294.5	48.7	2.5	4.0	40.6				
3	387.4	64.0	3.4	7.5	74.8				
4	479.0	79.2	4.3	11.8	117.9				
5	604.9	100.0	5.4	17.1	171.9				
6	738.9	122.2	6.7	23.8	239.0				
7	941.4	155.6	8.6	32.4	324.8				
8	1,286.3	212.6	10.8	43.2	432.9				
9	2,021.8	334.2	15.9	59.1	592.1				
10			40.9	100.0	1,002.6				
2002									
1	260.7	38.3	1.8	1.8	19.0				
2	361.8	53.2	2.9	4.7	50.6				
3	465.9	68.5	3.9	8.6	92.8				
4	564.2	83.0	4.7	13.4	143.6				
5	680.1	100.0	5.8	19.2	206.0				
6	835.7	122.9	7.0	26.2	281.6				
7	1,033.4	152.0	8.7	34.9	375.4				
8	1,332.4	195.9	10.9	45.9	492.9				
9	2,070.4	304.4	15.0	60.9	654.6				
10			39.1	100.0	1,074.9				
2004									
1	272.5	34.3	1.6	1.6	18.1				
2	405.9	51.2	2.9	4.5	52.3				
3	526.2	66.3	4.0	8.5	98.8				
4	657.6	82.9	5.1	13.6	157.9				
5	793.4	100.0	6.3	19.9	230.7				
6	963.2	121.4	7.5	27.3	317.3				
7	1,166.1	147.0	9.2	36.5	424.1				
8	1,546.6	194.9	11.4	48.0	557.0				
9	2,239.4	282.3	16.0	64.0	742.9				
10			36.0	100.0	1,160.9				
2005									
1	237.7	32.9	1.5	1.5	15.8				
2	362.7	50.1	2.8	4.3	46.3				
3	479.1	66.2	3.9	8.2	87.9				
4	584.7	80.8	5.0	13.2	141.3				
5	723.6	100.0	6.0	19.2	206.1				
6	877.2	121.2	7.4	26.6	285.8				
7	1,095.4	151.4	9.1	35.7	383.3				
8	1,427.0	197.2	11.6	47.3	507.3				
9	2,078.9	287.3	16.0	63.2	678.6				
10			36.8	100.0	1,073.2				
2006									
1	319.2	36.5	1.8	1.8	22.3				
2	448.1	51.2	3.1	4.9	61.6				
3	587.6	67.1	4.1	9.0	113.2				
4	722.0	82.5	5.2	14.2	179.1				
5	875.5	100.0	6.3	20.5	258.3				
6	1,047.6	119.7	7.8	28.3	356.2				
7	1,259.1	143.8	9.2	37.5	471.4				
8	1,627.6	185.9	11.3	48.7	613.1				
9	2,295.5	262.2	15.3	64.0	805.9				
10			36.0	100.0	1,258.3				

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita income (ictpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(ictpc2)

Table A5.4.

Mexico: Distributional summary statistics, 10 quantile groups using per capita consumption
1992-2006

Quantile group	Quantile	% of median	Income Share, %	L(p), %	GL(p)	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change
1992									
1	313.5	33.9	1.5	1.5	22.2	**-10.0**	**-4.9**	**-12.5**	3.3
2	458.6	49.6	2.6	4.1	61.1	**-3.8**	3.0	**-6.7**	0.5
3	603.2	65.2	3.5	7.6	114.2	**-2.1**	3.9	**-3.9**	**-1.8**
4	746.9	80.7	4.5	12.1	182.0	**-0.8**	2.7	**-0.7**	**-2.8**
5	925.0	100.0	5.5	17.7	265.1	**-1.4**	4.4	**-2.3**	**-0.7**
6	1143.9	123.7	6.9	24.5	368.3	0.1	4.1	0.3	**-3.1**
7	1472.9	159.2	8.6	33.1	497.1	1.2	4.0	2.5	**-4.3**
8	1972.9	213.3	11.3	44.4	666.7	2.7	2.0	2.3	**-2.4**
9	3074.9	332.4	16.3	60.8	911.8	2.3	**-0.4**	1.4	**-3.6**
10			39.2	100.0	1500.3	**-0.8**	**-3.3**	**-0.1**	4.3
						2000-2002 % change	**2002-2004 % change**	**2004-2005 % change**	**2005-2006 % change**
1994									
1	340.6	36.3	1.6	1.6	24.9	17.8	**-1.4**	**-4.7**	12.7
2	479.9	51.2	2.7	4.3	65.6	9.3	4.6	**-6.2**	6.6
3	614.3	65.5	3.6	8.0	120.3	6.6	6.9	**-7.3**	5.2
4	766.1	81.7	4.6	12.5	189.3	5.1	6.7	**-6.7**	2.0
5	938.0	100.0	5.6	18.1	274.3	1.8	7.1	**-7.3**	1.7
6	1142.9	121.8	6.9	25.0	378.2	1.0	6.2	**-6.4**	1.5
7	1443.3	153.9	8.5	33.5	506.5	**-0.5**	5.2	**-4.5**	0.6
8	1938.5	206.7	11.0	44.5	673.0	**-0.6**	2.3	**-3.2**	0.2
9	3083.8	328.8	16.0	60.5	914.5	0.9	0.4	**-1.5**	0.8
10			39.5	100.0	1512.6	**-2.9**	**-6.0**	7.8	**-2.7**
1996									
1	281.6	35.1	1.6	1.6	19.3				
2	404.4	50.4	2.8	4.3	53.5				
3	519.0	64.6	3.8	8.1	99.8				
4	647.1	80.6	4.7	12.8	157.6				
5	803.1	100.0	5.9	18.6	230.0				
6	973.0	121.2	7.2	25.8	318.1				
7	1210.8	150.8	8.8	34.6	427.0				
8	1599.0	199.1	11.2	45.8	565.4				
9	2430.7	302.7	15.9	61.7	761.6				
10			38.3	100.0	1233.4				
1998									
1	264.4	31.7	1.4	1.4	17.9				
2	408.7	49.1	2.6	4.0	51.7				
3	535.7	64.3	3.6	7.6	98.9				
4	675.7	81.1	4.7	12.2	159.7				
5	833.0	100.0	5.7	18.0	234.5				
6	1052.8	126.4	7.2	25.1	328.2				
7	1308.9	157.1	9.0	34.2	446.3				
8	1729.8	207.7	11.5	45.6	596.3				
9	2626.5	315.3	16.1	61.8	807.1				
10			38.2	100.0	1306.4				
2000									
1	328.0	32.9	1.4	1.4	22.4				
2	486.8	48.8	2.6	4.0	63.7				
3	641.7	64.3	3.5	7.6	119.9				
4	803.4	80.5	4.5	12.1	191.6				
5	997.7	100.0	5.7	17.8	281.8				
6	1218.0	122.1	6.9	24.7	392.0				
7	1534.6	153.8	8.7	33.4	529.2				
8	2030.9	203.6	11.2	44.6	706.9				
9	3089.1	309.6	15.5	60.1	953.5				
10			39.9	100.0	1585.7				
2002									
1	366.6	36.3	1.7	1.7	26.3				
2	526.7	52.1	2.8	4.5	71.1				
3	668.7	66.2	3.8	8.3	130.8				
4	829.0	82.1	4.8	13.0	205.8				
5	1010.2	100.0	5.8	18.8	297.2				
6	1217.8	120.5	7.0	25.9	408.0				
7	1534.9	151.9	8.6	34.5	543.8				
8	2031.3	201.1	11.1	45.6	719.6				
9	3147.0	311.5	15.7	61.3	967.0				
10			38.7	100.0	1577.8				
2004									
1	470.8	35.5	1.6	1.6	32.2				
2	693.3	52.2	3.0	4.6	90.5				
3	887.8	66.9	4.0	8.7	169.7				
4	1099.5	82.8	5.1	13.7	269.2				
5	1327.9	100.0	6.2	19.9	391.0				
6	1605.6	120.9	7.5	27.4	537.1				
7	1969.1	148.3	9.1	36.5	714.7				
8	2575.3	193.9	11.4	47.8	938.0				
9	3789.8	285.4	15.7	63.6	1246.7				
10			36.4	100.0	1960.5				
2005									
1	372.1	35.8	1.6	1.6	25.7				
2	540.3	52.0	2.8	4.4	71.6				
3	698.1	67.2	3.7	8.1	133.2				
4	862.8	83.1	4.7	12.8	211.1				
5	1038.7	100.0	5.8	18.6	305.7				
6	1269.9	122.3	7.0	25.6	420.4				
7	1589.4	153.0	8.7	34.2	562.6				
8	2085.8	200.8	11.0	45.3	744.0				
9	3229.7	311.0	15.5	60.8	999.0				
10			39.2	100.0	1644.1				
2006									
1	463.0	38.4	1.8	1.8	33.2				
2	655.6	54.3	3.0	4.7	89.3				
3	820.5	68.0	3.9	8.7	163.5				
4	1002.7	83.1	4.8	13.5	254.6				
5	1207.1	100.0	5.8	19.4	364.7				
6	1473.5	122.1	7.1	26.4	498.2				
7	1831.0	151.7	8.7	35.2	662.2				
8	2405.4	199.3	11.1	46.2	870.5				
9	3712.0	307.5	15.6	61.8	1164.9				
10			38.2	100.0	1883.9				

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita consumption (gctpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(gctpc2)

Table A5.5.

Mexico: Distributional summary statistics, 10 quantile groups, % changes using per capita income, 1992-2006

Quantile group	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change	2000-2002 % change	2002-2004 % change	2004-2005 % change	2005-2006 % change
1	5.7	0.2	**-16.3**	9.2	20.5	**-1.2**	**-10.5**	18.6
2	0.1	4.1	**-12.1**	6.2	13.8	4.8	**-6.2**	8.8
3	**-2.2**	4.8	**-5.8**	3.3	8.8	4.2	**-4.5**	5.6
4	**-0.9**	4.3	**-1.6**	0.8	7.6	1.6	**-3.1**	4.2
5	0.0	4.9	**-1.6**	2.0	3.3	1.8	**-1.3**	0.4
6	**-0.4**	3.1	0.3	2.9	1.6	**-0.4**	**-0.2**	0.5
7	**-0.6**	2.3	1.0	2.2	0.6	**-0.6**	**-0.2**	**-0.8**
8	**-2.6**	1.8	1.0	0.3	1.0	**-1.1**	**-0.5**	**-0.4**
9	**-2.3**	**-0.3**	2.7	0.0	0.0	**-0.7**	**-1.8**	0.3
10	1.8	**-2.9**	0.6	**-2.1**	**-4.0**	**-0.3**	2.7	**-2.1**

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita income (ictpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(ictpc2)

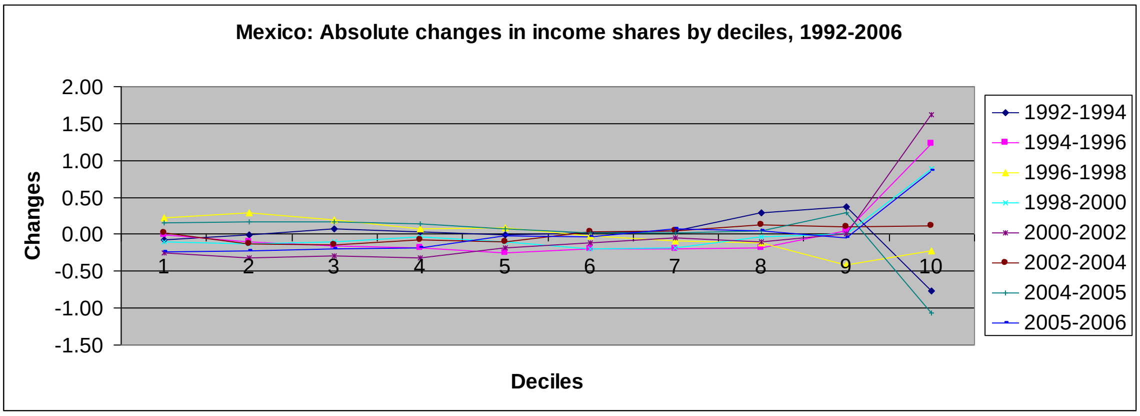
Table A5.6.

Mexico: Distributional summary statistics, 10 quantile groups, % changes using per capita consumption, 1992-2006

Quantile group	1992-1994 % change	1994-1996 % change	1996-1998 % change	1998-2000 % change	2000-2002 % change	2002-2004 % change	2004-2005 % change	2005-2006 % change
1	**-10.0**	**-4.9**	**-12.5**	3.3	17.8	**-1.4**	**-4.7**	12.7
2	**-3.8**	3.0	**-6.7**	0.5	9.3	4.6	**-6.2**	6.6
3	**-2.1**	3.9	**-3.9**	**-1.8**	6.6	6.9	**-7.3**	5.2
4	**-0.8**	2.7	**-0.7**	**-2.8**	5.1	6.7	**-6.7**	2.0
5	**-1.4**	4.4	**-2.3**	**-0.7**	1.8	7.1	**-7.3**	1.7
6	0.1	4.1	0.3	**-3.1**	1.0	6.2	**-6.4**	1.5
7	1.2	4.0	2.5	**-4.3**	**-0.5**	5.2	**-4.5**	0.6
8	2.7	2.0	2.3	**-2.4**	**-0.6**	2.3	**-3.2**	0.2
9	2.3	**-0.4**	1.4	**-3.6**	0.9	0.4	**-1.5**	0.8
10	**-0.8**	**-3.3**	**-0.1**	4.3	**-2.9**	**-6.0**	7.8	**-2.7**

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
Share = quantile group share of total per capita consumption (gctpc2)
L(p)=cumulative group share; GL(p)=L(p)*mean(gctpc2)

Figure A5.7.



Source: Author’s calculations with data from the ENIGH household surveys 1992-2006.

Table A5.7.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Gini Coefficient -- per capita income 1992 - 2006 (95% confidence)

Years	95% confidence Coefficient	BS Std Err.	Confidence interval		Significant 95%		
					1992-1994	1994-1996	1996-1998
1992	0.531	0.00705	0.517402	0.545022	no	no	no
1994	0.534	0.00617	0.521967	0.546135			
1996	0.522	0.00899	0.504127	0.539359			
1998	0.533	0.00747	0.518324	0.547600			
2000	0.522	0.00739	0.507911	0.536871	1998-2004	2004-2005	2005-2006
2002	0.498	0.00677	0.485224	0.511759	yes	no	no
2004	0.497	0.00510	0.486831	0.506834			
2005	0.509	0.00796	0.493562	0.524757			
2006	0.495	0.00510	0.484769	0.504758			

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
* The standard errors and confidence intervals were calculated using the bootstrapped technique with 100 replications.

Table A5.8.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Gini Coefficient -- per capita consumption 1992 - 2006 (95% confidence)

Years	95% confidence Coefficient	BS Std Err.	Confidence interval		Significant 95%		
					1992-1994	1994-1996	1996-1998
1992	0.503	0.00695	0.489364	0.516602	no	no	no
1994	0.498	0.00587	0.486943	0.509941			
1996	0.487	0.00608	0.475541	0.499392			
1998	0.493	0.00495	0.484933	0.504337			
2000	0.505	0.01581	0.473996	0.535972	1998-2004	2004-2005	2005-2006
2002	0.487	0.00859	0.470584	0.504237	yes	yes	no
2004	0.465	0.00386	0.458457	0.473581			
2005	0.493	0.00711	0.479019	0.506903			
2006	0.479	0.00519	0.468884	0.489213			

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
* The standard errors and confidence intervals were calculated using the bootstrapped technique with 100 replications.

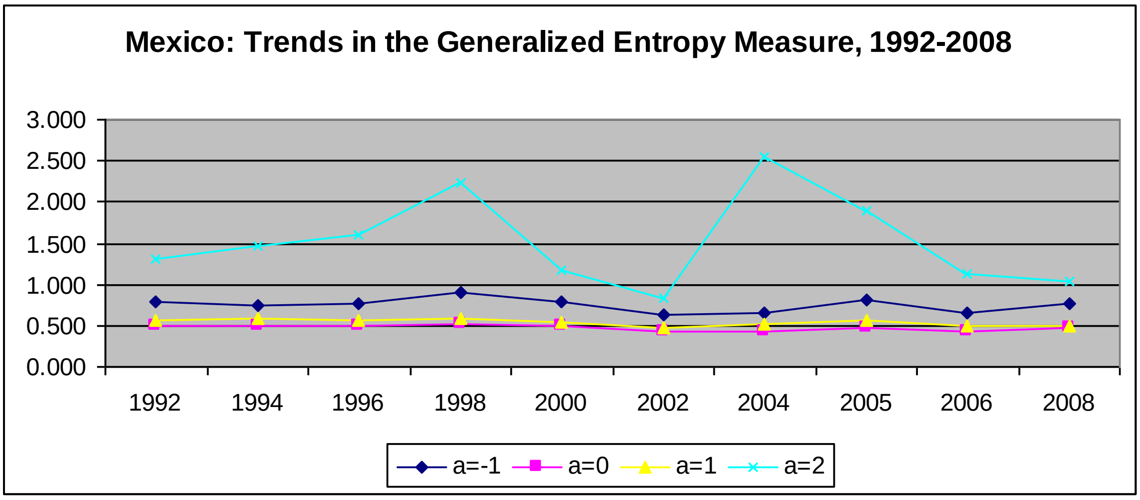
Table A5.9.

Mexico: Basic summary statistics by rural/urban areas, 1992-2006

	Urban pop.		Rural pop.	
Year	Pop. Share	Income share	Pop. Share	Income share
1992	59.0%	78.9%	41.0%	21.1%
1994	57.8%	78.6%	42.2%	21.4%
1996	59.2%	77.5%	40.8%	22.5%
1998	59.1%	78.0%	40.9%	22.0%
2000	61.1%	78.6%	38.9%	21.4%
2002	61.8%	77.4%	38.2%	22.6%
2004	62.5%	77.3%	37.5%	22.7%
2005	62.9%	79.7%	37.1%	20.3%
2006	63.2%	78.7%	36.8%	21.3%

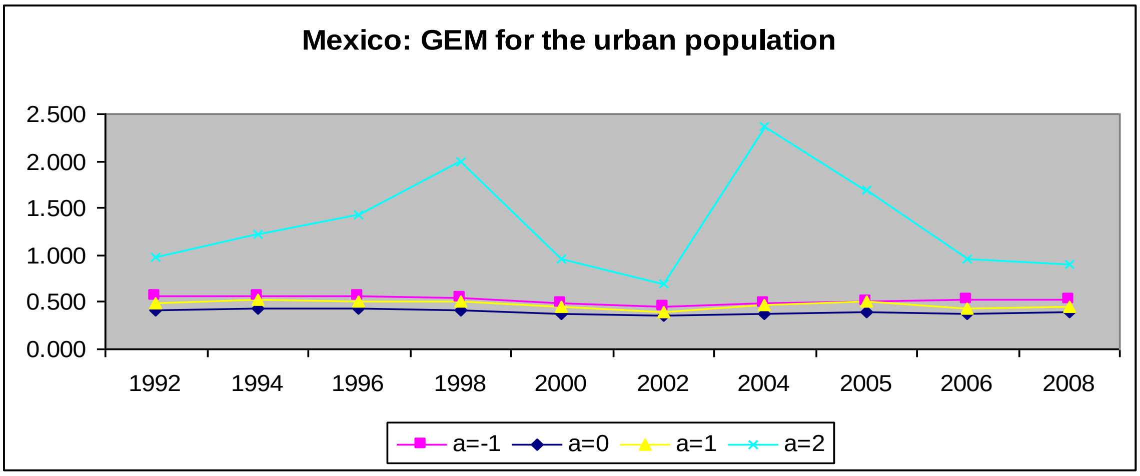
Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.

Figure A5.8.



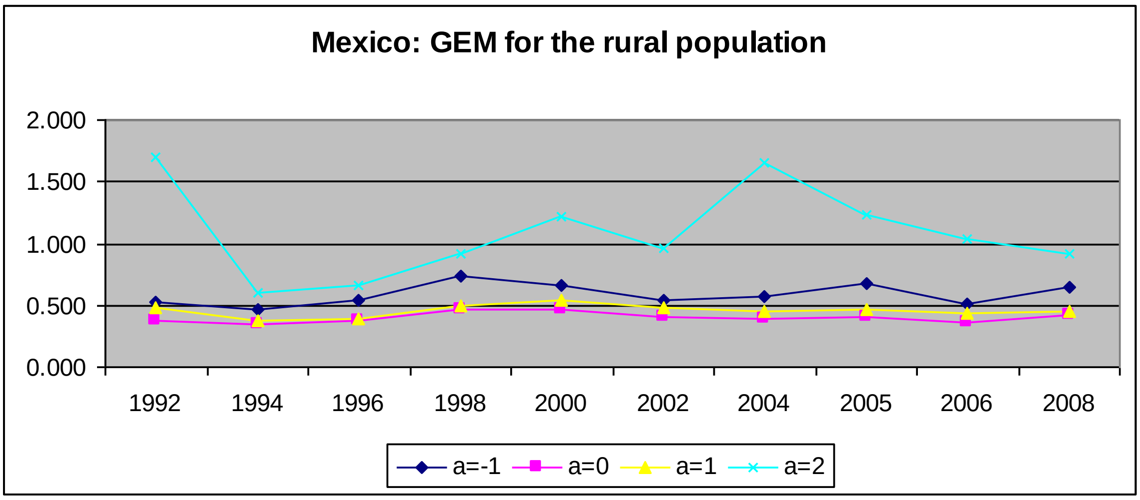
Source: Own calculations with data from the ENIGH household surveys, 1992-2008.

Figure A5.9.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Figure A5.10.



Source: Author's calculations with data from the ENIGH Household Surveys, 1992-2008.

Table A5.10.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the urban population 1992 - 2008 (95% confidence)

		95% confidence[1]				% change	
		Coefficient	**BS Std Err.**	**Confidence interval**		**Significant 95%**	**Significant 95%**
	1992					**1992-1996**	**1996-2002**
a=-1		0.560295	0.027205	0.506974	0.613616	no	yes
a=0		0.420189	0.014541	0.391688	0.448689	no	yes
a=1		0.481555	0.024605	0.433330	0.529778	no	yes**
a=2		0.985467	0.123763	0.742896	1.228038	no	no
	1994					**2002-2005**	**2005-2006**
a=-1		0.563381	0.027474	0.509532	0.617229	no	no
a=0		0.434562	0.016204	0.402802	0.466322	no	no
a=1		0.521919	0.028198	0.466653	0.577186	yes**	no
a=2		1.219997	0.224421	0.780141	1.659854	yes	no
	1996					**2006-2008**	
a=-1		0.567028	0.028430	0.511306	0.622749	no	
a=0		0.423661	0.017960	0.388461	0.458862	no	
a=1		0.515803	0.047655	0.422400	0.609205	no	
a=2		1.431483	0.445781	0.557768	2.305198	no	
	1998						
a=-1		0.550073	0.025382	0.500324	0.599821		
a=0		0.415609	0.016971	0.382347	0.448871		
a=1		0.514043	0.040128	0.435393	0.592693		
a=2		1.993555	0.951707	0.128243	3.858867		
	2002						
a=-1		0.456931	0.020821	0.416123	0.497739		
a=0		0.357770	0.011083	0.336048	0.379492		
a=1		0.404132	0.016024	0.372725	0.435540		
a=2		0.686499	0.037990	0.612040	0.760959		
	2005						
a=-1		0.507349	0.028062	0.452349	0.562349		
a=0		0.388033	0.018574	0.351629	0.424438		
a=1		0.502331	0.037352	0.429123	0.575540		
a=2		1.687354	0.388135	0.926624	2.448084		
	2006						
a=-1		0.520371	0.050600	0.421197	0.619544		
a=0		0.369661	0.010319	0.349437	0.389886		
a=1		0.441676	0.016013	0.410290	0.473061		
a=2		0.963035	0.106439	0.754418	1.171652		
	2008						
a=-1		0.529397	0.012483	0.504931	0.553862		
a=0		0.388086	0.006604	0.375143	0.401030		
a=1		0.445446	0.012805	0.420349	0.470542		
a=2		0.894787	0.054534	0.787903	1.001672		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005, 2006 and 2008.
1) Bootstrapped with 100 replications.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
** means statistically significant at the 90% level.

Table A5.11.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the rural population 1992 - 2008 (95% confidence)

		95% confidence[1]				% change	
		Coefficient	BS Std Err.	Confidence interval		Significant 95%	Significant 95%
	1992					**1992-1994**	**1994-2000**
a=-1		0.527428	0.042474	0.444180	0.610676	no	yes
a=0		0.382466	0.034067	0.315697	0.449236	no	yes
a=1		0.481894	0.095457	0.294802	0.668987	no	yes
a=2		1.695165	0.700945	0.321338	3.068992	no	yes
	1994					**2000-2004**	**2004-2005**
a=-1		0.466542	0.018724	0.429844	0.503241	no	no
a=0		0.345743	0.013150	0.319969	0.371516	no	no
a=1		0.370075	0.012153	0.346255	0.393896	no	no
a=2		0.599075	0.046427	0.508081	0.690070	no	no
	1996					**2005-2006**	**2006-2008**
a=-1		0.548128	0.026237	0.496704	0.599552	yes	yes
a=0		0.372261	0.011048	0.350607	0.393915	no	yes**
a=1		0.396186	0.013209	0.370297	0.422076	no	no
a=2		0.665207	0.035786	0.595068	0.735346	no	no
	1998						
a=-1		0.744071	0.057298	0.631769	0.856373		
a=0		0.459619	0.020881	0.418693	0.500545		
a=1		0.490120	0.031367	0.428642	0.551599		
a=2		0.910779	0.085415	0.743369	1.078188		
	2000						
a=-1		0.667994	0.054176	0.561811	0.774178		
a=0		0.466505	0.036851	0.394279	0.538731		
a=1		0.538201	0.047550	0.445005	0.631398		
a=2		1.218086	0.206371	0.813606	1.622566		
	2002						
a=-1		0.538546	0.052015	0.436598	0.640494		
a=0		0.404774	0.033648	0.338826	0.470723		
a=1		0.476233	0.056372	0.365746	0.586720		
a=2		0.959546	0.196906	0.573617	1.345475		
	2004						
a=-1		0.568181	0.042562	0.484760	0.651601		
a=0		0.386502	0.026839	0.333899	0.439105		
a=1		0.452707	0.075785	0.304170	0.601243		
a=2		1.650990	0.805735	0.071779	3.230202		
	2005						
a=-1		0.682293	0.045482	0.593150	0.771435		
a=0		0.411049	0.013157	0.385261	0.436837		
a=1		0.461921	0.025036	0.412851	0.510991		
a=2		1.229010	0.208037	0.821264	1.636755		
	2006						
a=-1		0.504834	0.026446	0.453001	0.556667		
a=0		0.367838	0.015685	0.337096	0.398580		
a=1		0.435664	0.035391	0.366298	0.505029		
a=2		1.038065	0.174622	0.695812	1.380318		
	2008						
a=-1		0.646284	0.021159	0.604814	0.687754		
a=0		0.424138	0.013778	0.397134	0.451142		
a=1		0.457347	0.022577	0.413096	0.501597		
a=2		0.922820	0.110973	0.705317	1.140323		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005, 2006 and 2008.

1) Bootstrapped with 100 replications.

2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.

** means statistically significant at the 90% level.

Table A5.12.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the total population 1992 - 2008 (95% confidence)

		95% confidence[1]				% change	
		Coefficient	**BS Std Err.**	**Confidence interval**		**Significant**	**Significant**
	1992					**95%**	**95%**
						1992-1996	**1996-1998**
a=-1		0.785491	0.031790	0.723184	0.847798	no	yes
a=0		0.505292	0.016694	0.472573	0.538012	no	no
a=1		0.570509	0.026339	0.518886	0.622132	no	no
a=2		1.305111	0.134192	1.042099	1.568123	no	no
	1994					**1998-2002**	**2002-2005**
a=-1		0.757002	0.021993	0.713897	0.800108	yes	yes
a=0		0.506224	0.013758	0.479259	0.533188	yes	no
a=1		0.585945	0.026612	0.533787	0.638103	yes	yes**
a=2		1.458330	0.257447	0.953744	1.962916	no	yes
	1996					**2005-2006**	**2006-2008**
a=-1		0.758937	0.030910	0.698356	0.819519	yes**	yes
a=0		0.486422	0.017128	0.452852	0.519991	no	yes
a=1		0.564065	0.035002	0.495463	0.632668	no	no
a=2		1.605521	0.525664	0.575238	2.635804	no	no
	1998						
a=-1		0.913394	0.043166	0.828791	0.997998		
a=0		0.522391	0.015832	0.491360	0.553422		
a=1		0.588089	0.036434	0.516680	0.659499		
a=2		2.230208	0.937119	0.393488	4.066928		
	2002						
a=-1		0.642593	0.022388	0.598714	0.686473		
a=0		0.437061	0.010955	0.415590	0.458532		
a=1		0.475958	0.015924	0.444747	0.507168		
a=2		0.845190	0.054811	0.737762	0.952617		
	2005						
a=-1		0.802358	0.042257	0.719535	0.885180		
a=0		0.471591	0.014812	0.442560	0.500623		
a=1		0.560564	0.037771	0.486534	0.634593		
a=2		1.901724	0.372679	1.171286	2.632162		
	2006						
a=-1		0.654785	0.033920	0.588304	0.721266		
a=0		0.430798	0.009071	0.413020	0.448576		
a=1		0.495875	0.015448	0.465598	0.526152		
a=2		1.121720	0.111666	0.902858	1.340581		
	2008						
a=-1		0.762434	0.015608	0.731842	0.793025		
a=0		0.467457	0.007069	0.453603	0.481311		
a=1		0.506878	0.011158	0.485009	0.528747		
a=2		1.048409	0.056924	0.936840	1.159979		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005, 2006 and 2008.

1) Bootstrapped with 100 replications.

2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.

** means statistically significant at the 90% level.

Table A5.13.

Mexico: Generalized Entropy Measure for the urban, rural and total population using per capita consumption
1992 - 2006

Generalized Entropy[1]	a=-1	a=0	a=1	a=2
1992 urban	0.465	0.369	0.418	0.747
1994 urban	0.439	0.361	0.413	0.722
1996 urban	0.437	0.355	0.414	0.801
1998 urban	0.432	0.345	0.399	0.757
2000 urban	0.401	0.328	0.369	0.632
2002 urban	0.407	0.339	0.394	0.721
2004 urban	0.410	0.334	0.409	1.077
2005 urban	0.446	0.367	0.461	1.347
2006 urban	0.422	0.350	0.419	0.929
% change urban				
1992-2000	-13.66	-11.16	-11.57	-15.42
2000-2005	11.22	11.97	24.78	113.25
2005-2006	-5.44	-4.54	-9.00	-31.05

Generalized Entropy	a=-1	a=0	a=1	a=2
1992 rural	0.425	0.328	0.374	0.782
1994 rural	0.363	0.300	0.347	0.708
1996 rural	0.465	0.337	0.371	0.914
1998 rural	0.551	0.389	0.423	0.773
2000 rural	0.696	0.533	0.843	4.974
2002 rural	0.487	0.389	0.492	1.200
2004 rural	0.465	0.330	0.342	0.561
2005 rural	0.496	0.361	0.417	0.984
2006 rural	0.406	0.319	0.382	0.856
% change rural				
1992-1994	-14.43	-8.61	-7.30	-9.53
1994-2000	91.51	77.69	143.10	602.96
2000-2004	-33.18	-38.21	-59.40	-88.73
2004-2005	6.64	9.58	21.76	75.62
2005-2006	-18.23	-11.66	-8.38	-13.04

Generalized Entropy	a=-1	a=0	a=1	a=2
1992 total	0.642	0.445	0.490	0.940
1994 total	0.585	0.430	0.483	0.912
1996 total	0.605	0.418	0.467	0.972
1998 total	0.677	0.438	0.473	0.919
2000 total	0.671	0.454	0.531	1.426
2002 total	0.565	0.412	0.466	0.901
2004 total	0.547	0.384	0.440	1.140
2005 total	0.614	0.428	0.508	1.494
2006 total	0.532	0.396	0.463	1.056
% change total				
1992-1994	-8.82	-3.38	-1.53	-3.01
1994-2000	14.70	5.67	9.95	56.34
2000-2004	-18.48*	-15.50**	-17.09	-20.05
2004-2005	12.25**	11.47*	15.35	31.09
2005-2006	-13.33*	-7.33	-8.81	-29.29

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
** means statistically significant at the 90% level.

Table A5.14.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the urban population 1992 - 2006, using per capita consumption (95% confidence)

	95% confidence[1] Coefficient	BS Std Err.	Confidence interval		% change Significant 95%	Significant 95%
1992					**1992-2000**	**2000-2005**
a=-1	0.465056	0.018282	0.429224	0.500889	no	no
a=0	0.368737	0.0148939	0.339545	0.397928	no	no
a=1	0.417743	0.0180368	0.382392	0.453095	no	no
a=2	0.746555	0.0481628	0.652157	0.840952	no	no
2000					**2005-2006**	
a=-1	0.401299	0.019759	0.362573	0.440026	no	
a=0	0.327503	0.012872	0.302274	0.352733	no	
a=1	0.369395	0.018090	0.333940	0.404851	no	
a=2	0.631720	0.068656	0.497158	0.766283	no	
2005						
a=-1	0.446306	0.018837	0.409386	0.483226		
a=0	0.366715	0.013951	0.339372	0.394057		
a=1	0.460935	0.034448	0.393417	0.528452		
a=2	1.347151	0.382313	0.597833	2.096470		
2006						
a=-1	0.421997	0.011548	0.399363	0.444631		
a=0	0.350017	0.009443	0.331508	0.368525		
a=1	0.419389	0.020072	0.380049	0.458729		
a=2	0.928737	0.129793	0.674347	1.183126		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005 and 2006.
1) Bootstrapped with 100 replications.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.

Table A5.15.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the rural population 1992 - 2006, using per capita consumption (95% confidence)

	95% confidence[1]				% change	
	Coefficient	**BS Std Err.**	**Confidence interval**		**Significant 95%**	**Significant 95%**
1992					**1992-1994**	**1994-2000**
a=-1	0.426659	0.020795	0.385901	0.467416	no	no
a=0	0.329744	0.013835	0.302629	0.356860	no	no
a=1	0.375438	0.025309	0.325833	0.425043	no	no
a=2	0.782825	0.154963	0.479103	1.086547	no	no
1994					**2000-2004**	**2004-2005**
a=-1	0.363448	0.017420	0.329306	0.397590	no	no
a=0	0.300091	0.014343	0.271980	0.328203	no	no
a=1	0.346679	0.023980	0.299679	0.393678	no	no
a=2	0.707560	0.173856	0.366810	1.048311	no	no
2000					**2005-2006**	
a=-1	0.696036	0.167829	0.367097	1.024976	no	
a=0	0.533220	0.131080	0.276308	0.790132	no	
a=1	0.842771	0.286311	0.281611	1.403930	no	
a=2	4.973847	2.744887	-0.406033	10.353730	no	
2004						
a=-1	0.465073	0.029014	0.408206	0.521940		
a=0	0.329499	0.016856	0.296462	0.362535		
a=1	0.342131	0.023792	0.295499	0.388762		
a=2	0.560559	0.069148	0.425032	0.696086		
2005						
a=-1	0.495945	0.024626	0.447679	0.544210		
a=0	0.361067	0.014005	0.333618	0.388515		
a=1	0.416585	0.022748	0.371999	0.461171		
a=2	0.984461	0.159283	0.672272	1.296650		
2006						
a=-1	0.405656	0.022985	0.360606	0.450705		
a=0	0.319025	0.020016	0.279795	0.358255		
a=1	0.381682	0.044456	0.294550	0.468813		
a=2	0.856109	0.209939	0.444636	1.267582		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005 and 2006.

1) Bootstrapped with 100 replications.

2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.

Table A5.16.

Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Generalized Entropy Measure for the total population 1992 - 2006, using per capita consumption (95% confidence)

	95% confidence[1]				% change	
	Coefficient	BS Std Err.	Confidence interval		Significant 95%	Significant 95%
1992					**1992-1994**	**1994-2000**
a=-1	0.642238	0.024827	0.593578	0.690897	no	no
a=0	0.444719	0.011291	0.422589	0.466849	no	no
a=1	0.490451	0.016281	0.458541	0.522361	no	no
a=2	0.939297	0.062308	0.817175	1.061419	no	no
1994					**2000-2004**	**2004-2005**
a=-1	0.585088	0.018389	0.549046	0.621130	yes	yes**
a=0	0.429497	0.0101694	0.409566	0.449429	yes**	yes
a=1	0.482948	0.0150113	0.453527	0.512370	no	no
a=2	0.911954	0.0529025	0.808267	1.015641	no	no
2000					**2005-2006**	
a=-1	0.671125	0.0419526	0.588899	0.753350	yes	
a=0	0.453859	0.0294712	0.396097	0.511622	no	
a=1	0.531019	0.0820712	0.370163	0.691876	no	
a=2	1.425695	0.5429255	0.361581	2.489810	no	
2004						
a=-1	0.547119	0.0154913	0.516756	0.577481		
a=0	0.383528	0.0075882	0.368655	0.398400		
a=1	0.440291	0.0119356	0.416897	0.463684		
a=2	1.139778	0.1276666	0.889556	1.390000		
2005						
a=-1	0.614124	0.019773	0.575369	0.652879		
a=0	0.427507	0.013037	0.401954	0.453059		
a=1	0.507881	0.034004	0.441235	0.574528		
a=2	1.494091	0.340303	0.827111	2.161072		
2006						
a=-1	0.532259	0.012327	0.508098	0.556419		
a=0	0.396126	0.008459	0.379546	0.412706		
a=1	0.463051	0.017298	0.429147	0.496955		
a=2	1.056242	0.144231	0.773555	1.338930		

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2002, 2005 and 2006.
1) Bootstrapped with 100 replications.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
** means statistically significant at the 90% level.

Table A5.17.

Mexico: Number of people living in poverty, millions, 1992-2008

Poverty line	URBAN 1992	RURAL 1992	TOTAL 1992	URBAN 2002	RURAL 2002	TOTAL 2002
Food	7.7	13.3	20.2	7.4	12.7	20.0
Capabilities	12.1	16.7	27.2	11.7	15.9	27.6
Assets	23.9	24.3	46.4	27.6	24.5	52.1
	1994	**1994**	**1994**	**2004**	**2004**	**2004**
Food	7.3	14.2	21.5	7.7	10.6	18.3
Capabilities	11.1	17.5	28.5	12.2	13.4	25.6
Assets	23.7	25.6	49.3	28.0	21.9	49.9
	1996	**1996**	**1996**	**2005**	**2005**	**2005**
Food	13.7	18.0	31.7	6.8	12.3	19.0
Capabilities	19.0	21.0	40.0	11.3	15.5	26.7
Assets	32.6	28.2	60.8	26.6	23.5	50.1
	1998	**1998**	**1998**	**2006**	**2006**	**2006**
Food	11.1	19.0	30.1	4.9	8.9	13.8
Capabilities	16.3	21.6	37.8	9.0	11.5	20.5
Assets	30.3	28.1	58.3	24.0	19.8	43.8
	2000	**2000**	**2000**	**2008**	**2008**	**2008**
Food	8.0	15.9	23.9	9.2	13.4	22.7
Capabilities	12.1	18.6	30.8	14.1	16.2	30.4
Assets	26.4	25.9	52.3	30.3	24.3	54.7

Source: Own calculations using the ENIGH household surveys from 1992 to 2008..

Table A5.18

Mexico: Incidence, depth and severity of poverty using per capita income as the welfare indicator (FGT*100)
1992 - 2008

Poverty line used	FGT[1] α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
	1992 urban			**1992 rural**			**1992 total**		
Food poverty line	15.58	4.59	1.93	38.69	15.29	8.06	24.02	8.39	4.16
Capabilities poverty line	24.41	7.48	3.31	48.55	19.60	10.74	32.37	11.60	5.90
Assets poverty line	48.20	18.95	9.79	70.54	33.80	20.34	55.18	23.57	13.12
	1994 urban			**1994 rural**			**1994 total**		
Food poverty line	14.15	3.56	1.36	37.62	13.54	6.63	24.05	7.77	3.58
Capabilities poverty line	21.44	6.17	2.53	46.36	17.97	9.25	31.95	11.14	5.37
Assets poverty line	45.88	17.11	8.44	67.99	32.03	18.72	55.20	23.40	12.78
	1996 urban			**1996 rural**			**1996 total**		
Food poverty line	24.96	7.87	3.46	47.72	19.54	10.64	34.25	12.64	6.39
Capabilities poverty line	34.71	11.94	5.64	55.58	24.57	13.92	43.23	17.10	9.02
Assets poverty line	59.54	26.06	14.46	74.68	39.17	24.76	65.72	31.41	18.66
	1998 urban			**1998 rural**			**1998 total**		
Food poverty line	19.75	5.76	2.48	48.69	21.66	12.29	31.58	12.25	6.49
Capabilities poverty line	28.96	9.16	4.16	55.34	26.32	15.65	39.74	16.17	8.85
Assets poverty line	53.83	22.14	11.71	72.03	39.68	26.10	61.26	29.31	17.59
	2000 urban			**2000 rural**			**2000 total**		
Food poverty line	13.31	3.28	1.28	41.53	16.19	8.45	24.30	8.30	4.07
Capabilities poverty line	20.18	5.78	2.38	48.77	20.66	11.32	31.31	11.58	5.86
Assets poverty line	43.94	16.03	7.89	67.68	34.08	20.98	53.18	23.06	12.98
	2002 urban			**2002 rural**			**2002 total**		
Food poverty line	11.81	3.16	1.25	32.92	11.50	5.54	19.87	6.35	2.89
Capabilities poverty line	18.73	5.43	2.28	41.34	15.49	7.82	27.37	9.27	4.39
Assets poverty line	44.31	15.95	7.70	63.58	28.78	16.42	51.67	20.85	11.03
	2004 urban			**2004 rural**			**2004 total**		
Food poverty line	11.91	3.16	1.29	27.47	10.12	5.27	17.74	5.77	2.78
Capabilities poverty line	18.95	5.40	2.29	34.70	13.35	7.12	24.85	8.38	4.10
Assets poverty line	43.46	15.52	7.55	56.77	24.77	14.23	48.45	18.98	10.05
	2005 urban			**2005 rural**			**2005 total**		
Food poverty line	10.33	2.73	1.13	31.83	12.29	6.68	18.31	6.27	3.19
Capabilities poverty line	17.22	4.75	2.00	40.10	15.91	8.80	25.71	8.89	4.52
Assets poverty line	40.65	14.16	6.81	61.05	28.20	16.75	48.22	19.37	10.49
	2006 urban			**2006 rural**			**2006 total**		
Food poverty line	7.40	1.81	0.68	23.14	7.74	3.72	13.18	3.99	1.79
Capabilities poverty line	13.62	3.38	1.31	29.90	10.64	5.28	19.60	6.05	2.77
Assets poverty line	44.16	16.58	8.43	62.81	30.04	18.24	50.89	21.44	11.97
	2008 urban			**2008 rural**			**2008 total**		
Food poverty line	13.46	3.94	1.76	34.70	13.88	7.48	21.13	7.53	3.83
Capabilities poverty line	20.64	6.33	2.89	41.96	17.67	9.86	28.34	10.42	5.41
Assets poverty line	44.16	16.58	8.43	62.81	30.04	18.24	50.89	21.44	11.97

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005, 2006 and 2008.
1) When α=0 the FGT index refers to the Headcount Index; when α=1 is the Poverty Gap; and when α=2 is the Squared Poverty Gap.

Table A5.19.

Mexico: Incidence, depth and severity of poverty using per capita consumption as the welfare indicator (FGT*100)
1992 - 2006

Poverty line used	FGT[1] α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
	1992 urban			**1992 rural**			**1992 total**		
Food poverty line	17.72	4.90	1.95	42.67	16.09	8.13	26.31	8.83	4.16
Capabilities poverty line	27.57	8.23	3.49	51.54	20.88	11.10	35.40	12.45	6.10
Assets poverty line	53.11	20.98	10.76	72.85	35.68	21.43	59.28	25.48	14.06
	1994 urban			**1994 rural**			**1994 total**		
Food poverty line	16.27	4.00	1.48	41.07	14.10	6.53	26.73	8.26	3.61
Capabilities poverty line	25.02	7.03	2.84	50.89	19.01	9.40	35.93	12.08	5.60
Assets poverty line	52.52	19.80	9.72	73.23	34.37	19.83	61.26	25.94	13.99
	1996 urban			**1996 rural**			**1996 total**		
Food poverty line	26.33	7.80	3.28	48.88	19.22	10.27	35.54	12.47	6.14
Capabilities poverty line	37.01	12.16	5.54	58.18	24.53	13.60	45.66	17.21	8.83
Assets poverty line	63.79	27.59	15.01	76.87	39.69	24.81	69.13	32.53	19.01
	1998 urban			**1998 rural**			**1998 total**		
Food poverty line	22.89	6.42	2.65	49.72	20.95	11.57	33.85	12.36	6.30
Capabilities poverty line	33.03	10.42	4.60	57.38	26.03	14.99	42.98	16.80	8.84
Assets poverty line	59.85	24.54	13.05	76.81	40.77	26.08	66.78	31.17	18.38
	2000 urban			**2000 rural**			**2000 total**		
Food poverty line	15.90	4.08	1.53	41.75	16.06	8.36	25.97	8.75	4.19
Capabilities poverty line	23.77	7.03	2.89	50.82	20.70	11.23	34.31	12.36	6.14
Assets poverty line	51.41	19.27	9.53	71.41	35.15	21.28	59.20	25.46	14.10
	2002 urban			**2002 rural**			**2002 total**		
Food poverty line	15.20	3.87	1.46	36.05	12.59	6.02	23.16	7.20	3.20
Capabilities poverty line	24.32	6.81	2.76	46.76	16.98	8.52	32.88	10.69	4.96
Assets poverty line	53.67	19.66	9.54	68.55	31.63	18.06	59.35	24.23	12.79
	2004 urban			**2004 rural**			**2004 total**		
Food poverty line	8.65	2.25	0.89	23.21	7.94	3.85	14.11	4.38	2.00
Capabilities poverty line	14.91	4.00	1.64	30.39	10.82	5.43	20.71	6.56	3.06
Assets poverty line	38.18	12.67	5.91	50.70	21.24	11.74	42.88	15.88	8.09
	2005 urban			**2005 rural**			**2005 total**		
Food poverty line	15.24	4.01	1.55	34.60	12.66	6.37	22.42	7.22	3.34
Capabilities poverty line	23.59	6.83	2.85	43.70	16.76	8.76	31.05	10.51	5.04
Assets poverty line	50.65	18.99	9.39	66.85	30.38	17.65	56.66	23.22	12.45
	2006 urban			**2006 rural**			**2006 total**		
Food poverty line	10.27	2.40	0.85	25.13	7.71	3.43	15.73	4.35	1.80
Capabilities poverty line	17.58	4.47	1.71	32.29	10.96	5.12	22.99	6.86	2.97
Assets poverty line	43.11	14.78	6.79	56.63	22.78	12.10	48.08	17.72	8.74

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
1) When α=0 the FGT index refers to the Headcount Index; when α=1 is the Poverty Gap; and when α=2 is the Squared Poverty Gap.

Table A5.19. (Continues)

Mexico: Trends in the incidence, depth and severity of poverty using per capita consumption as the welfare indicator
1992 - 2006

	FGT[1] α=0	α=1	α=2	α=0	α=1	α=2	α=0	α=1	α=2
Poverty line used	**% change urban**			**% change rural**			**% change total**		
1992-1994									
Food poverty line	-8.18	-18.43	-23.84	-3.75	-12.37	-19.70	1.60	-6.52	-13.24
Capabilities poverty line	-9.25	-14.54	-18.83	-1.25	-8.94	-15.31	1.51	-2.96	-8.13
Assets poverty line	-1.10	-5.63	-9.70	0.52	-3.69	-7.46	3.33	1.83	-0.51
1994-1996									
Food poverty line	61.79	95.15	121.52	19.01	36.33	57.28	32.97	50.99	69.98
Capabilities poverty line	47.92	73.00	95.45	14.31	28.99	44.62	27.08	42.46	57.64
Assets poverty line	21.45	39.33	54.39	4.97	15.50	25.08	12.86	25.41	35.95
1996-1998									
Food poverty line	-13.04	-17.74	-19.19	1.71	9.00	12.65	-4.75	-0.89	2.57
Capabilities poverty line	-10.76	-14.32	-17.08	-1.37	6.14	10.25	-5.87	-2.40	0.11
Assets poverty line	-6.17	-11.05	-13.03	-0.07	2.71	5.14	-3.40	-4.19	-3.35
1998-2000									
Food poverty line	-30.53	-36.34	-42.33	-16.02	-23.32	-27.75	-23.29	-29.19	-33.47
Capabilities poverty line	-28.03	-32.51	-37.18	-11.42	-20.49	-25.10	-20.18	-26.46	-30.63
Assets poverty line	-14.10	-21.46	-27.01	-7.04	-13.79	-18.43	-11.36	-18.34	-23.26
	% change urban[2]			**% change rural**			**% change total**		
2000-2004									
Food poverty line	-45.59	-45.03	-41.57	-44.41	-50.55	-53.90	-45.67	-49.93	-52.18
Capabilities poverty line	-37.27	-43.15	-43.33	-40.20	-47.73	-51.64	-39.62	-46.94	-50.15
Assets poverty line	-25.73	-34.27	-38.00	-28.99	-39.56	-44.81	-27.57	-37.61	-42.60
2004-2005									
Food poverty line	76.14	78.80	73.83	49.10	59.32	65.25	58.95	64.80	66.75
Capabilities poverty line	58.20	70.89	74.27	43.77	54.86	61.23	49.90	60.40	64.88
Assets poverty line	32.65	49.92	58.94	31.84	43.00	50.28	32.15	46.19	53.84
2005-2006									
Food poverty line	-32.61	-40.28	-45.11	-27.38	-39.11	-46.13	-29.85	-39.78	-46.11
Capabilities poverty line	-25.49	-34.53	-39.95	-26.10	-34.57	-41.52	-25.97	-34.76	-41.19
Assets poverty line	-14.88	-22.19	-27.66	-15.29	-25.00	-31.46	-15.14	-23.68	-29.81

Source: Own calculations using the ENIGH household surveys for 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006.
(*) means that the change is statistically significant at the 95% level; (**) at the 94% level; and (***) at the 93% level.
1) When α=0 the FGT index refers to the Headcount Index; when α=1 is the Poverty Gap; and when α=2 is the Squared Poverty Gap.

Table A5.20. Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Headcount Index using per capita income 1992 - 2008 (95% confidence)

	95% confidence[a]					95% confidence[a]				Changes in each period		
	Coefficient	BS Std Err.	Confidence interval			Coefficient	BS Std Err.	Confidence interval		1992-1994	1994-1996	1996-1998
1992					**2002**					Significant	Significant	Significant
Food poverty line[b]					**Food poverty line[b]**							
urban	0.1557286	0.0094440	0.1372187	0.1742384	urban	0.1180866	0.0065468	0.1052551	0.1309181	no	yes	yes
rural	0.3866170	0.0119560	0.3631837	0.4100503	rural	0.3292442	0.0102907	0.3090749	0.3494135	no	yes	no
total	0.2401184	0.0072526	0.2259036	0.254333	total	0.1987202	0.0056565	0.1876336	0.2098067	no	yes	yes
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.2440381	0.0096472	0.2251299	0.262946	urban	0.1873358	0.0058686	0.1758335	0.198838	no	yes	yes
rural	0.4852136	0.0146119	0.4565749	0.513852	rural	0.4133748	0.0113027	0.3912219	0.4355276	no	yes	no
total	0.3235341	0.0071357	0.3095484	0.337520	total	0.273652	0.0056486	0.2625809	0.2847231	no	yes	yes
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.4819229	0.0099336	0.4624535	0.501392	urban	0.4430841	0.0085958	0.4262366	0.4599315	no	yes	yes
rural	0.7049458	0.0109657	0.6834534	0.726438	rural	0.6358072	0.0106035	0.6150247	0.6565897	no	yes	no
total	0.5516213	0.0095268	0.5329490	0.570294	total	0.5166782	0.0069014	0.5031517	0.5302046	no	yes	yes
1994					**2004**					1998-2000	2000-2004	2004-2005
Food poverty line[b]					**Food poverty line[b]**							
urban	0.1414919	0.0088824	0.1240828	0.1589011	urban	0.1191023	0.0041924	0.1108854	0.1273192	yes	no	yes
rural	0.3762403	0.0121514	0.3524239	0.4000567	rural	0.2746582	0.0121291	0.2508856	0.2984308	yes	yes	yes
total	0.240483	0.0074909	0.225801	0.255165	total	0.1774062	0.0049163	0.1677705	0.187042	yes	yes	no
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.2144314	0.0091598	0.1964785	0.2323843	urban	0.1894704	0.0059714	0.1777668	0.2011741	yes	no	no
rural	0.463569	0.0131583	0.4377791	0.4893588	rural	0.346997	0.0125474	0.3224046	0.3715894	yes	yes	yes
total	0.3194903	0.0074582	0.3048724	0.3341081	total	0.248513	0.0051551	0.2384093	0.2586167	yes	yes	no
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.4587912	0.0095733	0.4400279	0.4775545	urban	0.4346117	0.0057983	0.4232473	0.4459761	yes	no	yes
rural	0.6798997	0.0109733	0.6583924	0.701407	rural	0.5676543	0.014143	0.5399344	0.5953741	yes	yes	yes**
total	0.5520305	0.0073441	0.5376363	0.5664247	total	0.4844774	0.0057255	0.4732557	0.4956991	yes	yes	no
1996					**2005**					2005-2006	2006-2008	
Food poverty line[b]					**Food poverty line[b]**							
urban	0.2495532	0.0079297	0.2340114	0.265095	urban	0.1033099	0.0038265	0.095810	0.110810	yes	yes	
rural	0.4771472	0.0104673	0.4566316	0.4976628	rural	0.3182991	0.0096963	0.299295	0.337304	yes	yes	
total	0.3425135	0.0065094	0.3297552	0.3552717	total	0.1830677	0.0042683	0.174702	0.191433	yes	yes	
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.3470713	0.0081713	0.3310558	0.3630868	urban	0.1721961	0.0043651	0.163641	0.180752	yes	yes	
rural	0.5558337	0.0093724	0.537464	0.5742033	rural	0.4010240	0.0112810	0.378914	0.423134	yes	yes	
total	0.4323398	0.0066802	0.4192469	0.4454327	total	0.2570879	0.0046454	0.247983	0.266193	yes	yes	
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.595365	0.0083764	0.5789476	0.6117823	urban	0.4065256	0.0064044	0.393973	0.419078	yes	yes	
rural	0.7467715	0.0081714	0.730756	0.7627871	rural	0.6105275	0.0098052	0.591310	0.629745	yes	yes	
total	0.6572066	0.0058275	0.645785	0.6686283	total	0.4822073	0.0058218	0.470797	0.493618	yes	yes	
1998					**2006**							
Food poverty line[b]					**Food poverty line**							
urban	0.1975439	0.0064105	0.1849794	0.2101083	urban	0.0740097	0.0028773	0.068370	0.079649			
rural	0.4869199	0.0104517	0.4664349	0.5074049	rural	0.2314665	0.0106265	0.210639	0.252294			
total	0.3157685	0.0068027	0.3024355	0.3291016	total	0.1318763	0.0041687	0.123706	0.140047			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.2896024	0.0089447	0.2720711	0.3071336	urban	0.1362717	0.0044153	0.127618	0.144926			
rural	0.553357	0.0097977	0.5341539	0.5725601	rural	0.2990405	0.0099105	0.279616	0.318465			
total	0.3973594	0.0067575	0.3841149	0.4106039	total	0.1960906	0.0048570	0.186571	0.205610			
Assets poverty line[d]					**Assets poverty line**							
urban	0.5383026	0.0080716	0.5224826	0.5541227	urban	0.3622044	0.0061885	0.350075	0.374334			
rural	0.720265	0.0105854	0.6995181	0.741012	rural	0.5138068	0.0121179	0.490056	0.537557			
total	0.6126434	0.0064186	0.6000632	0.6252236	total	0.4179194	0.0059424	0.406273	0.429566			
2000					**2008**							
Food poverty line[b]					**Food poverty line**							
urban	0.1331053	0.0075146	0.1183769	0.1478336	urban	0.1346162	0.0040049	0.126767	0.142466			
rural	0.4152809	0.0133733	0.3890697	0.4414921	rural	0.3470190	0.0081434	0.331058	0.362980			
total	0.2429703	0.007407	0.2284527	0.2574878	total	0.2113044	0.0038553	0.203748	0.218861			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.2017989	0.0097484	0.1826925	0.2209054	urban	0.2063829	0.0048421	0.196893	0.215873			
rural	0.4876514	0.0125527	0.4630487	0.5122542	rural	0.4195595	0.0087615	0.402387	0.436732			
total	0.3130955	0.0078635	0.2976834	0.3285076	total	0.2833504	0.0040597	0.275394	0.291307			
Assets poverty line[d]					**Assets poverty line**							
urban	0.4393518	0.0115323	0.4167489	0.4619547	urban	0.4416328	0.0055651	0.430725	0.452540			
rural	0.6767716	0.0115194	0.654194	0.6993493	rural	0.6280624	0.0078693	0.612639	0.643486			
total	0.5317911	0.0087233	0.5146938	0.5488885	total	0.5089433	0.0048319	0.499473	0.518414			

Source: Own calculations using the ENIGH household surveys for 1992-2008.
a: 100 replications.
b: The food poverty line is set at $672.27 monthly pesos for urban areas and $494.78 for rual ones (2002=100).
c: The capabilities poverty line is set at $824.54 monthly pesos for urban areas and $584.98 for rural ones (2002=100).
d: The assets poverty lines is set at $1,348.84 monthly pesos for rural areas and $897.83 for rural ones (2002=100).

Table A5.21. Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Poverty Gap using per capita income
1992 - 2008 (95% confidence)

	95% confidence[a]					95% confidence[a]				Changes in each period		
	Coefficient	BS Std Err.	Confidence interval			Coefficient	BS Std Err.	Confidence interval		1992-1994	1994-1996	1996-1998
1992					**2002**					Significant	Significant	Significant
Food poverty line[b]					**Food poverty line[b]**							
urban	0.0458735	0.0032365	0.0395302	0.0522169	urban	0.0316421	0.001658	0.0283924	0.0348918	no	yes	yes
rural	0.1527901	0.0060408	0.1409504	0.1646298	rural	0.1149842	0.0047153	0.1057424	0.1242261	no	yes	yes**
total	0.0838273	0.0028094	0.0783210	0.0893336	total	0.0634675	0.0022876	0.058984	0.067951	no	yes	no
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.0748204	0.0039777	0.0670243	0.0826166	urban	0.0543245	0.0026298	0.0491702	0.0594788	yes**	yes	yes
rural	0.1958791	0.0069862	0.1821863	0.2095718	rural	0.1548525	0.0050026	0.1450476	0.1646574	no	yes	no
total	0.1159388	0.0031534	0.1097583	0.1221194	total	0.0927126	0.0026078	0.0876014	0.0978237	no	yes	no
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.1894544	0.0057213	0.1782408	0.2006679	urban	0.1594707	0.0036379	0.1523406	0.1666008	no	yes	yes
rural	0.3377203	0.0085035	0.3210536	0.3543869	rural	0.2877979	0.0065738	0.2749134	0.3006823	no	yes	no
total	0.2356340	0.0036099	0.2285588	0.2427092	total	0.2084743	0.0038804	0.2008688	0.2160798	no	yes	yes
1994					**2004**					1998-2000	2000-2004	2004-2005
Food poverty line[b]					**Food poverty line[b]**							
urban	0.0356314	0.0025354	0.0306621	0.0406007	urban	0.0315911	0.0017427	0.0281755	0.0350067	yes	no	no
rural	0.1354092	0.0057961	0.1240491	0.1467693	rural	0.1011989	0.0053282	0.0907557	0.111642	yes	yes	yes
total	0.0777067	0.0026295	0.072553	0.0828605	total	0.0576808	0.0019703	0.053819	0.0615426	yes	yes	no
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.0616591	0.0028947	0.0559855	0.0673326	urban	0.054003	0.0019504	0.0501803	0.0578258	yes	no	no
rural	0.1797154	0.0055021	0.1689315	0.1904992	rural	0.1335107	0.0050105	0.1236904	0.143331	yes	yes	yes
total	0.1114423	0.0033435	0.1048891	0.1179954	total	0.0838033	0.0023265	0.0792434	0.0883632	yes	yes	no
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.1710642	0.004904	0.1614527	0.1806758	urban	0.1551483	0.002823	0.1496154	0.1606813	yes	no	yes
rural	0.3202666	0.008064	0.3044614	0.3360718	rural	0.2476763	0.0073579	0.2332551	0.2620975	yes	yes	yes
total	0.2339814	0.0034484	0.2272226	0.2407402	total	0.1898288	0.0028684	0.1842068	0.1954507	yes	yes	no
1996					**2005**					2005-2006	2006-2008	
Food poverty line[b]					**Food poverty line[b]**							
urban	0.078702	0.0027406	0.0733305	0.0840734	urban	0.0272836	0.0014314	0.024478	0.030089	yes	yes	
rural	0.19542	0.006109	0.1834466	0.2073933	rural	0.1228637	0.0051337	0.112802	0.132926	yes	yes	
total	0.1263752	0.0028847	0.1207213	0.1320291	total	0.0627424	0.0019327	0.058954	0.066530	yes	yes	
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.1194364	0.003664	0.1122552	0.1266177	urban	0.0475368	0.0015774	0.044445	0.050628	yes	yes	
rural	0.2456832	0.0065183	0.2329075	0.2584588	rural	0.1591077	0.0046440	0.150006	0.168210	yes	yes	
total	0.1710017	0.0032941	0.1645453	0.177458	total	0.0889280	0.0021846	0.084646	0.093210	yes	yes	
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.2605835	0.0048873	0.2510045	0.2701625	urban	0.1416401	0.0026345	0.136477	0.146804	yes	yes	
rural	0.3917154	0.0063738	0.3792231	0.4042078	rural	0.2820304	0.0057163	0.270827	0.293234	yes	yes	
total	0.3141441	0.0040616	0.3061835	0.3221046	total	0.1937228	0.0028976	0.188044	0.199402	yes	yes	
1998					**2006**							
Food poverty line[b]					**Food poverty line**							
urban	0.0575623	0.0028222	0.0520308	0.0630937	urban	0.0181324	0.0009276	0.016314	0.019951			
rural	0.2165468	0.0072452	0.2023465	0.2307471	rural	0.0774555	0.0038432	0.069923	0.084988			
total	0.1225154	0.0034134	0.1158253	0.1292055	total	0.0399341	0.0015829	0.036832	0.043037			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.0915999	0.0032115	0.0853054	0.0978943	urban	0.0338659	0.0014017	0.031119	0.036613			
rural	0.2632263	0.0062534	0.2509699	0.2754828	rural	0.1064756	0.0046704	0.097322	0.115629			
total	0.1617179	0.003436	0.1549834	0.1684524	total	0.0605505	0.0019655	0.056698	0.064403			
Assets poverty line[d]					**Assets poverty line**							
urban	0.2213909	0.0045633	0.212447	0.2303349	urban	0.1174354	0.0027134	0.112117	0.122754			
rural	0.3967831	0.0079777	0.3811471	0.4124192	rural	0.2124966	0.0064331	0.199888	0.225105			
total	0.2930475	0.0043875	0.2844482	0.3016467	total	0.1523711	0.0031729	0.146153	0.158590			
2000					**2008**							
Food poverty line[b]					**Food poverty line**							
urban	0.0327744	0.0022887	0.0282887	0.0372602	urban	0.0393539	0.0015752	0.0362666	0.0424412			
rural	0.1618672	0.0062441	0.149629	0.1741054	rural	0.1388298	0.0042000	0.1305979	0.1470617			
total	0.0830367	0.0031324	0.0768973	0.0891761	total	0.0752697	0.0017615	0.0718172	0.0787222			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.057809	0.003551	0.0508492	0.0647688	urban	0.0632703	0.0016433	0.0600495	0.0664912			
rural	0.2066377	0.0063782	0.1941367	0.2191386	rural	0.1767277	0.0042364	0.1684245	0.1850309			
total	0.1157554	0.0035267	0.1088432	0.1226676	total	0.1042342	0.0020755	0.1001662	0.1083021			
Assets poverty line[d]					**Assets poverty line**							
urban	0.1602882	0.0049681	0.150551	0.1700254	urban	0.1658213	0.0027306	0.1604693	0.1711733			
rural	0.3407829	0.0072922	0.3264904	0.3550753	rural	0.3003978	0.0047214	0.2911440	0.3096517			
total	0.2305637	0.0046238	0.2215012	0.2396263	total	0.2144102	0.0025722	0.2093687	0.2194517			

Source: Own calculations using the ENIGH household surveys for 1992-2008.
a: 100 replications.
b: The food poverty line is set at $672.27 monthly pesos for urban areas and $494.78 for rual ones (2002=100).
c: The capabilities poverty line is set at $824.54 monthly pesos for urban areas and $584.98 for rural ones (2002=100).
d: The assets poverty lines is set at $1,348.84 monthly pesos for rural areas and $897.83 for rural ones (2002=100).

Table A.22. Mexico: Bootstrapped Standard Errors and Confidence Intervals for the Squared Poverty Gap using per capita income
1992 - 2008 (95% confidence)

	95% confidence[a]					95% confidence[a]				Changes in each period		
	Coefficient	BS Std Err.	Confidence interval			Coefficient	BS Std Err.	Confidence interval		1992-1994	1994-1996	1996-1998
1992					**2002**					Significant	Significant	Significant
Food poverty line[b]					**Food poverty lir**	0.012526	0.0009931	0.0105795	0.0144725			
urban	0.0193173	0.0018274	0.0157356	0.0228990	urban	0.0554165	0.0027697	0.0499881	0.060845	yes**	yes	yes
rural	0.0805194	0.0040624	0.0725571	0.0884816	rural	0.0289044	0.0013245	0.0263084	0.0315003	yes**	yes	yes**
total	0.0415894	0.0018996	0.0378664	0.0453125	total					yes**	yes	no
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.0330609	0.0024704	0.028219	0.0379028	urban	0.0227574	0.0012492	0.0203091	0.0252058	yes**	yes	yes
rural	0.1073257	0.0050174	0.0974917	0.1171596	rural	0.0781649	0.0030474	0.0721921	0.0841377	yes**	yes	yes**
total	0.0589977	0.0018169	0.0554367	0.0625587	total	0.0439156	0.001485	0.041005	0.0468261	no	yes	no
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.0979197	0.0043105	0.0894713	0.1063681	urban	0.0770156	0.0021218	0.072857	0.0811742	no	yes	yes
rural	0.2032322	0.0063739	0.1907397	0.2157248	rural	0.1642275	0.0048069	0.1548062	0.1736488	no	yes	no
total	0.1310952	0.0029829	0.1252488	0.1369416	total	0.1103187	0.0024523	0.1055123	0.1151252	no	yes	yes**
1994					**2004**					1998-2000	2000-2004	2004-2005
Food poverty line[b]					**Food poverty line[b]**							
urban	0.013594	0.0011327	0.0113739	0.0158141	urban	0.0129158	0.000793	0.0113616	0.0144701	yes	no	no
rural	0.0663389	0.003399	0.059677	0.0730007	rural	0.0526914	0.0030902	0.0466348	0.058748	yes	yes	yes
total	0.035836	0.0015437	0.0328104	0.0388616	total	0.0278241	0.0011516	0.0255671	0.0300812	yes	yes	no
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.0253443	0.0017804	0.0218547	0.0288338	urban	0.0229105	0.001109	0.0207368	0.0250842	yes	no	no
rural	0.0925073	0.0033428	0.0859554	0.0990591	rural	0.0711958	0.0033909	0.0645498	0.0778418	yes	yes	yes
total	0.0536662	0.0018717	0.0499978	0.0573347	total	0.0410083	0.0014783	0.038111	0.0439057	yes	yes	no
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.0844384	0.0033957	0.077783	0.0910938	urban	0.0754782	0.0018156	0.0719196	0.0790368	yes	no	yes
rural	0.187191	0.0044861	0.1783984	0.1959836	rural	0.1422975	0.005306	0.1318979	0.1526972	yes	yes	yes
total	0.1277682	0.0030931	0.1217058	0.1338306	total	0.1005228	0.0019872	0.0966278	0.1044177	yes	yes	no
1996					**2005**					2005-2006	2006-2008	
Food poverty line[b]					**Food poverty line[b]**							
urban	0.0345762	0.0017688	0.0311095	0.0380429	urban	0.0112675	0.0007164	0.009864	0.012672	yes	yes	
rural	0.1064207	0.0043566	0.0978819	0.1149595	rural	0.0668075	0.0031065	0.060719	0.072896	yes	yes	
total	0.0639209	0.0017785	0.0604352	0.0674067	total	0.0318721	0.0013437	0.029238	0.034506	yes	yes	
Capabilities poverty line[c]					**Capabilities poverty line[c]**							
urban	0.0563622	0.0019277	0.0525839	0.0601405	urban	0.0199849	0.0010954	0.017838	0.022132	yes	yes	
rural	0.1391895	0.0043663	0.1306318	0.1477472	rural	0.0879990	0.0036540	0.080837	0.095161	yes	yes	
total	0.0901928	0.0025721	0.0851516	0.095234	total	0.0452171	0.0015167	0.042244	0.048190	yes	yes	
Assets poverty line[d]					**Assets poverty line[d]**							
urban	0.1445668	0.0032033	0.1382884	0.1508452	urban	0.0680594	0.0017783	0.064574	0.071545	yes	yes	
rural	0.2475745	0.0057478	0.2363089	0.25884	rural	0.1674479	0.0043996	0.158825	0.176071	yes	yes	
total	0.1866401	0.0027046	0.1813392	0.1919409	total	0.1049311	0.0019200	0.101168	0.108694	yes	yes	
1998					**2006**							
Food poverty line[b]					**Food poverty line**							
urban	0.024769	0.0015138	0.0218021	0.027736	urban	0.0067796	0.0005054	0.005789	0.007770			
rural	0.1229204	0.004815	0.1134832	0.1323575	rural	0.0371805	0.0026255	0.032035	0.042326			
total	0.0648688	0.00229	0.0603805	0.0693571	total	0.0179521	0.0009132	0.016162	0.019742			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.0415504	0.001798	0.0380264	0.0450744	urban	0.0131393	0.0007663	0.011637	0.014641			
rural	0.156492	0.0048853	0.146917	0.166067	rural	0.0528508	0.0028057	0.047352	0.058350			
total	0.0885098	0.0025258	0.0835594	0.0934603	total	0.0277336	0.0012768	0.025231	0.030236			
Assets poverty line[d]					**Assets poverty line**							
urban	0.1170947	0.0033883	0.1104538	0.1237357	urban	0.0528195	0.0014550	0.049968	0.055671			
rural	0.2610004	0.0061536	0.2489397	0.2730612	rural	0.1162491	0.0048118	0.106818	0.125680			
total	0.1758874	0.0031254	0.1697618	0.1820131	total	0.0761303	0.0018617	0.072482	0.079779			
2000					**2008**							
Food poverty line[b]					**Food poverty line**							
urban	0.0128148	0.0013357	0.010197	0.0154326	urban	0.0175855	0.0008399	0.0159393	0.0192318			
rural	0.0845314	0.0038051	0.0770735	0.0919892	rural	0.0748128	0.0023751	0.0701576	0.0794680			
total	0.0407376	0.0017014	0.0374029	0.0440723	total	0.0382475	0.0010717	0.0361470	0.0403479			
Capabilities poverty line[c]					**Capabilities poverty line**							
urban	0.0237579	0.0016767	0.0204716	0.0270441	urban	0.0288896	0.0009443	0.0270389	0.0307404			
rural	0.1131549	0.004698	0.1039469	0.1223629	rural	0.0985825	0.0027511	0.0931905	0.1039745			
total	0.0585646	0.0023307	0.0539965	0.0631326	total	0.0540523	0.0012449	0.0516124	0.0564921			
Assets poverty line[d]					**Assets poverty line**							
urban	0.0788835	0.0034624	0.0720973	0.0856697	urban	0.0842872	0.0015995	0.0811522	0.0874222			
rural	0.2097531	0.0058213	0.1983437	0.2211626	rural	0.1823919	0.0039330	0.1746834	0.1901003			
total	0.1298376	0.0034158	0.1231427	0.1365324	total	0.1197079	0.0018036	0.1161729	0.1232429			

Source: Own calculations using the ENIGH household surveys for 1992-2008.

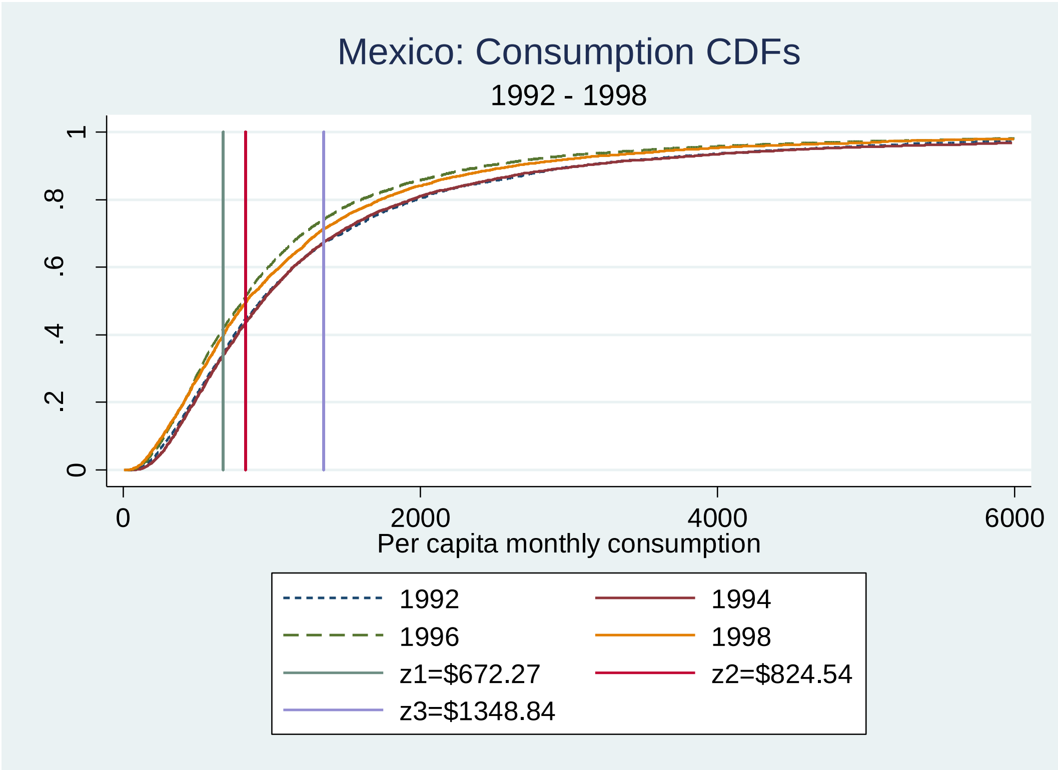
a: 100 replications.

b: The food poverty line is set at $672.27 monthly pesos for urban areas and $494.78 for rual ones (2002=100).

c: The capabilities poverty line is set at $824.54 monthly pesos for urban areas and $584.98 for rural ones (2002=100).

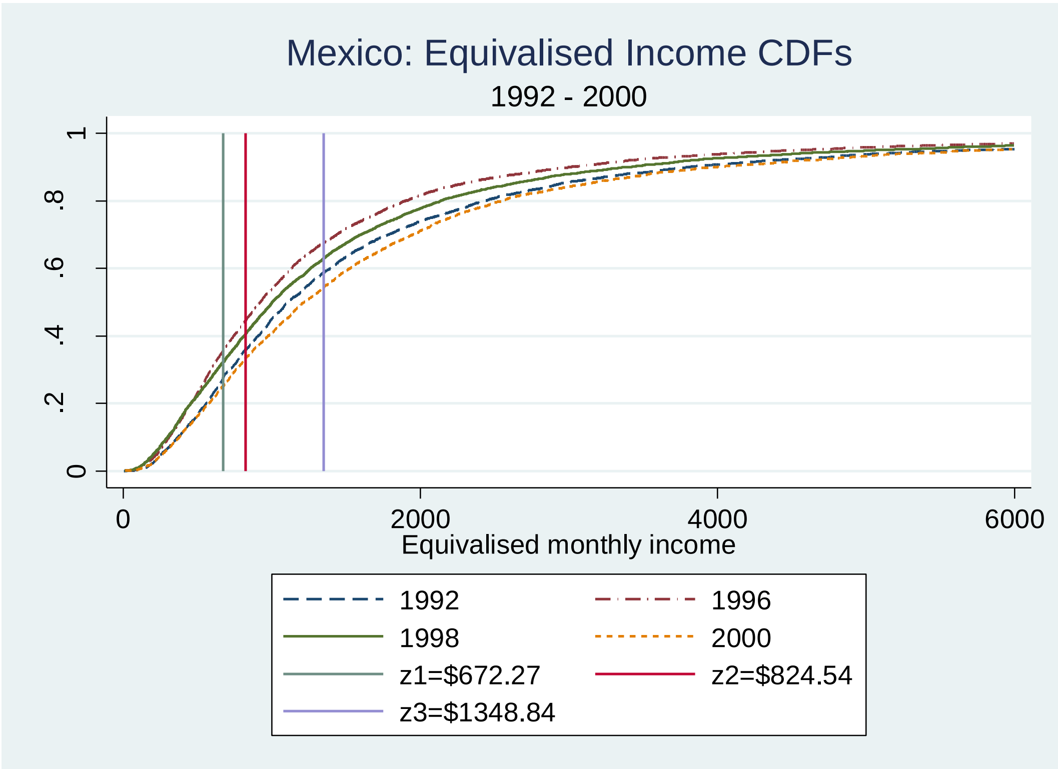
d: The assets poverty lines is set at $1,348.84 monthly pesos for rural areas and $897.83 for rural ones (2002=100).

Figure A5.11.



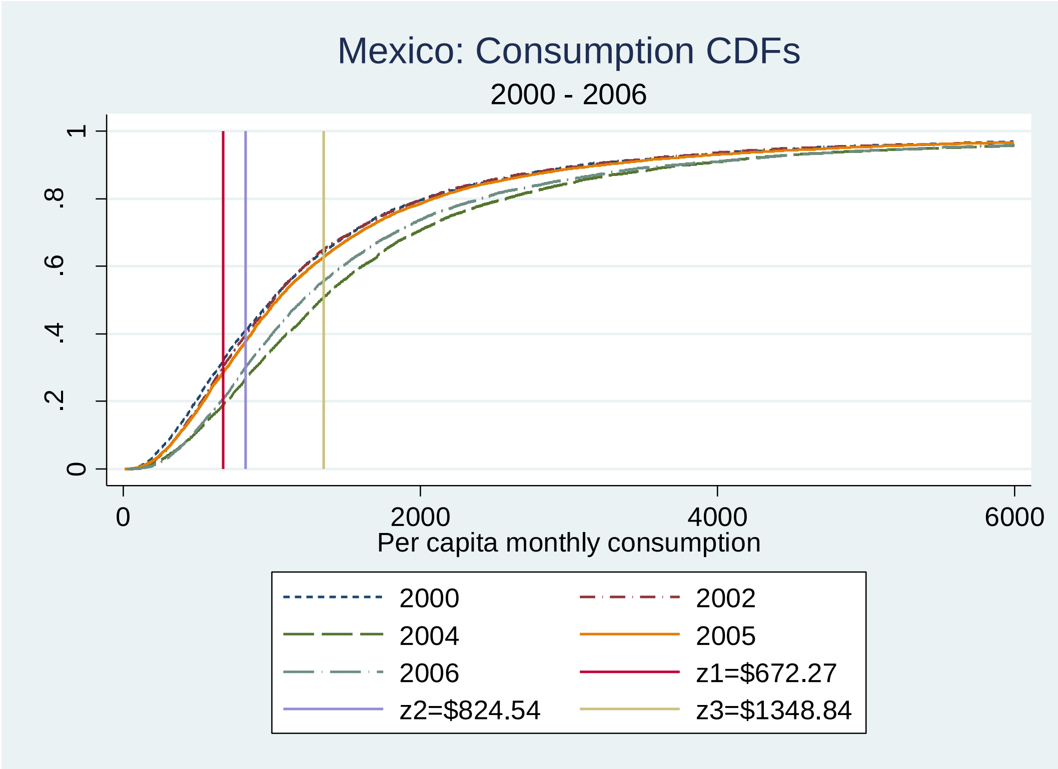
Source: Own calculations with data from ENIGH household surveys, 1992-1998.

Figure A5.12.



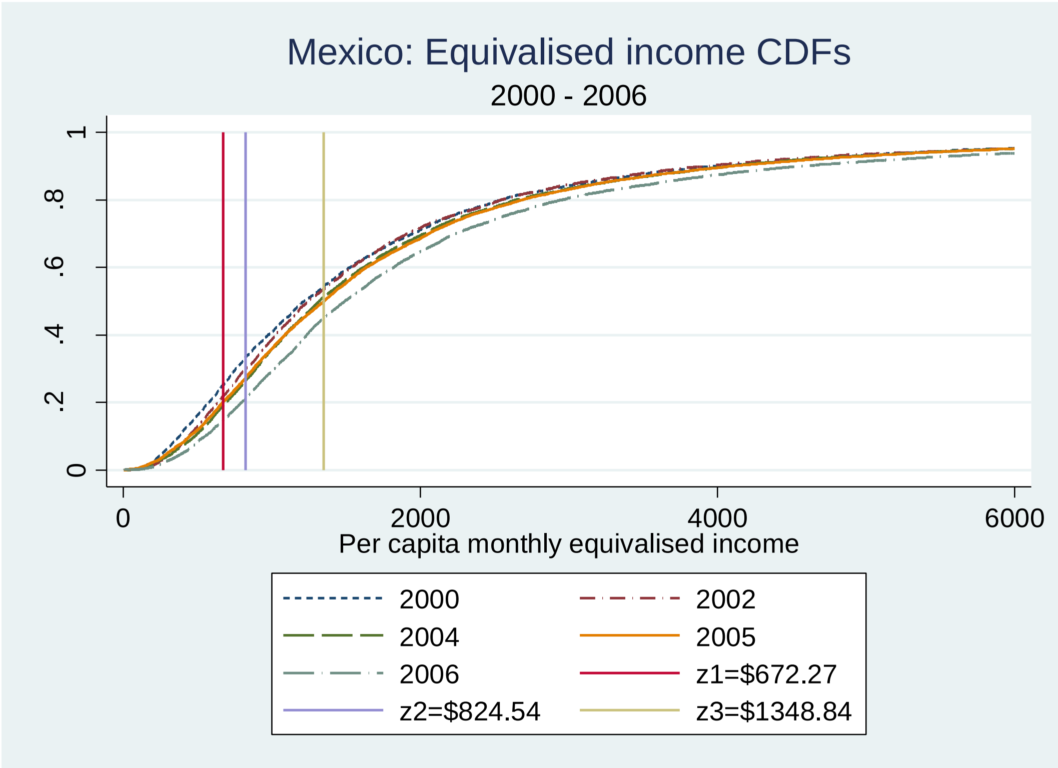
Source: Own calculations with data from ENIGH household surveys, 1992-2000.

Figure A5.13.



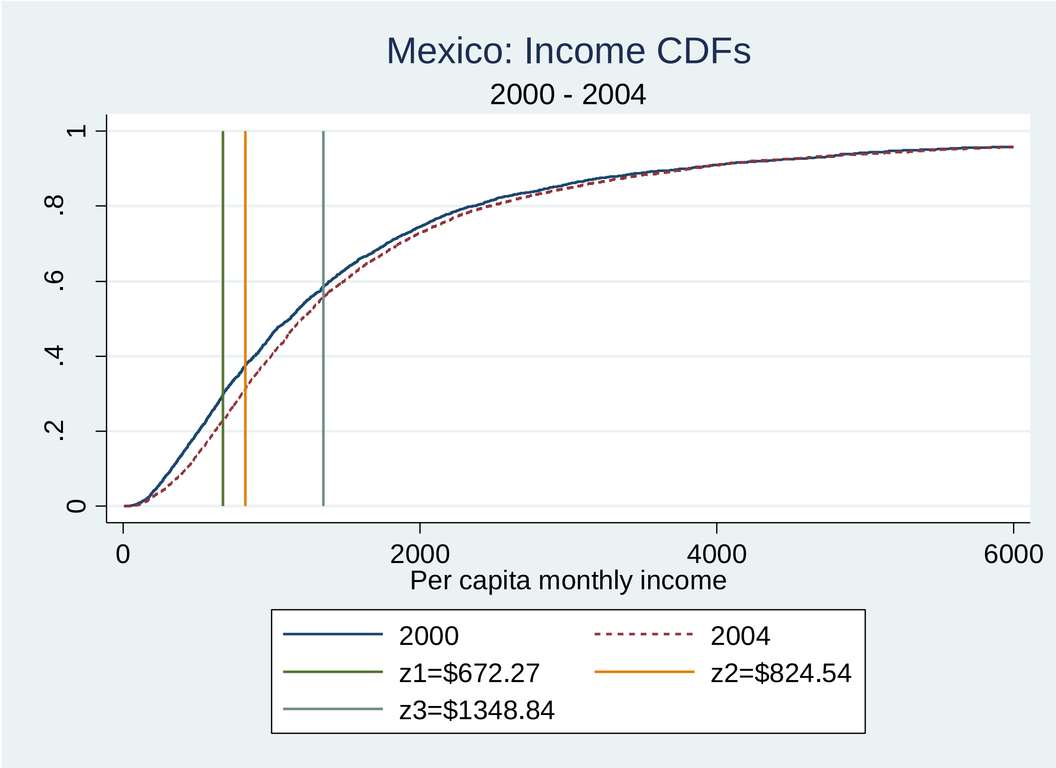
Source: Own calculations with data from ENIGH household surveys, 2000-2006.

Figure A5.14.



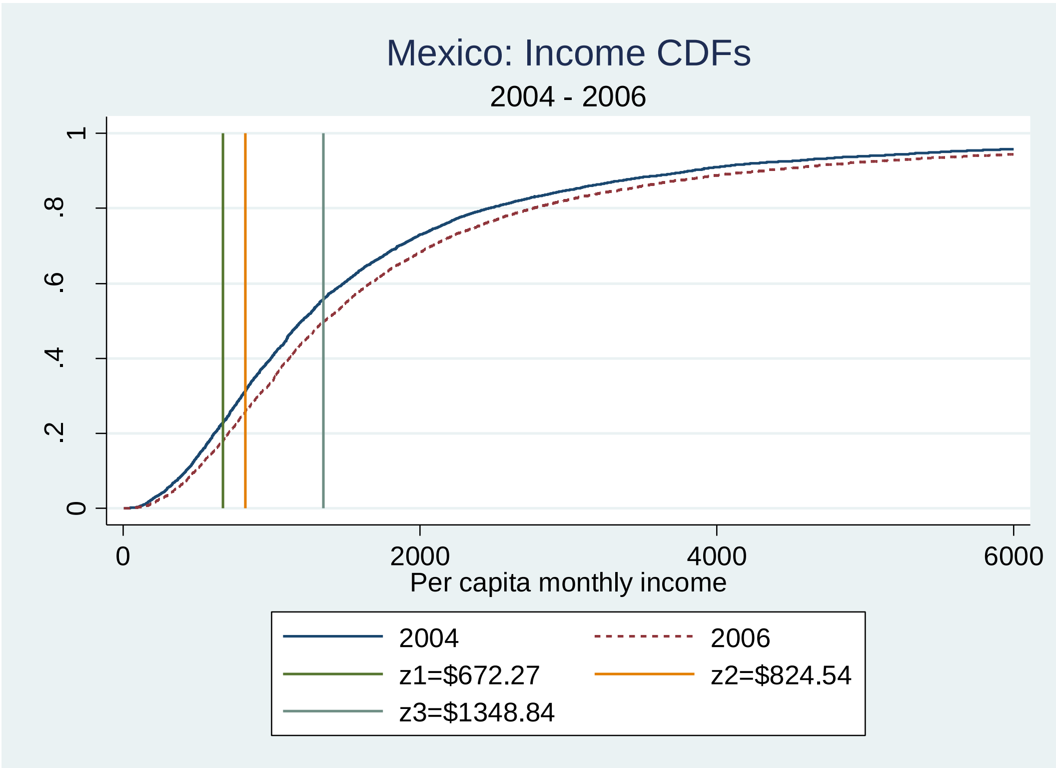
Source: Own calculations with data from ENIGH household surveys, 2000-2006.

Figure A5.15.



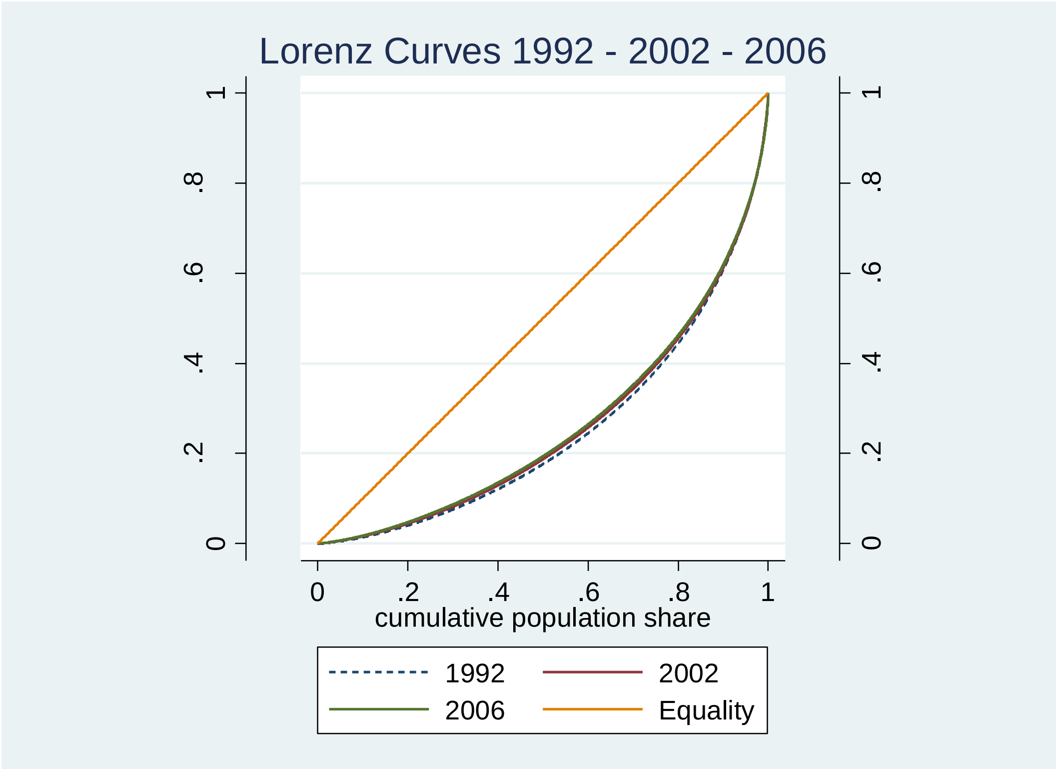
Source: Own calculations with data from ENIGH household surveys, 2000-2004.

Figure A5.16.



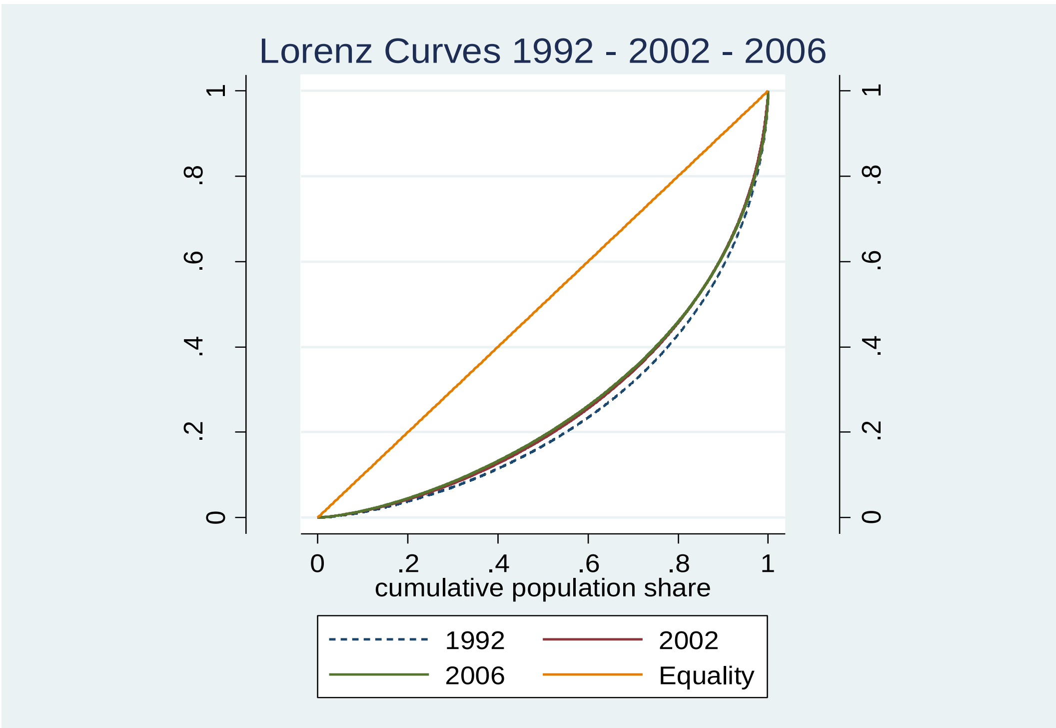
Source: Own calculations with data from ENIGH household surveys, 2004-2006.

Figure A5.17. Lorenz Curves using poverty line 1 and per capita consumption, 1992-2006.



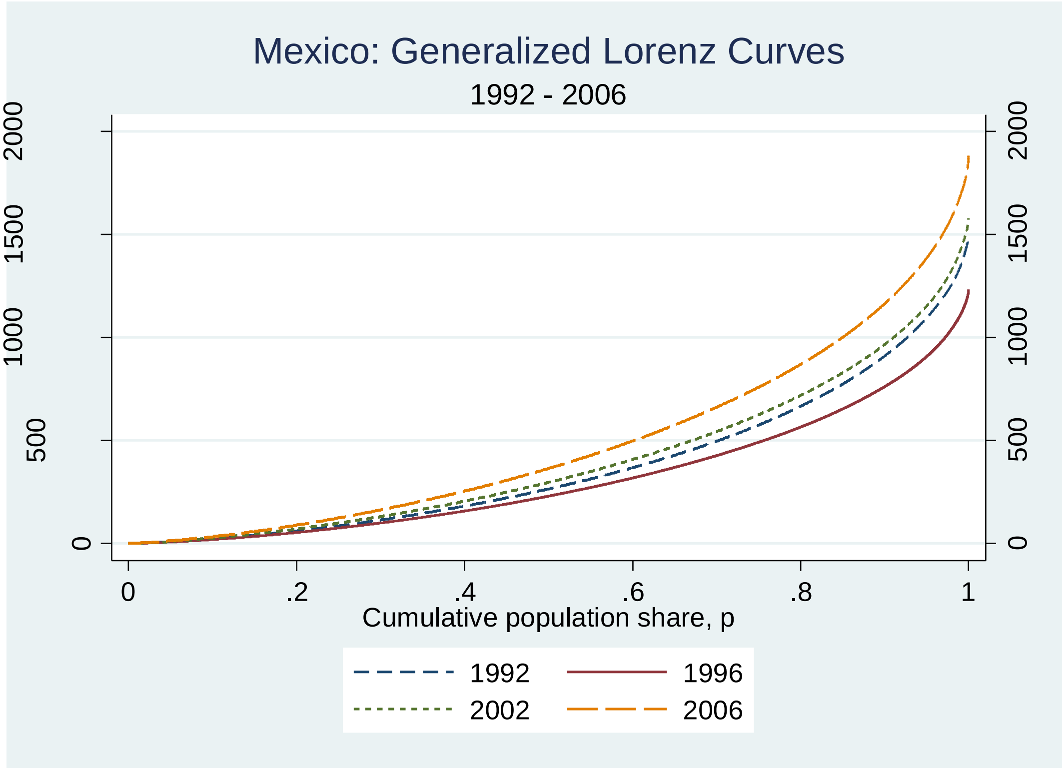
Source: Own calculations with data from ENIGH household surveys, 1992 and 2006.

Figure A5.18. Lorenz Curves using poverty line 1 and equivalised income, 1992-2006.



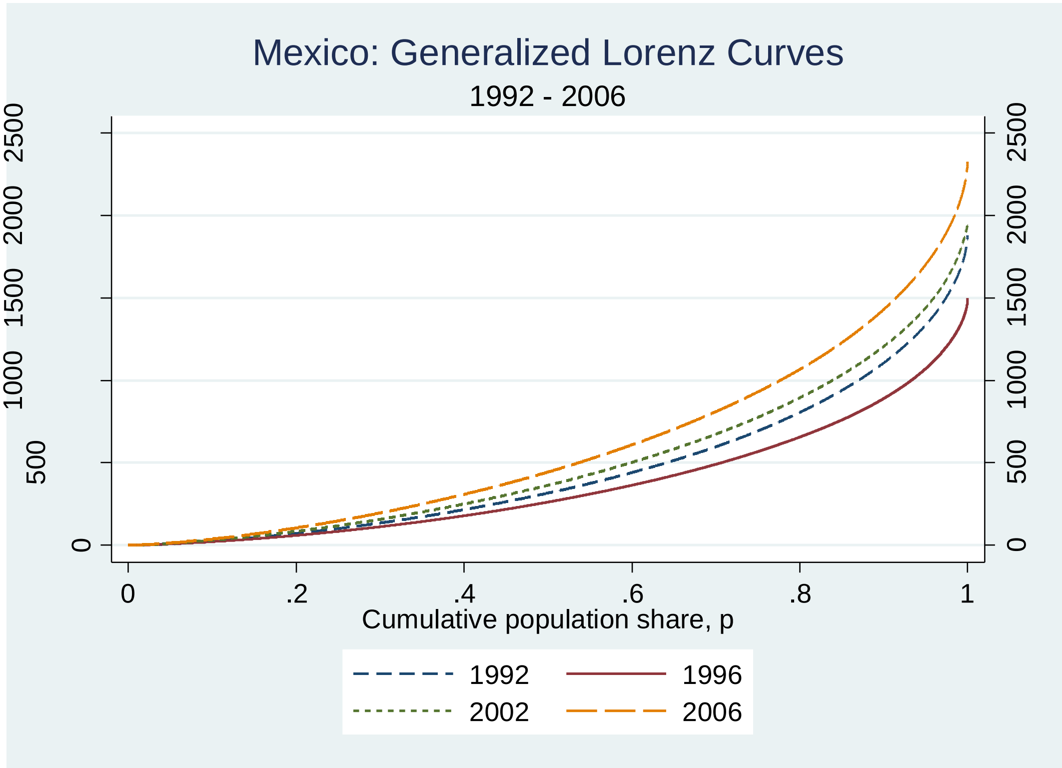
Source: Own calculations with data from ENIGH household surveys, 1992 and 2006.

Figure A5.19 Generalize Lorenz Curves using per capita consumption and PL1.



Source: Own calculations with data from ENIGH household surveys, 1992 and 2006.

Figure A5.20. Generalized Lorenz Curves using poverty line 1 and equivalised income, 1992-2006.



Source: Own calculations with data from ENIGH household surveys, 1992 and 2006.

ANNEX CHAPTER 6

Table A6.1.

Table 1. Mexico: Educational attainment of household heads, by gender
1992-2006

	1992		1994		1996		1998	
	Female	Male	Female	Male	Female	Male	Female	Male
Level of education	%	%	%	%	%	%	%	%
No education	29.4	16.5	31.8	17.2	26.3	13.6	21.9	12.9
Some primary	29.9	31.5	28.4	30.4	30.1	29.0	28.7	27.3
Primary	20.2	25.3	20.0	24.6	22.4	25.1	23.0	25.7
Lower Secondary	11.3	13.5	10.3	13.7	11.7	16.3	14.4	17.7
Upper Secondary	3.1	4.6	3.3	4.5	4.0	5.5	4.5	5.8
University	6.1	8.7	6.3	9.7	5.5	10.4	7.5	10.6

	2000		2002		2004		2006	
	Female	Male	Female	Male	Female	Male	Female	Male
Level of education	%	%	%	%	%	%	%	%
No education	21.9	12.4	21.9	13.3	15.8	9.1	18.2	9.6
Some primary	28.5	26.3	27.4	24.0	23.2	20.6	23.2	21.1
Primary	23.5	23.7	22.3	23.9	23.1	22.1	22.0	23.5
Lower Secondary	14.0	18.4	16.1	20.6	21.7	24.1	21.1	22.7
Upper Secondary	4.3	6.3	4.8	6.7	5.9	8.0	5.8	8.2
University	7.7	13.1	7.6	11.6	10.3	16.1	9.8	14.9

Source: Own calculations with data from the ENIGHs 1992-2006.

Table A6.2.

Mexico: Income deciles by Industry, 1992

Industry	1	2	3	4	5	6	7	8	9	10	Total
Agriculture	66	50	37	29	23	18	15	14	10	7	27
Mining & Electricity	0	0	1	2	1	2	2	2	2	2	1
Manufacturers	5	10	10	13	14	14	15	15	14	13	12
Construction	8	12	12	13	12	8	9	7	6	3	9
Commerce	5	7	10	11	13	15	12	14	16	15	12
Transport	1	3	4	4	5	6	6	6	6	5	5
Financial services	0	0	0	0	0	0	1	1	1	4	1
Rest of services	5	9	14	17	18	20	23	24	29	38	20
Not economically active	9	9	11	11	14	16	17	16	16	13	13
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Authors calculations with data from the 1992 ENIGH household survey.

Table A6.3.

Mexico: Income deciles by Industry, 2006

Industry	1	2	3	4	5	6	7	8	9	10	Total
Agriculture	53	31	20	14	12	9	8	7	5	4	16
Mining & Electricity	1	0	1	1	1	1	2	2	2	3	1
Manufacturers	7	11	13	14	14	15	13	14	12	10	12
Construction	9	13	14	13	11	10	7	7	6	6	10
Commerce	6	10	11	12	14	16	15	13	13	11	12
Transport	2	3	4	5	6	5	5	4	4	4	4
Financial services	0	0	0	0	0	0	0	1	1	2	1
Rest of services	8	16	20	22	24	27	30	34	37	43	26
Not economically active	15	15	16	18	18	17	19	19	19	17	17
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Authors calculations with data from the 2006 ENIGH household survey.

Table A6.4.

Mexico: Shares of educational level by income decile within income group, for urban and rural areas, 2006

Urban areas

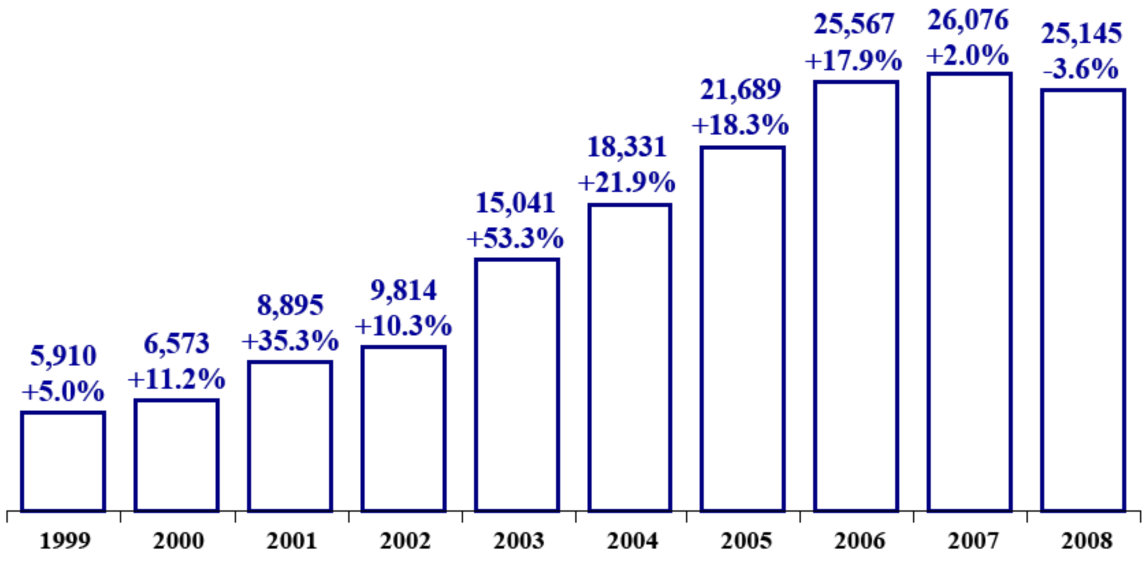
Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	30.7	39.3	21.4	7.4	1.0	0.1	100
2	23.8	35.1	24.3	13.9	2.3	0.6	100
3	20.5	32.1	27.0	16.4	3.1	0.9	100
4	18.8	34.8	24.5	16.3	3.2	2.4	100
5	16.2	28.4	27.8	19.6	5.4	2.6	100
6	14.3	30.1	23.7	22.6	4.9	4.3	100
7	12.6	28.5	21.3	22.6	8.1	6.8	100
8	12.6	25.6	20.0	20.2	9.3	12.3	100
9	8.5	17.4	20.5	23.6	10.5	19.4	100
10	4.0	13.8	13.5	21.5	8.9	38.2	100
Total	20.1	32.0	23.2	15.9	4.1	4.7	100

Rural areas

Quintile group	No education	Some primary	Primary	Lower Secondary	Upper Secondary	University	Total
1	20.7	32.1	27.2	15.8	2.4	1.9	100
2	14.1	24.8	32.0	22.1	4.4	2.7	100
3	11.0	22.4	28.3	28.8	7.5	1.9	100
4	10.7	22.4	30.2	27.4	6.0	3.3	100
5	8.2	18.9	29.1	30.0	7.9	5.9	100
6	6.7	18.0	26.9	29.7	9.8	8.8	100
7	6.1	17.0	24.5	27.5	11.3	13.6	100
8	4.7	12.3	21.5	28.8	12.4	20.3	100
9	3.0	8.1	16.0	26.1	11.7	35.1	100
10	1.2	3.8	8.8	16.7	12.1	57.5	100
Total	6.9	15.7	23.1	26.0	9.6	18.7	100

Source: Own calculations with data from the ENIGHs 1992 and 2006.
Primary includes incomplete lower secondary; Secondary includes incomplete upper Secondary; and University includes Incomplete University, University and Postgraduate.

Figure A6.1. Mexico: Total income remittances, millions of dollars, 1999-2008



Source: Banco de México (2009) Las remesas familiares en 2008. Figure 2, pp.2.

Table A6.5.

Mexico: Categories of sources of Income from different Industries

Industry	Code
Agriculture	1111, 1112, 1200, 1300 y 9710
Mining	2100, 2200, 2310, 2320 2910 y 2920
Manufacturers	3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3121, 3122, 3130, 3140, 3211, 3212, 3213, 3214, 3220, 3230, 3240, 3311, 3312, 3320, 3410, 3420, 3511, 3512, 3513, 3521, 3522, 3530, 3540, 3550, 3560, 3611, 3612, 3620, 3691, 3710, 3720, 3811, 3812, 3813, 3814, 3821, 3822, 3823, 3831, 3832, 3833, 3841, 3842, 3850, 3900
Electricity	4100, 4200
Construction	5011, 5012, 5013, 5014, 5020, 5030, 9720
Comerce	6110, 6120, 6140, 6210, 6220, 6230, 6240, 6250, 6260, 9750
Transport	7111, 7112, 7113, 7120, 7130, 7200, 9790, 9731, 9732, 9733
Financial services	8110, 8120, 8130,
Other services	8211, 8212, 8311, 8312, 9310, 9320, 9510, 9740, 9100, 9211, 9212, 9221, 9222, 9231, 9232, 9241, 9242, 9250, 9290, 9411, 9412, 9421, 9422, 9491, 9492, 9520, 9530, 9540, 9611, 9612, 9613, 9800

Source: Categories formed using INEGI's classification.
The *other services* category was formed grouping all the services sector excluding the financial services.

The following sub-groups were formed for the *industry* variable:

* (1) Agriculture
* (2) Mining
* (3) Manufacturers
* (4) Electricity
* (5) Construction
* (6) Commerce
* (7) Transport
* (8) Financial services
* (9) Other services

* (10) Unemployed and not economically active

Table A6.6.

Mexico: Occupation groups

Code	Description	Original Description
11	Professionals	Profesionistas
12	Technicians	Técnicos
13	Education workers	Trabajadores de la educación
14	Arts, show business and sports workers	Trabajadores del arte, espectáculos y deportes
21	High Level Bureaucrats and Managers (public and private sector)	Funcionarios y directivos de los sectores público, privado y social.
41	Workers in the agricultural sector	Trabajadores en actividades agrícolas, ganaderas, silvícolas, y de caza y pesca.
51	Medium Level Managers	Jefes, supervisores y otros trabajadores de control en la fabricación artesanal e industrial y en actividades de
52	Industrial workers	Artesanos y trabajadores fabriles en la industria de la transformación y trabajadores en actividades de repara
53	Machine operators	Operadores de maquinaria fija de movimiento continuo y equipos en el proceso de producción industrial.
54	Industrial assistants	Ayudantes, peones y similares en la fabricación artesanal e industrial y en actividades de reparación y mante
55	Drivers	Conductores y ayudantes de conductores de maquinaria móvil y medios de transporte
61	Foremen	Jefes de departamento, coordinadores y supervisores en actividades administrativas y de servicios.
62	Clerks	Trabajadores de apoyo en actividades administrativas.
71	Salespersons	Comerciantes, empleados de comercio y agentes de ventas.
72	Street sellers	Vendedores ambulantes y trabajadores ambulantes en servicios.
81	Workers in personal Services	Trabajadores en servicios personales en establecimientos.
82	Workers in domestic services	Trabajadores en servicios domésticos.
83	Armed Forces and security workers	Trabajadores en servicios de protección y vigilancia y fuerzas armadas.
99	Other type of workers	Otros trabajadores con ocupaciones no clasificados anteriormente, insuficientemente especificado y no espe

Source: Occupations formed using INEGI's classification.

The following *occupational* subgroups were formed:

* (1) Professionals, Technicians and Teachers
* (2) High Level Bureaucrats and Managers (public and private sector)
* (3) Medium level and low level office workers
* (4) Salespersons, Workers in personal services,
* (5) Arts, show business, sports workers and other type of workers
* (6) Drivers, armed forces and security workers
* (7) Industrial workers and Machine operators
* (8) Industrial assistants
* (9) Street sellers and domestic services
* (10) Agricultural sector workers and primary sector
* (11) Unemployed and not economically active

The variable *education* has 7 subgroups:

* (0) no education
* (1) with some primary
* (2) with primary
* (3) with some secondary
* (4) with secondary (includes technical or commercial career)
* (5) with some preparatory
* (6) with preparatory (includes normal and technical or commercial career)
* (7) with superior (includes Professional, Master and PhD)

The variable *conditions* of work has 4 subgroups:

* conditions=0 when the household head works in the formal sector
* conditions=1 when it works in the informal sector
* conditions=2 when the household head is unemployed;
* conditions=3 when the household head is not economically active

The variable *region* has 7 subgroups:

* (0) *Mexico City*
* (1) *North West* (Baja California, Baja California Norte, Sinaloa, Sonora, Nayarit)
* (2) *North East* (Tamaulipas, Nuevo León)
* (3) *North* (Coahuila, Chihuahua, San Luís Potosí, Zacatecas, Durango)
* (4) *Center* (Hidalgo, Querétaro, Tlaxcala, México, Morelos, Puebla)
* (5) *Center West* (Aguascalientes, Colima, Guanajuato, Jalisco, Michoacán)
* (6) *South* includes South (Tabasco, Veracruz); South-East (Chiapas, Guerrero, Oaxaca); and South-West (Campeche, Quintana Roo, Yucatán)

The *rural/urban* variable subgroup mean:

* (0) Urban: the household is situated in an urban area with 15,000 or more inhabitants.

* (1) Rural: the household is situated in a rural area with less than 14,999 inhabitants.

The variable *age* has 6 sub-groups:

* (1) if edad<25
* (2) if edad>=25 & edad<=34
* (3) if edad>=35 & edad<=44
* (4) if edad>=45 & edad<=54
* (5) if edad>=55 & edad<=64
* (6) if edad>=65

The variable *sex* has 2 subgroups:

* (1) the household head is male
* (2) the household head is female

The variable Type of *ownership of the house* the household live in has 2 subgroups:

* (1) Owned by the household
* (2) Otherwise

The variable for the *type of household* is divided in 5 subgroups:

* (1) Unipersonal: Household formed of only one person (usually the household head)
* (2) Nuclear: formed of a household head with/without partner with/without children.
* (3) Ampliado: formed of a household head with/without partner, with/without children, with other family members (such as uncles, cousins, brothers, in laws)
* (4) Compuesto: formed with household head with family and non-family members.
* (5) Corresidentes: formed with household head with non-family members.

The variable for the *employment status* of the household head is divided in 5 subgroups:

* (1) the household head is a full time worker
* (2) the household head is a part time worker
* (3) the household head is unemployed
* (4) the household head is retired
* (5) the household head belongs to the rest of the not economically active population

Table A6.7.

Mexico: Educational attainment by gender, for all the population
1992-2006

	1992		1994		1996		1998	
	Female	Male	Female	Male	Female	Male	Female	Male
Level of education	%	%	%	%	%	%	%	%
No education	29.8	27.8	28.7	27.4	26.2	24.6	15.5	13.6
Some primary	28.4	29.6	27.9	29.3	28.2	28.7	29.6	31.3
Primary	21.6	21.1	22.0	21.5	22.3	21.6	26.4	24.7
Lower Secondary	14.4	13.3	14.7	13.2	15.9	15.4	19.5	18.6
Upper Secondary	2.6	3.1	3.2	3.1	3.3	3.9	3.9	4.6
University	3.2	5.1	3.6	5.5	4.1	5.9	5.2	7.2

	2000		2002		2004		2006	
	Female	Male	Female	Male	Female	Male	Female	Male
Level of education	%	%	%	%	%	%	%	%
No education	21.9	12.4	14.8	13.2	12.4	10.9	13.2	11.5
Some primary	28.5	26.3	28.1	28.5	24.4	25.3	24.5	25.2
Primary	23.5	23.7	24.3	23.9	23.1	22.2	23.0	23.2
Lower Secondary	14.0	18.4	21.2	20.2	24.3	23.4	23.8	22.3
Upper Secondary	4.3	6.3	5.2	5.5	6.5	6.8	7.0	7.1
University	7.7	13.1	6.5	8.6	9.3	11.4	8.5	10.7

Source: Own calculations with data from the ENIGHs 1992-2006.
L. Secondary means Lower Secondary. U. Secondary means Upper Secondary.

Table A6.8.

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for education
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.780	0.506	0.573	1.314	0.620	0.338	0.377	1.057	0.160	0.168	0.196	0.258
1994	0.758	0.508	0.587	1.460	0.582	0.329	0.381	1.190	0.176	0.179	0.206	0.270
1996	0.759	0.487	0.566	1.617	0.603	0.324	0.375	1.367	0.156	0.163	0.191	0.250
1998	0.907	0.522	0.589	2.243	0.740	0.350	0.391	1.983	0.167	0.171	0.198	0.260
2000	0.799	0.495	0.543	1.181	0.629	0.322	0.346	0.930	0.170	0.173	0.196	0.251
2002	0.647	0.439	0.477	0.846	0.497	0.285	0.304	0.631	0.150	0.153	0.173	0.216
2004	0.664	0.439	0.522	2.544	0.530	0.297	0.357	2.331	0.134	0.142	0.165	0.214
2005	0.802	0.471	0.559	1.872	0.658	0.322	0.388	1.653	0.144	0.149	0.171	0.218
2006	0.654	0.431	0.496	1.122	0.527	0.296	0.341	0.924	0.128	0.135	0.155	0.198
					Rw=(100-Rb)				**Rb=(Ib/I)*100**			
1992					79.46	66.79	65.83	80.40	20.54	33.21	34.17	19.60
1994					76.83	64.70	64.90	81.52	23.17	35.30	35.10	18.48
1996					79.50	66.46	66.29	84.52	20.50	33.54	33.71	15.48
1998					81.60	67.16	66.39	88.42	18.40	32.84	33.61	11.58
2000					78.72	65.07	63.79	78.76	21.28	34.93	36.21	21.24
2002					76.82	65.00	63.75	74.53	23.18	35.00	36.25	25.47
2004					79.85	67.71	68.31	91.60	20.15	32.29	31.69	8.40
2005					82.04	68.36	69.41	88.33	17.96	31.64	30.59	11.67
2006					80.45	68.75	68.68	82.38	19.55	31.25	31.32	17.62

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Table A6.9.

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for industry
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.780	0.506	0.573	1.314	0.699	0.435	0.506	1.245	0.081	0.071	0.067	0.070
1994	0.758	0.508	0.587	1.460	0.657	0.422	0.507	1.377	0.101	0.086	0.080	0.083
1996	0.759	0.487	0.566	1.617	0.688	0.425	0.509	1.563	0.071	0.062	0.056	0.053
1998	0.907	0.522	0.589	2.243	0.821	0.450	0.526	2.184	0.086	0.071	0.063	0.059
2000	0.799	0.495	0.543	1.181	0.682	0.405	0.466	1.108	0.117	0.091	0.077	0.073
2002	0.647	0.439	0.477	0.846	0.558	0.368	0.417	0.793	0.089	0.071	0.060	0.053
2004	0.664	0.439	0.522	2.544	0.604	0.389	0.476	2.500	0.060	0.051	0.046	0.044
2005	0.802	0.471	0.559	1.872	0.729	0.408	0.496	1.794	0.073	0.064	0.063	0.077
2006	0.654	0.431	0.496	1.122	0.608	0.389	0.456	1.082	0.046	0.042	0.040	0.039

	Rw=(100-Rb)				Rb=(Ib/I)*100			
1992	89.68	85.99	88.29	94.70	10.32	14.01	11.71	5.30
1994	86.66	83.01	86.34	94.32	13.34	16.99	13.66	5.68
1996	90.63	87.27	90.03	96.69	9.37	12.73	9.97	3.31
1998	90.51	86.32	89.34	97.37	9.49	13.68	10.66	2.63
2000	85.34	81.70	85.81	93.83	14.66	18.30	14.19	6.17
2002	86.23	83.90	87.52	93.72	13.77	16.10	12.48	6.28
2004	90.98	88.46	91.24	98.26	9.02	11.54	8.76	1.74
2005	90.92	86.49	88.65	95.88	9.08	13.51	11.35	4.12
2006	92.93	90.31	92.03	96.48	7.07	9.69	7.97	3.52

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Table A6.10.

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for occupation
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.780	0.506	0.573	1.314	0.609	0.337	0.383	1.069	0.171	0.169	0.189	0.245
1994	0.758	0.508	0.587	1.460	0.584	0.336	0.395	1.211	0.174	0.172	0.193	0.249
1996	0.759	0.487	0.566	1.617	0.633	0.363	0.432	1.458	0.126	0.124	0.134	0.159
1998	0.907	0.522	0.589	2.243	0.757	0.378	0.436	2.059	0.151	0.143	0.153	0.184
2000	0.799	0.495	0.543	1.181	0.608	0.324	0.368	0.976	0.191	0.171	0.175	0.204
2002	0.647	0.439	0.477	0.846	0.497	0.299	0.330	0.672	0.150	0.140	0.147	0.174
2004	0.664	0.439	0.522	2.544	0.552	0.331	0.407	2.411	0.112	0.108	0.115	0.133
2005	0.802	0.471	0.559	1.872	0.669	0.343	0.419	1.699	0.133	0.128	0.140	0.172
2006	0.654	0.431	0.496	1.122	0.549	0.324	0.378	0.979	0.106	0.107	0.118	0.142

	Rw=(100-Rb)				Rb=(Ib/I)*100			
1992	78.10	66.64	66.94	81.32	21.90	33.36	33.06	18.68
1994	77.10	66.19	67.18	82.97	22.90	33.81	32.82	17.03
1996	83.43	74.59	76.39	90.16	16.57	25.41	23.61	9.84
1998	83.40	72.51	74.02	91.81	16.60	27.49	25.98	8.19
2000	76.06	65.48	67.79	82.70	23.94	34.52	32.21	17.30
2002	76.84	68.13	69.20	79.42	23.16	31.87	30.80	20.58
2004	83.17	75.40	78.06	94.77	16.83	24.60	21.94	5.23
2005	83.47	72.73	74.97	90.80	16.53	27.27	25.03	9.20
2006	83.82	75.12	76.20	87.31	16.18	24.88	23.80	12.69

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Table A6.11.

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for conditions
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.821	0.530	0.604	1.414	0.796	0.505	0.579	1.388	0.025	0.025	0.025	0.026
1994	0.758	0.508	0.587	1.460	0.718	0.468	0.547	1.418	0.039	0.040	0.040	0.042
1996	0.759	0.487	0.566	1.617	0.729	0.456	0.534	1.583	0.030	0.031	0.032	0.034
1998	0.907	0.522	0.589	2.243	0.886	0.500	0.566	2.219	0.021	0.022	0.022	0.023
2000	0.799	0.495	0.543	1.181	0.767	0.463	0.510	1.147	0.033	0.033	0.033	0.034
2002	0.647	0.439	0.477	0.846	0.616	0.407	0.445	0.814	0.032	0.032	0.032	0.033
2004	0.664	0.439	0.522	2.544	0.644	0.420	0.503	2.525	0.019	0.019	0.019	0.019
2005	0.802	0.471	0.559	1.872	0.782	0.452	0.540	1.852	0.020	0.019	0.019	0.019
2006	0.654	0.431	0.496	1.122	0.634	0.410	0.475	1.100	0.021	0.021	0.021	0.021

	Rw=(100-Rb)				Rb=(Ib/I)*100			
1992	96.97	95.28	95.81	98.18	3.03	4.72	4.19	1.82
1994	94.83	92.22	93.11	97.12	5.17	7.78	6.89	2.88
1996	96.03	93.64	94.30	97.90	3.97	6.36	5.70	2.10
1998	97.69	95.88	96.21	98.96	2.31	4.12	3.79	1.04
2000	95.92	93.42	93.92	97.13	4.08	6.58	6.08	2.87
2002	95.12	92.81	93.32	96.15	4.88	7.19	6.68	3.85
2004	97.09	95.66	96.37	99.25	2.91	4.34	3.63	0.75
2005	97.56	95.91	96.58	98.98	2.44	4.09	3.42	1.02
2006	96.79	95.14	95.76	98.10	3.21	4.86	4.24	1.90

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Tables A6.12 and A6.13

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for region
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.780	0.506	0.573	1.314	0.747	0.472	0.539	1.279	0.033	0.033	0.034	0.035
1994	0.758	0.508	0.587	1.460	0.715	0.464	0.541	1.410	0.043	0.044	0.046	0.050
1996	0.792	0.503	0.584	1.714	0.721	0.448	0.524	1.571	0.038	0.040	0.042	0.046
1998	0.948	0.538	0.608	2.409	0.890	0.480	0.550	2.348	0.059	0.058	0.058	0.061
2000	0.799	0.495	0.543	1.181	0.752	0.448	0.494	1.128	0.047	0.047	0.048	0.052
2002	0.647	0.439	0.477	0.846	0.598	0.391	0.430	0.797	0.049	0.047	0.047	0.049
2004	0.664	0.439	0.522	2.544	0.631	0.405	0.486	2.506	0.033	0.034	0.036	0.038
2005	0.802	0.471	0.559	1.872	0.759	0.425	0.508	1.813	0.043	0.046	0.051	0.058
2006	0.654	0.431	0.496	1.122	0.627	0.402	0.466	1.089	0.028	0.029	0.030	0.032

	Rw=(100-Rb)				Rb=(Ib/I)*100			
1992	95.74	93.45	94.10	97.32	4.26	6.55	5.90	2.68
1994	94.34	91.37	92.13	96.56	5.66	8.63	7.87	3.44
1996	95.19	92.11	92.78	97.33	4.81	7.89	7.22	2.67
1998	93.83	89.30	90.40	97.47	6.17	10.70	9.60	2.53
2000	94.13	90.58	91.08	95.55	5.87	9.42	8.92	4.45
2002	92.41	89.22	90.10	94.22	7.59	10.78	9.90	5.78
2004	95.03	92.30	93.19	98.49	4.97	7.70	6.81	1.51
2005	94.64	90.23	90.89	96.88	5.36	9.77	9.11	3.12
2006	95.77	93.36	93.93	97.11	4.23	6.64	6.07	2.89

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Mexico: Wthin-group and Between-group inequality using the Generalized Entropy Measure -- static analysis for rural/urban
1992 - 2006

	Generalized Entropy for the total population				Within-group inequality, GE_W(a)				Between-group inequality, GE_B(a):			
	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2	a=-1	a=0	a=1	a=2
1992	0.780	0.506	0.573	1.314	0.661	0.405	0.484	1.233	0.119	0.101	0.089	0.081
1994	0.758	0.508	0.587	1.460	0.631	0.401	0.493	1.374	0.127	0.107	0.094	0.087
1996	0.759	0.487	0.566	1.617	0.662	0.404	0.491	1.548	0.097	0.083	0.075	0.069
1998	0.907	0.522	0.589	2.243	0.806	0.435	0.511	2.171	0.101	0.087	0.078	0.071
2000	0.799	0.495	0.543	1.181	0.709	0.417	0.473	1.117	0.091	0.078	0.069	0.064
2002	0.647	0.439	0.477	0.846	0.578	0.377	0.422	0.795	0.070	0.061	0.055	0.051
2004	0.664	0.439	0.522	2.544	0.601	0.384	0.472	2.498	0.063	0.055	0.050	0.047
2005	0.802	0.471	0.559	1.872	0.714	0.396	0.493	1.811	0.087	0.075	0.066	0.061
2006	0.654	0.431	0.496	1.122	0.584	0.369	0.440	1.071	0.071	0.062	0.055	0.051

	Rw=(100-Rb)				Rb=(Ib/I)*100			
1992	84.73	80.09	84.51	93.82	15.27	19.91	15.49	6.18
1994	83.24	78.91	83.93	94.07	16.76	21.09	16.07	5.93
1996	87.27	82.87	86.82	95.74	12.73	17.13	13.18	4.26
1998	88.83	83.30	86.82	96.81	11.17	16.70	13.18	3.19
2000	88.67	84.26	87.23	94.62	11.33	15.74	12.77	5.38
2002	89.26	86.06	88.43	93.97	10.74	13.94	11.57	6.03
2004	90.58	87.37	90.35	98.16	9.42	12.63	9.65	1.84
2005	89.09	84.09	88.12	96.76	10.91	15.91	11.88	3.24
2006	89.20	85.65	88.81	95.45	10.80	14.35	11.19	4.55

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.
2) The Generalized Entropy Measure is more sensitive to changes in the lower end of the distribution when a=0,-1. It is equally sensitive to changes across the distribution when a=1. And is more sensitive to changes in the higher ends of the distribution when a=2.
3) Rb is a summary measure to obtain the % of total inequality that is explained by between-group inequality. Rw is the measure to obtain the % of total inequality that is explained by within-group inequality.

Table A6.14.

Mexico: Income deciles by Industry, percentage change points 1992-2006

Industry	1	2	3	4	5	6	7	8	9	10	Total
Agriculture	-13	-19	-17	-15	-12	-9	-7	-8	-5	-3	-11
Mining & Electricity	0	0	0	-1	0	0	0	0	0	1	0
Manufacturers	2	1	3	2	0	1	-2	-1	-3	-3	0
Construction	1	1	2	0	-1	1	-2	0	0	2	1
Commerce	1	3	1	1	1	1	3	-1	-3	-4	0
Transport	0	1	1	1	1	0	-2	-2	-2	-1	0
Financial services	0	0	0	0	0	0	0	0	0	-2	0
Rest of services	3	7	6	6	7	7	7	10	8	5	6
Not economically active	6	7	5	7	4	0	2	2	4	4	4

Source: Authors calculations with data from the 1992 and 2006 ENIGH household surveys.

Table A6.15.

Mexico: Static decomposition by income source, desagregation of income from transfers, 1992-2006

	1992	1994	1996	1998	2000	2002	2004	2005	2006
Total transing	4.6	1.5	2.5	3.5	9.4	5.4	33.2	3.2	6.5
pensions	0.7	1.0	1.0	1.6	2.6	3.4	8.8	2.5	3.7
insurance	2.7	0.1	0.2	1.2	0.6	0.7	6.9	0.3	1.3
scholarships	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
presents	0.8	0.4	0.5	0.4	5.4	1.1	0.6	0.4	1.1
remittances	0.3	0.0	0.7	0.3	0.8	0.2	17.0	0.0	0.2
procampo	NA	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.3
oportunidades	NA	NA	NA	NA	NA	0.0	0.0	-0.2	-0.3

Source: Own calculations using the 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005 and 2006 ENIGH Household Surveys.
1) Using per capita income as the welfare indicator.

Table A6.16.

Mexico: OLS income generating equation results for the urban population
1992-2008

	1992		1994		1996		1998		2000	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Educational level										
No education	-0.368**	(0.036)	-0.404**	(0.030)	-0.368**	(0.029)	-0.381**	(0.036)	-0.361**	(0.035)
Some primary	-0.197**	(0.025)	-0.180**	(0.022)	-0.180**	(0.021)	-0.190**	(0.024)	-0.194**	(0.025)
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.248**	(0.026)	0.218**	(0.023)	0.257**	(0.020)	0.224**	(0.023)	0.180**	(0.025)
Upper Secondary	0.469**	(0.040)	0.558**	(0.033)	0.522**	(0.031)	0.463**	(0.034)	0.446**	(0.037)
University	0.960**	(0.032)	0.966**	(0.029)	0.983**	(0.027)	0.961**	(0.030)	0.894**	(0.030)
Industry										
Agriculture	-0.647**	(0.098)	-0.555**	(0.109)	-0.183	(0.102)	-0.406**	(0.094)	-0.497**	(0.110)
Mining	-0.481**	(0.105)	-0.391**	(0.112)	0.060	(0.103)	-0.165	(0.097)	-0.172	(0.109)
Manufacturers	-0.480**	(0.082)	-0.410**	(0.098)	-0.155	(0.092)	-0.289**	(0.079)	-0.342**	(0.090)
Construction	-0.597**	(0.084)	-0.478**	(0.100)	-0.261**	(0.094)	-0.389**	(0.083)	-0.426**	(0.092)
Commerce	-0.457**	(0.083)	-0.390**	(0.098)	-0.151	(0.093)	-0.286**	(0.080)	-0.361**	(0.091)
Transport	-0.368**	(0.087)	-0.390**	(0.101)	-0.064	(0.095)	-0.224**	(0.082)	-0.292**	(0.095)
Financial	B	B	B	B	B	B	B	B	B	B
Other	-0.514**	(0.081)	-0.391**	(0.097)	-0.158	(0.091)	-0.336**	(0.078)	-0.362**	(0.088)
Unemployed	-0.568**	(0.087)	-0.512**	(0.101)	-0.177	(0.095)	-0.389**	(0.083)	-0.326**	(0.092)
Region										
Mexico City	-0.092**	(0.027)	0.039	(0.024)	0.015**	(0.026)	-0.121**	(0.027)	0.029	(0.036)
North	B	B	B	B	B	B	B	B	B	B
Center	-0.153**	(0.022)	-0.102**	(0.020)	-0.085**	(0.018)	-0.156**	(0.021)	-0.111**	(0.023)
South	-0.166**	(0.031)	-0.170**	(0.025)	-0.115**	(0.022)	-0.250**	(0.027)	-0.274**	(0.021)
Marital status										
Divorced	NA	NA	NA	NA	0.099**	(0.037)	0.106**	(0.039)	0.127**	(0.038)
Single	NA	NA	NA	NA	0.227**	(0.039)	0.214**	(0.044)	0.179**	(0.043)
Union	NA	NA	NA	NA	-0.111**	(0.025)	-0.095**	(0.027)	-0.120**	(0.026)
Married	NA	NA	NA	NA	B	B	B	B	B	B
Age	0.008**	(0.001)	0.010**	(0.001)	0.009**	(0.001)	0.010**	(0.001)	0.008**	(0.001)
Male	-0.112**	(0.028)	-0.070**	(0.024)	0.026	(0.036)	0.029	(0.037)	0.093**	(0.036)
Formal sector	0.076**	(0.021)	0.090**	(0.019)	0.131**	(0.017)	0.093**	(0.020)	0.101**	(0.021)
Household Characteristics:										
Household Size	-0.095**	(0.005)	-0.108**	(0.005)	-0.116**	(0.004)	-0.112**	(0.005)	-0.110**	(0.006)
Dependency Ratio	-0.282**	(0.015)	-0.293**	(0.013)	-0.253**	(0.012)	-0.260**	(0.014)	-0.225**	(0.015)
Constant	8.220**	(0.096)	8.068**	(0.105)	7.376**	(0.104)	7.699**	(0.099)	7.813**	(0.106)
R-squared	0.4319		0.4747		0.4839		0.4672		0.4364	
Sample size	5413		6520		7477		5836		5398	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.

Table A6.16. (continues)

Mexico: OLS income generating equation results for the urban population
1992-2008

	2002		2004		2005		2006		2008	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Educational level										
No education	-0.275**	(0.025)	-0.417**	(0.024)	-0.375**	(0.025)	-0.372**	(0.025)	-0.398**	(0.025)
Some primary	-0.133**	(0.018)	-0.165**	(0.016)	-0.177**	(0.017)	-0.182**	(0.017)	-0.192**	(0.017)
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.192**	(0.017)	0.198**	(0.014)	0.210**	(0.016)	0.198**	(0.015)	0.203**	(0.014)
Upper Secondary	0.485**	(0.024)	0.457**	(0.020)	0.422**	(0.021)	0.411**	(0.021)	0.442**	(0.019)
University	0.894**	(0.022)	0.937**	(0.018)	0.880**	(0.018)	0.895**	(0.019)	0.967**	(0.017)
Industry										
Agriculture	-0.433**	(0.109)	-0.468**	(0.070)	-0.330**	(0.083)	-0.229**	(0.072)	-0.427**	(0.061)
Mining	-0.068	(0.111)	-0.094	(0.075)	-0.000	(0.084)	0.005	(0.075)	-0.065	(0.063)
Manufacturers	-0.303**	(0.102)	-0.413**	(0.061)	-0.292**	(0.075)	-0.217**	(0.065)	-0.326**	(0.045)
Construction	-0.297**	(0.103)	-0.427**	(0.062)	-0.296**	(0.076)	-0.208**	(0.066)	-0.262**	(0.047)
Commerce	-0.272**	(0.102)	-0.379**	(0.061)	-0.314**	(0.075)	-0.225**	(0.065)	-0.340**	(0.045)
Transport	-0.238*	(0.104)	-0.349**	(0.063)	-0.258**	(0.077)	-0.203**	(0.067)	-0.326**	(0.049)
Financial	B	B	B	B	B	B	B	B	B	B
Other	-0.277**	(0.101)	-0.347**	(0.060)	-0.271**	(0.074)	-0.178**	(0.064)	-0.244**	(0.044)
Unemployed	-0.341**	(0.103)	-0.392**	(0.062)	-0.281**	(0.076)	-0.229**	(0.066)	-0.694**	(0.050)
Region										
Mexico City	-0.037	(0.022)	-0.002	(0.015)	0.068**	(0.023)	0.032	(0.022)	-0.018	(0.018)
North	B	B	B	B	B	B	B	B	B	B
Center	-0.104**	(0.014)	-0.117**	(0.013)	-0.107**	(0.013)	-0.058**	(0.013)	-0.055**	(0.012)
South	-0.230**	(0.017)	-0.210**	(0.015)	-0.135**	(0.015)	-0.121**	(0.016)	-0.162**	(0.015)
Marital status										
Divorced	0.112**	(0.026)	0.038	(0.020)	0.019	(0.021)	0.061**	(0.020)	0.064**	(0.018)
Single	0.167**	(0.031)	0.151**	(0.023)	0.100**	(0.025)	0.140**	(0.023)	0.153**	(0.022)
Union	-0.092**	(0.019)	-0.096**	(0.016)	-0.100**	(0.017)	-0.098**	(0.016)	-0.096**	(0.016)
Married	B	B	B	B	B	B	B	B	B	B
Age	0.008**	(0.001)	0.009**	(0.000)	0.010**	(0.000)	0.009**	(0.000)	0.010**	(0.000)
Male	0.070**	(0.025)	-0.009	(0.018)	-0.023	(0.019)	0.013	(0.018)	0.048**	(0.016)
Formal sector	0.113**	(0.014)	0.129**	(0.012)	0.142**	(0.013)	0.106**	(0.013)	0.076**	(0.011)
Household Characteristics:										
Household Size	-0.115**	(0.004)	-0.116**	(0.003)	-0.115**	(0.003)	-0.117**	(0.004)	-0.094**	(0.004)
Dependency Ratio	-0.249**	(0.010)	-0.236**	(0.009)	-0.235**	(0.010)	-0.219**	(0.010)	-0.287**	(0.010)
Constant	7.767**	(0.109)	7.881**	(0.068)	7.776**	(0.082)	7.771**	(0.073)	7.570**	(0.055)
R-squared	0.444		0.4459		0.4248		0.4413		0.3914	
Sample size	10275		15833		14187		13278		19416	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.

Table A6.17.

Mexico: OLS income generating equation results for the rural population
1992-2006

	1992		1994		1996		1998		2000	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Educational level										
No education	-0.390**	(0.034)	-0.366**	(0.028)	-0.362**	(0.031)	-0.352**	(0.036)	-0.421**	(0.036)
Some primary	-0.174**	(0.029)	-0.184**	(0.025)	-0.187**	(0.024)	-0.168**	(0.030)	-0.239**	(0.028)
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.190**	(0.045)	0.167**	(0.037)	0.225**	(0.035)	0.159**	(0.039)	0.136**	(0.036)
Upper Secondary	0.598**	(0.087)	0.536**	(0.072)	0.579**	(0.058)	0.570**	(0.075)	0.381**	(0.065)
University	1.128**	(0.099)	0.869**	(0.066)	0.924**	(0.053)	0.994**	(0.074)	0.867**	(0.058)
Industry										
Agriculture	B	B	B	B	B	B	B	B	B	B
Mining	0.377**	(0.078)	0.034	(0.054)	0.334**	(0.088)	0.479**	(0.096)	0.409**	(0.077)
Manufacturers	0.136**	(0.040)	0.104**	(0.033)	0.124**	(0.033)	0.127**	(0.038)	0.178**	(0.039)
Construction	0.147**	(0.036)	0.151**	(0.032)	0.109**	(0.031)	0.090*	(0.041)	0.191**	(0.035)
Commerce	0.317**	(0.040)	0.309**	(0.034)	0.296**	(0.035)	0.310**	(0.042)	0.378**	(0.039)
Transport	0.247**	(0.058)	0.421**	(0.053)	0.372**	(0.049)	0.346**	(0.058)	0.396**	(0.066)
Financial	0.427**	(0.148)	-0.038	(0.410)	0.585**	(0.202)	-0.507**	(0.147)	0.561	(0.395)
Other	0.269**	(0.041)	0.225**	(0.032)	0.206**	(0.032)	0.213**	(0.037)	0.257**	(0.037)
Unemployed	0.098*	(0.045)	0.087*	(0.035)	0.031	(0.036)	0.133**	(0.040)	0.145**	(0.039)
Region										
Mexico City	0.172	(0.113)	0.010	(0.092)	0.138	(0.119)	-0.253**	(0.094)	-0.189*	(0.089)
North	B	B	B	B	B	B	B	B	B	B
Center	-0.140**	(0.025)	-0.196**	(0.021)	-0.249**	(0.024)	-0.267**	(0.026)	-0.110**	(0.026)
South	-0.283**	(0.028)	-0.347**	(0.023)	-0.363**	(0.023)	-0.373**	(0.028)	-0.401**	(0.026)
Marital status										
Divorced	NA	NA	NA	NA	0.079	(0.042)	0.079	(0.051)	0.057	(0.045)
Single	NA	NA	NA	NA	0.124*	(0.049)	0.189**	(0.065)	0.170**	(0.059)
Union	NA	NA	NA	NA	-0.130**	(0.027)	-0.097**	(0.033)	-0.079**	(0.031)
Married	NA	NA	NA	NA	B	B	B	B	B	B
Age	0.007**	(0.001)	0.006**	(0.001)	0.008**	(0.001)	0.006**	(0.001)	0.008**	(0.001)
Male	-0.018	(0.043)	-0.025	(0.031)	-0.046	(0.044)	0.039	(0.053)	0.044	(0.047)
Formal sector	0.177**	(0.027)	0.241**	(0.024)	0.222**	(0.025)	0.299**	(0.028)	0.271**	(0.028)
Household Characteristics:										
Household Size	-0.078**	(0.005)	-0.089**	(0.004)	-0.094**	(0.004)	-0.098**	(0.005)	-0.111**	(0.005)
Dependency Ratio	-0.254**	(0.015)	-0.243**	(0.012)	-0.231**	(0.014)	-0.223**	(0.016)	-0.247**	(0.016)
Constant	7.053**	(0.067)	7.216**	(0.053)	6.967**	(0.065)	6.944**	(0.074)	7.079**	(0.071)
R-squared	0.3581		0.386		0.4047		0.3839		0.4461	
Sample size	4755		5995		6187		4733		4430	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.

Table A6.17. (continues)

Mexico: OLS income generating equation results for the rural population
1992-2006

	2002		2004		2005		2006		2008	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Educational level										
No education	-0.426**	(0.027)	-0.437**	(0.029)	-0.474**	(0.027)	-0.461**	(0.028)	-0.342**	(0.027)
Some primary	-0.159**	(0.024)	-0.172**	(0.025)	-0.187**	(0.021)	-0.177**	(0.023)	-0.174**	(0.021)
Primary	B	B	B	B	B	B	B	B		
Lower Secondary	0.171**	(0.030)	0.221**	(0.029)	0.168**	(0.025)	0.200**	(0.027)	0.195**	(0.023)
Upper Secondary	0.527**	(0.058)	0.526**	(0.049)	0.409**	(0.042)	0.374**	(0.044)	0.459**	(0.040)
University	0.853**	(0.061)	1.090**	(0.052)	1.078**	(0.042)	1.001**	(0.047)	1.112**	(0.047)
Industry										
Agriculture	B	B	B	B	B	B	B	B		
Mining	0.264**	(0.078)	0.558**	(0.064)	0.629**	(0.058)	0.521**	(0.079)	0.747**	(0.064)
Manufacturers	0.249**	(0.032)	0.322**	(0.033)	0.213**	(0.030)	0.276**	(0.030)	0.386**	(0.024)
Construction	0.249**	(0.029)	0.322**	(0.031)	0.296**	(0.027)	0.340**	(0.027)	0.446**	(0.025)
Commerce	0.372**	(0.033)	0.435**	(0.034)	0.347**	(0.030)	0.384**	(0.031)	0.427**	(0.027)
Transport	0.402**	(0.053)	0.359**	(0.046)	0.418**	(0.045)	0.340**	(0.052)	0.513**	(0.045)
Financial	-0.230	(0.362)	0.037	(0.216)	0.921**	(0.318)	0.898**	(0.202)	0.880**	(0.164)
Other	0.317**	(0.028)	0.366**	(0.029)	0.361**	(0.025)	0.336**	(0.029)	0.519**	(0.022)
Unemployed	0.212**	(0.033)	0.265**	(0.032)	0.208**	(0.029)	0.239**	(0.031)	-0.149**	(0.035)
Region										
Mexico City	-0.088	(0.045)	-0.001	(0.060)	-0.195**	(0.065)	-0.037	(0.059)	0.069	(0.053)
North	B	B	B	B	B	B	B	B		
Center	-0.068**	(0.021)	-0.145**	(0.022)	-0.113**	(0.021)	-0.096**	(0.021)	-0.074**	(0.020)
South	-0.335**	(0.022)	-0.375**	(0.022)	-0.311**	(0.020)	-0.300**	(0.022)	-0.314**	(0.022)
Marital status										
Divorced	0.064	(0.036)	-0.041	(0.034)	0.025	(0.029)	0.068*	(0.032)	-0.061*	(0.028)
Single	0.096*	(0.047)	0.066	(0.047)	0.113**	(0.041)	0.089*	(0.044)	0.051	(0.041)
Union	-0.150**	(0.024)	-0.048	(0.025)	-0.084**	(0.021)	-0.078**	(0.022)	-0.115**	(0.021)
Married	B	B	B	B	B	B	B	B		
Age	0.009**	(0.001)	0.009**	(0.001)	0.008**	(0.001)	0.008**	(0.001)	0.009**	(0.001)
Male	0.099**	(0.037)	-0.014	(0.034)	-0.020	(0.028)	-0.034	(0.030)	-0.025	(0.024)
Formal sector	0.278**	(0.023)	0.218**	(0.023)	0.237**	(0.020)	0.233**	(0.022)	-0.051**	(0.016)
Household Characteristics:										
Household Size	-0.102**	(0.004)	-0.116**	(0.005)	-0.114**	(0.004)	-0.111**	(0.004)	-0.085**	(0.004)
Dependency Ratio	-0.217**	(0.013)	-0.203**	(0.014)	-0.221**	(0.012)	-0.214**	(0.012)	-0.246**	(0.012)
Constant	6.753**	(0.058)	6.946**	(0.056)	7.024**	(0.050)	7.116**	(0.051)	6.753**	(0.049)
R-squared	0.4388		0.4706		0.4457		0.4376		0.3546	
Sample size	6511		6729		8941		7573		10335	

Source: Own calculations using Robust OLS with data from ENIGH Household Surveys for 1992-2008.
** Significant at the 1% level. * Significant at the 5% level
Robust standard errors in parenthesis.

Table A6.18. Education levels in Latin America and East Asia.

(Percent of the population over 25 years of age at each level)	Latin America	East Asia
No education	23.6	20.1
Primary, complete or incomplete	50.8	43.8
Secondary, complete or incomplete	16.9	28.0
Higher, complete or incomplete	8.6	8.2

Source: Figure 2.1 from IADB (1998) Facing up to Inequality in Latin America: Economic and Social Progress in Latin America. 1988-1999 Report, Washington.

Table A6.19.

Mexico: Factor inequality shares for per capita monthly income, total population
1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Residual	**49.1**	**46.6**	**47.7**	**47.6**	**48.3**	**45.7**	**46.6**	**47.7**	**48.2**	**53.1**
Household head characteristics:	**27.9**	**29.4**	**27.7**	**27.3**	**28.8**	**28.7**	**31.5**	**28.6**	**28.8**	**29.0**
Educational level	**20.0**	**20.9**	**20.8**	**19.9**	**20.5**	**19.7**	**22.9**	**21.3**	**21.5**	**20.8**
No education	3.9	4.2	3.0	3.4	3.6	3.9	3.7	3.7	3.5	2.5
Some primary	2.0	2.0	2.2	2.0	2.4	1.3	1.7	1.9	1.8	1.7
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	1.2	0.9	1.2	0.8	0.5	0.7	0.5	0.5	0.5	0.3
Upper Secondary	1.7	2.0	2.1	1.7	1.4	2.0	1.5	1.4	1.3	1.4
University	11.1	11.9	12.3	12.1	12.5	11.8	15.6	13.7	14.3	15.0
Industry total	**4.6**	**3.9**	**3.3**	**3.8**	**4.5**	**5.3**	**4.9**	**4.6**	**4.5**	**5.9**
Agriculture	11.9	9.4	5.2	6.9	9.2	8.5	8.7	7.6	7.0	7.7
Mining	-0.2	-0.1	0.0	0.0	-0.1	0.0	0.0	0.1	0.0	0.0
Manufacturers	-1.2	-0.7	-0.3	-0.4	-0.7	-0.4	-0.4	-0.2	-0.2	0.0
Construction	1.1	0.8	0.6	0.7	0.8	0.3	0.6	0.4	0.4	0.3
Commerce	-1.3	-0.9	-0.3	-0.5	-0.7	-0.5	-0.6	-0.5	-0.3	-0.4
Transport	-0.4	-0.4	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Financial services	B	B	B	B	B	B	B	B	B	B
Rest of services	-4.2	-3.4	-1.6	-2.2	-3.2	-2.1	-2.9	-2.4	-2.0	-2.8
Unemployed	-1.1	-0.8	-0.4	-0.5	-0.6	-0.4	-0.3	-0.3	-0.3	1.1
Region total	**1.5**	**2.4**	**2.1**	**2.2**	**2.4**	**2.3**	**2.6**	**1.8**	**1.6**	**1.4**
Mexico City	-0.5	0.1	-0.1	-0.8	0.0	-0.2	-0.1	0.1	0.0	-0.1
North	B	B	B	B	B	B	B	B	B	B
Center	0.4	0.6	0.4	0.7	0.1	0.2	0.4	0.2	0.0	0.0
South	1.6	1.7	1.8	2.3	2.3	2.3	2.3	1.5	1.5	1.5
Marital status	**NA**	**NA**	**1.5**	**1.4**	**1.4**	**1.4**	**0.9**	**1.0**	**1.3**	**0.9**
Divorced	NA	NA	0.3	0.3	0.3	0.3	0.0	0.1	0.2	0.0
Single	NA	NA	0.8	0.8	0.8	0.6	0.6	0.5	0.6	0.5
Union	NA	NA	0.5	0.3	0.4	0.5	0.3	0.4	0.4	0.4
Married	NA	NA	B	B	B	B	B	B	B	B
Age	0.0	0.0	0.1	0.1	-0.2	0.3	0.6	0.4	0.6	0.6
Male	0.3	0.2	0.0	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.0
Formal sector	1.5	2.0	2.3	2.2	2.1	2.3	1.9	2.2	1.8	0.1
Household Characteristics:	**23.0**	**24.0**	**22.2**	**22.9**	**21.1**	**23.3**	**19.4**	**21.0**	**20.7**	**17.1**
Urban	6.7	6.3	4.5	6.9	4.7	7.0	4.5	6.1	5.1	5.5
Household Size	8.6	10.2	11.1	9.7	10.4	10.1	9.7	9.7	10.2	5.7
Dependency Ratio	7.7	7.5	6.6	6.3	6.0	6.1	5.2	5.3	5.4	5.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Own calculations using expression 3.27 in the text.

Table A6.20.

Mexico: Factor inequality shares for per capita monthly income, urban population
1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Residual	**56.8**	**52.5**	**51.6**	**53.3**	**56.4**	**55.6**	**55.4**	**57.5**	**55.9**	**60.9**
Household head characteristics:	**26.6**	**29.3**	**29.6**	**29.0**	**29.3**	**26.5**	**29.6**	**27.2**	**27.8**	**26.9**
Educational level	**23.1**	**25.0**	**24.4**	**23.5**	**23.5**	**21.5**	**23.8**	**22.0**	**23.0**	**22.2**
No education	2.0	2.9	2.1	2.0	2.0	1.4	2.1	1.8	1.9	1.6
Some primary	2.2	1.7	1.9	1.8	1.9	1.2	1.3	1.5	1.5	1.4
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.7	0.2	0.3	0.0	-0.2	-0.3	-0.6	-0.5	-0.5	-0.7
Upper Secondary	1.6	2.2	2.2	1.4	1.3	1.9	1.2	1.1	1.1	0.9
University	16.6	17.9	17.8	18.4	18.5	17.3	19.8	18.1	19.1	18.9
Industry total	**1.6**	**1.4**	**0.8**	**0.7**	**1.0**	**0.7**	**1.2**	**0.8**	**0.6**	**1.6**
Agriculture	1.3	1.0	0.3	0.7	0.8	0.7	0.6	0.5	0.2	0.4
Mining	-0.1	-0.1	0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0
Manufacturers	0.1	0.3	0.1	0.3	0.0	0.4	0.6	0.4	0.4	0.7
Construction	3.0	2.2	1.2	1.6	2.1	1.0	1.5	1.0	0.7	0.5
Commerce	-0.2	0.0	0.2	0.1	0.4	0.2	0.3	0.4	0.3	0.8
Transport	0.0	0.2	0.0	0.1	0.2	0.2	0.3	0.2	0.2	0.2
Financial services	B	B	B	B	B	B	B	B	B	B
Rest of services	-2.6	-2.7	-1.1	-1.8	-2.1	-2.3	-2.5	-1.9	-1.4	-2.0
Unemployed	0.1	0.4	0.1	-0.2	-0.2	0.6	0.3	0.1	0.1	0.9
Region total	**0.9**	**1.4**	**0.8**	**1.2**	**2.1**	**1.3**	**1.4**	**1.0**	**0.6**	**0.5**
Mexico City	-0.3	0.3	0.1	-0.5	0.1	-0.1	0.0	0.2	0.1	-0.1
North	B	B	B	B	B	B	B	B	B	B
Center	0.9	0.6	0.5	1.0	0.0	0.5	0.6	0.5	0.2	0.1
South	0.3	0.5	0.2	0.7	2.0	0.9	0.7	0.3	0.2	0.5
Marital status	**NA**	**NA**	**1.7**	**1.8**	**1.6**	**1.4**	**1.3**	**1.1**	**1.6**	**1.2**
Divorced	NA	NA	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.1
Single	NA	NA	1.2	1.1	0.9	0.9	0.7	0.5	0.9	0.6
Union	NA	NA	0.4	0.5	0.6	0.4	0.5	0.6	0.6	0.5
Married	NA	NA	B	B	B	B	B	B	B	B
Age	0.2	0.6	0.5	1.0	0.2	0.6	0.8	0.9	1.0	0.9
Male	0.3	0.1	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Formal sector	0.6	0.8	1.5	0.9	1.0	1.1	1.2	1.3	1.0	0.5
Household Characteristics:	**16.6**	**18.2**	**18.8**	**17.8**	**14.4**	**17.9**	**15.0**	**15.3**	**16.4**	**12.2**
Household Size	9.3	10.8	12.2	11.0	9.2	11.2	9.8	9.9	11.0	6.2
Dependency Ratio	7.3	7.4	6.5	6.7	5.1	6.7	5.2	5.4	5.3	6.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Own calculations using expression 3.27 in the text.

Table A6.21.

Mexico: Factor inequality shares for per capita monthly income, rural population
1992-2008

Factors	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008
Residual	64.2	61.4	59.5	61.6	55.4	56.1	52.9	55.4	56.2	64.5
Household head characteristics:	**18.0**	**18.2**	**22.2**	**21.5**	**24.9**	**26.7**	**30.2**	**28.4**	**27.4**	**23.9**
Educational level	**9.2**	**8.7**	**10.6**	**9.1**	**11.4**	**11.5**	**14.9**	**15.7**	**14.4**	**11.8**
No education	3.0	2.9	2.2	2.5	3.4	4.5	4.0	4.1	3.8	2.2
Some primary	0.8	0.9	1.3	0.9	1.5	0.6	1.0	1.2	1.1	1.0
Primary	B	B	B	B	B	B	B	B	B	B
Lower Secondary	0.6	0.6	1.0	0.6	0.6	0.8	1.2	0.8	1.1	0.8
Upper Secondary	1.4	0.9	1.4	1.3	0.9	1.4	1.5	1.2	1.0	1.2
University	3.4	3.3	4.7	3.9	5.0	4.2	7.2	8.5	7.4	6.5
Industry total	**3.4**	**3.0**	**3.3**	**3.5**	**4.7**	**5.6**	**6.7**	**5.9**	**5.6**	**8.4**
Agriculture	B	B	B	B	B	B	B	B	B	B
Mining	0.4	0.0	0.3	0.7	0.3	0.1	0.7	0.9	0.5	0.6
Manufacturers	0.1	0.1	0.1	0.2	0.3	0.4	0.8	0.2	0.6	0.7
Construction	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.2	0.0	-0.1	0.4
Commerce	1.0	1.0	0.8	0.9	1.4	1.3	1.4	0.8	1.0	1.3
Transport	0.2	0.5	0.5	0.4	0.4	0.4	0.2	0.4	0.2	0.3
Financial services	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.2
Rest of services	1.5	1.3	1.5	1.1	2.1	2.7	2.9	3.2	2.7	4.5
Unemployed	0.3	0.2	0.1	0.3	0.3	0.8	0.5	0.3	0.5	0.3
Region total	**2.9**	**3.5**	**3.6**	**4.3**	**4.3**	**3.7**	**4.6**	**2.5**	**2.8**	**2.6**
Mexico City	0.2	0.0	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
North	B	B	B	B	B	B	B	B	B	B
Center	0.3	0.5	0.4	1.0	-0.1	-0.1	-0.2	0.0	-0.2	-0.3
South	2.5	2.9	3.1	3.3	4.4	4.0	4.8	2.6	3.0	2.9
Marital status	NA	NA	**1.2**	**1.0**	**1.0**	**1.3**	**0.2**	**0.8**	**0.8**	**0.4**
Divorced	NA	NA	0.4	0.3	0.2	0.3	-0.1	0.1	0.3	-0.1
Single	NA	NA	0.3	0.5	0.5	0.2	0.2	0.4	0.2	0.1
Union	NA	NA	0.5	0.2	0.2	0.8	0.1	0.3	0.3	0.4
Married	NA	NA	B	B	B	B	B	B	B	B
Age	0.9	0.7	0.9	0.5	0.5	1.9	1.1	0.6	0.9	0.7
Male	0.0	0.1	0.2	-0.1	-0.1	-0.3	0.0	0.1	0.1	0.0
Formal sector	1.6	2.4	2.4	3.2	3.1	3.0	2.6	2.9	2.7	-0.1
Household Characteristics:	**17.8**	**20.4**	**18.3**	**16.9**	**19.7**	**17.2**	**16.8**	**16.2**	**16.4**	**11.6**
Household Size	9.0	11.7	11.3	10.5	12.5	11.1	11.5	10.8	10.7	5.6
Dependency Ratio	8.7	8.6	7.0	6.4	7.3	6.1	5.3	5.4	5.7	6.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Own calculations using expression 3.27 in the text.

Table A6.22.

Mexico: Contribution of factors to changes in income inequality, 1998-2002

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.2125	0.2159	0.2015	0.2048	0.2037	0.1994
Industry	-0.1269	-0.1679	0.0043	-0.0350	-0.0225	0.0295
Region	0.0135	0.0112	0.0205	0.0184	0.0191	0.0219
Marital status	0.0120	0.0115	0.0135	0.0130	0.0132	0.0138
Age	-0.0220	-0.0278	-0.0036	-0.0091	-0.0074	-0.0001
Male	0.0145	0.0183	0.0022	0.0059	0.0047	-0.0001
Formal sector	0.0106	0.0079	0.0194	0.0168	0.0177	0.0211
Urban	0.0585	0.0558	0.0672	0.0646	0.0654	0.0688
Household Size	0.0502	0.0385	0.0874	0.0763	0.0798	0.0946
Dependency Ratio	0.0819	0.0867	0.0667	0.0712	0.0698	0.0637
Residual	0.6953	0.7497	0.5208	0.5731	0.5564	0.4873
∑	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.

Table A6.23.

Mexico: Contribution of factors to changes in income inequality, 2002-2005

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.5223	0.9346	0.2755	0.4098	0.3005	0.2254
Industry	-0.0913	-0.2740	0.0180	-0.0415	0.0069	0.0402
Region	-0.0841	-0.2201	-0.0026	-0.0469	-0.0109	0.0139
Marital status	-0.0766	-0.1916	-0.0077	-0.0452	-0.0147	0.0062
Age	0.0204	0.0422	0.0073	0.0144	0.0086	0.0046
Male	0.0532	0.1237	0.0111	0.0340	0.0153	0.0025
Formal sector	0.0144	0.0039	0.0207	0.0173	0.0201	0.0220
Urban	-0.1274	-0.3784	0.0228	-0.0589	0.0076	0.0533
Household Size	0.0058	-0.1151	0.0782	0.0388	0.0709	0.0929
Dependency Ratio	-0.1173	-0.3436	0.0182	-0.0555	0.0045	0.0457
Residual	0.8805	1.4185	0.5585	0.7337	0.5911	0.4932
∑	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.

Table A6.24.

Mexico: Contribution of factors to changes in income inequality, 2005-2006

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.1721	0.1400	0.2036	0.1906	0.1967	0.2099
Industry	0.0672	0.0841	0.0507	0.0575	0.0543	0.0473
Region	0.0625	0.0973	0.0283	0.0424	0.0357	0.0213
Marital status	-0.0455	-0.0888	-0.0030	-0.0206	-0.0123	0.0056
Age	-0.0304	-0.0573	-0.0039	-0.0148	-0.0097	0.0014
Male	0.0089	0.0155	0.0024	0.0050	0.0038	0.0010
Formal sector	0.1006	0.1619	0.0403	0.0652	0.0534	0.0281
Urban	0.2591	0.4144	0.1065	0.1695	0.1398	0.0757
Household Size	-0.0114	-0.0960	0.0717	0.0374	0.0536	0.0885
Dependency Ratio	0.0286	0.0098	0.0470	0.0394	0.0430	0.0507
Residual	0.3885	0.3192	0.4566	0.4285	0.4418	0.4703
∑	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.

Table A6.25.

Mexico: Contribution of factors to changes in income inequality, 2006-2008

Factors	CV	Gini	GE(-1)	GE(0)	GE(1)	GE(2)
Education	0.1001	0.0462	0.1996	0.1534	0.1616	0.2056
Industry	0.2879	0.4019	0.0774	0.1751	0.1578	0.0648
Region	-0.0142	-0.0282	0.0117	-0.0003	0.0018	0.0132
Marital status	-0.0445	-0.0712	0.0049	-0.0180	-0.0140	0.0078
Age	0.0177	0.0233	0.0074	0.0122	0.0113	0.0068
Male	-0.0032	-0.0047	-0.0005	-0.0017	-0.0015	-0.0003
Formal sector	-0.2684	-0.4027	-0.0204	-0.1355	-0.1151	-0.0056
Urban	0.1187	0.1506	0.0598	0.0871	0.0823	0.0563
Household Size	-0.6569	-1.0127	-0.0002	-0.3050	-0.2509	0.0392
Dependency Ratio	0.1470	0.1908	0.0663	0.1038	0.0971	0.0615
Residual	1.3158	1.7068	0.5941	0.9291	0.8696	0.5508
∑	1.0	1.0	1.0	1.0	1.0	1.0

Note: Calculations based on equations 3.29 and 3.30 in the text.