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What Do Mexican Unions Do?

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WHAT DO MEXICAN UNIONS DO?SUMMARY

In recent years interest in the economic analysis of trade unions in developing countries has waned due to declining union density. Nevertheless, trade unions are still an important institution in many developing countries. Mexico, like many industrialised countries witnessed a decline in union density over the 1980s. However, unlike most industrialised countries, the rate of decline has slowed down in the last decade. This can be potentially accounted by the changing nature of unions in Mexico, and in particular the growth of independent unionism. The resurgence in unionisation rates naturally leads to the question: What are Mexican unions currently doing?

This thesis investigates this question. Firstly, I provide a recapitulation of the history of trade unions in Mexico, and their relationship to the state. This history between ‘official’ unions and the state explains how the legal framework governing unions developed.

Second, I turn my attention to the question what do unions do to wages in Mexico? In particular I investigate the union pay gap for the recent period 2005–2015. The raw wage gap is found to range between 18–22%. Estimates of the adjusted wage gap using a well-known decomposition suggest that union wage premium lies between 5.1–12.9%. Further estimates are invariant to application of selectivity corrected decomposition. The effect of unions on the wage distribution is considered, and the ‘sword-of-justice’ effect is found to exist in Mexico. The evidence presented in this chapter suggests that whilst unions are marginalised in the labour market, they still play an important role.

Third, I ask: Are there any gains to joining unions? I provide evidence on the worker compensation gains (losses) made by males upon joining (leaving) a union for the period 2005q1–2016q1. The transitions between a non-union and a union status are investigated using a difference-in-difference estimator. I find that joining and leaving a union is associated with small wage gains and losses, similar to what the literature reports for most industrialised nations. This chapter also contributes to the wider literature by providing the first estimates of the gain (loss) associated with joining (leaving) a union with respect to non-wage benefits. The findings show joining (leaving) a union increases (decreases) the probability of being in receipt of legally guaranteed benefits such as bonuses, paid holidays and pensions.

Fourth, I examine the relationship between union strike petitions, a legal mechanism by which unions signal the desire to negotiate, and the business cycle. I focus on the time period 1990–2012, a period of legal and electoral institutional change in Mexico as the country democratised after the 70 year rule of the Institutional Revolutionary Party. I find that strike threats are counter-cyclical, unlike the established literature on actual strikes. I explore the causal relationship between elections and the rate of strike threats using a sharp regression discontinuity design and using information on close municipal elections. I find a causal effect from close electoral wins of right- and left-wing mayors on strike threats two years after an election. Victories for the right (left) party lead to an increase the number of strike threats two years after narrow wins. When disaggregating these effects by type of union it emerges that ‘officialist unions’ are behind the increased threats. I then provide evidence that this increase in strike threats stimulates electoral turnout in the following election. The evidence provided in this chapter suggests that whilst unions act in accordance with the cycle, they also behave contrary to the interests of their rank-and-file to satisfy political goals.

Finally, I conclude that the evidence presented in this thesis suggests that although union density may be in decline, and officialist unions may not act in accordance to their rank-and-file’s wishes, unions still have an important role to play in voicing worker’s preferences and ensuring that employers comply with the law. In the last chapter I discuss further insights from the present research, detail the limitations, and outline an agenda for further research on the themes explored in this thesis.

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Chapter 1

Introduction

This thesis investigates the behaviour of trade unions in Mexico over the period 2005–2016. Although research exists on the effects of unions on the labour market for developing countries, and Mexico in particular, little of it covers the past two decades. These last two decades have seen a decline in union density, and changes to the legal and political institutions in Mexico. Thus, in the spirit of [Freeman and Medoff \(1984\)](#), it seems relevant to ask: “What do Mexican unions do?” This thesis focuses on assessing the role of unions in both economic and political terms.

As [Freeman \(2010\)](#) acknowledges, while unions in developing countries are weak, on aggregate, unions may be more engaged in political behaviour than their counterparts in developed countries. [Levitsky and Mainwaring \(2006\)](#) suggest that unions in Latin America have a poor track record in being involved in democratic struggles, and often have been co-opted into the ruling elite’s power structures. In this respect, the focus on Mexican unions has potential policy relevance for the rest of Latin America.

Mexico was ruled by an authoritarian regime for 71 years, which originated in the Mexican Revolution (1910–1920) and ended at the watershed 2000 presidential elections. Labour legislation, such as the 1931 *Ley Federal del Trabajo (FLL)*¹ is favourable to unions, but at the same time places restrictions on the formation and practices of unions. For example, the law prohibits employing replacement workers during officially recognised strikes, as well as requiring employers to automatically deduct union fees from a workers paycheque and distribute them directly to union officers. However, unions are subject to a stringent regime of union certification, which although in theory is straightforward is often in practice subject to purposeful administrative

¹Federal Labour Law

delays and political influence (Bensusán and Middlebrook, 2012c).

The post-revolutionary period saw the formation and concentration of union power into a few large trades unions congresses, which were co-opted by the ruling party. This relationship was one of the central pillars by which the ruling party maintained power. The success of the state–union relationship during the period 1938–1970 thrived in part due to the pursuit of import substitution policies by successive Mexican governments. However, the 1980s debt crisis, and the subsequent structural changes introduced led to an erosion of union importance on the national stage. ‘Officialist’ unions changed their language from the struggle for higher wages, to that which sought to ameliorate the ‘social wage’ (Middlebrook, 1995). The decline of political power, coupled with the privatisations of government owned enterprises in the 1980s and 1990s, had a marked effect upon ‘officialist’ unions. This decline in ‘official’ union power coincided with the declining unionisation rates, the democratisation of the country and various institutional reforms. The result of this was a rift in labour politics between what Bensusán and Middlebrook (2012c) call ‘social trade unionism’ and ‘movement trade unionism’. The social trade unionists are a group of unions who distance themselves from government control, successfully negotiate contracts with employers as well as hold a commitment to internal democracy.² The movement trade unionists are seen to be the more belligerent wing of modern Mexican trade unionism. They have close ties to other social movements and are more likely to use strike in their conflicts with employers.³ A major contribution of this thesis to the economics literature will be in the investigation of the role of independent unionisation in Mexico and the political component of union behaviour which has hitherto remained an unexplored issue.

1.1 Structure and overview

This thesis is comprised of four substantive chapters. The first provides context for the research, and is followed by three empirical chapters that analyse the role of unions in Mexico.

Chapter 2 recounts the history of Mexican unionism from 1910 to the present day. It outlines the coevolution between ‘officialist’ trade unions and the *Partido Revolucionario Institucional* (PRI)⁴, which ruled Mexico for 71 years. It details how the trade unions were co-opted into the PRI party, and were utilised to mobilise votes for the PRI. Whilst ‘officialist’ unions were beneficiaries of this post-revolutionary regime, in particular in terms of favourable labour legis-

²e.g. the Mexican Telephone Worker’s Union, amongst others.

³Notably, the *Frente Auténtico de Trabajo* (FAT), teachers’ unions and unions of university employees.

⁴Institutional Revolutionary Party

lation, they were also subject to stringent legislation that placed restrictions on the formation and behaviour of unions, and a strict regime of oversight over strikes. Perverse institutions were developed by the [PRI](#) to maintain control over its corporatist–authoritarian regime. Labour legislation was explicitly drafted to ensure that unions were favourable to government, and actively discouraged the formation of independent unionism.

Unions in Mexico have been facing declines in membership similar to those witnessed in other developing countries. The 1980s debt crisis left ‘officialist’ unions weakened, as the state was forced to switch economic strategy towards export-oriented manufacturing. This decline in fortunes for unions was also shared by the [PRI](#) party. The aftermath of the 1988 presidential elections, where the [PRI](#) were widely regarded to have won through fraudulent means, created the impetus for reform and the creation of ‘good’ institutions, such as an independent judiciary, which would eventually lead to Mexican democratisation. These political developments, coupled with a shift in government economic policy, meant that unions lost importance for the [PRI](#), and thus became politically marginalised. The purpose of this chapter is to serve as a contextualisation to the politics and legislation which will be the subject of inquiry in the three empirical chapters.

Given the present discussion, it is clear that unions in Mexico have not historically behaved as other union movements have in developed countries. As such, in the spirit of [Freeman and Medoff \(1984\)](#), I ask: What do Mexican unions do to wages? In [Chapter 3](#) I provide new evidence on the union wage gap over the last decade. The empirical work exploits the *Encuesta Nacional de Ocupación y Empleo* (ENOE) survey. The analysis is divided into two parts: In the first, the magnitude of the union wage gap is investigated using the well known [Oaxaca \(1973\)–Blinder \(1973\)](#) decomposition. The potential issue of union selection is addressed through the application of a [Lee \(1978\)](#) endogenous switching model. Further estimates of the Union wage mark-up are obtained by exploiting the panel nature of the [ENOE](#) survey, to obtain an individual fixed-effects regression. I then give a synthesis of all of these competing estimates. In the final part of the analysis, I ask: ‘Did unions wield a ‘sword-of-justice’ across the wage distribution over the last decade?’ This is explored through the application of a variance decomposition and the use of quantile regression models.

[Chapter 4](#) further exploits the panel nature of the [ENOE](#) dataset. In this chapter I ask: ‘Are there any gains (losses) to joining (leaving) a union?’ The chapter provides evidence on the worker compensation gains (losses) made by males upon joining (leaving) a union. If one believes

that that workers are only likely to join effective unions, then perhaps, these estimates may be regarded as the gains to independent unionisation. I estimate the gains and losses associated with transitioning between non-union and union status using a difference-in-difference estimator. The findings suggest that joining and leaving a union is associated with no wage gains and small wage losses respectively. This is in contrast to what is reported in the literature for most industrialised nations. This chapter also contributes to the wider literature by providing the first estimates of the gain (loss) associated with joining (leaving) a union with respect to non-wage benefits. The findings reveal joining (leaving) a union increases (decreases) the probability of being in receipt of legally guaranteed benefits such as bonuses, paid holidays and pensions. This suggests that although union density may be in decline, unions still have an important role to play in voicing workers preferences with respect to compensation and ensuring that employers are compliant with the law.

The investigation on unions thus far has only considered the role unions exert as economic agents in the labour market. However, given the long history entwining ‘officialist’ unions and the [PRI](#), it is important to investigate whether the period of democratisation Mexico experienced in the 1990s, where the “rules of the game” were tightened up, had any effect upon unions. [Chapter 5](#) seeks to explore this question by exploiting Mexican administrative data on all strike threats between 1991–2012, a period of political institutional improvement. I document the pro-cyclicality of strike threats, confirming their role in contract bargaining. While legally strike threats, in the form of petitions to strike, may only deal with intra-firm complaints, I find an association between threats and electoral years. This chapter asks: Are strike threats partially caused by the political cycle? Using municipal electoral data, I employ a regression discontinuity approach, and investigate for the existence of a causal effect from close elections of right- and left-wing mayors on strike threats two years after an election. I further supplement these findings by testing if increases in petitions have an effect upon subsequent electoral turnout. To test this hypothesis, a differences-in-differences model is employed to estimate electoral turnout in narrow win municipalities. I find that electoral turnout is stimulated by strike threats, in the context of tight electoral rules surrounding campaigning, these findings may be interpreted as confirmation of illegal campaigning.

Finally, [Chapter 6](#) provides an overview of all of the conclusions from the preceding empirical work. I draw further conclusions from the whole of the work, as well as reflect on limitations from the research, and I outline an agenda for future research on the role of unions in Mexico.

Chapter 2

The Rise and Fall of the Dinosaurs

Unions, Legislation, Political actors and Institutional change in Mexico

2.1 Introduction

In 1990 the renowned writer Mario Vargas Llosa remarked that Mexico lived under ‘the perfect dictatorship’ (Krauze, 2012). This regime was enabled by legislation and the institutions developed in the aftermath of the Mexican Revolution (1910–1920). These power structures allowed the *Partido Revolucionario Institucional* (PRI) to rule the country almost unopposed for 71 years. Trade unions served as one of the pillars that allowed the continued existence of the corporatist–authoritarian regime. This was achieved through the co-opting of the labour movement into the new post-revolutionary institutions of the PRI. The largest post-revolutionary union, the *Confederación de Trabajadores de México* (CTM)¹ was formally a part of the PRI, as the ‘official’ labour segment. It is for this reason that those unions which formally dealt with the PRI, and by extension the state, are often called ‘officialist’ unions. This chapter will provide context on the history of the labour movement in Mexico, and will outline the institutional framework within which the empirical analysis of this thesis is situated.

The central proposition that I discuss in this chapter relates to how the post-revolution state co-evolved with organised labour. The interaction between the PRI and trades unions led to the creation of perverse institutions, which helped the PRI rule the country, the legacy of which pre-

¹Confederation of Mexican workers

vails to this day. The old authoritarian–corporatist state was dismantled in the 1990s and there was a series of reforms, which focused in reshaping the formal political, electoral and judicial institutions in the country. Amongst these reforms a comprehensive labour reform was widely discussed for much of the 1990s, and even after the watershed 2000 elections. Nevertheless, no reform materialised until the dying days of the Calderón² presidency in 2012. The passage of these reforms by a ‘lame duck’ president, with the support of an incoming PRI president meant that significant compromises in the text of the law were made. In particular some of the chapters which saw the fewest changes were those relating to union regulation.

This chapter is structured as follows, Section 2.2 explains the evolution of the labour movement in Mexico from the dying days of the dictatorship of General Porfirio Díaz (1876–1911) through the revolution and the subsequent Constitution of 1917. These events laid the groundwork for the hegemony of power of the CTM over labour relations, which would last until the reforms instituted in the 1980s eroded the importance of organised labour in the PRI. Section 2.3 relates the key concepts in the Federal Labour Law for understanding the analysis conducted in this thesis. Section 2.4 gives a brief account of the judicial and political reforms undertaken in Mexico in the 1990s. Finally, Section 2.5 contains a summary of the narrative.

2.2 A brief history of Mexico, unions and legal institutions

2.2.1 Pre-revolution institutions and labour conflicts (1860s–1910)

The Mexican constitution of 1857 offered workers the rights to negotiate and withdraw from labour contracts as well as forming workers associations. A liberal reading of these clauses would suggest that these rights implied the right to strike. At this time Mexico was ruled by Porfirio Díaz, a military dictator, who was in power almost continuously from 1867–1911. Strictly speaking, Díaz was temporary president in November–December 1876, where he resigned and left a puppet president. He was then elected in 1877, the following election was won by his hand-picked successor, and he won further elections in 1884, 1888, 1892, 1896, 1900, 1904 and 1910. The success of the early labour movement was permitted by the Díaz government due to their *laissez-faire* approach to the economy and labour matters. However, in the later days of the regime the growth plans heavily relied on foreign investment which meant that unions and strikes were discouraged, and in some cases repressed. This *de facto* suppression of organised

²President, who was elected in 2006 under the *Partido Acción Nacional* (PAN) banner. For a chronology of Mexican Presidents since the Revolution see Appendix A.

labour activities led to a decline in union membership.

There were two major flashpoints of strike repression during this period. The Cananea and Rio Blanco strikes which were violently put down by the Díaz government. Unsurprisingly, the quelling of these strikes led to further unrest. This would be one of the many contributing factors that led to the outbreak of the Mexican Revolution.

2.2.2 Labour, the Revolution, and Institutions (1910–1917)

During the 1910 election campaign, Francisco Madero campaigned against the incumbent Díaz who had held power for 45 years, under the slogan *Sufragio efectivo, no reelección*.³ Madero was arrested for sedition and jailed, and Díaz declared the winner of a fraudulent election. Madero escaped prison and went into exile in the USA where he called for an uprising against the Díaz government. The revolution initially focused on the northern part of the country. When the rebels took control of Ciudad Juárez, Díaz resigned and went into exile in France.

After Díaz resigned, the interim president called for a further election. In 1911 Madero was elected President of Mexico and his government tried to gain support from labour organisations by relaxing the interpretation of the law and allowing workers to unionise and strike. In 1913 a counter-revolutionary *coup d'état* against the government succeeded in assassinating Madero and installing Victoriano Huerta as the president. The governor of the state of Coahuila, Venustiano Carranza, organised the Constitutionalist movement, the counter-counter-revolutionary movement, which aimed to remove Huerta from power. For the next five years the country would be in a state of civil war, with fighting taking place in every state.

During this period, the strategic importance of the newly unionised industries (railroads, ports, petroleum) led to revolutionary leaders seeking an alliances with the various labour movements. As the revolution began to fade in 1915 the organised labour movement was rewarded for their loyalty to the Constitutionalist movement by the eventual victor Carranza. Union officials were given a place at the table when drafting the 1917 Constitution ensuring that union interests would be enshrined in law. Article 123 of the Constitution deals with working hours and workplace conditions, occupational health and safety, minimum wages and overtime pay, educational facilities for workers, labour unions and the right to strike, work contracts, Arbitration and Conciliation Commissions, and consumer cooperatives (Middlebrook, 1995). However, the constituent assembly notably refused to make a labour law subject to federal jurisdiction,

³Translated as: Effective suffrage, no re-election. Ironically, that slogan was Díaz's own from his first election campaign of 1877.

insisting to leave it at the discretion of each individual state to regulate labour. This omission led to divergence of labour law at a state level, which proved problematic for industries such as the railways that by their very nature spanned more than one state.

2.2.3 Post-Revolutionary Government and union collusion (1918–1928)

In the immediate post-revolutionary period unions, and in particular *Confederación Regional Obrera Mexicana* (CROM), the Mexican Regional Labour Confederation, played a key role. The *Partido Laborista Mexicano* (PLM)⁴, the political wing of CROM, successfully ran two electoral campaigns that saw two consecutive presidents elected Alvaró Obregón (1920–1924), and Plutarco Elías Calles (1924–1928). It was during this period that the labour institutions which oversee the labour market were ‘rehearsed’. The importance of unions was such that Obregón during his candidacy signed a secret pact with CROM who promised to provide support for Obregón’s bid in exchange for political influence through the creation of a labour ministry which CROM would influence and as well as the promise of reforms which codify Article 123 of the Constitution (Carr, 1976).

The success displayed by CROM in gaining political influence was largely due to its moderate stance and its attempts to distance itself from direct action, opting for more strategic interventions. This approach appealed to those in power, in particular as the labour movement had been crucial during the revolutionary years. Indeed, CROM’s support would prove vital for the Post-Revolutionary governments, quashing a potential military uprising by playing a diplomatic role liaising with foreign unions and the USA Government.

The mutually beneficial relationship between CROM and Obregon’s successor President Calles, is evidenced by the CROM’s appointment of Calles as the honorary president of CROM. The loyalty of CROM during the military uprising and their electoral importance was rewarded by the appointment of Luis Morones, their secretary-general, as Minister for Industry, Commerce and Labour in the Calles administration (1924–1928) (Lastra Lastra, 2002a). In exchange for Morones’s support in stabilising worker–employer relations, and limiting strikes he gained the ability to increase CROM’s membership, influence and power at the expense of other competing trade unions congresses. The labour ministry consolidated CROM’s power by changing practices on the regulation on the formation of unions and internal union affairs, the practice of assigning collective bargaining monopolies to the first union to organise a workplace, and the routine

⁴Mexican Labour Party

approval of ‘closed shop’, or exclusion clauses in collective bargaining contracts. This last practice ensured that unions did not need to mobilise or retain the support of rank-and-file, as loss of one’s union membership would lead to the loss of one’s job.

These practices, notably the introduction of exclusion clauses were undoubtedly unconstitutional, violating Article 123’s freedom of association. Nevertheless these were codified into law and remained in statute until 2001. Under Morones the union leadership was also empowered with the ability to unilaterally seek binding sanctions on workers undertaking strike action, through issuing petitions to the Arbitration and Conciliation Commission. Thus, if workers obtained a legally sanctioned strike, their leadership may opt to go against their own rank-and-file and apply to the Arbitration and Conciliation Commission for strikes to be shut down, assuming the leadership got something in return. These are some examples of the coercive powers that were available to union leaderships. The ‘closed shop’ provisions of the 1920s would later facilitate the creation of ‘ghost unions’, unions formed unbeknownst to workers, where workers are automatically enrolled to prevent further union organisation at an establishment. As under the *Ley Federal del Trabajo* (FLL) the first union to register in an establishment gains a monopoly over the collective bargaining rights.

The role of ‘official’ trades unions congress would not be held by CROM for long. In 1927 the Constitution was amended to allow non-consecutive presidential re-election, paving the way for Obregón’s re-election. This amendment, seen as a betrayal of revolutionary ideals, led to a rift between CROM and Obregón. During the election campaign many elected PLM members of congress quit as they sympathised with Obregón. When Obregón won the election, Morones bitter with the result, held a rally in which he suggested that ‘something’ might happen to Obregón. Obregón was assassinated within days of winning the election, before he could assume the presidency. It was widely assumed at the time that CROM were behind his assassination. Due to suspicions of CROM’s involvement in the assassination there was an purge of CROM supporters within the government (Lastra Lastra, 2002a). The aftermath of the Obregón assassination, led Calles to distance himself from CROM, and thus the PLM, and break away to form *Partido Nacional Revolucionario* (PNR), the National Revolutionary Party, which would go on to rule the country for 71 years. It is widely accepted that the presidents that followed (Portes Gil, Ortiz Rubio and Rodriguez) were Calles’s puppets. Congress instated Emilio Portes Gil (1928–1930) as the new interim president. CROM’s control over labour relations can be regarded as the mould which future labour relations between the state and trades unions

congresses would follow and would tie the trades unions and the state for the next 60 years (Lastra Lastra, 2002a).

2.2.4 The Federal Labour Law and the birth of CTM (1928–1936)

The Ortiz Rubio presidency (1930–1932) saw the passage of the 1931 *Ley Federal del Trabajo* (FLL)⁵ included various clauses which were very favourable to unions, such as, monopoly over contract bargaining and exclusion clauses, provisions which prohibit employing replacement workers during officially recognised strikes, and requiring employers to automatically deduct union fees from workers' paycheques to distribute directly to union officers. However, whilst union officials stood to gain handsomely from this reform there were other methods of control which were imposed by this law. The law allows a group of 20 workers to unionise without seeking prior authorisation, but the new union may not take part in any negotiations until registered with a state-level Arbitration and Conciliation Commission, or the *Secretaría de Trabajo y Previsión Social* (STPS)'s associational registry. Legally, the registration procedures are simple, but are subject to 'purposeful' delay and political influence (Bensusán and Middlebrook, 2012c, p.14).

The benefits of mobilising organised labour on behalf of the government became obvious under the Calles administration, and the subsequent 'puppet' presidencies. A substitute 'official' trades union was sought by the government as soon as the CROM was marginalised. This role would eventually be filled by the *Confederación de Trabajadores de México* (CTM). One of the founders of the CTM was Vicente Lombardo Toledano, a former member of CROM. During the mid-1930s Toledano spearheaded a movement calling for the creation of a 'national labour front' to replace CROM. In 1934 PNR nominated Lázaro Cárdenas del Río to the presidency of Mexico. Given the dominance of PNR in elections, both through legitimate and illegitimate means, nomination to contest an election under this party virtually guaranteed an electoral win. Cárdenas had previously been Governor of the state of Michoacán and had undertaken a series of reforms in which worker and peasant organisations had been vital. In his inaugural address to Congress "he referred to the labour movements' lack of centralised organisation as one of its principal problems" (Middlebrook, 1995). Thus, in 1935, shortly after Cárdenas took power, a series of strikes by reinvigorated unions in key foreign-owned industries broke out, leading to a showdown between the conservative wing of the PNR and Cárdenas. Calles's

⁵Federal Labour Law, not known by its acronym in Spanish, hence preference for English.

proclamation that the the strikes amounted to ‘treason’, was seen by unions and Cárdenas sympathisers to be an attempt to regain power and prevent Cárdenas’ socio-economic reforms. The pressing concern that [CROM](#) and Calles would take control from these newly reinvigorated labour movements was the catalyst for the creation of the [CTM](#). In June 1935, at the behest of Cárdenas the most important labour organisations met to form the *Comité Nacional de Defensa Proletaria* ([CNDP](#)), creating a power base which allowed Cárdenas to consolidate his political might and further enabling him to purge the [PNR](#) and government of Calles supporters. This support for Cárdenas was rewarded by government support for unionisation, increased resources for inspectors who enforced the [FLL](#), as well as a crackdown on employer-controlled unions. These actions resulted in increases in unionisation throughout the remainder of 1930s. In 1936 Cárdenas declared that it was “in the national interest to provide the support necessary to create a single organisation of industrial workers that would end the inter-union strife that [was] equally pernicious to the interest of workers, employers and the government.” ([Middlebrook, 1995](#), p.88) Shortly after this speech the [CNDP](#) organised a ‘national unification congress’ whose aims would be to create a single national union. With that, the [CTM](#) was born.

2.2.5 CTM hegemony over labour relations (1938–1982)

In 1938, Cárdenas, renamed the [PNR](#) the *Partido de la Revolución Mexicana* ([PRM](#)).⁶ The change of party name reflected a restructuring of the party across four sectors: peasants, [CTM](#), the popular sector⁷, and the military. This rearrangement of the internal organisation of the ruling party ensured that the future of the [PRM](#) and the [CTM](#) would be intertwined. [CTM](#) leaders agreed to being co-opted by the Cárdenas government due to the attractiveness of his nationalistic economic policies, such as the nationalisation of the petroleum industry, and the change of administration of the railways to one which was worker-led. The benefits from forming part of the ‘labour’ sector of the [PRM](#) enabled the continued existence of groups such as [CTM](#). [Middlebrook \(1995, p.100\)](#) provides evidence that in the [CTM](#) accounts in their early years donations accounting for two-thirds of their running costs were received from sources, which were later confirmed by senior [CTM](#) officials to have originated from the federal government. These monies were channelled via the [PRM](#), and its successor the [PRI](#). Other benefits from being formally allied with the ruling party were seen in terms of ‘political subsidies’. These ranged from the weakening of non co-opted unions that may have threatened the legitimacy of the

⁶Party of the Mexican Revolution

⁷Business leaders, middle class professionals amongst others.

‘officialist’ unions, to protecting the union bosses from rank-and-file challenges. There were also opportunities for pro-government labour organisers to find themselves elected to political office. This gave the ‘officialist’ union leadership the opportunity attempt to change the legislation furthering their interests, similar to [CROM](#)’s behaviour in the early 1920s.

The change of government from Cárdenas to his conservative successor Manuel Ávila Camacho (1940–1946) led to a rift in the [CTM](#) between those individuals who wished to continue to remain under state patronage and those who supported Lombardo Toledano, the Secretary General of the [CTM](#), who sought to distance [CTM](#) from [PRI](#). This rift led to the eventual removal of Toledano from his post and the instatement of Fidel Velázquez as the new Secretary General. He would remain the leader of the [CTM](#) until his death in 1997.

The relationship between the State and the [CTM](#) continued from the 1940s through to the 1970s. The success of this was predicated on the economic policy of Mexico which, due to the outbreak of WWII, followed import substitution. During this period the [CTM](#) was able to continue its activities and successfully lobbied for higher minimum wages, [Hernández Laos \(2006\)](#) provides evidence that these wage increases were likely based on rising labour productivity.

The 1950s and 1960s also saw further co-opting of unions by the State. [CTM](#) in an attempt to stave off rising demand for independent unions ensured that large trade unions congresses united under the [PRI](#) banner. In January 1955, they formed the Worker’s Unity Block, which aimed at organising co-operation between various unions. This served as a precursor to the *Congreso del Trabajo* (CT), the Labour Congress, which in February 1966 formally united the four largest trades unions congresses. The creation of the [CT](#) effectively implied that the majority of unions in the country were now affiliated with the ruling [PRI](#) party.

The 1982 debt crisis challenged the state–‘officialist’ union relationship. The increase in debt interest rates, coupled with an overvalued currency and a large fiscal deficit led to capital flight. Initially the crisis saw a contraction of the economy by 0.6% and was primarily manifested by an increase in annualised rates of inflation by 98.9%. The de la Madrid (1982–1988) administration was forced to turn to the [International Monetary Fund \(IMF\)](#) for liquidity. In turn the government agreed to a three year stabilisation programme. The intended targets were to reduce the current account deficit and reducing inflation. The stabilisation programme took two phases, the first entailed abandoning a fixed exchange rate regime which led to a real depreciation of 160%. This led to GDP reduction of 4.2%. The second phase of the adjustment focused on correcting prices. This was partially done through setting prices to expected inflation rates,

and as such meant that the official minimum wage became a ceiling for wage increases, rather than a starting point for wage negotiations. As the state was the largest employer at that time this controlled wage inflation. These adjustments were followed by lowering trade barriers unilaterally, as well as the privatisation of many state owned enterprises.⁸ The preparations for the privatisation often included wage cuts, loss of non-wage benefits and contract changes which reduced the power of unions.

The response from the CTM to the crisis was to back the de la Madrid administration's plan. This led to severe discontent amongst the union rank-and-file, manifesting as an increasing number of strike petitions to Arbitration and Conciliation Commissions. The government took a hard line, and in industries that fell under federal jurisdiction this was reflected in an average strike approval of 1.8% (Middlebrook, 1995). Thus, whilst there was a historic high in strike petitions there were fewer strikes than would be expected, and a large number of petitions were deemed either illegal, or illegitimate by Arbitration and Conciliation Commissions. This was possible as the board of these commissions both at Federal and 'local' level is comprised of representatives from government, business and unions. The president of the Commission, appointed by the Government, acts as the tie breaker in the case that union leaders and business owners disagree. The 'officialist' unions were faced with growing discontent from their members, and a government who refused to bow to their demands. The unions changed their demands; instead of focusing on wages, CTM and the CT lobbied to save what they termed the 'social wage', the non-wage benefits their workers received. They were successful in their demands. The non-wage benefits bargained nationally included access to government subsidised union-owned stores where their members could purchase discounted goods.

The collapse of the Mexican stock market in November 1987 led to a near-breakdown of relation between the state and labour organisations. Unions and the CTM wanted to avoid further cuts to public expenditure. These would inevitably affect their funding, as well as public sector jobs which were unionised. These concerns and the erosion of wages led the unions to threaten a general strike. After lengthy negotiations the '*Pacto de Solidaridad Económica*'⁹ was signed by representatives from the Government, peasant, labour and business sectors. The agreement was placed to rein in inflation, and to this extent it succeeded. The CT and unions ensured that they gained something from this pact, and were rewarded with increased access to

⁸Middlebrook (1995) notes that at the beginning of the de la Madrid administration there were 1,155 state owned enterprises and investment funds, by the end of his term this number had significantly reduced to 412.

⁹Economic Solidarity Pact

subsidised housing, food and credits. However, these concessions compensated workers little for what they lost as a result of the government's wage policy ([Hernández Laos, 2006](#)).

2.2.6 The 'era of the Dinosaurs' and the rise of independent unions (1988–Present)

The privatisation of government owned enterprises was continued by de la Madrid's successor Carlos Salinas de Gortari (1988–1994). The effect of this on 'official' unions was marked, as it weakened their traditional advantages of lobbying government and using their influence in politics to win concessions in terms of wages, working conditions and fringe benefits. [Tulio Esquinca and Melgoza Valdivia \(2006\)](#) demonstrate that once these reforms were in place the next target was the so-called *contratos-ley* which set common working conditions and wages in various sectors.¹⁰ Furthermore, business interests lobbied for changes to the [FLL](#) to allow more flexibility in hiring practices, as well as further restrictions to strikes. The reform to the [FLL](#) did not come to pass, and the unions used what political capital they had to prevent it. However, the Salinas administration achieved these aims without needing to redraw the [FLL](#). The way these policies were achieved was through the common use of 'ghost unions', unions which were unknown to rank-and-file members but exploited the 'closed shop' provisions by preventing other unions from organising in a particular workplace. During this period there was also a proliferation of 'employer protection contracts', in which unaccountable union bosses agreed with employers to uphold their stance; in other words, control the union on behalf of the firm ([Bensusán and Middlebrook, 2012c](#)).

The government's approach towards labour relations in the early to mid 1990s coincided with a broad decline of unionisation. It was during this time period that the derogatory term of 'dinosaur' entered Mexican popular parlance to refer to union and [PRI](#) leadership which was primarily composed of elderly individuals, such as Fidel Velázquez, who had been running the [CTM](#) since 1941. The perceived ineffectiveness of 'officialist' labour during the 1980s and early 1990s led to a rift in labour politics. [Bensusán and Middlebrook \(2012c\)](#) separate the factions into 'social' trade unionism and 'movement' trade unionism. 'Social' trade unionists distance themselves from government control, successfully negotiate contracts with employers as well as hold a commitment to internal democracy. The 'movement' trade unionists are seen to be the more belligerent wing of modern Mexican trade unionism. They have close ties to other social

¹⁰viz. Radio, Television, textile, rubber and sugar industries.

movements and are more likely to strike.

Perhaps the watershed moment for these alternative currents in organised labour came with the death of Fidel Velázquez in 1997. During the aftermath of his death the Union of National Workers (UNT) formed and presented itself as a party-agnostic rival to the CTM. Initially this union was quite successful in gaining new members, however, lately this trend seems to have stalled. The rise of independent unionism, whilst related to the death of ‘dinosaurs’ such as Velázquez, may also be attributed to shifts in Government economic strategy. The 1980s and 1990s saw the movement towards an export oriented economy as well as structural changes within the PRI. Both of these weakened the role of ‘officialist’ unions, and the increased political competition which will be outlined in Section 2.4 meant that independent unionism became relatively more attractive to workers.

Finally, another feature of organised labour in the last decade has been one of fragmenting movements. Independent unionism has either remained politically aloof, or in the case of northern ‘white unions’, have supported PAN.¹¹ ‘White unions’ are those that seek to work with employers, and are often formed with the express consent of the business, and will not be combative towards the employer. They are a regional phenomenon in Mexico, and have been predominantly in the North, but since 2000 have begun to spread. (see Ramírez Sánchez, 2011) Other independent unions have sought to ally themselves with the *Partido Revolucionario Democrático* (PRD)¹².

2.2.7 Mexican unions today

The behaviour of private sector unions in the last decade will be the subject of inquiry of this thesis. As the previous discussion has outlined unionisation in Mexico has faced several structural changes from the transformation from a corporatist state-controlled unionisation to the rise of independent unions. Thus, it becomes salient to ask, how has the rate of unionisation changed over the last decade? Unfortunately, the answer to this question is controversial. There are three main sources from which to derive union density.

First, are administrative records from STPS, the Secretariat for Labour and Social Welfare, and the Local Arbitration and Conciliation Commissions. Although there is a legal requirement for unions to keep their affiliate registry up-to-date with STPS and local Arbitration and Con-

¹¹National Action Party, the Christian Democratic party of Mexico. For more details on Mexican politics see subsection 2.4.1.

¹²Revolutionary Democratic Party, the left-wing offshoot of the PRI.

Figure 2.1: Evolution of working age male private union density in Mexico 1984–2016

Note: Author's own calculation with ENIGH and ENOE.

ciliation Commissions, in practice this is rarely the case. As the raw numbers are not queried, unions themselves are likely to inflate these numbers to appear stronger than they are (de la Garza Toledo, 2006).

Second, there are establishment-level surveys. The Mexican statistics agency (INEGI) runs *ENESTYC*, the National survey on labour, wages, technology and training in the manufacturing sector; which collects union membership numbers. This survey is only available for the manufacturing sector, and is also run infrequently, over the past two decades there have only been five editions. Another challenge of this survey regards ‘ghost unions’. If an establishment has a ‘ghost union’ then the unionisation rate will be inflated by these illegitimate, and illegal practices.

Third, there are two household surveys which contain information on unionisation rates. The *Encuesta Nacional de Ingresos y Gastos de los Hogares* (ENIGH) and *Encuesta Nacional de Ocupación y Empleo* (ENOE).¹³ ENIGH has temporal coverage from 1984 to the present, with a biennial basis, Zapata (2005) and de la Garza Toledo (2006, 2012) suggest that it may not be representative of unionised workers. ENOE, is a quarterly labour force survey that has a complex survey design which is probabilistic, stratified, conglomerated and dual-phased. Start-

¹³These are the Household income and expenditure survey and the National Survey of Employment and Occupation, respectively.

ing in the first quarter of 2005, it has a rotating panel design where households are interviewed for five consecutive quarters before being replaced to ensure that the sample remains nationally representative. However, the union question is only asked in the extended questionnaire, and thus far there have been thirteen editions of the expanded questionnaire.¹⁴ It should be noted that the nature of the union question does not allow me to identify the specific union an individual belongs to. I have harmonised the ENIGH and ENOE surveys to contain only the sub-population of analysis for this thesis. [Figure 2.1](#) plots union density for the period 1984–2016, where the density is defined as the rate of unionisation amongst working age males in employment in the private sector. The figure captures the decline in unionisation that has been suggested by the preceding discussion.

It is interesting to note that the male density follows the trends reported by [Tulio Esquinca and Melgoza Valdivia \(2006\)](#). The early 2000s saw increases in the rate of unionisation. As suggested earlier in this section, the most likely explanation for this increase is credible alternative to ‘official’ unions. In more recent years, it seems that the gains made from independent unionisation in the early part of the 2000s had been lost by 2006. Since then union density has continued to decline.

2.3 Labour legislation, unions and strikes

2.3.1 The FLL and Unions

Labour regulation is dictated by the Constitution of 1917. Article 123 of the Constitution deals with working hours and workplace conditions, occupational health and safety, minimum wages and overtime pay, educational facilities for workers, labour unions and the right to strike, work contracts, labour Arbitration and Conciliation Commissions, and consumer cooperatives. Whilst the Constitution gives a general outline of a workers rights, these are further detailed in the [FLL](#). The [FLL](#) was first introduced in 1931, and received minor changes in the 1970s and 1980s. More recently there has been a labour law reform which came into effect in 2013, although as noted earlier, these reforms changed few things concerning unions and union regulation.

Some of the clauses in the [FLL](#) are very favourable to unions. For example, the law prohibits employing replacement workers during officially recognised strikes, as well as requiring employers to automatically deduct union fees from workers’ pay-cheques and distribute them directly to

¹⁴These are 2005q1–2006q1, 2007q2, 2008q2, 2009q1, 2010q1, 2011q1, 2012q1, 2013q1, 2014q1, 2015q1, and 2016q1.

union officers. As noted earlier, this requirement, along with exclusion clauses, allowed for perverse institutions such as ‘ghost unions’ to develop. These unions may be unknown to workers, deduct membership dues and, in general, be an approach by which business owners may deny workers their legal right to unionise, and ask for a collectively bargained contract. A landmark 2001 legal ruling by the Supreme Court found exclusion clauses to violate the freedom of association guaranteed in Article 123 of the Constitution ([Lastra Lastra, 2002b](#)).¹⁵ However, ‘ghost unions’ persist, but a worker who becomes aware of them may opt to leave such a union. However, in practice this would almost certainly involve leaving one’s job, as employers are under no obligation to renegotiate contracts. In theory, workers in such a firm are able to form another union, and attempt to wrest the collective bargaining monopoly from the ‘ghost union’ through lengthy legal procedures.

Another example of union favourable legislation is Article 359 of the [FLL](#) which states that collective contracts as agreed between management and unions may include ‘closed shop’ clauses. However, these may not be used against workers who do not wish to unionise, and can apply to all workers after the contract has been agreed. So, workers who join a firm after a union contract has been imposed may be subjected to the contract. The current legal framework does not generate incentives for democratic unionisation to exist. Indeed, ‘officialist’ unions are beneficiaries from the legal framework as numerous clauses are favourable to both large unions, and undemocratic unions at the expense of smaller independent democratic unions. The law also places restrictions on union formation and internal practices.

The procedures for setting up a union are as follows. A group of at least twenty workers has the legal right to form a union without prior authorisation. Note that the law envisages unions to be founded at an establishment-level. However, *gremial*¹⁶ unions are also allowed. All unions may associate with larger organisations. A new ‘union’ cannot begin operations such as negotiating a collective contract with an employer or engage in other activities such as strikes until it is officially registered by an Arbitration and Conciliation Commission. The [FLL](#) places regulation of unions are under the jurisdiction of STPS. However, this only applies to certain unions, and in general is not a straightforward matter. Public sector unions, and those in certain key sectors are subject to federal oversight and thus face oversight from STPS and are subject to the Federal Arbitration and Conciliation Commission. However, the majority of firms, fall under local jurisdiction and thus are subject to state-level oversight under ‘local’

¹⁵This ruling however was only possible due to the Judiciary reforms outlined in [section 2.4](#).

¹⁶Guild unions. These are allowed to span multiple workplaces but may only contain a single occupation.

Arbitration and Conciliation Commissions. These commissions exist in every state, and in most municipalities, and it is these Local Conciliation and Arbitration Commissions that are the subject of investigation in [Chapter 5](#).

Arbitration and Conciliation Commissions are tripartite institutions. The Commission is comprised of a president who is designated by the government and has both voting and tie breaking powers. The remaining members are representatives of large unions and employer organisations. Registration procedures are straightforward, but are subject to ‘purposeful administrative delay’ and political influence ([Bensusán and Middlebrook, 2012c](#)). Once a union has successfully registered with the Arbitration and Conciliation Commission the union is entitled to be involved in collective bargaining. However, the first union to organise labour in a firm receives the monopoly over these negotiations. Other unions may mount legal challenges over this, and usually the monopoly is awarded to the union which represents most workers, but this too is subject to lengthy legal proceedings ([Fairris, 2007](#)). It should be noted that independent unions are unlikely to sit in most Arbitration Commissions.

The [FLL](#) also regulates the internal workings of unions, it requires that unions have statutes and freely elect their officers but the law falls short of explicitly calling for secret ballots. Instead elections of union members are stipulated by law to occur during plenary sessions. This lack of anonymity coupled with exclusion clauses led to a democratic deficit within large unions. This lack of internal democracy allows for union leadership to become unaccountable to the rank-and-file members ([Middlebrook, 1995](#); [Fairris, 2006](#); [Bensusán and Middlebrook, 2012a](#)).

An important tool that unions use to exert power is strike action, which is heavily regulated under the [FLL](#). A union who intends to strike must first make their grievances known in writing to their employers. A copy of their grievance letter must then be sent to the relevant Arbitration and Conciliation Commission. The letter must specify when work will be stopped if the grievances are not resolved. The [FLL](#) states that this period, termed the ‘pre-strike period’, must last at least a six working days for private sector firms. This grievance letter is termed a ‘petition to strike’. The Commission will then call for a conciliation meeting and during the meeting representatives for the union and the employer will attempt to solve the issue. If the workers, or their representatives, do not turn up to this conciliation attempt, then the strike will be determined invalid by the Commission and as such illegal. It should be noted that the Commission is legally allowed to call this meeting at any time of day and during any day of the week (Art.928 [FLL](#)). If the mediation efforts fail and the prerequisites are met then formal strike action may

commence. The mechanism through which the renewal of a collective bargaining contract is signalled is a petition to strike (Barba García, 2004). Thus far, the procedure for strikes has been presented as a mechanical process. In reality this procedure, whilst straightforward is subject to significant levels of discretion by the state governor (Bensusán and Middlebrook, 2012b). Under the framework of the law the only valid reasons for threatening a strike are related to intra-firm complaints. Legally, there is no scope for strikes to be threatened over wider political issues.

2.3.2 The FLL and Worker rights and entitlements

The FLL defines the working conditions that a worker may expect in employment. It also lays out the requirements of employers with respect to their workers. It should be noted that whilst the FLL applies equally to all workers, public sector workers, known as subsection ‘A’ workers, who are not included in the analysis of this thesis, are subject to a different subsection of FLL chapters than private sector workers. For all private sector workers, subsection ‘B’ of the law is applied. Thus, a worker who is employed by someone else is subject to labour management law regardless of having a written contract and all provisions of the FLL apply. The FLL describes this relationship, and the obligations and responsibilities of each party.

The FLL also outlines a number of mandatory non-wage benefits that must be provided directly by an employer. These include, but are not limited to: *Aguinaldo*, or Bonus. This is a mandatory annual payment that must be equivalent to a minimum of 15 working days salary (Clause V Art.89 FLL). If the worker did not complete a full year at the firm they are entitled to the *pro rata* equivalent. If a worker leaves their employment¹⁷ prior to the bonus being paid out, usually in December, they are entitled as part of their severance payments to take the proportion of the bonus earned.

Chapter IV of the FLL entitles workers to six days of paid holiday once they have been employed for a year, and each additional year at the firm secures another day of paid leave. Once twelve days has been reached an additional two days are accrued every five years with the firm. It should be noted that this does not include national holidays¹⁸, which are considered paid leave days, regardless of one’s seniority at the firm.

The FLL and the Law of Social Security stipulate that all workers in an worker-employer relationship must be registered with the *Instuto Mexicano de Seguro Social* (IMSS)¹⁹.²⁰ This

¹⁷Regardless of choosing to leave, being made redundant, or being fired.

¹⁸There are usually six legally mandated public holidays per year.

¹⁹Mexican Institute of Social Security

²⁰Workers subject to subsection ‘A’ of the law have similar, albeit separate social security institutions. Rather

allows workers to obtain certain benefits such as Health Care,²¹ and Pensions.

As a result of the 1980s debt crisis the Mexican pensions system was migrated to a defined contribution system. Workers enrolled with social security have 7.75% of their base salary deducted and paid to IMSS, with employers expected to contribute for each worker the equivalent of 5.15% of their salary towards pension contributions and finally the state ‘tops-up’ pension payments with 5.5% of the minimum wage in Mexico city and 0.225% of each salary towards pension contributions. Of the worker contributions, 2 percentage points are destined towards a retirement fund, and 3.15 percentage points towards a pension fund. These differ as workers may voluntarily retire prior to the old age retirement pension, but will be unable to access this money until later in life. Finally, as part of clause XII of Article 123 of the Constitution employers are responsible for worker housing. Until the 1970s that clause was not enforced, in 1973 the Echeverría administration (1970–1976) sought to meet this constitutional requirement, and founded the *Instituto Nacional del Fondo de la Vivienda para los Trabajadores* (INFONAVIT)²². It is a compulsory scheme where employers must pay the equivalent of 5% of a worker’s salary. These funds were originally solely for a state provided housing provident fund. It has now developed into a full credit scheme that serves as the basis for Latin America’s largest mortgage fund. Prior to the 1990s CTM controlled INFONAVIT disbursements and union membership was a near requirement for obtaining INFONAVIT credits (see Middlebrook, 1995, p.296). The Salinas administration reformed this, inflicting a further blow to ‘officialist’ unions. INFONAVIT credit eligibility is now based on a transparent points system relating to a number of worker characteristics including total number of contribution-years, the size of their contribution, their firm tenure, etc. INFONAVIT contributions are considered part of pensions as affiliates are both the source of the deposit fund, and as such earn some return for their money being invested, as well as a source for generating household equity.

Workers may also voluntarily top-up these funds. Pension contributions whilst paid to IMSS are managed by *Administradoras de Fondos de Retiro* (AFORES).²³ The pension reform of 1997 was modelled in the Chilean 1980s reform, as such pensions were made into defined contribution accounts that are worker specific, and they follow the worker regardless of where they are employed. Pension contributions prior to 1997 were made by employers to their preferred pension

than being registered with IMSS they are registered with the Public sector analogue *Instituto de Seguridad Social y Servicios de Trabajadores del Estado* (ISSSTE).

²¹This is provided by the IMSS directly. In theory, any formal worker should have access to subsidised health care.

²²National Institute for the Worker housing fund

²³Retirement Fund Administrators

fund, in their designated bank; since 1997 all pension contributions go to a default ‘concentrated account’. Workers may opt-out of this account into different private [AFORES](#) which will invest their retirement contributions.

It is also worthwhile to note that although in many respects Mexico saw a series of institutional changes throughout the 1990s and 2000s, as will be detailed briefly in the following section, labour legislation did not change until 2013. There were minor procedural reforms to the text of the [FLL](#) in the 1970s and 1980s, but neither of these affected the articles regarding the oversight of unions. For much of the 1980s and 1990s there was national discussion of reforming and making radical changes in the [FLL](#), but none of these came to pass. In 2012, during the dying days of the Calderón Presidency, a reform to the [FLL](#) was agreed and was allowed passage through both Congress and Senate by a [PRI](#) majority. Notable changes include the removal of the most excessive clauses such as Article 359, in recognition of the 2001 Supreme Court judgement of freedom of union association. Equally, Unions managed to negotiate such that strike days may also be remunerated, up to a maximum of one month (Clause VII Art.429 [FLL](#)).

2.4 Mexican Politics, Political and institutional reform

2.4.1 Main political actors

Mexico is a multi-party federal democracy, with three main political parties. These are the [PAN](#), [PRI](#), and [PRD](#). Though there are other political parties, these three account for the majority of seats at all levels of government during the period under analysis for this thesis. Mexico has three levels of government. As a federal state there is the national Government, led by the President, elected every six years. There is the legislative branch, or Congress, which consists of the Chamber of Deputies and the Senate, the upper and lower legislative chambers, respectively. Both of these hold elections every three years, where in each election half of each chamber is replaced. Until 2016, when Mexico city was given State status, Mexico was made up of 31 autonomous States. Each of these states elect a Governor who serves a six year term. Each state has its own unicameral legislative branch which holds triennial elections. The final elected level of government is the Municipality, these elect Municipal Presidents triennially, and represent the smallest administrative unit of government. It is worthwhile to note that the constitution enshrined the *Maderista* ideal of no re-election. The result of this requirement, is that until the

2015 politico-electoral reform, for all political offices there was absolutely no re-election. This means that at every political level there is no continuity amongst individuals, and the political party itself is very important as only they maintain continuity and select candidates. Prior to the 1990s to all extents and purposes that meant the most important elections were those internal to the PRI. One final point is that politicians may move between different government levels.

PRI is the longest lived party of the three. As outlined in [section 2.2](#), the PRI ruled Mexico for 71 years, under the name of the PNR and PRM. It emerged as a party at the conclusion of the Mexican Revolution. The constitutional requirement that there is no re-election meant that for 71 years there has been a lack of continuity of politicians within roles. Politicians within the PRI were originally drawn from the ranks of the Military. Over time the political class from the PRI became more corrupt. The PRI maintained control of the country through ‘democratic’ elections which are widely acknowledged to have been fraudulent. As [Gillingham \(2012\)](#) outlines the PRI’s strategy to maintaining power was both case-specific but in general had four broad features. Firstly there was a general permissiveness in allowing for the existence of opposition parties such as PAN, as it lent it credibility in the international stage ([Camp, 2003](#)). Second, they effectively played a ‘meta-game’ of adjusting legislation, both electoral and other related laws to benefit the party and those factions which support them ([Gillingham, 2012](#)). Thirdly, as has been discussed earlier, one of the pillars of this structure was the co-opting of organised labour and the creation of ‘officialist’ unions. Finally, total electoral control was also achieved through intimidation, disenfranchisement and co-opting of opposition actors. Further electoral manipulation was achieved through control on the key actors and events of the election day itself. Examples of this control range from the *Secretario de Gobernación*,²⁴ who was in charge of the pre-1988 electoral institutions, to the members of the public involved in vote counting. Naturally, the sophistication of corrupt practices, and perhaps the brazen nature of the electoral manipulation increased over time.

The high watermark of PRI corruption and the beginning of the end for the ‘era of the dinosaurs’ was the 1988 elections. Prior to this electoral process a PRI member, Cuahutémoc Cárdenas Solórzano²⁵ broke away from the party, as they had ‘strayed’ from the revolutionary ideals that underpinned PRI ideology. He sought to run for presidency. However, at the time electoral law was such that only ‘officially’ recognised political parties may nominate candid-

²⁴Interior Minister, equivalent in remit to Home Office Secretary.

²⁵The son of former president Lazaro Cárdenas

ates.²⁶ Cárdenas convinced smaller leftist parties, that had previously lent PRI legitimacy by running as a type of permanent opposition, to unite as a coalition with him as their candidate. The election campaign was closely fought, and on election day the results from exit polls demonstrated how unexpectedly a majority of voters had swung away from the PRI, despite all of the control institutions at its disposal. The Government was forced to announce that the computer system for tabulating votes had ‘crashed’. The official results announced that Carlos Salinas de Gortari had won. This is now known to have been a fraudulent result²⁷ (Camp, 2012).²⁸ However, Mexican civil society did not believe the result, and all non-PRI parties publicly questioned the result.

Nevertheless, the electoral result stood. However, the PRI was plunged into a weak position. The electoral results for Congress suggested that the PRI had lost its majority for the first time, and the next largest party was PAN. Lujambio (2001)²⁹ reports that PAN officials at the time agreed not to contest the outcome, conditional on meaningful electoral reform, and the recognition of all legitimate electoral victories. This deal was certainly helped by the fact that the proposed policies of the Salinas administration were closer politically to those proposed by PAN, with a strong bent on shifting Mexico further into an export-oriented economy, whereas the policy mix suggested by a potential Cárdenas administration would have represented a return to the state controlled import substitution policies (Bruhn, 2012).

PAN was founded in 1939, as a reactionary oppositional party against the perceived radical left-wing policies of the Lázaro Cárdenas PRM government by the former Dean of the *Universidad Nacional Autónoma de México* (UNAM)³⁰. The movement gained members from those supporting catholic conservatism, and those who fought in the Cristero War (1926—1929) against the State in its secularist, anti-clerical policies. PAN remained as a marginalised political movement for much of the 1950s. However, it adopted a strategy of contesting elections at all levels despite the widespread fraud, in particular ensuring candidates were run for Municipal President. PRI maintained the illusion of democracy by allowing some electoral victories to their opponents (Lujambio, 2001). It was through these hard fought victories that the PAN

²⁶This would remain the case until a 2008 Inter-American court of Human Rights decreed the Governments change legislation to allow independent candidates.

²⁷Former president de la Madrid’s autobiography confirms the fraud. The ballots were burned after the election to cover up the scandal.

²⁸The unanticipated margin of the election, meant that during the ‘manual’ vote count that followed the PRI rushed some of the most brazen vote-stuffing of urns (Bruhn, 2012).

²⁹An academic who was member of PAN, and later went on to serve as secretary of Health in the Calderón administration until his death in 2011.

³⁰Autonomous National University of Mexico

maintained its national relevance. The increased political competition due to international pressure led to the successful election of a PAN governor in the State of Baja California Norte in 1989. The electoral reforms outlined in the following subsection paved the way to the 2000 presidential election, where PAN gained control of the presidency, breaking the 71 year rule of PRI. Although, PAN may politically be described as a Christian Democratic party, which ideologically covers the centre-right, its policies towards unions have not been adversarial. Indeed, they were known for being actively associated with ‘white unions’. Furthermore, the years of political opposition against a party which relied on union friendly policies meant that they too needed to adopt policies which were broadly friendly to unions. This was particularly the case after the election of Vicente Fox Quesada (2000–2006) a former Coca-Cola executive and PAN’s presidential candidate. After the watershed elections of 2000, there was a concern that pro-PRI industrial action would paralyse the country. Consideration for these concerns meant that the policies adopted by the first PAN administration could not radically dismantle the structures that had sustained the previous corporatist–authoritarian regime (Bensusán and Middlebrook, 2012a). Finally, it is of note that PAN won a further presidential election in 2006 under Felipe Calderón Hinojosa (2006–2012) thus maintaining continuity in the democratic transition. However, much of the Calderón administration (2006–2012) would be overshadowed by the 2008 global economic downturn, and the escalating violence of the Drug War.

The final political actor that will be considered in this chapter is the PRD.³¹ This political party is the smallest and youngest party considered here. The PRD was founded by Cuahutémoc Cárdenas and is the result of the broad left alliance which saw him nominated for the 1988 elections. The PRD is less electorally successful than either other political actor considered thus far; they have never reached the presidency, nor have they controlled either chamber of Congress. The PRD has been successful in winning municipal presidencies, the office of Mayor of Mexico City and a few governorships. In the 2006 presidential elections, the former Mayor of Mexico City, Andrés Manuel López Obrador narrowly lost the election to the PAN candidate Calderón. In the weeks that followed the PRD and López Obrador would go on to claim that there were electoral irregularities which led to this result, they were directly echoing the 1988 results. However, the electoral reforms enacted in the 1990s, as outlined in the following section, suggest that this ‘fraud’ is unlikely to have happened. López Obrador ran for president once more in the 2012 presidential elections, and again came in second by a narrow margin. Once

³¹Party of the Democratic Revolution

more he claimed there were electoral irregularities, and the subsequent fallout within his party meant he broke away from them. Nevertheless, the role of the left in Mexican democratisation was crucial. The Cárdenas bid for the presidency in 1988 was the key moment, which created the preconditions for subsequent democratisation.

2.4.2 COFIPE, IFE and State Electoral authorities

The controversy over the 1988 presidential election result led to the passing of the *Código Federal de Instituciones y Procedimientos Electorales* (COFIPE)³² in 1990, which created the *Instituto Federal Electoral* (IFE).³³ This was initially envisioned as another dependency of government, which fell under the oversight of Congress and the Executive branch.³⁴ This remained the case until the reforms of 1996, which made it independent of any branch of government. Whilst COFIPE focused on strengthening the role of the electoral institutions in Mexico, it only dealt with elections at a federal level. Nevertheless, these changes in the nature of elections led to increases in political competitiveness for Congress and Senate positions, which in turn led to further reforms to COFIPE in 1993, 1996, and 2007. Of importance for this thesis is the reform of 1996, which required all electoral authorities to become independent of the state and have their own legal personality separate from the state. This in effect converted the previously existing state electoral authorities into a variety of electoral institutes, which oversaw elections for Governor and Municipal President.

One of the final pieces of reform which is key for this analysis is the strengthening of the Judiciary. Prior to the 1990s the Judicial branch of government was not particularly independent of oversight from the executive or legislative branches. The PRI faced with the increased likelihood of losing the following presidential election of 1994 undertook a series of ambitious reforms as a sort of ‘Ulysses pact’ (see Eisenstadt and Yelle, 2012). In particular these reforms included gave the judiciary oversight over electoral matters, by creating the *Tribunal Electoral del Poder Judicial de la Federación* (TEPJF).³⁵ It was tasked with ensuring election disputes were resolved. A further judicial reform in 1994, ensured that the Judiciary branch of Government was strengthened with the introduction of independent councils ensuring rigorous standards. Finkel (2005) suggests that the strengthening of the Judiciary was a type of ‘insurance policy’ to ensure that the institutional changes such as the COFIPE would be irreversible, even under

³²Federal code of Procedures and Electoral Institutions

³³Federal Electoral Institute

³⁴Indeed, the first President of IFE was the then secretary for Gobernación, Fernando Gutiérrez Barrios.

³⁵Federal Electoral Tribunal of the Judiciary Power.

a different political administration. Once granted independence, the Judiciary went to great lengths to express its independence by showing it held no loyalty to the [PRI](#) party. A prominent example is the 1998 ruling on the unconstitutionality of electoral rules in the state of Quintana Roo, which would have handed the [PRI](#) control of the state legislature.³⁶ It was these types of state level judicial battles, coupled with the [COFIPE](#) 1996 reform, which laid the groundwork for the watershed elections of 2000 when the [PRI](#) lost the presidency to the [PAN](#) party.

2.5 Discussion

This chapter has outlined the entwined history between organised labour and the [PRI](#) party, which ruled Mexico for 71 years. As has been outlined, unions were co-opted into the [PRI](#) party formally. This was a double edged sword; ‘officialist’ unions were beneficiaries as post-revolutionary labour legislation was written to benefit unions. However, the legislation also placed restrictions on the formation and behaviour of unions, as well as a strict regime of oversight over strikes. These perverse institutions were utilised by the [PRI](#) to maintain control over its corporatist–authoritarian regime. Labour legislation was explicitly drafted to ensure that unions were favourable to government, and actively discouraged the formation of independent unionism.

The result of the 1988 presidential election, which is widely acknowledged to be fraudulent, led to the creation of institutions which would eventually lead to Mexican democratisation. These political developments coupled with the shifting government economic policy meant that unions lost importance to the [PRI](#), and thus became marginalised. The creation of strong institutions in the form of independent judiciary and electoral authorities ensured Mexico continued its democratic transition. The remainder of this thesis will analyse how these institutional changes have affected the behaviour of unions.

³⁶This was due to the [PRI](#)’s introduction of a clause of governability, where the party to gain the largest share of the vote would be allocated the most seats in the assembly, so for example a party winning with 20% of the popular vote would be given over 50% of the seats in the assembly.

Appendix A

Chronology of Mexican Presidents

Table A.1: List of Mexican Presidents (1917–Present)

| Name | Years | Party | Notes |
|--|-----------|---------------------|---|
| Venustiano Carranza | 1917–1920 | PLC | Held power since 1914 as head of Constitutional Army. Was formally elected in 1917, killed in Rebellion spearheaded by Álvaro Obregón |
| Adolfo de la Huerta | 1920 | | Interim President, came in through a <i>coup d'état</i> . Headed failed military uprising in 1928. |
| Álvaro Obregón | 1920–1924 | PLM | Assassinated days after second electoral win in 1928. |
| Plutarco Elías Calles | 1924–1928 | PLM | At end of presidency founded PNR |
| PNR , PRM , and PRI rule | | | |
| Emilio Portes Gil | 1928–1930 | PNR | Appointed as Interim President after assassination of Álvaro Obregón, puppet of Calles. |
| Pascual Ortiz Rubio | 1930–1932 | PNR | Won 1929 elections, resigned due to Calles interventions in government |
| Abelardo L. Rodríguez | 1932–1934 | PNR | Interim president appointed by Congress, puppet of Calles. |
| Lázaro Cárdenas | 1934–1940 | PNR | Won 1934 elections, outmanoeuvred Calles, began process of nationalising key industries. Rebranded PNR into PRM , and subsumed unions into party. |

... continued

| Name | Years | Party | Notes |
|---------------------------|--------------|-------|---|
| Manuel Ávila Camacho | 1940–1946 | PRM | Rebranded PRM into PRI, introduced IMSS. |
| Miguel Alemán Valdés | 1946–1952 | PRI | |
| Adolfo Ruiz Cortines | 1952–1958 | PRI | |
| Adolfo López Mateos | 1958–1964 | PRI | |
| Gustavo Díaz Ordaz | 1964–1970 | PRI | |
| Luis Echeverría | 1970–1976 | PRI | |
| José López Portillo | 1976–1982 | PRI | |
| Miguel de la Madrid | 1982–1988 | PRI | Implemented IMF structural adjustment programmes |
| Carlos Salinas de Gortari | 1988–1994 | PRI | Contentions election followed by further privatisations, economic liberalisation, some electoral reform |
| Ernesto Zedillo | 1994–2000 | PRI | Judiciary Reform, further electoral reforms |
| Democratisation | | | |
| Vicente Fox | 2000–2006 | PAN | Winner of watershed 2000 election, breaking 71 years of PRI rule |
| Felipe Calderón | 2006–2012 | PAN | Ramped up Mexican drug war, further electoral reform, FLL reform. |
| Enrique Peña Nieto | 2012–Present | PRI | |

Chapter 3

What have Mexican unions done to wages over the last decade?

3.1 Introduction

This chapter estimates the union wage premium for Mexico. Until very recently, Mexican labour legislation remained virtually unchanged since the introduction of the *Ley Federal del Trabajo* (FLL) in the 1930s. In the past three decades Mexico has unilaterally opened up to international trade, faced a currency crisis and joined the North American Free Trade Agreement (NAFTA). Over the period 1982–2016 the Mexican economy experienced six recessions.¹ The effects of these macroeconomic events on labour market institutions has not been fully explored. This chapter aims to elucidate the role of Mexican unions on the wage bargaining process during a period of macroeconomic change and uncertainty with a particular emphasis on the period 2005–2016. A key objective of the chapter is to provide a clear indication of the trends in the union premium over this period.

The analysis in this chapter utilises a novel dataset which has not been used to date in the literature to interrogate the union wage gap in Mexico. The analysis employs the *Encuesta Nacional de Ocupación y Empleo* (ENOE)², a richly detailed labour force survey conducted on a quarterly basis. The analysis is split along two questions, the first asks “What have Mexican unions done to wages in the last decade?”, whilst the second asks “Did unions in Mexico wield

¹The 1982 debt crisis, the side effects of the structural adjustment programmes, the 1994 Peso crisis, the manufacturing crash related to the 2000 dotcom bust, the 2008 recession induced by the global financial crisis, a subsequent recession and a recession in 2016. These are the officially measured turning peak–trough turning points of the OECD Composite coincident indicator, which is the official measure of the economic cycle in Mexico.

²National Employment and Occupation survey

a ‘sword-of-justice’ across the wage distribution over the last decade?”

The first question is assessed through a temporal analysis which focuses on a representative quarter for each year and applies the well known [Blinder \(1973\)](#) / [Oaxaca \(1973\)](#) decomposition to quantify the union wage gap. A set of instruments is exploited to account for the endogenous nature of the wage gap using a [Lee \(1978\)](#) endogenous switching model³, and a selectivity corrected decomposition is computed. The estimates of the union wage gap are further complemented by evidence from individual fixed-effects regressions. I then provide a synthesis of all of the competing estimates.

The effect of unions on the wage distribution is investigated by using a variance decomposition methodology, analogous to the mean decomposition. The effect of unions across the conditional wage distribution is then investigated by the application of quantile regression techniques.

This chapter is arranged in the following way. [Section 3.2](#) provides a brief background on unions in Mexico as well as a review of the existing literature on union wage gaps in Latin America and other developed countries. [Sections 3.3](#) contains a discussion of suitable datasets, and the data the present study utilises. [Section 3.4](#) outlines the econometric methodology. [Section 3.5](#) presents the results, and finally [Section 3.6](#) concludes.

3.2 Background and Literature Review

It is well documented that in Mexico there was a corporatist system which allied unions with the *Partido Revolucionario Institucional* (PRI).⁴ This alliance gave ‘officialist’ unions a great deal of political influence and was aided by a legislative framework which prevented the growth of independent unions ([Middlebrook, 1995](#)).

The legislative framework under which unions in Mexico are regulated is laid out both in the Constitution and the FLL.⁵ Some of the clauses in the law are very favourable to unions. For example, it prohibits employing replacement workers during officially recognised strikes, as well as requiring employers to automatically deduct union fees from workers’ pay-cheques and distribute them directly to union officers. Whilst ‘official’ unions benefited from this law, they were also subject to regulation regarding the formation and practices of trade unions. The pro-

³Not to be confused with the [Lee \(1983\)](#) multinomial selection correction procedure.

⁴Translated in English as Institutional Revolutionary Party.

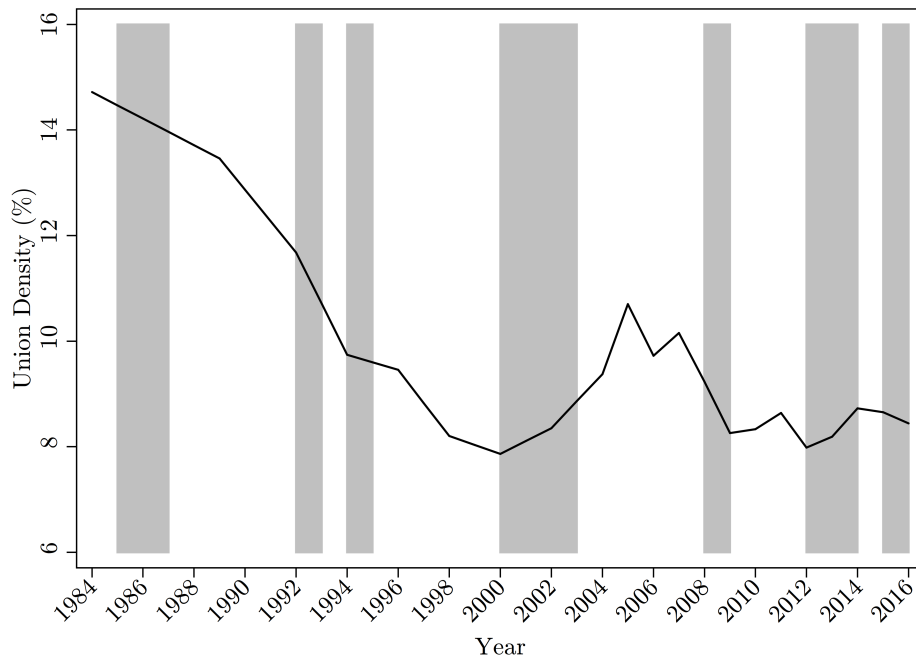
⁵The Federal Labour Law was first introduced in 1931, and was subject to minor amendments in the 1970s and 1980s. More recently there has been a labour law reform which came into effect in 2013.

cedures for establishing a union are as follows. A group of at least twenty workers has the legal right to form a union without prior authorisation. This union cannot negotiate a collective contract with an employer or engage in other activities such as strikes until it is officially registered by an Arbitration and Conciliation Commission. This is a tripartite arrangement where the president of the board is designated by the government, and there are representatives of both union and employer organisations. Registration procedures are straightforward, but are subject to ‘purposeful administrative delay’ and political influence (Bensusán and Middlebrook, 2012c). Once a union has successfully registered with the Arbitration and Conciliation Commission the union is entitled to be involved in collective bargaining. However, the first union to organise labour in a firm enjoys the monopoly control over these negotiations. Other unions may mount legal challenges on this, and usually the monopoly is awarded to the union which represents the majority of workers (Fairris, 2007).

The FLL also regulates the internal workings of unions. It requires that unions have statutes and freely elect their officers but the law falls short of explicitly calling for secret ballots. Indeed, the election of union officers is stipulated by law to occur during plenary sessions. This lack of internal democracy allows for union bosses to become unaccountable to the rank-and-file members (Middlebrook, 1995).

An important tool that unions use to exert their power is strike action, which is heavily regulated under the FLL. A union which intends to strike must first make its grievance known in writing to its employers. This grievance letter is termed a petition to strike. A copy of their grievance letter must then be sent to the local Arbitration and Conciliation Commission. The letter must specify when work will be stopped if the grievances are not resolved. The FLL states that this period termed the pre-strike period must last at least six working days. The Arbitration and Conciliation Commission, may call for a mediation meeting in which representatives of the union and the employer attempt to resolve the issue. If the workers do not turn up to this conciliation attempt, then the strike will be determined invalid by the Commission and as such illegal. If the mediation efforts fail and the prerequisites are met then formal strike action may commence. It should be noted that the mechanism by which the renewal of a collective bargaining contract is signalled is through a petition to strike (Barba García, 2004).

Figure 3.1 plots the Mexican union density rate over the period 1984–2016. In this figure the shaded areas denote recessionary periods as defined by the Mexican statistics agency. These recessions are determined by the composite coincident indicators methodology devised by the

Figure 3.1: Evolution of union density in Mexico 1984–2016

Note: Author's own calculation with *Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)* and *ENOE*. Shaded areas are recessions (see text).

OECD.⁶ From this plot it should be clear that the effect of the business cycle on the density of union members is weakly negative.⁷ In the past three decades there has been a declining trend in unionisation rates, which began in the 1990s. This is likely related to the break in the alliance between the state and ‘official’ unions during the 1980s, and the wave of privatisations that subsequently followed. Since the 1980s there has also been an increase in ‘ghost’ unions. These are unions established by management as a way of preventing further unionisation from occurring (Middlebrook, 1995; Bensusán, 2007; Fairris, 2006).

It is interesting to note that Tulio Esquinca and Melgoza Valdivia (2006) report a larger rate of unionisation in the early 2000s. One possible explanation for this is the rise of a credible alternative to ‘official’ unions. In more recent years, it seems that the gains made from independent unionisation in the early part of this century had been eroded by 2008. Since then union density has continued to decline.

Putting these figures into an international context, the trend is broadly similar to that noted for other Latin American countries and in particular Chile (Landerretche et al., 2011; Rios-Avila and Hirsch, 2014). The pattern observed for developed countries has also exhibited a slow

⁶The composite index for Mexico is comprised of Monthly changes in manufacturing employment, Employment in manufacturing, Finished goods stocks (manufacturing), Production (manufacturing), Yield of 10-year US federal Government securities, Cost managing deposits for banks, Real effective exchange rates

⁷This is confirmed by a naive regression including a dummy for recession years and an interaction with a time trend.

decline, with the 1980s providing a watershed moment when deunionisation began. Mexico's trajectory is therefore not unique. However, there are some notable features in [Figure 3.1](#). In particular, union density rates do not respond to recessions in a systematic fashion.

Focusing on the most recent period of union decline it is relevant to ask what has happened to wage determination in the union sector over this period, and it is this question on which the remainder of this chapter attempts to inform.

3.2.1 Literature Review

There is an extensive literature on union/nonunion wage gaps for developed countries.⁸ Overall there is a consensus amongst labour economists that the union wage gap for the USA is in the range of 10–20% ([Fuchs et al., 1998](#)). [Lewis \(1986b\)](#) surveys the research for the USA from 1968–1979 and finds that after adjusting for differences in characteristics the union wage gap ranges from 9.6–16.4%. [Jarrell and Stanley \(1990\)](#) take the studies that [Lewis](#) surveyed and perform a meta-analysis for the USA from 1968–1979. They find that the union wage gap ranges between 8.9–12.4%. Similar magnitudes have been found for other developed countries ([Pencavel, 1974](#); [Stewart, 1983](#); [Robinson and Tomes, 1984](#); [Callan and Reilly, 1993](#)).

Union status, however, is not randomly determined ([Robinson, 1989](#)). Numerous studies have attempted to address this issue with selection methods such as those proposed by [Lee \(1978\)](#), [Heckman \(1979\)](#), or [Lee \(1983\)](#) with varying degrees of success ([Lewis, 1986a](#)). The studies have struggled to ascertain in which direction the bias is likely to be. [Budd and Na \(2000\)](#) exploit instruments related to the ability of unions to influence the USA state-level political process and find that, once selection is controlled for, the wage premium is greater. In contrast, [Booth and Bryan \(2004\)](#) use British data from an employer-employee linked survey, and detect positive selection into unions, once this is accounted for the union wage premium disappears. [Main and Reilly \(1992\)](#) use British data to estimate the union wage gap for females, controlling for selection into unions and employment status. Once this is taken into account the wage gap is found to be smaller. The identification of selection effects in this literature is difficult. Unsurprisingly, this has been due to the difficulty in finding instruments that shift the probability of joining a union but not the wage level.

More recent studies for developed countries have focused on trying to find causal estimates of the union wage gap using regression discontinuity design procedures. [DiNardo and Lee \(2004\)](#)

⁸For an exhaustive review of the earlier literature see [Lewis \(1963, 1986a\)](#)

Table 3.1: Selected Studies on the Wage Gap

| Author | Year of Data | Country | Wage Gap Estimate |
|--|--------------|-----------|-------------------|
| <i>Aggregate Data Studies</i> | | | |
| Throop (1968) | 1950 & 1960 | USA | 10–30% |
| Pencavel (1974) | 1964 | UK | 0–10% |
| <i>Microeconometric individual level studies using mean analysis</i> | | | |
| Johnson and Youmans (1971) | 1965–1966 | USA | 34% |
| Stewart (1983) | 1975 | UK | 7.7 |
| Callan and Reilly (1993) | 1987 | Ireland | 20.5% |
| <i>Microeconometric individual level studies using quantile regression</i> | | | |
| Manquilef-Bächler et al. (2009) | 1991 & 2003 | UK | 0–20% |
| Rios-Avila and Hirsch (2014) | 2007 & 2008 | USA | 3.6–21% |
| <i>Developing countries</i> | | | |
| Schultz and Mwabu (1998) [†] | 1993 | S. Africa | 19–145% |
| Fields and Yoo (2000) | 1986 & 1993 | S. Korea | 3–6% |
| Menezes-Filho et al. (2005) [‡] | 1988–1998 | Brazil | 12% |
| Landerretche et al. (2013) [†] | 2002–2009 | Chile | 20% |
| Panagides and Patrinos (1994) | 1989 | Mexico | 10.4% |
| Fairris (2003) | 1984 & 1996 | Mexico | 12–18% |

★ Lower and upper bounds given by 10th and 90th percentile estimates, respectively.

† denotes a quantile regression study, ‡ reflects enterprise-level data.

focus on the results of contested union elections in enterprises and they find that there are short-run differences in terms of wages between those that narrowly voted in unions versus those that rejected them. This approach was then developed further by [Frandsen \(2012\)](#) who matched the election data with confidential household information. He concludes that unions exert a strong effect on wages for those at the lower ends of the pay distribution, where a union win increases wages at the bottom decile by as much as 0.30 log points.

Estimates for union wage differentials and the impact on wage dispersion were recently surveyed by [Freeman \(2010\)](#) as part of an overview of labour markets in developing countries. The evidence for Africa predominantly focused on wage effects. The wage premium in South Africa for unions is found to range between 8–40% at the mean. [Schultz and Mwabu \(1998\)](#) estimate the union wage gap across the conditional wage distribution in South Africa, and find that the wage gap for Africans is greater at the lower ends of the pay distribution and, not surprisingly, decreases with movement up the wage distribution. Their findings suggest those at the bottom end of the distribution workers have seen their wages increase by 145%, whilst those in the top decile experience a more modest 19% advantage. [Butcher and Rouse \(2001\)](#) replicate the [Schultz and Mwabu](#) study with different data and apply more controls. They find that the wage premium monotonically decreases along the wage distribution. This suggests the existence of a ‘sword-of-justice’ effect, wherein unions compress the pay distribution. Their estimates suggest that those at the lower ends of the distribution earn an extra 32%, whilst those at the top enjoy a more modest premium of just 6.7%. Finally, the mean wage gap is found to be 20%. Thus, on the whole, both studies conclude that the wage distribution is compressed by the presence of unions. [Hofmeyr and Lucas \(2001\)](#) apply a series of selection correction techniques to the analysis of the mean wage gap. They find, that dependent on the type of correction mechanism, the wage gap for urban African males increased over the period 1985–1993 from 8% to 20%. [Blunch and Verner \(2004\)](#) report an estimated wage gap of about 6% for Ghana. [Baah \(2005\)](#) reports that the Ghana wage gap increased ranges between 7.8 and 12.6 percentage points in 1992 and 1999. Both studies conclude that unions in Ghana decrease the dispersion of wages. It is worth noting that all of these studies relate to the union wage gap for the formal sector. Coverage of union wage effects in the informal sector is, to the best of my knowledge, non-existent, primarily because unions do not organise in these sectors.

Asian estimates of the union wage gap vary by country. [Bhandari \(2008\)](#) reports evidence for a small sample of Indian workers and his findings suggest a wage gap of 6% for contract

workers, while permanent workers secure a wage gap of 25%. The wage gap for South Korea is found to be small, [Fields and Yoo \(2000\)](#) study the evolution of the gap over a period of rapid union growth. They report that despite these increases in density, and hence bargaining ability, the gap simply rose from 3% to 6%. [Park \(2008\)](#) finds an all-worker wage differential of 5%, and when disaggregated by gender finds the gap to be 12% and 2% for women and men, respectively.

Turning to the Latin American literature, [Arbache and Carneiro \(1999\)](#) report a wage premium of 5–7% in the manufacturing sector for Brazil. In contrast, [Menezes-Filho et al. \(2005\)](#) detect a union wage effect of 12% for Brazil, using establishment-level data. The Uruguayan dictatorship of 1973–1984 outlawed collective bargaining. [Casoni et al. \(2005\)](#) provide evidence for Uruguay in the period subsequent to the return of democracy, finding that unions increased wages by up to 7.5%. [Landerretche et al. \(2011, 2013\)](#) report evidence for the union wage differential for Chile using panel data for 2002–2009. They correct for endogeneity of union status and find that the corrected union wage gap ranges between 18.6–24%. [Rios-Avila and Hirsch \(2012, 2014\)](#) study the union wage effect for Bolivia and Chile across the wage distribution and apply the [Firpo et al. \(2009\)](#) decomposition technique, which allows the effects of subsets of variables to be isolated.⁹ They find that the Chilean union wage gap is immutable across the wage distribution at about 20%, whilst the Bolivian raw union wage gap is found to be between 20–35% across the wage distribution. They find in both cases that the wage structure accounts for about half of the gap, and also note that unions reduce wage dispersion. [Panagides and Patrinos \(1994\)](#) report the union wage gap in Mexico. They apply a [Oaxaca-Blinder](#) decomposition and determine that the all-worker union/nonunion wage gap for 1989 is 10.4%. [Fairris \(2003\)](#) reports the treatment component of a [Oaxaca-Blinder](#) decomposition and finds that the adjusted union mark-up declined from 19% in 1984 to 14% in 1996.

This brief summary of the academic literature on the union wage gap has shown the following stylized facts: First, there is a union wage gap. The raw mean wage gap is found to range between 10–70%, when adjusted for observable characteristics it reduces to a more modest 3–30%. Second, it appears that the union-mark-up is associated with union density, although increases in one will not translate in a one-for-one relationship. Third, there are concerns about the non-random nature of union status. In general, the literature has not come to a consensus on the direction of bias due to selection, and it appears to be context specific. Finally, unions are found to have a ‘sword-of-justice’ effect across the wage distribution. They compress the

⁹However, even with this approach there remains an identification problem; where estimates for sub-groups of variables are sensitive to the base group used in estimation.

wage distribution by ensuring that wage gains are greatest for those at the bottom end of the distribution, whilst those at the upper end enjoy a more modest advantage. The remainder of this chapter will now focus on interrogating these stylized facts for Mexico over the last decade.

3.3 Data

In this section the sample data and variables used in the analysis are discussed in depth and some descriptive statistics presented.

3.3.1 Data and sample construction

Previous studies on the economic impacts of unions in Mexico have exploited the [ENIGH](#). These are household surveys for which data are available on a biennial basis.¹⁰ The survey has a complex design that is probabilistic, stratified, and multi-staged. Although this is a household income-expenditure survey it has been favoured by researchers over the traditional labour force surveys for being the only one which includes a question on union membership.

There are numerous caveats with [ENIGH](#),¹¹ and the insufficient coverage of labour market data is a large concern with this survey. Furthermore, [Zapata \(2005\)](#) and [de la Garza Toledo \(2006, 2012\)](#) suggest that it may not be representative of unionised workers. For this reason I use the [ENOE](#). The temporal coverage of this survey begins in the first quarter of 2005. The survey is conducted quarterly and its coverage includes 120,260 households. It has a rotating panel design which ensures that a single household is interviewed five consecutive quarters before being replaced. This replacement is done to ensure that the sample remains nationally representative.

This survey includes a question on union membership in the expanded questionnaire. The specific question that individuals were asked was: “*En este empleo pertenece a algún sindicato?*”.¹² During the first five quarters of [ENOE](#)’s existence households were interviewed using the expanded questionnaire, subsequent applications of the expanded questionnaire have been restricted to once every four quarters. The survey also covers a set of questions on hours worked, contract types, education levels, benefits, occupational and workplace questions.

¹⁰It is worthwhile to note that there are data available from 1984, 1989, 1992, 1994, 1996, 1998, 2000, 2004, 2005, and every two years thereafter.

¹¹The Mexican Household Survey of Income and Expenditure.

¹²‘In this job do you belong to a union?’ Note that this question is asked separately for main jobs and any other jobs that an individual may hold.

Thus far, there have been sixteen editions of the expanded questionnaire.¹³ As mentioned previously this interviews approximately 120,620 households, providing an effective sample of about 425,000 individuals per quarter. The literature suggests that wage determination by unions within the public sector is markedly different to that in the private sector (Ehrenberg and Schwarz, 1986). For this reason I restrict the analysis to wage earners in the private sector, who are of legal working age (16–65). Thus, self-employed individuals, workers in the armed forces, and domestic service workers are excluded from our sample. Females were not included in the analysis as it was deemed that in order to correct for the well known selection bias into the labour market as emphasised by Heckman (1979), there would be insufficient instruments to correctly identify these effects. Thus, the remaining sample size ranges from 163,000–180,000 per quarter.

3.3.2 Identification Strategy

As explained in subsection 3.2.1, the established literature on unions has struggled to find a set of instruments which allow a researcher to obtain an estimate of the union wage gap uncontaminated by the endogeneity of union status. This chapter contributes to this literature by proposing and exploiting a theoretically exogenous instrument for the Mexican context. I supplement the microdata from ENOE with administrative data on strike petitions at a local jurisdiction level. These data are the basis for instrumenting union status. The data were obtained from *Instituto Nacional de Estadística, Geografía e Informática* (INEGI)¹⁴ who collect them on behalf of local Arbitration and Conciliation Commissions and cover the time period 1991–2014. The data track the incidence of strike petitions on a monthly basis for the whole of Mexico. These data contain for each municipality and for each sector the number of strike petitions. Note that all wage strike threats were excluded from the analysis. The petitions considered for this instrument are those dealing with contract negotiations (but not wages) and those complaining about intra-firm working conditions. The data allow me to identify to which unions congress each petition refers, unfortunately, the survey data do not allow me to match this through to the individual on a union by union basis. I aggregate these to be the mean rate of petitions per 10,000 of the local municipal population by independent unions and ‘officialist’ unions. Thus, for the s^{th} sector in the m^{th} municipality in the t^{th} quarter the for the u^{th} type

¹³These are 2005q1–2006q2, 2007q2, 2008q2, 2009q1, 2010q1, 2011q1, 2012q1, 2013q1, 2014q1, 2015q1, and 2016q1.

¹⁴The Mexican statistics agency.

of union the instrument is defined as follows:

$$\text{Petition rate}_{usmjt} = \frac{\sum_{j=1}^J \text{Petition}_{usmjt-4}}{\text{Population}_{mjt-4}}$$

Although the contract negotiations outlined here are free of any wage increases, I lag the petition rates by one calendar year in order to avoid potential correlations with actual wage negotiations. Despite the rate being lagged, the selection corrections exercises outlined in [Section 3.4](#), only covers the years 2005q1–2015q1 due to data constraints.

The story behind the use of this instrument relies on some of the recent events in the Mexican labour market as outlined in [Section 3.2](#) and in [Chapter 2](#). The last decade has been characterised by the rise of independent unions. These unions have challenged the near hegemonic control that ‘officialist’ unions have had on the Mexican labour market. Given the close relationship between the state and ‘officialist’ unions, it is likely that the rate of strike threats were artificially low during the period prior to independent unionism, as unions were unlikely to dissent from the government line. One such example of this is the economic solidarity pact of 1987. However, the increased competition from independent unions would be reflected in increased strike threats, by both independent and ‘officialist’ unions as they competed for better contracts and conditions for workers. Individuals seeking to join a union are likely to seek out signals of the quality of the potential union. Individuals may be aware that various unions exist but may be unwilling to join unless they are perceived to act in worker’s interests. Workers are likely to make the decision to join based on a union’s bargaining record. It is likely that this signal will be contained in the rate of strike petitions. This is due to the instrumental role of petitions to strike in contract negotiations as proscribed by the [FLL](#).

Petitions at a sectoral-municipal level are intended to capture the intensity of labour relations at a local level. Where, a municipality with relatively high rates of strike petitions in a given industry is likely to have a union which is seeking to improve the lot of their workers. Thus, a marginal worker who is amenable to the idea of joining a union may be influenced to organise if they perceive unions to be effective. The instrument is the lagged rate of petitions for both ‘officialist’ and independent unions in the previous calendar year for a given sector in a given municipality. Workers are likely to be motivated to organise themselves if they see that unions in their area and industry have been performing their duties in the recent past. However, it is unlikely unionisation is a frictionless enterprise. For this reason I do not use the effects of current

petition rates. One potential limitation of these data is relates to legal jurisdiction. Industries within a given state may not all fall under local jurisdiction, as some industries under the [FLL](#) are deemed to fall under Federal oversight. This implies that the strike petitions used in this chapter exclude these petitions given data constraints.

Thus, I propose that the average union joiner will likely seek to enter into a ‘good’ union as identified by them. If the historical behaviour of ‘officialist’ unions implies that they will have artificially low petitions rate, and as revealed in [Chapter 5](#) a petitions rate that is influenced by politics, then we might expect that as the rate of petitions for ‘officialist’ unions increase, the probability of an individual joining will decrease. If the historical narrative in [Chapter 2](#), is considered, it is suggestive that amongst the loose grouping independent unions there are numerous unions such as the ‘movement’ unionists who are perceived to behave in the interests of their rank-and-file, or ‘white unions’ which seek to work with management to improve conditions for all parties involved. It is likely that the petitions to strike of these unions would be perceived by a potential union entrant as a positive signal, and thus the probability of becoming a ‘joiner’ is likely to be positively related to these petitions.

3.3.3 Variables and Summary Statistics

In order to capture the wage determination process of union and nonunion individuals standard human capital controls, among others, were selected. [ENOE](#) allows us to distinguish the age of the respondent, their educational qualifications, occupation, the region of residence, and the hours worked. The survey allows individuals to report their wages as they prefer, be that weekly, daily, monthly, annually as well as per unit. The data give sufficient information to allow for these to be transformed to hourly wages, which will be definition of wages used throughout this chapter. Wages were deflated by the [Consumer Price Index \(CPI\)](#) provided by [INEGI](#) and are expressed in December 2010 prices.

[Table 3.3](#) presents some descriptive statistics of the variables used in the analysis disaggregated by union status for the period 2005–2016. It is obvious that the mean proportions presented in this table may be insufficient for disentangling the structural differences between these two sectors, which may in turn reflect the changing structural composition of the economy.

It is worthwhile to note that union members are generally prime age workers. However, over the period surveyed there appears to be little unionisation among those individuals just starting their careers. Thus, if unions are unsuccessful in recruiting younger members as their current

Table 3.2: Variable Description: [ENOE](#) 2005q1–2016q1

| Variable | Description |
|---|---|
| <i>Individual Demographic variables</i> | |
| Primary | =1 if Primary is maximum level of education, 0 otherwise. |
| Secondary | =1 if Secondary is maximum level of education, 0 otherwise. |
| Preparatory | =1 if Preparatory is maximum level of education, 0 otherwise. |
| Tertiary | =1 if University or Postgraduate level education is maximum attained, 0 otherwise. |
| Age | Individual's age |
| Age ² | Age squared |
| Married | =1 if individual is Married, 0 otherwise. |
| <i>Labour variables</i> | |
| Tenure | Individual's tenure in their current job in years. |
| Tenure ² | Tenure squared |
| Temporary Contract | =1 if individual's work contract is less than 1 year, 0 otherwise. |
| No Contract | =1 if individual has no work contract, 0 otherwise. |
| Micro Business | =1 if individual's firm size is less than 10 people, 0 otherwise. |
| Medium Business | =1 if individual's firm size is between 11 and 50 people, 0 otherwise. |
| Union | =1 if individual is a member of a union. |
| <i>Controls</i> | |
| State Controls | 32 dummies for each state in the Mexican republic. |
| Industry Controls | 1 digit NAICS industry dummies. (viz. Agriculture, Extractive Industries, Manufacturing, Construction, Commerce, Amenities services, Transport, Professional services, Social Services, and Other services) |

NOTE: All derived from [ENOE](#).

membership ages unions will become further marginalised.

Union members are primarily comprised of individuals with slightly higher levels of education than the nonunion sector, and are comprised of a large proportion who have secondary education as their maximum qualification. This is in stark contrast to the educational composition reported by [Tulio Esquinca and Melgoza Valdivia \(2006\)](#) who find that in 1992 the majority of unionised workers only had primary and secondary education with very few individuals with tertiary education.

It is well known that unions have a strong preference for linking wage determination to seniority at the firm. This is likely to be the case with Mexican unions and is evinced by the tenure figures where 12.8% of union members have been in their job between 15 and 25 years. Unsurprisingly, union discourse suggests that their membership would be primarily composed of permanent workers and the data confirm this. However, it is interesting to note that they have successfully organised some of the most vulnerable workers, particularly those without contracts. Finally, it should come as little surprise that unions are dominant in firms where there is more than 50 workers.

Recall that [Figure 3.1](#) showed the evolution of union density in Mexico. It presents the

Table 3.3: Descriptive Statistics

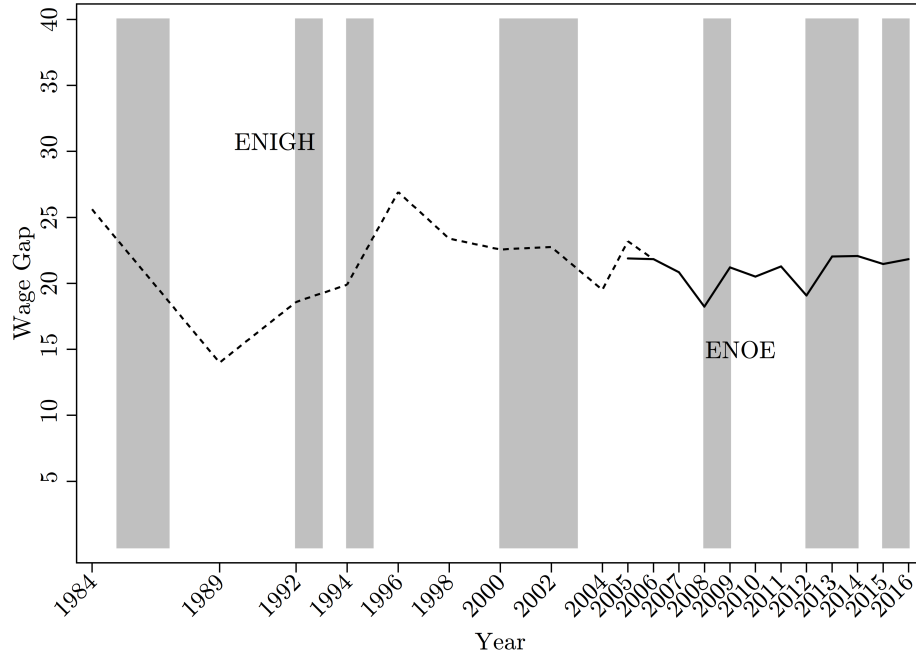
| | Non Unionised | Unionised | Total |
|------------------------|---------------|-----------|---------|
| Age | | | |
| Under 25 | 29.4 | 18.7 | 28.6 |
| 25–44 | 49.6 | 59.7 | 50.4 |
| 45–55 | 13.6 | 17.0 | 13.9 |
| 55 and over | 7.3 | 4.6 | 7.1 |
| Total | 100.0 | 100.0 | 100.0 |
| Education | | | |
| Primary | 29.4 | 15.3 | 28.4 |
| Secondary | 35.6 | 40.8 | 36.0 |
| Preparatory | 19.4 | 25.6 | 19.8 |
| University | 15.7 | 18.4 | 15.9 |
| Total | 100.0 | 100.0 | 100.0 |
| Marital Status | | | |
| Single, or Otherwise | 52.4 | 36.4 | 51.3 |
| Married | 47.6 | 63.6 | 48.7 |
| Total | 100.0 | 100.0 | 100.0 |
| Tenure | | | |
| Less than 1 year | 13.3 | 4.5 | 12.7 |
| 1–3 years | 43.9 | 34.7 | 43.3 |
| 4–6 years | 16.6 | 18.1 | 16.7 |
| 7–15 years | 17.0 | 24.2 | 17.5 |
| 15–25 years | 6.3 | 12.8 | 6.7 |
| 26+ years | 2.9 | 5.7 | 3.1 |
| Total | 100.0 | 100.0 | 100.0 |
| Contract length | | | |
| No Contract | 61.5 | 7.2 | 57.7 |
| <2 Months | 1.0 | 3.2 | 1.2 |
| 2–6 Months | 2.9 | 5.3 | 3.1 |
| 6–12 Months | 2.1 | 2.1 | 2.1 |
| Until end of project | 1.5 | 1.2 | 1.4 |
| Permanent | 31.0 | 81.1 | 34.5 |
| Total | 100.0 | 100.0 | 100.0 |
| Business Size | | | |
| Micro | 54.9 | 4.8 | 51.4 |
| Small | 22.8 | 13.9 | 22.2 |
| Medium | 13.4 | 26.1 | 14.3 |
| Large | 8.8 | 55.1 | 12.1 |
| Total | 100.0 | 100.0 | 100.0 |
| Sample size | 517,687 | 39,356 | 557,043 |

NOTE: Data are derived from [ENOE](#) for 2005q1–2016q1 and represent means for the sample used in estimation.

unionisation rates as reported by both [ENIGH](#) and [ENOE](#), and the shaded areas are the recessionary periods. It is clear from this that union density in Mexico has been in decline since the

1980s, with the exception of their brief resurgence in the early 2000s.¹⁵ The period captured by [ENOE](#), shown by the solid line, reveals a steady decline in unionisation rates for working age males. In 2005 union membership totalled 10.7% of all private sector workers, since then it has contracted by one-fifth to a union membership rate of 8.4% in 2016.

Figure 3.2: The evolution of the raw union wage gap, Mexico 2005q1–2016q1



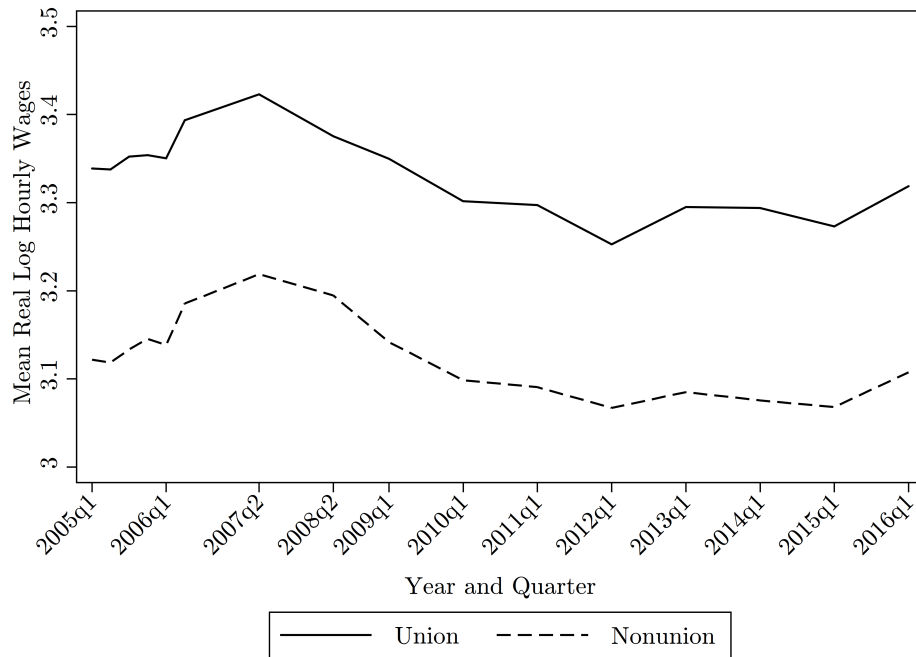
Note: Author's own calculation using [ENIGH](#) and [ENOE](#).

The raw differences in wages between the sectors are presented in [Figure 3.2](#). It is interesting to note that whilst the gap is relatively stable over the time period under analysis, it has not always been so. The aftermath of the debt crisis and the privatisations of state-owned enterprises can explain the halving of the wage gap between 1984 and 1989. Since then, there seems to have been a short-lived increase in the gap during the currency crisis period in the 1990s. However, it has since remained relatively stable, oscillating between 18–22 per cent over this period.

[Figure 3.3](#) shows the evolution of the mean wage between 2005 and 2016. This provides suggestive evidence that the stability in the wage gap is indicative of weak union power. Members appear to be subject to the same wage trends as non-members.

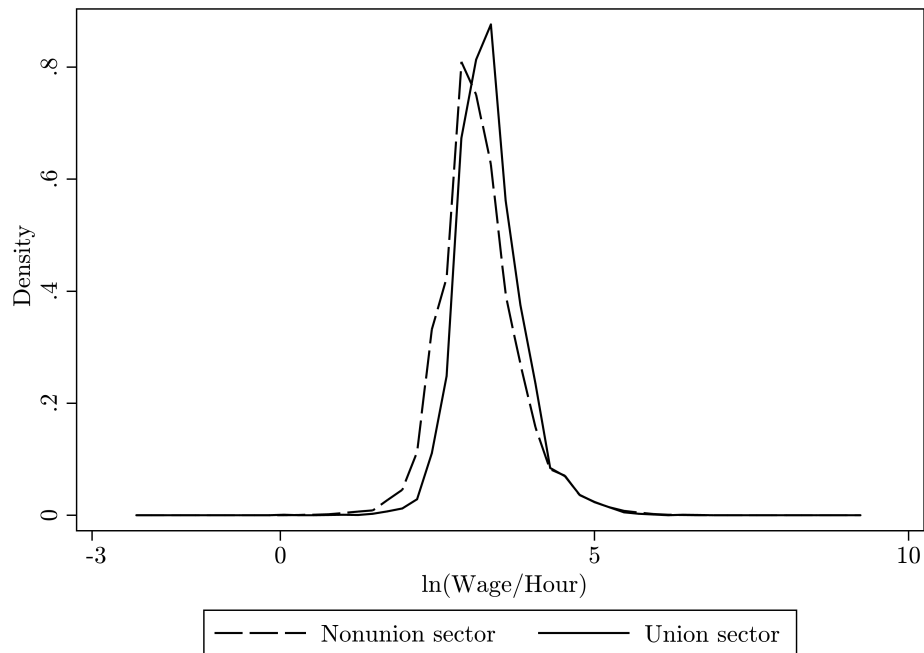
The systematic differences between sectors are confirmed by the time pooled kernel densities

¹⁵For comparison, in Chile in the 1990s the union density rate ranged between 18–20% and by the early 2000s this had fallen to 12–14% ([Landerretche et al., 2011, 2013](#)). The rates of unionisation in Bolivia are reported by [Rios-Avila and Hirsch \(2014\)](#) to be on average, 12.9% for the 2000s. In Uruguay union density rose to 60% upon the legalisation of unions, but had fallen to approximately 18% by 1997. Thus, the Mexican experience in the rates of union membership reflects the broader trends for Latin America.

Figure 3.3: The evolution of the mean wage by sector, Mexico 2005q1–2016q1

Note: Author's own calculation using [ENOE](#).

shown in [Figure 3.4](#). The union sector's wages are clearly greatest at the mean.¹⁶ Although this may reflect no more than the fact that the wage gaps reported earlier are indicative of systematic differences between the two sectors.

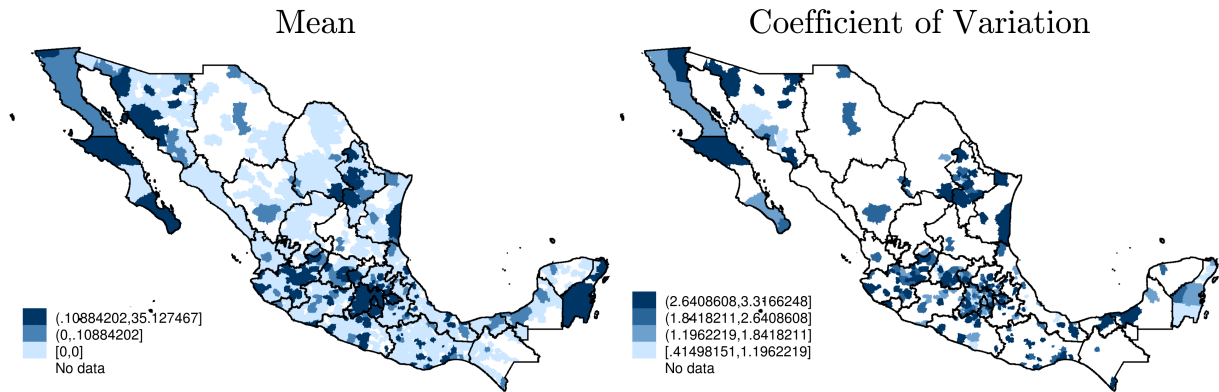
Figure 3.4: Kernel density of $\ln(\text{wages}/\text{hour})$ by union status, Mexico 2005q1–2016q1

Note: Author's own calculation using [ENOE](#).

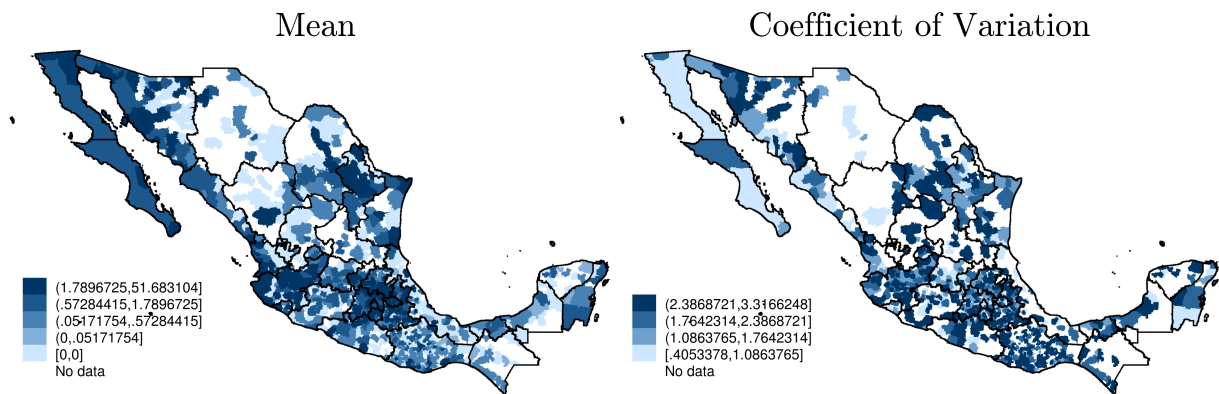
¹⁶See Appendix B which reports the kernel densities for 2006, 2010 and 2016. These confirm that the same pattern evidenced in the time pooled sample can be seen in the year specific plots.

Figure 3.5: Strike petitions, Mexico 1991q1–2014q4

(a) Independent Unions



(b) ‘Officialist Unions’



Note: Author’s own calculation using administrative data from local arbitration and conciliation boards.

Finally, [Figure 3.5a](#) is a choropleth map of the mean of the sectoral mean petition rate by municipality, where for each type of union the mean and coefficient of variation are reported. It should be noted that the areas marked in white are municipalities for which there are no petitions over the time period 1991–2014.¹⁷ One possible explanation for these gaps in the data is that all of the industries within these areas are legally under Federal jurisdiction. [Figure 3.5b](#) shows the coefficient of variation in the sectoral mean for each municipality. It should be remarked that there is a high degree of variation between sectors in each location. There are also considerable levels of variation within each state. As anticipated, there are fewer municipality-sectoral years available for independent unions.

¹⁷Whilst these may seem alarmingly large, they are mainly due to geographically large municipalities, which do not contain many individuals.

3.4 Methodology

The objective of this chapter is to obtain the effect of unionisation on wages. To this end, this chapter employs a number of different empirical approaches. Firstly, I follow the traditional approach in the literature to investigate the research question beginning with a set of sectoral specific wage equations:

$$w_s = \mathbf{X}'_s \beta_s + \eta_s \begin{cases} s = u, & \text{if } U = 1; \\ s = n, & \text{if } U = 0. \end{cases} \quad (3.1)$$

where \mathbf{X}_u and \mathbf{X}_n are $(k \times n)$ matrices of characteristics and β is a $(k \times 1)$ vector of unknown parameters which capture the effect of the various covariates on the natural log of the wage w , and η is a $(n \times 1)$ vector of random error terms specific to union and nonunion individuals. U_i is binary variable which takes the value of 1 if an individual is a union, and 0 otherwise.

This framework allows the application of the well known decomposition approach of [Blinder \(1973\)](#) and [Oaxaca \(1973\)](#):

$$\bar{w}_u - \bar{w}_n = (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_n + \bar{\mathbf{X}}'_u (\hat{\beta}_u - \hat{\beta}_n) \quad (3.2)$$

This is a decomposition where the first term of [equation \(3.2\)](#) gives the wage differences due to endowments, and the second due to differences in the coefficients (i.e., treatment).

This approach is potentially affected by an “index number problem”. Therefore, one can reformulate [equation \(3.2\)](#) under the assumption that the union wage structure prevails in the absence of unequal treatment as:

$$\bar{w}_u - \bar{w}_n = (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_u + \bar{\mathbf{X}}'_n (\hat{\beta}_u - \hat{\beta}_n) \quad (3.3)$$

Although the Oaxaca–Blinder decomposition is a standard tool in economic analysis there is a thin literature on the construction of the sampling variances of each of the terms of the decomposition. [Oaxaca and Ransom \(1998\)](#) and [Greene \(2008, pp. 55–56\)](#) provide some methods to obtain the sampling variances for both terms. [Jann \(2008\)](#) challenges the assumptions underlying these previous estimates, noting that the assumption that the regressors are fixed is likely violated in most applications.

It is worth noting that the estimates of the unexplained component of [equations \(3.2\)](#) and

(3.3) are in fact estimators for the [Average Treatment Effect on the Treated \(ATET\)](#) and [Average Treatment Effect on the Non-treated \(ATEN\)](#) ([Black et al., 2006](#); [Melly, 2006](#); [Fortin et al., 2011](#); [Śłoczyński, 2013, 2015b](#)).

The variance suggested by [Oaxaca and Ransom \(1998\)](#) are derived using the delta method. Where the sampling variance for the endowment effect in (3.2) is

$$\hat{V}([\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n]' \hat{\beta}_n) = ([\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n]' \hat{\beta}_n + 1)^2 (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{V}(\hat{\beta}_n) (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n) \quad (3.4)$$

and the variance for the the treatment is given by

$$\hat{V}(\bar{\mathbf{X}}_u' [\hat{\beta}_u - \hat{\beta}_n]) = ([\bar{\mathbf{X}}_u' \hat{\beta}_u - \hat{\beta}_n] + 1)^2 \bar{\mathbf{X}}_n' [\hat{V}(\hat{\beta}_u) + V(\hat{\beta}_n)] \bar{\mathbf{X}}_n \quad (3.5)$$

where $\hat{V}(\hat{\beta})$ is the estimated variance-covariance matrix obtained from regression.

The application of the delta method in this case assumes that the variables are asymptotically normally distributed, and that $\bar{\mathbf{X}}$ is fixed, this is unlikely to be the case and can be shown to bias the standard errors. [Jann \(2008\)](#) derives standard errors consistent with $\bar{\mathbf{X}}$ being stochastic. Thus, the sampling variances for the decomposition are:

$$\hat{V}([\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n]' \hat{\beta}_n) \approx (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{V}(\hat{\beta}_n) (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n) + \hat{\beta}_n' [\hat{V}(\bar{\mathbf{X}}_u) + \hat{V}(\bar{\mathbf{X}}_n)] \hat{\beta}_n \quad (3.6)$$

and

$$\hat{V}(\bar{\mathbf{X}}_u' [\hat{\beta}_u - \hat{\beta}_n]) \approx \bar{\mathbf{X}}_u' [\hat{V}(\hat{\beta}_u) + \hat{V}(\hat{\beta}_n)] \bar{\mathbf{X}}_u + (\hat{\beta}_u - \hat{\beta}_n)' \hat{V}(\bar{\mathbf{X}}_u) (\hat{\beta}_u - \hat{\beta}_n) \quad (3.7)$$

where an estimator for $V(\bar{\mathbf{X}})$ is given by $[(\mathbf{X} - 1\bar{\mathbf{X}}')'(\mathbf{X} - 1\bar{\mathbf{X}}')]/[n(n-1)]$, that is the cross-product of the centered-data matrix adjusted for the number of observations in each group. Note that these are reported as approximations as they ignore a small asymptotically vanishing term ($\text{Tr}[\hat{V}(\bar{\mathbf{X}})\hat{V}(\hat{\beta})]$). The expressions (3.6) and (3.7) imply that the stochastic nature of $\bar{\mathbf{X}}$ downwards biases the sampling variance for the endowment effect.

3.4.1 Alternative Oaxaca Decomposition Counterfactuals

The [Oaxaca-Blinder](#) decompositions are subject to the well known ‘index-number’ problem ([Oaxaca and Ransom, 1999](#)). There is a possibility that neither the union nor nonunion wage structures would prevail in the absence of unions. [Neumark \(1988\)](#) suggests that an alternate wage structure for an appropriate counterfactual is that of the pooled regression. [Jann \(2008\)](#)

points out that this approach is likely to transfer some portion of the treatment effect to the explained component of the decomposition, due to residual group difference spillover into the constant term of the pooled equation. As such the appropriate counterfactual vector is one which includes a dummy for union status which is then net out prior to the decomposition. This new decomposition can be expressed as below:

$$\bar{w}_u - \bar{w}_n = (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}^* + [\bar{\mathbf{X}}_u'(\hat{\beta}_u - \hat{\beta}^*) + \bar{\mathbf{X}}_n'(\hat{\beta}^* - \hat{\beta}_n)] \quad (3.8)$$

where $\hat{\beta}^*$ describes the vector that prevails in the absence of discrimination.

Cotton (1988) provides an alternate decomposition. He suggests that the optimum vector weight is $\hat{\beta}^* = \frac{N_n}{N_u + N_n} \cdot \beta_u + \frac{N_u}{N_u + N_n} \cdot \beta_n$ and thus, this represents an average of what is the ‘benefit’ to unionisation, as well as the ‘cost’ of unionisation, in order to obtain the treatment and endowment effects. Słoczyński (2013, 2015a) shows that the treatment effect in this decomposition is equivalent to the following:

$$\text{TE}_{\text{Cotton (1988)}} = \frac{N_n}{N_u + N_n} \cdot \bar{\mathbf{X}}_n'(\hat{\beta}_u - \hat{\beta}^*) + \frac{N_u}{N_u + N_n} \cdot \bar{\mathbf{X}}_u'(\hat{\beta}_n - \hat{\beta}^*) \quad (3.9)$$

However, as outlined in a critique by Elder et al. (2010); Słoczyński (2013, 2015b) this approach gives undue weight to the smaller population of the two. Słoczyński (2013, 2015b) proves that reversing the weights in the Cotton (1988) decomposition yields a consistent estimator of the population Average Treatment Effect (ATE).

$$\text{ATE} = \frac{N_u}{N_u + N_n} \cdot \bar{\mathbf{X}}_n'(\hat{\beta}_u - \hat{\beta}^*) + \frac{N_n}{N_u + N_n} \cdot \bar{\mathbf{X}}_u'(\hat{\beta}_n - \hat{\beta}^*) \quad (3.10)$$

For both decompositions in equations (3.9) and (3.10), an analogue can be derived for the endowment effect. The analogue endowment effect for (3.9) is given by:

$$\text{EE}_{\text{Cotton (1988)}} = \frac{N_n}{N_u + N_n} \cdot (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_u + \frac{N_u}{N_u + N_n} \cdot (\bar{\mathbf{X}}_n - \bar{\mathbf{X}}_u)' \hat{\beta}_n \quad (3.11)$$

and the analogue population Average Endowment Effect (AEE) for (3.10) is given by:

$$\text{AEE} = \frac{N_u}{N_u + N_n} \cdot (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_u + \frac{N_n}{N_u + N_n} \cdot (\bar{\mathbf{X}}_n - \bar{\mathbf{X}}_u)' \hat{\beta}_n \quad (3.12)$$

Finally, the variance of the (3.10) can be shown to be given by:

$$\hat{V}(\widehat{ATE}) = \left(\hat{V}(U) \cdot \hat{V} \left[\bar{\mathbf{X}}'_u \Delta \hat{\beta} \right] + \left[\bar{\mathbf{X}}'_u \Delta \hat{\beta} \right]^2 \cdot \hat{V}(U) + U^2 \cdot \hat{V} \left[\bar{\mathbf{X}}'_u \Delta \hat{\beta} \right] + \right. \quad (3.13)$$

$$\left. \hat{V}(N) \cdot \hat{V} \left[\bar{\mathbf{X}}'_n \Delta \hat{\beta} \right] + \left[\bar{\mathbf{X}}'_n \Delta \hat{\beta} \right]^2 \cdot \hat{V}(N) + N^2 \cdot \hat{V} \left[\bar{\mathbf{X}}'_n \Delta \hat{\beta} \right] \right) \quad (3.14)$$

where $U = \frac{N_u}{N_n + N_u}$ and $N = \frac{N_u}{N_n + N_u}$, the proportions of the population of the union and nonunion sectors, respectively. $\Delta \hat{\beta} = (\hat{\beta}_u - \hat{\beta}_n)$. $\hat{V}(\cdot)$ is the variance operator, and the variance of the treatment effects can be obtained as in equation (3.7). The variance of the proportions is as follows: $\hat{V}(U) = \frac{\frac{N_u}{N_u + N_n} \cdot \frac{N_u}{N_u + N_n}}{\frac{N_u}{N_u + N_n}}$.

3.4.2 Endogenous Switching

One of the challenges outlined by the existing literature for developed countries is the endogenous nature of union determination (Robinson, 1989). The identification challenge of finding a suitable instrument that is correlated to an individual's union status but uncorrelated with their wages has proved to be challenging. If one finds such an instrument, then not only is it possible to identify the effect upon an intercept shift, but use it to control for union selection in the wage equations such as those estimated by equation (3.1).

I shall briefly motivate an endogenous switching regime, which will then allow for selection into both the union and non-union sector, and in turn provide a Oaxaca-Blinder type decomposition which accounts for the endogenous nature of union status. As outlined earlier in section 3.3 the rate of strike threats for both 'officialist' and independent unions will be exploited as identifying instruments for unionisation.¹⁸

One can now model the union decision using a Probit as follows:

$$\Pr(U = 1) = \Phi(\mathbf{X}'_s \beta_s + \mathbf{Z}'_i \gamma_s) \quad (3.15)$$

where $\Phi(\cdot)$ is the Cumulative Density Function (CDF) normal distribution, and as before \mathbf{X} is a matrix of individual level characteristics, and \mathbf{Z} vector includes all the identifying instruments for union status, namely the lag of 'officialist' and independent union petition rate for a given industry in a given municipality.

¹⁸What follows is a brief summary of the Lee (1978) model. See Appendix D for a fuller motivation and explanation behind the endogenous switching model.

Now, in order to correct for union selection equation (3.1) into (D.1) become:

$$w_{ui} = \mathbf{X}'_{iu}\beta_u + \lambda'_u \left(-\frac{\phi(\hat{\mathbf{Z}}_i)}{\Phi(\hat{\mathbf{Z}}_i)} \right) + \eta_u \quad (3.16)$$

$$w_{ni} = \mathbf{X}'_{in}\beta_n + \lambda'_n \left(\frac{\phi(\hat{\mathbf{Z}}_i)}{(1 - \Phi(\hat{\mathbf{Z}}_i))} \right) + \eta_n \quad (3.17)$$

Where $\phi(\cdot)$ and $\Phi(\cdot)$ are the pdf and CDF of the normal distribution and $P = \Pr(U = 1|\mathbf{Z}_i)$. Thus, we now have sectoral wage equations that account for the selection into union status. This effect will be given by the λ estimand, and where $E(\eta_u|U = 1) = -\frac{\phi(\hat{\mathbf{Z}}_i)}{\Phi(\hat{\mathbf{Z}}_i)}$ and $E(\eta_n|U = 0) = \frac{\phi(\hat{\mathbf{Z}}_i)}{(1-\Phi(\hat{\mathbf{Z}}_i))}$ which are the inverse Mills ratio and the complement of the Mills ratio, respectively. The estimated parameter $\lambda = \sigma \cdot \rho$ where σ is the variance of the error term of the selection model, whilst $\rho = \text{corr}(\eta, \psi)$. The approach adopted in this paper is to obtain the estimates for the endogenous switching model by implementing estimation of equations (3.15), (3.16) and (3.17) is to estimate these as a single equation using a **Full Information Maximum Likelihood (FIML)** procedure. In practice this is done by using the programme implemented by [Lokshin and Sajaia \(2004\)](#).

Selectivity Corrected Oaxaca Decomposition The inclusion of the selection terms now pose a problem for the estimation of the **Oaxaca–Blinder** decomposition. The decomposition requires that the σ parameters be excluded from the $\hat{\beta}$ vector of parameters and the \bar{x} vectors of means as in equations (3.2) and (3.3). [Neuman and Oaxaca \(2004\)](#) propose various alternatives for incorporating the selection effect into the decomposition. One of the most attractive is that proposed by [Duncan and Leigh \(1980\)](#) and [Reimers \(1983\)](#) who suggest that the selection effect are netted out and a new term be added to equation (3.2). The decomposition now becomes:

$$\bar{w}_u - \bar{w}_n = (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_n + \bar{\mathbf{X}}_u' (\hat{\beta}_u - \hat{\beta}_n) + (\hat{\theta}_u \bar{\lambda}_u - \hat{\theta}_n \bar{\lambda}_n) \quad (3.18)$$

where $\hat{\theta}_s = \hat{\rho}_s \hat{\sigma}_s$. The last term is the selectivity effect, or the sectoral differences due to selectivity bias. It should be noted that the decomposition no longer refers to the wage differential, as netting out the selectivity effect amounts to comparing the difference in wage *offers* between union and nonunion sectors. Given the components of θ_s are not just identified, but estimated as part of the log likelihood function then we may obtain the sampling variance of the last term of the decomposition. The variance is as follows:

$$V(\hat{\theta}_u \bar{\lambda}_u - \hat{\theta}_n \bar{\lambda}_n) = \left([V\bar{\lambda}_u V\rho_u^2] + [V(\bar{\lambda}_u)\rho_u^2] + [V(\rho_u^2)\bar{\lambda}_u^2] - [V\bar{\lambda}_n V\rho_n^2] + [V(\bar{\lambda}_n)\rho_n^2] + [V(\rho_n^2)\bar{\lambda}_n^2] \right)$$

3.4.3 Panel Regressions

The [ENOE](#) survey is a panel dataset, this aspect of the data may be exploited to account for unobserved heterogeneity of union members. This approach will be exploited as yet another way to address the issue of endogeneity. As noted earlier the union question is only available in the extended questionnaire which is run once per calendar year. Thus, a panel of individuals may be constructed with a one year gap between interviews. In order to inform on the effects of the recession on the wage gap I shall therefore estimate the following:

$$w_{it} = \alpha_i + \mathbf{X}_{it}'\beta + \kappa \text{Union}_{it} + \epsilon_{it} \quad (3.19)$$

where \mathbf{X}_{it} is a $(k \times n)$ matrix of characteristics and α_i is the individual-specific fixed effect. The term α_i is the unobserved individuals effect. If one believes that the correlation between unobserved effects and union status is positive then, this would lead to an upward bias of the estimate of κ .

The fixed effects estimate of the union effect, as given by the estimate for κ , is identified from the variation due to those individuals who switch union status. The κ parameter in this estimate may also be interpreted as the treatment effect from a differences-in-differences procedure. Due to the nature of the fixed-effects estimator, and the data, κ will be an estimator of the [ATET](#). One particular downside of the specification outlined is that it makes the assumption that the effects of switching union status are similar for joining a union and leaving a union. However, if this assumption is violated, then estimated parameter will be an average of the two effects. Whilst this is a restrictive assumption, a more sophisticated analysis of union joiners and leavers is the focus of [Chapter 4](#).

Nevertheless, the estimate from equation (3.19) may be contrasted with those obtained from [Ordinary Least Squares \(OLS\)](#), and will serve to illustrate the short-run effects of changing union status. I propose to estimate these effects for the time periods of 2005q1–2007q2, 2010q1–2012q1 for the non recessionary periods, the periods of the great recession 2008q2–2009q1 and the more

recent post-labour reform period of 2013q1–2016q1.

3.4.4 Variance Decomposition

It is well known that unions compress the wage distribution ([Freeman, 1980](#); [Gosling and Machin, 1995](#); [Card et al., 2008](#); [Metcalf et al., 2001](#)). [Fairris \(2003\)](#) finds that for Mexico the variance of wages is reduced by unions. His findings suggest that the relative weakening of unions between 1984 and 1996 accounts for an 11% increase in wage inequality in the formal sector. [Popli \(2007\)](#) examines changes across the income distribution using the [DiNardo et al. \(1996\)](#) semi-parametric decomposition to estimate how much the changes in wage variation are due to changes in unionisation. She reports that when applying the characteristics of the 1984 union density to the 2000 distribution, the counterfactual distribution has higher wages. Given the continued decline in unionisation rates, even relative to 2000, it is important to assess the ability of unions to compress the wage distribution over the past decade.

The most common approach that has been undertaken in the academic literature in assessing the ‘sword-of-justice’ is through the implementation of variance decompositions. In this spirit I propose to implement the [Dolton and Makepeace \(1985\)](#) variance decomposition, which is a direct analogue of the [Oaxaca-Blinder](#) decomposition at the second moment of the distribution. This decomposition takes the following form:

$$\hat{s}_n^2 - \hat{s}_u^2 \approx \underbrace{\hat{\sigma}_n^2 - \hat{\sigma}_u^2 + (\hat{\beta}_n - \hat{\beta}_u)' V(\mathbf{X}_u) (\hat{\beta}_n - \hat{\beta}_u)}_{\text{Treatment}} + \underbrace{\hat{\beta}_n' [V(\mathbf{X}_n) - V(\mathbf{X}_u)] \hat{\beta}_n}_{\text{Endowment}} \quad (3.20)$$

where \hat{s}^2 are the variances for log hourly wages in sector s to be decomposed. σ^2 is the estimated variance from the application of OLS in [equation \(3.1\)](#), and finally $V(\mathbf{X}_s)$ is the variance-covariance matrix of worker characteristics in the s^{th} sector.

3.4.5 Quantile Regression

To further explore the role of unions on the wage distribution, I propose to estimate the union mark-up at different points of the wage distribution using quantile regression, namely at the 10th, 50th and 90th quantiles. ([Koenker and Bassett, 1978](#); [Buchinsky, 1998](#)) Given that $\mathbf{Q}_\theta(\cdot)$ denotes the conditional quantile operator at the θ^{th} quantile of interest, then $\mathbf{Q}_\theta(w_i|\mathbf{X}_i) = \mathbf{X}_i' \beta_{\theta i}$, where $\beta_{\theta i}$ is the vector of parameters and $u_{\theta i}$ is the error term, whose distribution is unspecified

but where $\mathbf{Q}_\theta(u_{\theta i}|\mathbf{X}_i) = 0$ is assumed.

Therefore, I can now express a simple wage equation, where union status is denoted by an intercept shift as follows:

$$\mathbf{Q}_\theta(w_i) = \mathbb{E}(\mathbf{X}_i|w_i = \mathbf{Q}_\theta(w_i))' \hat{\beta}_\theta + \hat{\kappa}_\theta \mathbb{E}(\text{Union}_i|w_i = \mathbf{Q}_\theta(w_i)) + \mathbb{E}(u_{\theta i}|w_i = \mathbf{Q}_\theta(w_i)) \quad (3.21)$$

where the circumflex accent denotes the quantile regression estimates and $\mathbb{E}(\cdot)$ is the expectations operator. The parameter of interest is denoted by $\hat{\kappa}_{\theta i}$ which is the union mark up at the θ^{th} quantile. It should be noted that the characteristics are evaluated conditionally at the unconditional quantile log of the hourly wage, which differs from the unconditional, which was utilised in the mean regression.

3.5 Results

This section presents the results from the estimation of wage equations and the findings with respect to the [Oaxaca-Blinder](#) decompositions at the mean. The results from selectivity corrected estimates are then explored along with those from the endogenous switching model, variance decomposition, quantile regression and fixed effects regressions.

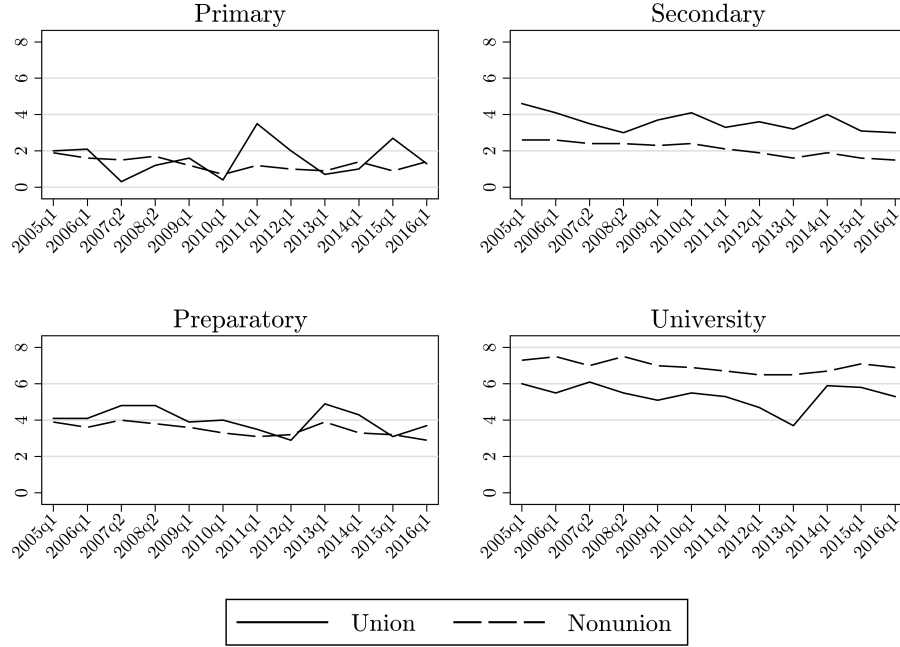
3.5.1 What do Mexican unions do to wages?

Wage equations

Tables [C.1](#) and [C.2](#) in the appendix provide the complete set of results from the wage equations. The tables reveal that there is a statistically significant impact of education on labour market earnings. The implicit annualised rates of return to education are plotted in [Figure 3.6](#), which reveals that the educational return profile of the mean individual differs across these two sectors. Recalling that [Table 3.3](#) revealed that a large proportion of union members hold secondary education as their maximum qualification, the estimates for annualised rates of secondary education suggest that unions raise the wages of these individuals relative to their nonunion counterparts. As the fourth pane of [Figure 3.6](#) evinces, rates of return to tertiary education and above are below the rates in the nonunion sector, foreshadowing the results that will be explored in [subsection 3.5.2](#). Another notable feature of the returns to education results over this time period is

the remarkable lack of change on the rates of return, despite differing macroeconomic conditions, which mitigate the oscillations observed. Rates of return to education increase monotonically across the educational distribution.

Figure 3.6: Annualised rates of return to education by union status, Mexico 2005q1–2016q1



Note: Author's own calculation using ENOE, results are calculations implicit from underlying wage regressions are presented in Tables C.1 and C.2 in the appendix.

The evidence on tenure presented in tables C.1 and C.2 suggests, perhaps unsurprisingly, that unionised individuals accrue for each extra year in their job an extra half a percentage point increase in their wages than nonunion members highlighting union preferences for seniority. Although this gap is reduced over the time period under analysis, it does not reverse.

With regards to the dispersion of wages it is notable that the estimated variance of the union sector is smaller than that of the nonunion sector. A simple application of a variance equality test of the form $F = \hat{\sigma}_n / \hat{\sigma}_u$ (where the null is equal variances) is rejected, in all instances. This serves as another indication that unions play an important role in reducing dispersion in wages. This is further discussed in subsection 3.5.2.

Oaxaca-Blinder Decompositions

Table 3.4 reports the results for the Oaxaca-Blinder mean wage gap decomposition. It reports the estimates of equation (3.3) where the union wage structure prevails in the absence of unequal treatment.

It is notable that whilst this time period witnessed a marked decline in unionisation rates, the unadjusted wage gap has remained relatively stable, despite being subject to two recessions over this time. This is suggestive that union power with regards to wages has weakened such that when wages decrease in the economy due to recessions, unions are unable to protect their members.

Under the assumption that the union wage structure prevails in the absence of unequal treatment it is clear that the larger portion of the gap is attributable to a composition effect (i.e., the endowments of individuals who belong to the union sector). This finding conforms to the literature in developed countries, and in particular, the ‘monopoly’ face of unionisation. Thus, firms when faced with higher wages reduce employment, and increase the ‘quality’ of workers.

It is remarkable that there are almost no differences in any of the treatment effects, during the recessionary periods of 2008–2011 or 2013–2016. This may reflect the relative stagnation of union membership power during the 2008 recession as evidenced in [Figure 3.1](#). Over the whole time period surveyed the treatment effect is found to range between 6.7% and 13.8%. With the periods of 2011 and 2012 being notable years where, although there was technically no recession, my findings suggest that on average union workers enjoyed no wage mark-up.

One issue with this approach is the potential for selection into union status. The following sections will try to address these concerns.

I now turn my attention to the alternate scenarios where the nonunion wage structure prevails, and the [Neumark](#) approach of using a pooled regression. It is clear from these exercises that unionised individuals would see their wages remain the same or decrease if nonunion wage determination prevailed and the differences in composition between sectors remained constant. However, most of this is offset by the interaction term which suggests that between 19–22 percent of the wage gap can be accounted by the fact that returns to union members tend to be greater for those characteristics in which union members have higher means. This interaction term is consistent with the idea that there is an element of persistence in the union wage gap. Union members command higher wages in part due to the bargaining structures, but this is also justified by the better composition of union members for the industries in which they compete. Indeed, the findings suggested by the interaction and endowment effects are confirmed when applying the method proposed by [Neumark \(1988\)](#). When the wage structure of neither sector prevails it becomes readily apparent that there is no significant unequal treatment in the labour

Table 3.4: Oaxaca Decompositions at the mean, Mexico 2005q1–2016q1

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 | 2016q1 |
|--|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Raw Wage Gap | 0.219 | 0.218 | 0.208 | 0.182 | 0.212 | 0.205 | 0.213 | 0.191 | 0.220 | 0.221 | 0.215 | 0.218 |
| <i>Union wage structure prevails</i> | | | | | | | | | | | | |
| –Treatment (ATEN) | 0.084*** (0.028) | 0.093*** (0.031) | 0.094*** (0.034) | 0.067* (0.035) | 0.120*** (0.040) | 0.092*** (0.040) | 0.056 (0.037) | 0.052 (0.038) | 0.119*** (0.040) | 0.138*** (0.038) | 0.111*** (0.037) | 0.108*** (0.036) |
| –Endowment | 0.135*** (0.019) | 0.125*** (0.020) | 0.114*** (0.019) | 0.115*** (0.021) | 0.092*** (0.024) | 0.113*** (0.023) | 0.157*** (0.022) | 0.139*** (0.023) | 0.101*** (0.023) | 0.083*** (0.021) | 0.104*** (0.021) | 0.110*** (0.021) |
| <i>Nonunion wage structure prevails</i> | | | | | | | | | | | | |
| –Treatment (ATET) | 0.006 (0.011) | -0.020** (0.010) | -0.021** (0.011) | -0.043*** (0.011) | -0.010 (0.012) | -0.018 (0.012) | 0.006 (0.012) | -0.015 (0.013) | 0.003 (0.013) | 0.012 (0.011) | 0.014 (0.012) | 0.024** (0.012) |
| –Endowment | 0.213*** (0.031) | 0.239*** (0.033) | 0.230*** (0.035) | 0.225*** (0.039) | 0.222*** (0.041) | 0.223*** (0.043) | 0.207*** (0.041) | 0.206*** (0.040) | 0.217*** (0.041) | 0.209*** (0.040) | 0.201*** (0.038) | 0.194*** (0.039) |
| <i>Neither wage structure prevails (Pooled OLS counterfactual, includes union dummy)</i> | | | | | | | | | | | | |
| –Treatment | 0.011 (0.012) | -0.015 (0.012) | -0.015 (0.012) | -0.038*** (0.013) | -0.005 (0.014) | -0.013 (0.014) | 0.010 (0.014) | -0.010 (0.015) | 0.005 (0.015) | 0.017 (0.013) | 0.017 (0.014) | 0.027* (0.014) |
| –Endowment | 0.208*** (0.019) | 0.233*** (0.020) | 0.223*** (0.019) | 0.221*** (0.021) | 0.217*** (0.024) | 0.218*** (0.023) | 0.203*** (0.022) | 0.201*** (0.023) | 0.215*** (0.023) | 0.204*** (0.021) | 0.198*** (0.021) | 0.192*** (0.021) |
| <i>Neither wage structure prevails (Pooled OLS counterfactual, no union dummy)</i> | | | | | | | | | | | | |
| –Treatment | 0.008 (0.011) | -0.012 (0.011) | -0.012 (0.012) | -0.031** (0.012) | -0.004 (0.014) | -0.010 (0.014) | 0.008 (0.013) | -0.008 (0.015) | 0.004 (0.015) | 0.013 (0.013) | 0.014 (0.013) | 0.021 (0.014) |
| –Endowment | 0.210*** (0.019) | 0.230*** (0.020) | 0.220*** (0.019) | 0.213*** (0.021) | 0.216*** (0.024) | 0.215*** (0.023) | 0.205*** (0.021) | 0.199*** (0.023) | 0.216*** (0.023) | 0.207*** (0.021) | 0.201*** (0.021) | 0.197*** (0.021) |
| Cotton (1988) decomposition | | | | | | | | | | | | |
| –Treatment | 0.013 (0.010) | -0.011 (0.010) | -0.012 (0.011) | -0.035*** (0.011) | -0.002 (0.012) | -0.011 (0.012) | 0.009 (0.012) | -0.011 (0.012) | 0.010 (0.013) | 0.021* (0.011) | 0.021* (0.012) | 0.030** (0.012) |
| –Endowment | 0.206*** (0.029) | 0.230*** (0.031) | 0.221*** (0.033) | 0.217*** (0.036) | 0.214*** (0.039) | 0.216*** (0.040) | 0.204*** (0.039) | 0.202*** (0.038) | 0.210*** (0.039) | 0.200*** (0.037) | 0.194*** (0.036) | 0.188*** (0.037) |
| Average Effects as Słoczyński (2013, 2015b) | | | | | | | | | | | | |
| ATE | 0.077*** (0.026) | 0.084*** (0.029) | 0.085*** (0.031) | 0.059* (0.035) | 0.112*** (0.038) | 0.085** (0.037) | 0.053 (0.035) | 0.048 (0.036) | 0.112*** (0.038) | 0.129*** (0.035) | 0.104*** (0.035) | 0.102*** (0.034) |
| AEE | 0.142*** (0.018) | 0.134*** (0.019) | 0.123*** (0.018) | 0.123 (0.020) | 0.100*** (0.023) | 0.120*** (0.022) | 0.160*** (0.021) | 0.143*** (0.022) | 0.108*** (0.022) | 0.092*** (0.020) | 0.111*** (0.020) | 0.116*** (0.020) |
| Union Density | .085 | .077 | .081 | .073 | .064 | .065 | .067 | .062 | .064 | .069 | .069 | .067 |
| N | 48742 | 49903 | 49756 | 49066 | 45500 | 45450 | 44929 | 44722 | 43697 | 45610 | 45167 | 44501 |

NOTES:*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
Underlying wage regressions are presented in [Tables C.1](#) and [C.2](#) in the appendix.

market in Mexico. The entire gap is attributed to the differences in individual characteristics of individuals in the unionised sector. This finding is consistent with the marginalised role of unions in the Mexican labour market with the notable exception being during the great recession in 2008 where being a union member actually decreases ones wages by 3.1%.

Selectivity corrected wage equations

[Table D.1](#) in the appendix reports the results from the endogenous switching exercise. The identifying instrument set is comprised of the lag of both independent and ‘officialist’ union petitions rate for each sector-municipality pair. These instruments are found to be relevant, and are significant in the union selection equation, for most years with the only notable exception being in 2008q2. The lack of predictive power of these instruments for this year can be thought to be related to the relative lack of union petitions for the time period surrounding the great recession. Due to the external macroeconomic disturbances, it is likely that for that quarter individuals would not have sought to join a union, as they may have already faced precarious work conditions. The estimates for 2007q2, 2009q1, and 2014q1 suggest that petitions by ‘officialist unions’ are negatively related to union membership, whilst the estimates for the period 2008q2, 2010q1, 2011q1, 2012q1 for ‘officialist unions’ are found to be insignificant. These findings validate the hypothesis put forth in [subsection 3.3.2](#), increases in petitions by type of union have differing effects on potential union joiners. The petitions rate of ‘Officialist’ unions either fails to identify union attachment, or acts as a negative predictor for the same. This suggests that these petitions may be viewed as unattractive by potential union members. However, this effect is not constant over the complete time span, and as such some caution must be taken when interpreting the estimates for the wage equations.

It is noteworthy that the reported Likelihood Ratio test for the ρ estimates of correlation between unobservables in the wage equation are zero for the period of the great recession of 2007q2–2009q1. During that time period there is no selection into either the union or nonunion sectors. Looking at the sector-specific ρ terms, I find that there is selection into the nonunion sector. The estimands of ρ_n suggest that, with the exception of the great recession, the unobservable characteristics which determine nonunion attachment are negatively related to wages. The results are less clear for the union equation; selection is only a feature of the data for the periods 2006q1, 2008q2 and 2013q1. Of these time periods the unobservables seem to be positively associated with union attachment. This is consistent with the notion that individuals with

better unobservable characteristics are selecting into unions.

Selectivity Corrected Oaxaca-Blinder Decompositions

Using the estimates from the [Lee \(1978\)](#) endogenous switching model, I computed the unconditional wage decomposition for the union mark-up. The results from this exercise are reported in [Table 3.5](#). The decomposition may no longer be interpreted as a decomposition of the mean wage, but instead must be conceptualised as a decomposition of observed wage offers.

The observed wage difference is smaller than that of the mean wage, but once selectivity is net out as suggested by [Duncan and Leigh \(1980\)](#) and [Reimers \(1983\)](#), the wage offer gap is found to be larger than the mean wage gap.¹⁹ Regardless of which counterfactual is assumed to prevail in the absence of unionisation, it is clear that the largest portion of the mark-up is actually determined by worker characteristics, just as with the estimates in [subsection 3.5.1](#). These account for 8–20% of the wage-offer gap.

The unconditional union mark-up, or union treatment effect, is found to range between 15–20%. It should be noted that the results for 2013 rather implausibly suggest that being in a union is associated with a decline in wages of 85.7% relative to the nonunion sector. This is a stark contrast to the near 12% suggested by [Table 3.4](#). Under the alternative counterfactual, where nonunion wages are assumed to prevail in the absence of unions, the findings for the union mark-up are confirmed. The unconditional union wage offer mark-up is found to range between 7% and 10%. Note that in both of these estimates the union mark-up is absent during the great recession. This may be contrasted with the findings for the current 2014–2015 recession where the union wage gap is found to be positive.

¹⁹Note that the wage offer gap is computed by taking the difference between the selection component of the decomposition and the observed wage difference.

Table 3.5: Selectivity corrected Oaxaca-Blinder decomposition Mexico 2005q1–2015q1

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|
| Observed Wage Difference | 0.219 | 0.218 | 0.208 | 0.182 | 0.212 | 0.205 | 0.213 | 0.191 | 0.220 | 0.221 | 0.215 |
| Wage Offer Gap | 0.193 | 0.214 | 0.148 | 0.126 | 0.190 | 0.251 | 0.188 | 0.194 | -0.291 | 0.188 | 0.192 |
| (Observed-Selectivity) | | | | | | | | | | | |
| –Selection | 0.078 (0.085) | -0.053 (0.106) | 0.051 (0.087) | 0.059 (0.073) | -0.024 (0.143) | -0.092 (0.213) | 0.047 (0.124) | -0.006 (0.140) | 0.941*** (0.317) | 0.053 (0.143) | 0.038 (0.121) |
| Union wage structure prevails | | | | | | | | | | | |
| –Treatment (ATEN) | 0.069 (0.052) | 0.151** (0.062) | 0.028 (0.055) | 0.020 (0.050) | 0.157** (0.079) | 0.218** (0.108) | 0.062 (0.070) | 0.107 (0.077) | -0.857*** (0.309) | 0.141* (0.076) | 0.099 (0.067) |
| –Endowment | 0.125*** (0.037) | 0.063 (0.042) | 0.120*** (0.039) | 0.106*** (0.041) | 0.032 (0.050) | 0.033 (0.062) | 0.126*** (0.049) | 0.087* (0.052) | 0.566*** (0.166) | 0.047 (0.051) | 0.093*** (0.046) |
| Nonunion wage structure prevails | | | | | | | | | | | |
| –Treatment (ATET) | 0.091*** (0.029) | 0.031 (0.031) | -0.043 (0.028) | -0.047 (0.029) | 0.001 (0.041) | 0.108* (0.060) | 0.056 (0.035) | 0.072* (0.039) | -0.408*** (0.149) | 0.074* (0.039) | 0.080*** (0.034) |
| –Endowment | 0.103*** (0.020) | 0.183*** (0.021) | 0.191*** (0.020) | 0.173*** (0.024) | 0.189*** (0.024) | 0.143*** (0.028) | 0.132*** (0.023) | 0.122*** (0.025) | 0.117*** (0.026) | 0.115*** (0.023) | 0.112*** (0.022) |
| Cotton (1988) decomposition | | | | | | | | | | | |
| –Treatment | 0.089*** (0.027) | 0.040 (0.029) | -0.037 (0.026) | -0.042 (0.027) | 0.011 (0.039) | 0.115** (0.057) | 0.056* (0.033) | 0.074** (0.037) | -0.437*** (0.142) | 0.079** (0.037) | 0.081** (0.032) |
| –Endowment | 0.105*** (0.019) | 0.174*** (0.020) | 0.185*** (0.019) | 0.168*** (0.023) | 0.179*** (0.023) | 0.136*** (0.027) | 0.132*** (0.022) | 0.120*** (0.024) | 0.146*** (0.028) | 0.110*** (0.022) | 0.111*** (0.021) |
| Average Effects as Słoczyński (2013, 2015b) | | | | | | | | | | | |
| ATE | 0.071 (0.048) | 0.142** (0.057) | 0.022 (0.051) | 0.015 (0.046) | 0.147** (0.074) | 0.211** (0.101) | 0.062 (0.065) | 0.105 (0.072) | -0.828*** (0.290) | 0.136* (0.071) | 0.098 (0.062) |
| AEE | 0.123*** (0.034) | 0.072* (0.039) | 0.126*** (0.036) | 0.111*** (0.038) | 0.042 (0.047) | 0.040 (0.058) | 0.126*** (0.046) | 0.089* (0.049) | 0.537*** (0.156) | 0.052 (0.048) | 0.094*** (0.043) |
| Union Density | .085 | .077 | .081 | .073 | .064 | .065 | .067 | .062 | .064 | .069 | .069 |
| N | 48742 | 49903 | 49756 | 49066 | 45500 | 45450 | 44929 | 44722 | 43697 | 45610 | 45167 |

NOTES: * p<.10, ** p<.05, *** p<.01. Errors are clustered at Municipal-Sectoral level (the level of the selection equation instruments)

$\theta = \rho \times \sigma$; $\bar{\lambda}$ is the mean for the appropriate mills ratio term.

Selection term is as follows: $(\hat{\theta}_n \bar{\lambda}_n - \hat{\theta}_n \bar{\lambda}_u - \hat{\theta}_n \bar{\lambda}_n)$ for union and $(\hat{\theta}_n \bar{\lambda}_n - \hat{\theta}_n \bar{\lambda}_u)$ for nonunion.

Panel Regression

Table 3.6 provides estimates of a pooled union fixed effects regression for Mexico. Once individual unobserved heterogeneity is taken into account the union wage gap is found to be roughly a third of the OLS estimates. The wage gap is modestly sized at 2% for the duration of the ENOE rotating panel. Breaking down the estimates into recessionary periods and non recessionary periods reveals the period of the great recession of 2008–2009 and its aftermath yield no evidence of a union pay gap.

Table 3.6: Individual fixed effects estimates of the union wage gap, Mexico 2005q1–2015q1

| | 2005q1–2007q2 | 2008q2–2009q1 | 2010q1–2012q1 | 2013q1–2016q1 | 2005q1–2016q1 |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | No Recession | Recession | No Recession | Recession | All |
| Union Member | 0.019*** (0.005) | 0.012 (0.023) | 0.015 (0.017) | 0.042** (0.018) | 0.020*** (0.004) |
| Age | 0.031*** (0.006) | 0.071*** (0.023) | 0.078*** (0.027) | 0.008 (0.038) | 0.042*** (0.005) |
| Age ² | -0.032*** (0.008) | -0.079*** (0.028) | -0.054** (0.026) | -0.102*** (0.019) | -0.046*** (0.007) |
| Tenure | 0.004*** (0.001) | 0.002 (0.003) | 0.004 (0.003) | 0.008*** (0.002) | 0.004*** (0.001) |
| Tenure ² | -0.008*** (0.002) | -0.003 (0.007) | -0.003 (0.008) | -0.019*** (0.005) | -0.008*** (0.002) |
| Contract < 2m | -0.021*** (0.005) | -0.033* (0.019) | -0.020 (0.018) | -0.027 (0.017) | -0.022*** (0.004) |
| No Contract | -0.039*** (0.004) | -0.034** (0.015) | -0.045*** (0.015) | -0.023* (0.013) | -0.039*** (0.004) |
| Micro firm (<10) | -0.049*** (0.007) | 0.001 (0.023) | -0.044 (0.031) | -0.047** (0.020) | -0.047*** (0.006) |
| Small firm (11–50) | -0.013** (0.006) | 0.007 (0.019) | -0.021 (0.026) | -0.004 (0.019) | -0.013** (0.005) |
| Medium firm (51–250) | -0.005 (0.005) | 0.033* (0.018) | 0.006 (0.023) | -0.012 (0.016) | -0.003 (0.004) |
| R ² | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 |
| N | 244,462 | 44,711 | 42,217 | 49,646 | 381,036 |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| State Time Trends | Yes | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes | Yes |

NOTES: * p<.10, ** p<.05, *** p<.01, standard errors reported are clustered at the municipal level. Squared terms have been scaled by 100.

Regressions include state time trends, national time trend, sectoral fixed effects and time trends, year fixed effects.

The evidence provided for these periods once again suggests that a union's bargaining power appears to have eroded in the Mexican context. It is also worth stating that unions appear to be unable to shelter their workers from the state of the economy at large, particularly during deep recessions.

As a final remark on these estimates, it is worth remembering that the identification of the union wage effects are coming from those individuals 'switching' union status. This is both a help and a hindrance. This procedure allows me to cancel out the individual specific

unobserved heterogeneity, and in some respects it is hoped that some of the potential bias from endogeneity is cancelled out. However, it also embodies a strong assumption. Identification of the union ‘treatment effect’ is coming from those individuals who change their union status. This implicitly assumes that there is symmetry in the effect, those individuals who leave union status are assumed to have the same direction of effect. If this assumption is violated, then the estimates will reflect a conflation of the [ATET](#) for both of the group of union joiners and leavers. A more sophisticated treatment of union joiners and leavers is thus the focus of [Chapter 4](#). A second issue is concerns regarding whose union wage gap is measured. Union dialectic is based on the notion of seniority and wages fitting jobs. If this is the case we would expect that the union wage gap increases with seniority at the union. The application of a fixed effects estimator in this instance would only ever yield the short run wage differences for those unionising. The average tenure effects cannot be informed by this procedure.

Summary of union mark-up

Thus far, I have presented various methods by which to estimate the union wage mark-up. However, there are two questions which are outstanding. First, how do these differ from the established literature for Mexico? Second, how can one reconcile all of these estimates? I will now address these two questions.

A preliminary interpretation of the previously presented estimates suggests that my estimates are at odds with the existing literature for Mexico. [Panagides and Patrinos \(1994\)](#) reports that using [ENIGH](#) the union wage gap is 10.4% for 1989. However, their estimate differs from what I have reported in that they report the treatment effect as $\bar{\mathbf{X}}'_{all} [\hat{\beta}_u - \hat{\beta}_n]$. This effectively asks: “What is the union wage mark-up for a worker with the sample average characteristics?” This estimate can be obtained by weighting the union and nonunion treatment effects by their population proportions.²⁰ If this exercise is performed on my reported estimates from tables [3.4](#) and [3.4](#), then the estimated treatment effect is found to be 7.7% and 10.4% for the first quarter of 2005 and 2015, respectively. Comparing my estimates to [Panagides and Patrinos](#) suggests that unions, despite the decline in density and perhaps bargaining ability, have commanded a comparable mark-up to that of 1989.

[Fairris \(2003\)](#) does not report estimates for the [Oaxaca-Blinder](#) decomposition. Nevertheless,

²⁰This can be expressed as follows: $\bar{U} \times (\bar{\mathbf{X}}'_u [\hat{\beta}_n - \hat{\beta}_u]) + (1 - \bar{U}) \times (\bar{\mathbf{X}}'_n [\hat{\beta}_n - \hat{\beta}_u])$, where \bar{U} is the relevant union proportion for a given year. This is the population averaged treatment effect as suggested by [Śloczyński \(2013, 2015a\)](#).

he provides counterfactual wages from which one is able to construct the treatment effect under various assumptions. The Fairris implicit estimates for the union wage mark-up are 19% (-17%) for 1984 and 14% (-12%) for 1996 under the assumption that the union (nonunion) wage structure prevails in the absence of unequal treatment. These estimates can be compared to the Panagides and Patrinos estimates as follows: 7.9% and 8.7% for 1989 and 1996, respectively. The comparison with the previous literature suggests that despite reduced participation, unions have retained a strong role in determining a stable wage gap between the mid 1980s and the 2000s.

Finally, I can now look towards reconciling all the estimates of the union wage mark-up reported in this chapter. Four distinct findings emerge. These are related to the counterfactual question posed by each estimator.

First, the treatment effect under the union wage structure prevailing, $\bar{\mathbf{X}}'_n \Delta \hat{\beta}_{nu}$, asks: “What is the union mark-up commensurate with the average non-union worker?” In this instance, the results presented in Table 3.4 suggest that the counterfactual ‘gains’ to a worker joining a union have remained stable over the previous decade. However, when comparing to the earlier period of the 1980s and 1990s, there has been a decline of between 9–12 percentage points.

Second, the treatment effect under the nonunion wage structure prevailing, $\bar{\mathbf{X}}'_u \Delta \hat{\beta}_{nu}$, asks: “What is the loss associated with the average union member leaving?” The results presented in Table 3.4 are less clear. For the period 2006–2009 there is a clear wage loss ranging between 2–4%, whilst for 2016 the average union leaver would see an increase in their wages by 2.4%. Comparing this to Fairris we can see that the implied ‘loss’ to the average union member has been declining since the 1980s and 1990s.

Third, the treatment effect estimate obtained from the application of an intercept shift model has been proven by Elder et al. (2010) to be equivalent to the Cotton (1988) decomposition treatment effect²¹ This estimate of the union wage mark-up has been critiqued by both Elder et al. (2010) and Słoczyński (2015a) as it gives undue weight to the smaller population, in this context the union individuals. It is also worthwhile to note that as the proportion of the population in the nonunion sector increases, the implied estimate from this approach will diverge from the population average estimate of the treatment effect (Słoczyński, 2013, 2015a). Thus, in this context it would over estimate the penalty for ‘leaving’ a union. So, given the insights

²¹This can be expressed as follows: $(1 - \bar{U}) \times (\bar{\mathbf{X}}'_u [\hat{\beta}_n - \hat{\beta}_u]) + \bar{U} \times (\bar{\mathbf{X}}'_n [\hat{\beta}_n - \hat{\beta}_u])$, where U is the relevant union proportion for a given year.

in this discussion, what can I conclude? If one is interested in measuring the effect of unions on the labour market, then perhaps these estimates are not the most informative as the implicit weightings on each treatment effect, (i.e., the averaged estimate of the ‘gain’ and ‘loss’ implicit in joining a union) are weighted by the opposite population to that of interest. Thus, whilst these estimates provide an indication of the effect of unions on the ‘switching’ population, however, it is likely that these estimates are not symmetric and thus will overweight by the ‘leavers’ treatment effect. This suggests that a more careful treatment between those ‘switching’ statuses can be achieved. This will be the focus of the next chapter.

Finally, what of the population average union mark-up? The estimate reported by [Panagides and Patrinos \(1994\)](#) has been shown to represent a consistent estimator of the ATE ([Śłoczyński, 2013, 2015a](#)). What has happened to this measure in the last decade? Stagnation. As already suggested the implicit estimates from ([Fairris, 2003](#)), and those I report in tables 3.4, suggest a different story from that previously reported. Despite the decline in membership the union wage mark-up exists in Mexico, and has ranged between 4–10%. The explanation for the stagnation in this measure, may be explained by the weighted nature of the ATE. Union density has declined, and this has also coincided with the decline of the ATET, or $\bar{X}_u' \Delta \beta_{nu}$, so as unions have become weaker, so too has the penalty associated with leaving a union declined. Whilst, conversely the magnitude of the nonunion population has risen, there has been a decline in the ATEN of the nonunion members, or the counterfactual wage that the average nonunion member would obtain if unionised. One final remark is related to the selectivity corrected ‘index number’ decompositions. The point estimates from the treatment effect under the assumption of union wages prevailing in the absence of unequal treatment, in this context account for the selectivity into the union sector, and thus ask: “What wage would a nonunion worker earn if they were remunerated at the union level, and this were a random draw from the population?” Thus, these results may be interpreted as an estimator for the population average treatment effects.

3.5.2 ‘Sword-of-Justice’ effect

It is well known that unions compress the wage distribution. This has been termed by the literature as the ‘sword-of-justice’ that unions wield across the wage distribution. This is partly due to union preferences for ‘honest day’s pay for honest work’ remuneration. Thus, unions are interested in ensuring returns are related to occupation and job based attributes, rather than worker characteristics. There is ample evidence that this is the case for developed countries (see [Stewart, 1983](#); [Callan and Reilly, 1993](#); [Gosling and Machin, 1995](#); [Metcalf et al., 2001](#); [Card, 2004](#)). [Fairris \(2003\)](#) reports that for Mexico, during 1989 and 1996, unions were associated with a reduction in variance. [Popli \(2007\)](#) confirms these findings showing that declining union density between 1984 and 2000 accounts for 28% of the increase in wage variation in the formal sector. These findings suggest that the decline in union density has also been associated with a lower ability on the part of unions to compress the wage distribution.

Variance Decomposition

As motivation for what follows, it should be noted that the evidence presented thus far in [Tables C.1](#) and [C.2](#) indicates that the distribution of wages is systematically lower in the union sector for all years, as evidenced by the systematically lower estimate of the $\hat{\sigma}^2$ for the union specific equations. It seems prudent to investigate the effects of unions on the wage distribution in Mexico for the past 11 years. The literature has predominantly investigated this through the implementation of variance decompositions such as that proposed by [Dolton and Makepeace \(1985\)](#); [Card \(2001\)](#); [Card et al. \(2008\)](#); [DiNardo et al. \(1996\)](#).

Table 3.7: Variance decomposition of wage equations, Mexico 2005q1–2016q1

| Year | $\Delta \hat{s}^2$ | Treatment | Endowment |
|--------|--------------------|-----------|-----------|
| 2005q1 | 0.076 | 0.048 | -0.124 |
| 2006q1 | 0.093 | 0.088 | -0.152 |
| 2007q2 | 0.071 | 0.041 | -0.209 |
| 2008q2 | 0.076 | 0.044 | -0.168 |
| 2009q1 | 0.085 | 0.125 | -0.187 |
| 2010q1 | 0.077 | 0.063 | -0.190 |
| 2011q1 | 0.068 | 0.087 | -0.146 |
| 2012q1 | 0.072 | 0.144 | -0.266 |
| 2013q1 | 0.073 | 0.122 | -0.169 |
| 2014q1 | 0.082 | 0.144 | -0.250 |
| 2015q1 | 0.072 | 0.210 | -0.265 |
| 2016q1 | 0.063 | 0.790 | -0.515 |

NOTES: Follows the [Dolton and Makepeace \(1985\)](#) decomposition. Underlying regressions are reported in [Tables C.1](#) and [C.2](#) in the appendix. Regressions include state time trends, national time trend, sectoral fixed effects and time trends, year fixed effects.

Table 3.8: Variance decomposition of selectivity corrected wage equations, Mexico 2005q1–2016q1

| Year | $\Delta \hat{s}^2$ | Treatment | Endowment |
|--------|--------------------|-----------|-----------|
| 2005q1 | 0.061 | 0.057 | -0.074 |
| 2006q1 | 0.079 | 0.107 | -0.111 |
| 2007q2 | 0.062 | 0.045 | -0.151 |
| 2008q2 | 0.064 | 0.052 | -0.126 |
| 2009q1 | 0.077 | 0.149 | -0.12 |
| 2010q1 | 0.076 | 0.077 | -0.173 |
| 2011q1 | 0.059 | 0.086 | -0.100 |
| 2012q1 | 0.069 | 0.142 | -0.199 |
| 2013q1 | 0.06 | 0.056 | -0.352 |
| 2014q1 | 0.077 | 0.182 | -0.186 |
| 2015q1 | 0.065 | 0.210 | -0.210 |

NOTES: Follows the [Dolton and Makepeace \(1985\)](#) decomposition. Underlying regressions are reported in [Table D.1](#) in the appendix. Regressions include state time trends, national time trend, sectoral fixed effects and time trends, year fixed effects.

I now adopt the [Dolton and Makepeace \(1985\)](#) decomposition to investigate the ‘sword-of-justice’ effect in Mexico. The results from this exercise are reported in [Table 3.7](#). The raw differences in the standard deviations reported in the first column suggest that the difference in dispersion has remained roughly constant throughout the time period surveyed. Despite this the trends suggest that the raw difference does increase in recessionary periods. The results for the ‘treatment’ component, or the structural differences due to the union sector, suggest that they account for the bulk of the gap. The differences in worker characteristics suggest that if non-union workers were endowed with union characteristics there would be sharp decline in the variance by approximately 0.12 of a standard deviation in 2005, this rises to 0.52 of a standard deviation by 2016. Unfortunately due to the non-linear nature of this decomposition both of the effects do not sum to the raw differences in standard deviations.

A concern that one may raise to this approach as outlined earlier is the endogenous nature of union status. The effect of selection into unionised jobs, just as with the mean decomposition, is that the decomposition will be tainted by unobserved selection. Exploiting the estimated variances from [table D.1](#) allow me to address this issue. These estimates suggest once selectivity is taken into account, wage dispersion, as measured by the estimate of σ between the union and nonunion sector are found to be different from each other, with the union estimate being systematically lower, with the exception of 2010 and 2013. These findings tentatively support the view that the ‘sword-of-justice’ effect in Mexico is not determined by the unobservable selection into both the union and nonunion sector. Thus, the decline in dispersion is likely associated with union pay policies.

Union Quantile Regression Effects

I will now investigate the magnitude of the wage mark-up across the conditional pay distribution through the estimation of the union wage gap using quantile regression techniques. This approach has the added advantage that it allows me to infer how the wage gap behaves at selected conditional quantiles. The results of this estimation are reported in [Table 3.9](#). Looking at the results for the wage gap at the bottom end of the wage distribution, it is clear that unionised individuals in Mexico enjoy a modest gap of 2–7%. The median wage gap is found to be zero for periods prior to 2011, where the median gap is found to oscillate between 2–3%. Conversely, union members at the upper ends of the wage distribution actually witness a decline in their wages relative to nonunion members. This is found to be in the order of 4–7%.

Table 3.9: Quantile Estimates of κ Union parameter

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|-------------------|--------------------|--------------------|---------------------|
| <i>Union parameter at selected Q_θ</i> | | | | | | | | | | | |
| $Q_{0.1}$ | 0.023 (0.015) | 0.020 (0.014) | 0.027* (0.014) | -0.012 (0.014) | 0.059*** (0.014) | 0.036** (0.015) | 0.038** (0.015) | 0.011 (0.013) | 0.023 (0.015) | 0.029** (0.014) | 0.033** (0.013) |
| N | 42,032 | 43,042 | 42,977 | 42,271 | 38,822 | 38,632 | 38,257 | 37,837 | 36,925 | 38,597 | 38,087 |
| $Q_{0.5}$ | 0.011 (0.010) | -0.012 (0.011) | -0.002 (0.011) | -0.009 (0.009) | 0.003 (0.012) | 0.005 (0.012) | 0.021** (0.010) | 0.017 (0.012) | 0.026** (0.012) | 0.028** (0.012) | 0.030*** (0.011) |
| N | 42,032 | 43,042 | 42,977 | 42,271 | 38,822 | 38,632 | 38,257 | 37,837 | 36,925 | 38,597 | 38,087 |
| $Q_{0.9}$ | -0.050*** (0.019) | -0.062*** (0.016) | -0.053*** (0.019) | -0.073*** (0.018) | -0.065*** (0.023) | -0.072*** (0.021) | -0.042** (0.020) | -0.035 (0.022) | 0.016 (0.017) | -0.003 (0.019) | -0.010 (0.025) |
| N | 42,032 | 43,042 | 42,977 | 42,271 | 38,822 | 38,632 | 38,257 | 37,837 | 36,925 | 38,597 | 38,087 |

NOTES: * $p < .10$, ** $p < .05$, *** $p < .01$, standard errors reported are results of 200 bootstrap repetitions.
Estimates refer to κ parameter in equation (3.21) and are the result of quantile regression.

For the most recent recessionary period, 2013–present, unions have secured wage differentials across the conditional pay distribution for those at the median and the bottom end of the wage distribution. These findings confirm the story that has emerged throughout this paper. In the past decade unions have remained relatively marginalised in the labour market. During favourable macroeconomic periods they are able to bargain higher wages for their workers, and they attempt to shield those at the bottom ends of the wage distribution as much as possible. However, Mexican unions are unable to cut a swathe across the wage distribution to the same extent as their counterparts in developed countries, and it is possible that this is associated with the declines in union density witnessed in the last decade in the Mexican labour market. However, this conjecture requires further investigation and research. Equally, as the estimates of the union pay gap are determined by a simple intercept shift, it is likely that the critique of [Elder et al. \(2010\)](#); [Słoczyński \(2015a\)](#) apply in these estimates, and this may to some extent explain the effects at the upper ends of the income distribution.

3.6 Conclusions

The empirical analysis undertaken in this chapter provided evidence on the magnitude of the union wage gap in Mexico during the last decade, one which has witnessed continued deunionisation. This analysis was performed using a variety of different methods.

This chapter uses a rich labour force survey data from the Mexican labour market with a sample size of 163,000–180,000 male private sector salaried workers aged 16–64. The real wage (in 2010 Pesos) is calculated using the hourly wages net of any non-wage benefits that individuals receive from their main job. This chapter sought to assess what unions have done to wages in the last decade. This question was addressed in two approaches. The first was to look at the union wage mark-up, whilst the second sought to determine whether unions compress the wage distribution and thus confirm the existence of the ‘sword-of-justice’ effect.

I estimated various wage equations. From these estimates one can conclude that unions alter change returns to human capital for their members. They increase those for secondary education, whilst reduce those for tertiary education and above. This acts as an equalising force within the labour market. Unionised individuals receive higher returns to an additional year in the workplace, compared to their nonunionised counterparts. The mean raw wage gap estimated during the period 2005–2016 was found to fluctuate in the range of 18–22 percent.

When applying the well-known [Oaxaca-Blinder](#) index number decomposition, the unexplained component of the decomposition is found to range between 6.7% and 13.8%, when asking the question: “What would nonunion individuals earn if they unionised?” I then address the concern of selection into unions by employing the lags between ‘officialist’ and independent union strike threats as instruments in a [Lee \(1978\)](#) endogenous switching model. These are both a set of plausible and theoretically exogenous instruments. However, I must acknowledge that the instruments do not identify union attachment perfectly, however, in the years where these work best, I find that there is no selection of unobservables into the union sector, indeed it seems there is negative selection of unobservables into the private sector. Thus, when correcting for this issue the implicit question being asked is now: “What would the gain be to a nonunion individual joining a union, if they were randomly selected from the population?” This effect is found to range between 15–20%. These findings are in contrast with the estimates derived from individual fixed-effects panel estimation of the union wage gap. When estimating a model with individual fixed effects the estimates range between 1.9–4.2%, but where the whole sample

period wage mark-up is found to be 2%. I synthesize all of these findings, and suggest that they are all mutually compatible, but ultimately all measure different elements of the wage mark-up. I conclude that if one compares to earlier estimates, the average treatment effect has remained constant since the 1980s.

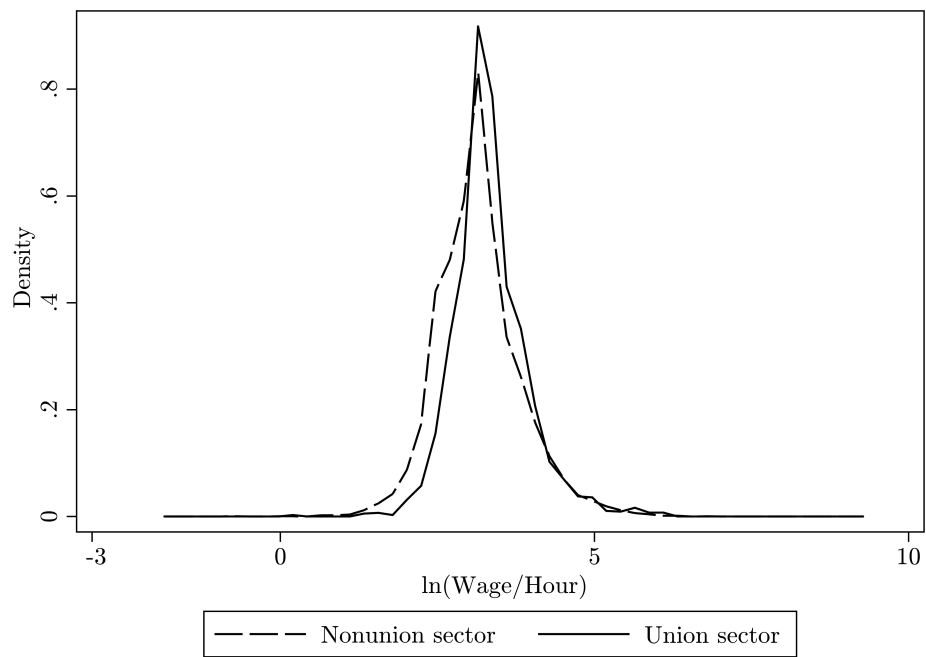
The investigation then turns to the ‘sword-of-justice’ effect. I find that Mexican unions are found to systematically compress dispersion in the wage distribution. This is corroborated by the application of a [Dolton and Makepeace \(1985\)](#) variance decomposition, and these findings are robust to correcting for endogeneity in the union sector. I then try to estimate how the wage mark-up varies across the wage distribution and find that unions in Mexico, where possible, increase the wages of those workers at the bottom end of the wage distribution, whilst those at the upper ends of the wage distribution see a union penalty.

The estimates presented in this chapter suggest that unions in Mexico, despite having a history of being co-opted by the state, do behave like unions in other developed countries. Summing up, all of the competing estimates of the union wage gap differ in terms of the hypothetical question being asked. If one is interested on the wage gap for those currently in a union, then it seems that this is small and 2–4%. If one is interested on the potential gains if nonunionised individuals joined a union, then the estimates presented in this chapter suggest that the average individual stands to gain between 6 and 14 per cent. However, I acknowledge that this may be reflecting selection of unobservables in the labour market. However, fundamentally, this question is similar to that posed by the [ATE](#) for the whole population. The union wage mark-up when looked at through the prism of the average treatment effect has oscillated between 7–10.4%, suggesting that it has remained remarkably constant over the last decade, and when compared to the evidence provided by [Panagides and Patrinos \(1994\)](#), it is suggestive that this may be true for much of the past two decades. Nevertheless, it does seem that it is salient disentangle who benefits from unionisation, I propose to address this by asking: “What is the treatment effect for those who unionise?”. This will be subject of the investigation in the next chapter.

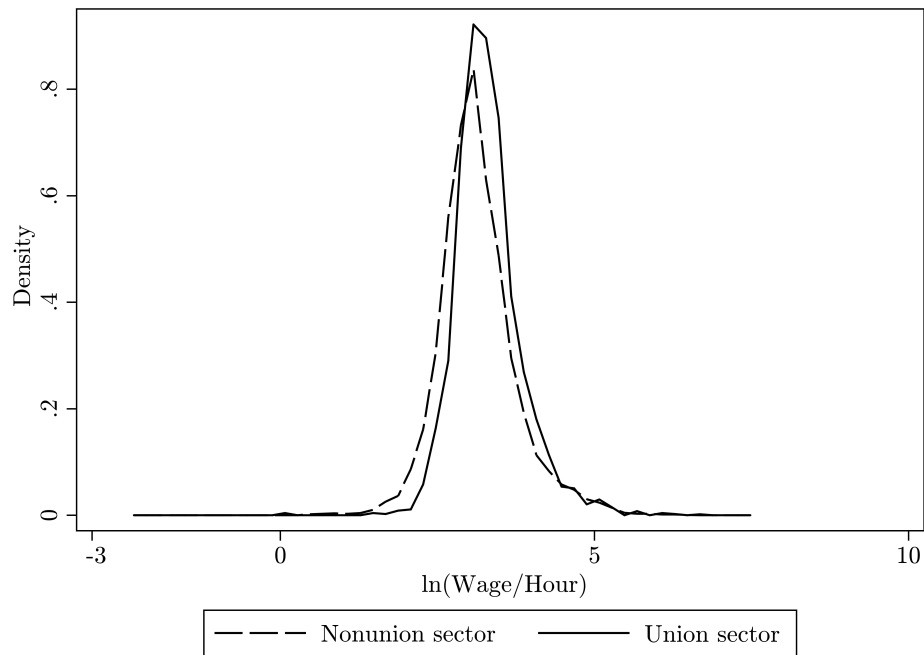
Appendix B

Kernel densities for selected years

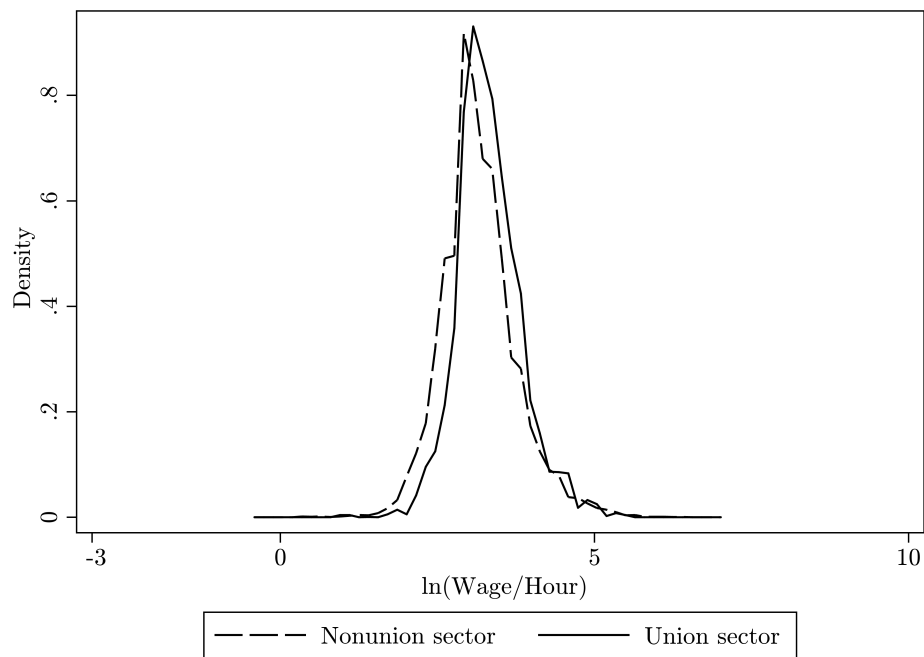
Figure B.1: Kernel density of $\ln(\text{wages/hours})$ by union status, Mexico 2005q1



Note: Author's own calculation using [ENOE](#).

Figure B.2: Kernel density of $\ln(\text{wages/hours})$ by union status, Mexico 2010q1

Note: Author's own calculation using [ENOE](#).

Figure B.3: Kernel density of $\ln(\text{wages/hours})$ by union status, Mexico 2016q1

Note: Author's own calculation using [ENOE](#).

Appendix C

OLS Wage Equation Estimates

Table C.1: OLS estimates of Sectoral Wage Equations for Mexico, 2005q1–2010q1

| | 2005q1 | | 2006q1 | | 2007q2 | | 2008q2 | | 2009q1 | | 2010q1 | |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion |
| Primary | 0.123** (0.057) | 0.112*** (0.013) | 0.124** (0.061) | 0.096*** (0.012) | 0.02 (0.064) | 0.091*** (0.014) | 0.073 (0.099) | 0.099*** (0.013) | 0.098 (0.065) | 0.070*** (0.013) | 0.022 (0.111) | 0.045*** (0.014) |
| Secondary | 0.262*** (0.057) | 0.191*** (0.014) | 0.246*** (0.060) | 0.174*** (0.013) | 0.127*** (0.065) | 0.164*** (0.014) | 0.163 (0.099) | 0.171*** (0.014) | 0.208*** (0.063) | 0.138*** (0.014) | 0.146 (0.111) | 0.115*** (0.014) |
| Preparatory | 0.386*** (0.059) | 0.307*** (0.015) | 0.369*** (0.062) | 0.283*** (0.014) | 0.269*** (0.066) | 0.283*** (0.015) | 0.307*** (0.100) | 0.285*** (0.015) | 0.326*** (0.065) | 0.247*** (0.014) | 0.265** (0.112) | 0.213*** (0.015) |
| University | 0.685*** (0.061) | 0.675*** (0.016) | 0.647*** (0.063) | 0.659*** (0.015) | 0.576*** (0.068) | 0.634*** (0.016) | 0.581*** (0.102) | 0.658*** (0.016) | 0.583*** (0.067) | 0.598*** (0.016) | 0.539*** (0.113) | 0.559*** (0.016) |
| Age | 0.031*** (0.006) | 0.028*** (0.001) | 0.020*** (0.005) | 0.025*** (0.001) | 0.024*** (0.006) | 0.026*** (0.001) | 0.019*** (0.005) | 0.025*** (0.001) | 0.021*** (0.005) | 0.024*** (0.001) | 0.027*** (0.006) | 0.025*** (0.001) |
| Age ² | -0.036*** (0.007) | -0.031*** (0.002) | -0.021*** (0.007) | -0.029*** (0.001) | -0.027*** (0.008) | -0.030*** (0.001) | -0.022*** (0.006) | -0.029*** (0.001) | -0.023*** (0.007) | -0.027*** (0.001) | -0.030*** (0.007) | -0.029*** (0.001) |
| Tenure | 0.015*** (0.004) | 0.010*** (0.001) | 0.013*** (0.003) | 0.013*** (0.001) | 0.013*** (0.004) | 0.010*** (0.001) | 0.019*** (0.002) | 0.011*** (0.001) | 0.015*** (0.007) | 0.011*** (0.001) | 0.017*** (0.007) | 0.013*** (0.001) |
| Tenure ² | -0.013 (0.013) | -0.015*** (0.003) | -0.01 (0.003) | -0.024*** (0.001) | -0.009 (0.004) | -0.016*** (0.001) | -0.022*** (0.002) | -0.017*** (0.001) | -0.023** (0.004) | -0.019*** (0.001) | -0.019** (0.003) | -0.023*** (0.001) |
| Married | 0.03 (0.019) | 0.083*** (0.006) | 0.039** (0.018) | 0.076*** (0.006) | 0.051*** (0.020) | 0.077*** (0.006) | 0.044** (0.020) | 0.084*** (0.006) | 0.051** (0.021) | 0.064*** (0.006) | 0.017 (0.020) | 0.063*** (0.006) |
| Temporary Contract | -0.037 (0.026) | -0.081*** (0.010) | -0.045* (0.024) | -0.073*** (0.010) | -0.048* (0.025) | -0.086*** (0.010) | -0.043* (0.025) | -0.089*** (0.010) | -0.052* (0.028) | -0.059*** (0.011) | -0.097*** (0.025) | -0.078*** (0.011) |
| No Contract | -0.016 (0.032) | -0.111*** (0.008) | -0.036 (0.035) | -0.107*** (0.007) | 0.041 (0.036) | -0.113*** (0.007) | 0.024 (0.039) | -0.099*** (0.007) | 0.005 (0.040) | -0.082*** (0.008) | 0.008 (0.041) | -0.106*** (0.008) |
| Micro (<10) | -0.126*** (0.043) | -0.144*** (0.012) | -0.047 (0.046) | -0.167*** (0.011) | -0.147*** (0.048) | -0.162*** (0.011) | -0.090* (0.050) | -0.154*** (0.011) | -0.033 (0.054) | -0.154*** (0.012) | -0.096* (0.051) | -0.146*** (0.012) |
| Small (11–50) | -0.037 (0.027) | -0.024** (0.012) | -0.028 (0.027) | -0.046*** (0.011) | -0.058** (0.029) | -0.053*** (0.011) | 0.004 (0.029) | -0.049*** (0.010) | -0.032 (0.031) | -0.048*** (0.011) | -0.062** (0.030) | -0.039*** (0.011) |
| Medium (51–250) | -0.046*** (0.019) | -0.046*** (0.012) | -0.028 (0.018) | -0.044*** (0.011) | -0.063*** (0.020) | -0.062*** (0.011) | -0.056*** (0.021) | -0.053*** (0.011) | -0.059*** (0.021) | -0.045*** (0.012) | -0.045** (0.021) | -0.061*** (0.012) |
| Constant | 2.324*** (0.120) | 2.478*** (0.032) | 2.626*** (0.119) | 2.577*** (0.029) | 2.685*** (0.132) | 2.671*** (0.030) | 2.664*** (0.135) | 2.655*** (0.030) | 2.592*** (0.146) | 2.596*** (0.030) | 2.435*** (0.161) | 2.587*** (0.032) |
| State Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\sigma}$ | 0.504 | 0.547 | 0.463 | 0.512 | 0.491 | 0.527 | 0.474 | 0.516 | 0.461 | 0.511 | 0.459 | 0.518 |
| R ² | 0.272 | 0.288 | 0.27 | 0.315 | 0.264 | 0.296 | 0.273 | 0.303 | 0.248 | 0.281 | 0.285 | 0.267 |
| N | 4133 | 44609 | 3867 | 46036 | 4018 | 45738 | 3595 | 45471 | 2929 | 42571 | 2961 | 42489 |

NOTES: * p<.10, ** p<.05, *** p<.01, standard errors reported use the White (1980) sandwich estimator.
The pay measure is net of taxes and is measured as the log of hourly wages.
The regressions include 10 industry controls and 31 regional controls.
Squared terms have been scaled by 100.

Table C.2: OLS estimates of Sectoral Wage Equations for Mexico, 2011q1–2015q1

| | 2011q1 | | 2012q1 | | 2013q1 | | 2014q1 | | 2015q1 | | 2016q1 | |
|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|---------------------|----------------------|
| | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion | Union | Nonunion |
| Primary | 0.211* (0.121) | 0.069*** (0.013) | 0.119 (0.086) | 0.060*** (0.014) | 0.04 (0.117) | 0.051*** (0.015) | 0.057 (0.155) | 0.085*** (0.015) | 0.161 (0.172) | 0.052*** (0.015) | 0.079 (0.127) | 0.086*** (0.015) |
| Secondary | 0.311*** (0.120) | 0.133*** (0.014) | 0.228*** (0.084) | 0.116*** (0.014) | 0.135 (0.116) | 0.100*** (0.015) | 0.178 (0.154) | 0.143*** (0.015) | 0.254 (0.171) | 0.100*** (0.015) | 0.168 (0.126) | 0.130*** (0.015) |
| Preparatory | 0.415*** (0.120) | 0.227*** (0.015) | 0.314*** (0.085) | 0.212*** (0.015) | 0.282** (0.116) | 0.218*** (0.016) | 0.306** (0.155) | 0.243*** (0.016) | 0.348** (0.172) | 0.197*** (0.016) | 0.280** (0.126) | 0.216*** (0.016) |
| University | 0.681*** (0.121) | 0.559*** (0.016) | 0.547*** (0.088) | 0.536*** (0.017) | 0.468*** (0.119) | 0.545*** (0.017) | 0.599*** (0.156) | 0.579*** (0.017) | 0.640*** (0.173) | 0.553*** (0.017) | 0.548*** (0.128) | 0.563*** (0.017) |
| Age | 0.012** (0.005) | 0.022*** (0.001) | 0.027*** (0.006) | 0.023*** (0.001) | 0.010* (0.006) | 0.024*** (0.001) | 0.010** (0.005) | 0.022*** (0.001) | 0.013** (0.006) | 0.023*** (0.001) | 0.012** (0.006) | 0.020*** (0.001) |
| Age ² | -0.01 (0.007) | -0.025*** (0.001) | -0.033*** (0.008) | -0.027*** (0.002) | -0.01 (0.008) | -0.027*** (0.001) | -0.010* (0.006) | -0.025*** (0.001) | -0.015* (0.008) | -0.026*** (0.001) | -0.014* (0.007) | -0.023*** (0.001) |
| Tenure | 0.016*** (0.003) | 0.011*** (0.001) | 0.012*** (0.004) | 0.011*** (0.001) | 0.019*** (0.003) | 0.012*** (0.001) | 0.013*** (0.003) | 0.012*** (0.001) | 0.014*** (0.003) | 0.012*** (0.001) | 0.017*** (0.003) | 0.011*** (0.001) |
| Tenure ² | -0.014 (0.009) | -0.019*** (0.006) | -0.009 (0.011) | -0.019*** (0.003) | -0.033*** (0.010) | -0.023*** (0.003) | -0.015 (0.011) | -0.021*** (0.002) | -0.012 (0.011) | -0.022*** (0.003) | -0.025** (0.011) | -0.020*** (0.002) |
| Married | 0.059*** (0.020) | 0.058*** (0.006) | 0.026 (0.022) | 0.061*** (0.006) | 0.037* (0.021) | 0.052*** (0.006) | 0.051*** (0.018) | 0.051*** (0.006) | 0.039** (0.019) | 0.057*** (0.006) | 0.061*** (0.019) | 0.060*** (0.006) |
| Temporary Contract | -0.056** (0.028) | -0.078*** (0.010) | -0.078*** (0.028) | -0.083*** (0.010) | -0.075*** (0.027) | -0.065*** (0.010) | -0.036 (0.027) | -0.075*** (0.010) | -0.077*** (0.028) | -0.068*** (0.009) | -0.028 (0.031) | -0.095*** (0.010) |
| No Contract | -0.042 (0.041) | -0.115*** (0.008) | -0.080* (0.042) | -0.112*** (0.008) | -0.039 (0.042) | -0.109*** (0.008) | 0.067* (0.039) | -0.098*** (0.008) | -0.002 (0.042) | -0.093*** (0.008) | -0.032 (0.041) | -0.099*** (0.008) |
| Micro (<10) | -0.087* (0.048) | -0.115*** (0.012) | -0.076 (0.058) | -0.136*** (0.011) | -0.036 (0.056) | -0.125*** (0.012) | -0.103* (0.054) | -0.126*** (0.011) | -0.136** (0.058) | -0.128*** (0.011) | -0.088 (0.054) | -0.128*** (0.011) |
| Small (11–50) | -0.035 (0.030) | -0.022* (0.011) | -0.03 (0.031) | -0.039*** (0.011) | -0.077** (0.032) | -0.032*** (0.011) | -0.076** (0.031) | -0.030*** (0.010) | -0.075** (0.030) | -0.032*** (0.010) | -0.036 (0.035) | -0.018* (0.010) |
| Medium (51–250) | -0.026 (0.020) | -0.044*** (0.012) | -0.032 (0.024) | -0.055*** (0.011) | -0.076*** (0.024) | -0.041*** (0.011) | -0.039* (0.022) | -0.033*** (0.011) | -0.050** (0.022) | -0.049*** (0.010) | -0.032 (0.023) | -0.017 (0.011) |
| Constant | 2.595*** (0.158) | 2.595*** (0.032) | 2.564*** (0.152) | 2.626*** (0.031) | 2.872*** (0.159) | 2.581*** (0.032) | 2.802*** (0.199) | 2.560*** (0.033) | 2.474*** (0.209) | 2.571*** (0.033) | 2.959*** (0.196) | 2.681*** (0.036) |
| State Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $\hat{\sigma}$ | 0.449 | 0.504 | 0.454 | 0.505 | 0.465 | 0.508 | 0.443 | 0.506 | 0.447 | 0.495 | 0.459 | 0.501 |
| R ² | 0.273 | 0.255 | 0.236 | 0.245 | 0.223 | 0.255 | 0.26 | 0.255 | 0.24 | 0.261 | 0.238 | 0.251 |
| N | 3006 | 41923 | 2770 | 41952 | 2800 | 40897 | 3163 | 42447 | 3128 | 42039 | 2986 | 41515 |

NOTES: * p<.10, ** p<.05, *** p<.01, standard errors reported use the White (1980) sandwich estimator.

The pay measure is net of taxes and is measured as the log of hourly wages.

The regressions include 10 industry controls and 31 regional controls.

Squared terms have been scaled by 100.

Appendix D

Endogenous Switching

This appendix outlines the motivation and derivation of the endogenous switching model. It also reports the estimates for the [Lee \(1978\)](#) procedure.

Assuming that the utility function for the i^{th} individual in sector s where, as in [equation \(3.1\)](#) $s = [n, u]$. Where n and u denote nonunion and union status respectively. The benefits associated with sector s are given as follows:

$$\mathbf{U}_i(s, b) = \alpha \cdot (W_{is} + \mathbf{Z}'_i \gamma_s) + \epsilon_i(s, b) \quad (\text{D.1})$$

where as before W is the natural log of hourly wages and γ is a vector of individual characteristics. It follows that increases in W would also increase an individuals utility. Thus, an individual would choose to be in the union sector u if the following is true:

$$\mathbf{U}_i(u, b) + C(u, b) \geq \mathbf{U}_i(n, b) + C(n, b) \quad (\text{D.2})$$

So, the union sector is associated with benefits b , and these are preferred so long as the value added C to the individual by unionisation is greater than that which would be available in the nonunion sector s . Naturally, what follows from this is that union status may not be random. Estimation of [equation \(3.1\)](#) would be biased. Now, the exact monetary value of unionisation in [\(D.2\)](#) is unobserved in this empirical application. However, I assume that these are related to the type of wage bargaining approach that a specific union make take. As discussed earlier in [section 3.3](#) and the previous subsection, it may be that the bargaining behaviour of a union as measured by the petitions rate for independent unions and ‘officialist’ may be such an identifying instrument. Then what follows is an endogenous switching regime such as that shown in [Lee](#)

(1978).

Where substituting the sector independent version of [equation \(3.1\)](#) into [\(D.1\)](#) yields a utility reduced form where the sector specific subscripts have been suppressed:

$$\mathbf{U}_i(s, b) = \alpha \cdot (x'_s \beta_s) + \mathbf{Z}'_i \gamma_s + \psi_i(s) \quad (\text{D.3})$$

where $\psi_i = \alpha \cdot \eta_i + \epsilon(s)$

yielding

$$\mathbf{U}^* \alpha (x'_s \beta_s + \mathbf{Z}'_i \gamma_s) + \psi_i \quad (\text{D.4})$$

However, we do not observe the latent state of \mathbf{U}^* , assuming that $\psi_i(s) \sim N(0, \sigma_s^2)$, yields the following estimable probit model:

$$\Pr(\mathbf{U} = 1) = \Phi(x'_s \beta_s + \mathbf{Z}'_i \gamma_s) \quad (\text{D.5})$$

where the \mathbf{Z} vector includes all the identifying instruments for union status, namely the lag of ‘officialist’ and independent union petition rate for a given industry in a given municipality.

Now, in order to correct for union selection [equation \(3.1\)](#) into [\(D.1\)](#) become:

$$w_{ui} = x'_{iu} \beta_u + \lambda'_u \left(-\frac{\phi(\hat{\mathbf{Z}}_i)}{\Phi(\hat{\mathbf{Z}}_i)} \right) + \eta_u \quad (\text{D.6})$$

$$w_{ni} = x'_{in} \beta_n + \lambda'_n \left(\frac{\phi(\hat{\mathbf{Z}}_i)}{(1 - \Phi(\hat{\mathbf{Z}}_i))} \right) + \eta_n \quad (\text{D.7})$$

Where $\phi(\cdot)$ and $\Phi(\cdot)$ are the pdf and CDF of the normal distribution and $P = \Pr(\mathbf{U} = 1 | \mathbf{Z}_i)$. Thus, we now have sector specific wage equations that account for the selection into union status this effect will be given by λ estimands, and where $E(\eta_u | \mathbf{U} = 1) = -\frac{\phi(\hat{\mathbf{Z}}_i)}{\Phi(\hat{\mathbf{Z}}_i)}$ and $E(\eta_n | \mathbf{U} = 0) = \frac{\phi(\hat{\mathbf{Z}}_i)}{(1 - \Phi(\hat{\mathbf{Z}}_i))}$ which are the inverse Mills ratio and the complement of the Mills ratio, respectively. The estimated parameter $\lambda = \sigma \cdot \rho$ where σ is the variance of the error term of the selection model, whilst $\rho = \text{corr}(\eta, \psi)$. As in [Heckman](#)’s original model, it is worthwhile noting that the standard errors from the two-step approach outlined above will be incorrect. As [Lee \(1978\)](#) points out there has to be a correction to the variance covariance matrix to account for the inclusion of the estimated selectivity coefficients. [Greene \(1981\)](#) derives an analytical solution to the correct error structure of this type of Heckit model.

The approach adopted in this paper is to obtain the estimates for the endogenous switching model by implementing estimation of equations (D.5), (D.6) and (D.7) is to estimate these as a single equation using FIML. In practice this is done by using the programme derived by Lokshin and Sajaia (2004). As noted by Puhani (2000) the use of the FIML estimator should be preferred unless there are issues of collinearity. One major drawback to the FIML estimator is the computational intensity required to run. The estimated log likelihood function looks as follows:

$$\ln L = \sum_i \left(U_i \left[\ln \{ \Phi(\tau_{ui}) \} + \ln \{ \phi(\eta_{ui}/\sigma_u)/\sigma_u \} \right] + (1 - U_i) \left[\ln \{ 1 - \Phi(\tau_{ni}) \} + \ln \{ \phi(\eta_{ni}/\sigma_n)/\sigma_n \} \right] \right) \quad (\text{D.8})$$

Where as before $\phi(\cdot)$ and $\Phi(\cdot)$ are the PDF and CDF of the normal distribution, and

$$\tau_{si} = \frac{(\mathbf{Z}'_i \gamma_i + \rho_s \eta_{si}/\sigma_s)}{\sqrt{1 - \rho_s^2}} \quad s = u, n$$

As it should be clear an added advantage to this procedure is the indirect estimation of the parameter ρ which is defined as before as the correlation between the selection model and the selectivity corrected equation. In practice ρ_s and σ_s are indirectly estimated as transformations $\ln \sigma_s$ and $\text{atanh} \rho_s$, ensuring that the variables are positive and bounded in the space $[-1, 1]$, respectively.

The inclusion of the selection terms now pose a problem for the estimation of the Oaxaca-Blinder decomposition. In the case where the decomposition is computed from a two-step procedure the σ parameters must be excluded from the $\hat{\beta}$ vector of parameters and the \bar{x} vectors of means as in equations (3.2) and (3.3). Neuman and Oaxaca (2004) propose various alternatives for incorporating the selection effect into the decomposition. One of the most attractive is that proposed by Duncan and Leigh (1980) and Reimers (1983) who suggest that the selectivity be net out and a new term be added to equation (3.2). The decomposition now becomes:

$$\bar{w}_u - \bar{w}_n = (\bar{\mathbf{X}}_u - \bar{\mathbf{X}}_n)' \hat{\beta}_n + \bar{\mathbf{X}}_u' (\hat{\beta}_u - \hat{\beta}_n) + (\hat{\theta}_u \bar{\lambda}_u - \hat{\theta}_n \bar{\lambda}_n) \quad (\text{D.9})$$

where $\hat{\theta}_s = \hat{\rho}_s \hat{\sigma}_s$. The last term is the selectivity effect, or the differences due to selectivity bias. It should be noted that the decomposition no longer refers to the wage differential, as

netting out the selectivity effect amounts to comparing the difference in wage *offers* between union and nonunion sectors. Given the components of θ_s are not just identified, but estimated as part of the log likelihood function then we may obtain the sampling variance of the last term of the decomposition. The variance is as follows:

$$V(\hat{\theta}_u \bar{\lambda}_u - \hat{\theta}_n \bar{\lambda}_n) = \left([V\bar{\lambda}_u V\rho_u^2] + [V(\bar{\lambda}_u)\rho_u^2] + [V(\rho_u^2)\bar{\lambda}_u^2] - \right. \\ \left. [V\bar{\lambda}_n V\rho_n^2] + [V(\bar{\lambda}_n)\rho_n^2] + [V(\rho_n^2)\bar{\lambda}_n^2] \right)$$

Table D.1: FIML estimates of endogenous union-nonunion switching model for Mexico 2005q1–2015q1

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Selectivity corrected wage equation for Nonunion sector | | | | | | | | | | | |
| Age | 0.028*** (0.001) | 0.026*** (0.001) | 0.027*** (0.001) | 0.026*** (0.001) | 0.025*** (0.001) | 0.025*** (0.001) | 0.024*** (0.001) | 0.023*** (0.001) | 0.024*** (0.001) | 0.022*** (0.001) | 0.023*** (0.001) |
| Age ² | -0.032*** (0.002) | -0.030*** (0.001) | -0.032*** (0.001) | -0.031*** (0.002) | -0.029*** (0.002) | -0.030*** (0.002) | -0.027*** (0.002) | -0.027*** (0.002) | -0.028*** (0.002) | -0.026*** (0.002) | -0.026*** (0.002) |
| Tenure | 0.010*** (0.001) | 0.014*** (0.001) | 0.012*** (0.001) | 0.012*** (0.001) | 0.012*** (0.001) | 0.014*** (0.001) | 0.012*** (0.001) | 0.012*** (0.001) | 0.013*** (0.001) | 0.013*** (0.001) | 0.012*** (0.001) |
| Tenure ² | -0.015*** (0.004) | -0.026*** (0.004) | -0.021*** (0.004) | -0.019*** (0.004) | -0.020*** (0.003) | -0.025*** (0.003) | -0.021*** (0.005) | -0.022*** (0.004) | -0.024*** (0.003) | -0.023*** (0.003) | -0.023*** (0.003) |
| Married | 0.083*** (0.007) | 0.078*** (0.006) | 0.083*** (0.006) | 0.093*** (0.006) | 0.070*** (0.006) | 0.066*** (0.006) | 0.068*** (0.006) | 0.064*** (0.006) | 0.058*** (0.006) | 0.054*** (0.006) | 0.063*** (0.006) |
| Short Contract | -0.057*** (0.011) | -0.064*** (0.010) | -0.077*** (0.010) | -0.077*** (0.010) | -0.059*** (0.011) | -0.064*** (0.012) | -0.061*** (0.011) | -0.068*** (0.011) | -0.047*** (0.011) | -0.051*** (0.011) | -0.053*** (0.010) |
| No Contract | -0.067*** (0.009) | -0.091*** (0.008) | -0.094*** (0.008) | -0.081*** (0.009) | -0.068*** (0.008) | -0.078*** (0.010) | -0.087*** (0.009) | -0.085*** (0.009) | -0.081*** (0.009) | -0.070*** (0.009) | -0.064*** (0.008) |
| Micro (<10) | -0.045*** (0.017) | -0.147*** (0.015) | -0.153*** (0.015) | -0.121*** (0.019) | -0.151*** (0.014) | -0.083*** (0.024) | -0.055*** (0.016) | -0.069*** (0.016) | -0.033*** (0.016) | -0.051*** (0.017) | -0.059*** (0.015) |
| Small (11–50) | 0.051*** (0.016) | -0.037*** (0.014) | -0.048*** (0.014) | -0.023 (0.017) | -0.052*** (0.013) | 0.007 (0.022) | 0.026* (0.015) | 0.016 (0.015) | 0.041*** (0.015) | 0.035** (0.016) | 0.019 (0.014) |
| Medium (51–250) | 0.002 (0.014) | -0.040*** (0.013) | -0.062*** (0.013) | -0.038*** (0.015) | -0.050*** (0.013) | -0.027 (0.018) | -0.012 (0.014) | -0.016 (0.014) | 0.019 (0.014) | 0.013 (0.014) | -0.010 (0.013) |
| Population | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) | 0.001*** (0.000) |
| Primary | 0.114*** (0.015) | 0.092*** (0.014) | 0.087*** (0.015) | 0.092*** (0.016) | 0.076*** (0.015) | 0.051*** (0.016) | 0.071*** (0.015) | 0.042*** (0.016) | 0.078*** (0.017) | 0.071*** (0.018) | 0.062*** (0.018) |
| Secondary | 0.186*** | 0.166*** | 0.154*** | 0.159*** | 0.142*** | 0.121*** | 0.128*** | 0.095*** | 0.121*** | 0.126*** | 0.113*** |

... continued

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 |
|-------------|--------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|
| Primary | (0.000) 0.156*** (0.054) | (0.000) 0.124** (0.062) | (0.000) 0.039 (0.066) | (0.000) 0.037 (0.105) | (0.000) 0.091 (0.061) | (0.000) -0.035 (0.133) | (0.000) 0.137 (0.087) | (0.000) 0.126 (0.083) | (0.000) -0.018 (0.150) | (0.000) 0.011 (0.162) | (0.000) 0.165 (0.189) |
| Secondary | 0.300*** (0.054) | 0.243*** (0.062) | 0.149** (0.066) | 0.148 (0.106) | 0.203*** (0.060) | 0.091 (0.133) | 0.233*** (0.084) | 0.201** (0.081) | 0.102 (0.149) | 0.147 (0.162) | 0.262 (0.188) |
| Preparatory | 0.419*** (0.057) | 0.367*** (0.063) | 0.292*** (0.068) | 0.283*** (0.107) | 0.317*** (0.062) | 0.222* (0.134) | 0.338*** (0.086) | 0.281*** (0.082) | 0.246 (0.150) | 0.268* (0.162) | 0.346* (0.188) |
| University | 0.717*** (0.059) | 0.649*** (0.065) | 0.594*** (0.070) | 0.552*** (0.108) | 0.570*** (0.064) | 0.505*** (0.134) | 0.602*** (0.087) | 0.529*** (0.085) | 0.351** (0.151) | 0.555*** (0.163) | 0.638*** (0.189) |

Selection Equation: Instruments

| | | | | | | | | | | | |
|-------------------------------|---------------------|---------------------|----------------------|-------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|---------------------|
| Independent Union | 1.040*** (0.344) | 1.199*** (0.251) | 0.586*** (0.152) | 0.132 (0.122) | 1.486*** (0.361) | 1.120*** (0.403) | 0.817*** (0.291) | 0.762** (0.388) | -0.200 (0.319) | 1.132*** (0.348) | 0.046 (0.288) |
| Petition Rate -1yr | 0.155*** (0.043) | 0.122** (0.057) | -0.141*** (0.052) | -0.023 (0.035) | -0.093* (0.055) | 0.052 (0.066) | 0.072 (0.068) | 0.096 (0.061) | 0.125* (0.069) | -0.148* (0.082) | 0.225*** (0.084) |
| Officialist Union | | | | | | | | | | | |
| Petition Rate -1yr | | | | | | | | | | | |
| Other Exogenous Variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Log-likelihood | -42,163.65 | -39,906.95 | -41,428.86 | -39,235.17 | -35,157.01 | -35,386.11 | -34,071.38 | -33,129.72 | -32,612.87 | -34,645.00 | -33,549.16 |
| LR test $\rho_u = \rho_n = 0$ | 59.79 | 7.18 | 1.85 | 4.21 | 0.15 | 8.96 | 26.88 | 32.25 | 60.09 | 27.55 | 46.88 |
| P-Val | (0.000) | (0.030) | (0.400) | (0.120) | (0.930) | (0.010) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| N | 42,032 | 43,042 | 42,977 | 42,271 | 38,822 | 38,632 | 38,257 | 37,837 | 36,925 | 38,597 | 38,087 |
| $\hat{\sigma}_u$ | 0.498 (0.009) | 0.460 (0.009) | 0.486 (0.009) | 0.472 (0.009) | 0.456 (0.01) | 0.449 (0.012) | 0.447 (0.01) | 0.442 (0.010) | 0.566 (0.058) | 0.434 (0.008) | 0.443 (0.009) |
| $\hat{\sigma}_n$ | 0.550 (0.004) | 0.511 (0.003) | 0.524 (0.003) | 0.513 (0.003) | 0.509 (0.003) | 0.520 (0.004) | 0.505 (0.004) | 0.504 (0.003) | 0.507 (0.004) | 0.509 (0.004) | 0.498 (0.004) |
| ρ_u | 0.025 (0.040) | -0.061* (0.047) | 0.044 (0.039) | 0.045* (0.032) | -0.023 (0.063) | -0.117 (0.093) | 0.020 (0.054) | -0.034 (0.059) | 0.683*** (0.135) | 0.020 (0.061) | 0.006 (0.052) |

... continued

| | 2005q1 | 2006q1 | 2007q2 | 2008q2 | 2009q1 | 2010q1 | 2011q1 | 2012q1 | 2013q1 | 2014q1 | 2015q1 |
|------------|----------------------|----------------------|-------------------|-------------------|-------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| ρ_n | -0.459*** (0.051) | -0.114*** (0.047) | -0.033 (0.044) | -0.122 (0.081) | 0.006 (0.041) | -0.320*** (0.109) | -0.308*** (0.056) | -0.375*** (0.060) | -0.433*** (0.055) | -0.400*** (0.068) | -0.401*** (0.052) |
| θ_u | 0.012 (0.041) | -0.028 (0.048) | 0.022 (0.040) | 0.021 (0.033) | -0.010 (0.064) | -0.052 (0.093) | 0.009 (0.055) | -0.015 (0.06) | 0.387 (0.147) | 0.009 (0.061) | 0.003 (0.053) |
| θ_n | -0.252 (0.051) | -0.058 (0.047) | -0.017 (0.044) | -0.062 (0.081) | .003 (0.041) | -0.166 (0.109) | -0.156 (0.056) | -0.189 (0.060) | -0.219 (0.055) | -0.203 (0.068) | -0.200 (0.052) |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Sector FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: * p<.10, ** p<.05, *** p<.01. Standard errors are clustered at Municipal-Sectoral level (the level of the selection equation instruments)

The pay measure is net of taxes and is measured as the log of hourly wages. The regressions include 10 industry controls and 31 regional controls.

Selection Equation includes all of the exogenous variables, but have been omitted due to space constraints. $\theta = \rho \times \sigma$.

ρ is the estimated correlation coefficient between the union decision equation and the wage equation. σ is the estimated variance of the wage equation.

Chapter 4

Are there gains to joining a union?

4.1 Introduction

Unions in Mexico have been in decline since the 1980s. Union density has declined from a peak of approximately 14% in 1984 of the male formal labour force to its current rate of approximately 7.5%. Whilst density fell in the 1990s, the early to mid-2000s witnessed a minor resurgence in unionisation rates. Yet, most information on the effects of unions relate exclusively to that period. Even then, very little is known about the role of unions in the face of macroeconomic adversity, and their role in bargaining over non-pay packages. This chapter aims to investigate the union role along these dimensions for the recent eleven-year period (2005–2016). The evidence presented in [Chapter 3](#) revealed that there is a sizeable raw mean wage differential between union members and nonmembers (18–22 percent). This gap reduces to 6.7–13.8% once worker characteristics are taken into account. However, this estimate is based on the counterfactual wages if those not currently in a union were to unionise. Estimates from the [Average Treatment Effect on the Treated \(ATET\)](#) suggest that the union wage mark-up for current members is a modest -2.4–4.4%. These point estimates are confirmed by a naïve application of an individual fixed-effects estimator confirming the effect of ‘switching’ to be 2%. However, conventional estimates of [ATET](#) and [Local Average Treatment Effect \(LATE\)](#), conflate the effects of being a union ‘joiners’ and ‘leaver’. This is likely biasing the estimates reported. The goal of this chapter is to obtain a clean estimate of the [ATET](#) which is free of these issues.

Given the modest estimates of the [ATET](#) from [Chapter 3](#), and the evidence presented by [Fairris \(2006\)](#), who finds that during the 1990s and Mexican unions tilted worker compensation towards non-wage benefits, it is salient to ask “Is there any benefit / loss associated with

transitioning in or out of a union?” This chapter will address the research question by carefully disentangling the wage and non-wage benefits to joining (leaving) a union. The main contribution of this chapter is that it provides the first estimates of the short-run effects of unions on worker compensation to the literature for a developing country. This is investigated using the *Encuesta Nacional de Ocupación y Empleo* (ENOE), a richly detailed labour force survey conducted on a quarterly basis. This dataset comprises a rotating panel with individuals interviewed for five consecutive quarters. I exploit the panel dimension of these data to look at the union wage differential as well as probability models of non-wage benefits for union joiners and leavers.

The results reveal that in the short-run, the average union joiner does not perceive any wage differentials. However, when the data are disaggregated, it becomes clear temporary contract workers who unionise—amongst some of the most vulnerable workers—obtain a wage increase of 18.5% relative to other temporary non-unionised workers. No other wage effects are detected for any other sub-group. Nevertheless, the probability of being in receipt of legally mandated non-wage benefits rises as a consequence of unionising. This is also found to be consistent across individuals either transitioning firms or contract types.

The results for union leavers suggest that in the short-run they perceive decreases in their wages, in particular once differences in characteristics are taken into account. Temporary contract workers who leave unions are the sub-group that find their wages decrease by 44%. Equally, union leavers are found to have lower probabilities of holding legally mandated non-wage benefits.

The evidence provided suggests that the voice effects originally suggested by [Freeman and Medoff \(1984\)](#) remain relevant today in Mexico. Unions ensure that firms provide all of the legally mandated benefits to which a worker is entitled. Leavers forfeit these benefits, perhaps in exchange for maintaining wages commensurate with their erstwhile union bargained wage levels.

The chapter is laid out as follows: I draw upon the developed country union literature and provide a brief background to the legal requirements of the *Ley Federal del Trabajo* (FLL) in [Section 4.2](#). The data are described in more detail in [Section 4.3](#). The methodology is detailed in [Section 4.4](#). [Section 4.5](#) presents the empirical results, some robustness checks are presented in [Section 4.6](#), and finally [Section 4.7](#) concludes.

4.2 Background

4.2.1 Federal Labour Law provisions in non-wage benefits

Chapter 2 outlined the entitlements guaranteed by the FLL. My aim in this chapter is to investigate the effect of joining and leaving a union. This effect will be investigated focussing on both the wages and the non-wage components of remuneration. In the Mexican context, as outlined previously, full-time formal workers are entitled to an *Aguinaldo* (or Bonus), paid holidays, and registration with social security, which in turn entitles workers to a pension. The FLL also outlines the legal framework under which unions operate. It should be noted that enshrined in the FLL is the freedom to both unionise and leave a union.¹ Union membership is defined as voluntary, and in the law it states that one may join or leave a union without being the subject of coercion. Joining a union may take multiple forms. In principle, however, workers must form a new union which may then be associated with a larger national unions congress. When changing jobs one may be able to enter a union to obtain a union contract. Any worker over 14 years of age may join a union. All unions need to be registered to the relevant Arbitration and Conciliation Commission. The law does not proscribe the procedure for voluntarily leaving a union, and only lays out the rules for someone to be involuntarily expelled from a union, for which a two-thirds majority based on a non-secret vote is required. The details of leaving a union are left to each union's constitution. However, in general, leaving a union is an administratively expensive affair. One may resign their union membership by writing a letter formally doing so, and having it notarised. This will then need to be presented for ratification to the relevant Arbitration and Conciliation Commission. Finally this is presented to the union leadership. However, this may also have implications for a worker's contract. If the collective contract is for unionised individuals, workers may need to reapply for their jobs to obtain a role as a *trabajador de confianza*, that is a nonunionised role within the same firm.

4.2.2 Literature Review

The original neoclassical labour economics view on unions characterises them as monopolists. The absence of unions would see competition between individuals for jobs, which would lead to firms offering market clearing pay packages that reward the worker for their marginal contribution to the production process. The composition of the pay packet should be attractive to the

¹See (Art. 359 FLL)

marginal worker in order to ensure competitiveness. Thus, if workers were interested in better non-wage benefits (e.g. pensions, profit-sharing, medical cover, etc.), they would settle for a job with a lower wage that provides better benefits. In this view unionised individuals distort the pay composition of the remuneration package and increase it above the competitive level through the threat of increasing firm costs (through strike action, for example).

Freeman and Medoff (1984) offer an alternative view of unions. In a series of seminal studies they investigate what they describe as the ‘other face’ of unionism. This view, developed from earlier work by Hirschman (1971) and Slichter et al. (1960), is coined by Freeman and Medoff as ‘collective voice’. For example, individuals who face economic problems may use two methods to solve these problems. The first is exit-and-entry. In this instance, it would imply that the one way in which an individual may make their discontent felt is through quitting their job. The second alternative is what Hirschman called ‘voice’. It emphasises the use of communication to lead to better outcomes. However, there may be instances in which worker voice may lead to adverse outcomes. Unions in that sense serve as a medium for collective voice that may be better able to speak to management to ameliorate work conditions. Unions in this case are political institutions, which, if elected democratically, respond to the needs of their median voter (member). This suggests that they will bargain with management over the composition of pay packets to reflect their membership’s median preferences over those of the marginal worker.

Freeman (1981) was the first study to explicitly examine the effect of unions on non-wage benefit composition. Using the Expenditures for Employee Compensation (EEC), an establishment level survey for the USA, he finds that the *a priori* predictions that non-wage benefits are greater for unionised firms is upheld by the data. Workplaces with a union density of 50% have 25–35% higher expenditure on non-mandatory benefits. This raw gap, once adjusted for levels of total compensation is reduced to 15–20%. Freeman and Medoff (1984) utilise various individual-level datasets to further analyse this question², and find that union members are 24 to 32 percentage points more likely than nonunion workers to have a pension. Montgomery and Shaw (1997) find unions to be associated with a larger incidence of pension benefits. Using longitudinal Canadian data, Swindinsky and Kupferschmidt (1991) report that unionised workers are 20% more likely to have a pension plan. Miller and Mulvey (1992) report for Australia, using a longitudinal survey, that the value of fringe benefits are 13.9% higher for union compared to nonunion workers. Kornfeld (1993) finds that joining a union in Australia increases the probability of having a

²Namely the Current Population Survey (CPS), the National Longitudinal Survey of Older Men (NLSOM), the Panel Study of Income Dynamics (PSID) and the Quality of Employment Survey (QES).

pension. Budd (2004) updates the estimates of unions and fringe benefits for the USA and finds that being in a union increases the probability of having employer-provided health insurance and a pension by 16.4% and 18.8% respectively. Budd (2005) updates the Freeman (1981) EEC estimates and finds that the voluntary benefits are 10.5% higher for union compared to nonunion members. Budd and Mumford (2004) estimate the effects of unions on family friendly policies. They find that unions increase the probability of parental leave, subsidised childcare, special leave, and job-sharing options.

Budd (2004) suggests that unions may also increase the uptake of mandated social insurance benefits through what he calls the ‘facilitation effect’. He suggests that unions not only act as a medium for the collective voice of workers, but they may also play an important role in the diffusion of knowledge about existing benefits to which workers may be entitled. Hirsch et al. (1997) suggest that part of the differential in compensation between union/nonunion workers may be due to the assistance unions provide. This is supported by evidence in Budd and Brey (2003), who find for unionised hourly employees that there is a greater probability of having heard of the American Family and Medical Leave Act. Budd and McCall (1997) find that unemployment insurance is more likely to be taken up by union than nonunion members.

The literature reviewed thus far has focused on developed countries. For developing countries Standing (1992) looks at the incidence of non-wage benefits using establishment level data for Malaysia. He finds that benefits differ not only between union/nonunion workers but rather that the entitlement to benefits is greater for those unionised by an industry-level union than at plant-level. Baah (2005) finds that Ghanaean trade unions significantly increase access to medical, and non-wage benefits by 41 to 48 percentage points. Fairris (2006) reports evidence for Mexico using establishment level data for 1992 and 1999. He finds that for the period prior to North American Free Trade Agreement (NAFTA) unionised establishments offered benefits 140 percent higher than nonunion establishments, and after liberalisation this had decreased to 26 percent. Fairris (2007) further exploits the establishment data to look at the value of fringe benefits as a proportion of compensation and finds that unions lower this proportion relative to the nonunion sector. The difference is found to be 0.2% in 1992. However, after trade liberalisation this had widened to 7.2%. Fairris suggests that a lack of research in the area for developing countries is to a large extent due to the unavailability of detailed surveys.

The extant evidence on non-wage benefits and wages reviewed thus far in the literature is exclusively based on the concept of a differential between the union and nonunion sector using

cross-sectional data. This chapter aims to look beyond the concept of the gap between the two sectors and investigate the wage and non-wage benefit gain (loss) associated with transitioning to (from) a union job using longitudinal data. This is a gap which both the developing and developed country literature has not considered to date to my knowledge.

4.3 Data

The analysis in this chapter utilises the [ENOE](#), a nationally representative labour force survey carried out by the [Instituto Nacional de Estadística, Geografía e Informática \(INEGI\)](#), the government statistics agency. The survey follows a complex sample design. It is a two-stage self-weighting sample. The first stage stratifies over geographical areas, whilst in the second stage households are randomly selected for inclusion in the survey. Each quarter one-fifth of households in the sample are dropped and a new cohort is introduced. Each cohort is interviewed for five consecutive quarters. Thus, every survey quarter contains five cohorts at different points of their respective interview cycle. Unfortunately, the survey only includes the question on union membership in the extended questionnaire, which is only administered once every calendar year. For the purposes of this chapter, this effectively reduces the available sample to those individuals for whom there are two extended questionnaire responses one year apart. In all instances this leaves only two temporal observations per period.

The specific question that individuals were asked was: “¿En este empleo pertenece a algún sindicato?”³ Note that this question is asked separately for main jobs and any other jobs that an individual holds. This chapter is only concerned with the response relating to an individual’s primary job as this is the one for which the union decision is most likely to be relevant. During the first five quarters of [ENOE](#)’s existence households were interviewed using the expanded questionnaire, subsequent applications of the expanded questionnaire have been restricted to once every four quarters. The present study exploits the between-year transitions. To date there have been fourteen editions of the expanded questionnaire.⁴ The relevant question for mandated non-wage benefits is as follows: “En este trabajo ¿A usted le dan (aguinaldo | vacaciones con goce de sueldo)?”⁵ and “En este trabajo ¿A usted le dan fondo de retiro, aunque no lo utilice?”⁶ The nature of the questions asked limits the scope of the analysis. No further

³“In this job do you belong to a union?”

⁴These are 2005q1–2006q2, 2007q2, 2008q2, 2009q1, 2010q1, 2011q1, 2012q1, 2013q1, 2014q1, 2015q1 and 2016q1.

⁵“In this job do you receive (bonus | paid holidays)?”

⁶“Although you may not use it in this job do you receive a retirement fund (pension)?”

information regarding the value of these benefits is asked in the survey questionnaire. Thus, this chapter solely focuses on the incidence of these non-wage benefits rather than their value or magnitude.

The nature of the pensions question must be regarded with care. Mexico since 1997 has a defined contributions pension system. Workers who are registered with the Mexican *Instituto Mexicano de Seguro Social* (IMSS) are automatically enrolled for a pension⁷, regardless of an individual opting-in. Contributions towards this pension will automatically be deducted from their base salary, employers have to match this by law, and the government also adds a small proportion to this pot.⁸ Workers may opt to have their mandatory pensions managed by the central government ‘concentrated’ account,⁹ or they may choose amongst one of the twenty-one private providers to invest their pension. Given this automatic enrolment, this question must therefore be interpreted as private—external to the IMSS scheme—pension provision.

As hinted above, the nature of the survey creates a challenge for the construction of a panel dataset. For the first six quarters of the survey’s existence a large proportion of the whole sample may be tracked.¹⁰ However, for later years we are only able to track one-fifth of the sample between quarters. For the purposes of this chapter I have chosen to look at year on year transitions.

The literature suggests that wage determination by unions within the public sector is markedly different from that in the private sector (Ehrenberg and Schwarz, 1986). For this reason I restrict the analysis to those wage earners in the private sector¹¹, who are of legal working age (16–65). This means that self-employed individuals, workers in the armed forces, and domestic service workers are excluded from our sample. Females were not included in the analysis in order to reflect the type of samples that have been used in the literature investigating the magnitude of the wage gap.

The sample size, once these restrictions have been imposed, is reported in Table 4.1. The dataset for the whole time period contains 70,698 observations, implying there are 35,346 indi-

⁷This is the case since the 1997 reform, so for any workers who were in the labour market prior to this date, they would have had a pension which was managed in their employer’s designated bank, however, after the 1997 reform they would have had to migrate this to one of the privately managed pension funds available.

⁸Note that workers may also add additional unmatched contributions towards this fund.

⁹Which is in turn managed by one of the twenty-one private providers, with a rotating three month basis.

¹⁰The proportion that one is able to track depends on the frequency of transitions one wishes to consider.

¹¹The analysis in this chapter is exclusively focused on the private sector, as there is a large literature that shows that public sector unions, may behave differently. There is however a restriction which must be acknowledged. There may be unobserved selection which is ignored wherein individuals sort themselves into the public sector and private sector, as well as self-employment. I lack the instruments to identify this selection process. It should be noted that both ‘treatment’ and ‘control’ in the analysis will be subject to this caveat.

viduals, of which 4,512 transition in and out of unions over the period 2005–2016. It should also be noted that all informal workers are excluded from this sample. This is due to the different wage determination process in that segment of the labour force, and the fact that unionisation in this sector is fairly fragmented.

Following [Addison et al. \(2013\)](#) I define two new groups ‘Union Joiners’ and ‘Union Leavers’. Joiners are individuals who are not union members in time $t = 0$ but are so in $t = 1$. Therefore, they are found to have transitioned into the union sector, and their natural comparison group are those individuals who have never joined a union. That is, in both $t = 0$ and $t = 1$ they report no union affiliation. Equally Leavers are those individuals who in $t = 0$ are union members and in $t = 1$ report to no longer have a union affiliation. Their comparison group are those individuals who in both $t = 0, 1$ report to be in a union. This method for identifying union status changers does not distinguish between ‘active’ and ‘passive’ unionisation. Active unionisation is when an individual seeks out a union, and this may often occur at the same time as one changes job. Whilst ‘passive’ unionisation is when a union arrives at a work place and seeks to organise it. This distinction requires foreknowledge of an individual’s intent. This information is not included in [ENOE](#). However, one way in which this can be identified is to look at other changes that occur simultaneously with one’s union transition. We can think that those individuals who actively unionise are those who also transition job at the same time as joining a union, whilst those passively unionising are those who remain in their workplace during the transition. These transitions will be identified by looking at changes in an individual’s self-reported tenure in a firm. Those individuals who report having an employer tenure lower than one year and who were employed in the previous period are assumed to have changed job.

Wages are defined as the log of the gross hourly wage, which is an individual’s gross wage divided by the hours worked. This is deflated using the National [Consumer Price Index \(CPI\)](#) for Mexico provided by [INEGI](#). Thus wages are expressed in December 2010 prices. The coverage of non-wage benefits in the [ENOE](#) survey is limited. The respondent is asked whether they are in receipt of the following: bonuses, or paid holidays. The information regarding pensions is reported as the availability of a pension regardless of whether or not an individual is a recipient.

[Table 4.1](#) reports the summary statistics for the whole sample of joining/leaving transitions. It is notable that unlike the average wage gap, the average wage difference between joiners and never union individuals is about 12.5% prior to joining a union, this gap is increased to 14.7% after joining a union. This gives a simple difference-in-difference estimate of joining a

Table 4.1: Individual characteristics of Joiners and Leavers, 2005q1–2016q1

| | Never Union | Union Joiners | Always Union | Union Leavers |
|--|------------------|------------------|------------------|------------------|
| (a) ln(Hourly Wages) in 2010 prices | | | | |
| Pre & Post transition | 3.185 (0.002) | 3.324 (0.009) | 3.350 (0.008) | 3.310 (0.008) |
| Pre transition | 3.196 (0.004) | 3.321 (0.015) | 3.347 (0.013) | 3.339 (0.013) |
| Post transition | 3.179 (0.003) | 3.326 (0.011) | 3.351 (0.009) | 3.292 (0.010) |
| (b) Bonus | | | | |
| Pre & Post transition | 0.560 (0.002) | 0.886 (0.005) | 0.960 (0.003) | 0.867 (0.005) |
| Pre transition | 0.557 (0.003) | 0.830 (0.009) | 0.955 (0.005) | 0.911 (0.007) |
| Post transition | 0.561 (0.002) | 0.919 (0.005) | 0.963 (0.003) | 0.841 (0.007) |
| (c) Paid Holidays | | | | |
| Pre & Post transition | 0.245 (0.002) | 0.570 (0.008) | 0.746 (0.006) | 0.542 (0.008) |
| Pre transition | 0.245 (0.003) | 0.460 (0.012) | 0.738 (0.011) | 0.627 (0.012) |
| Post transition | 0.245 (0.002) | 0.635 (0.009) | 0.750 (0.008) | 0.489 (0.010) |
| (d) Pension | | | | |
| Pre & Post transition | 0.529 (0.002) | 0.872 (0.005) | 0.952 (0.003) | 0.855 (0.005) |
| Pre transition | 0.527 (0.003) | 0.802 (0.010) | 0.949 (0.005) | 0.901 (0.007) |
| Post transition | 0.530 (0.002) | 0.914 (0.005) | 0.954 (0.004) | 0.827 (0.007) |
| (e) Demographic | | | | |
| AGE | | | | |
| Under 25 | 0.24 | 0.21 | 0.10 | 0.17 |
| 25–44 | 0.54 | 0.59 | 0.63 | 0.63 |
| 45+ | 0.22 | 0.19 | 0.26 | 0.20 |
| MARRIED | 0.55 | 0.61 | 0.74 | 0.65 |
| (f) Job Characteristics | | | | |
| TENURE | | | | |
| Less than 1 year | 0.10 | 0.06 | 0.02 | 0.06 |
| 1–3 years | 0.41 | 0.40 | 0.23 | 0.33 |
| 4–6 years | 0.19 | 0.19 | 0.18 | 0.20 |
| 7–15 years | 0.20 | 0.22 | 0.28 | 0.26 |
| 15–25 years | 0.07 | 0.10 | 0.19 | 0.12 |
| 26+ years | 0.03 | 0.03 | 0.09 | 0.03 |
| TEMPORARY CONTRACT | 0.08 | 0.12 | 0.07 | 0.12 |
| NO CONTRACT | 0.47 | 0.11 | 0.03 | 0.12 |
| FIRM SIZE | | | | |
| Micro | 0.40 | 0.08 | 0.01 | 0.10 |
| Small | 0.30 | 0.20 | 0.09 | 0.22 |
| Medium | 0.18 | 0.29 | 0.23 | 0.28 |
| Large | 0.11 | 0.42 | 0.67 | 0.40 |
| SECTOR | | | | |
| Agriculture, Forestry, Fishing and Hunting | 0.15 | 0.02 | 0.00 | 0.02 |
| Extractive Industry & Utilities | 0.01 | 0.02 | 0.04 | 0.02 |
| Manufacturing | 0.23 | 0.50 | 0.66 | 0.48 |
| Constuction | 0.07 | 0.03 | 0.01 | 0.04 |
| Trade | 0.22 | 0.14 | 0.07 | 0.16 |
| Accommodation & Food Services | 0.06 | 0.07 | 0.08 | 0.07 |
| Transportation and Warehousing | 0.08 | 0.09 | 0.11 | 0.10 |
| Professional, Financial & Corporate Services | 0.08 | 0.07 | 0.01 | 0.05 |
| Social Services | 0.01 | 0.02 | 0.00 | 0.01 |
| Other Services | 0.09 | 0.04 | 0.02 | 0.04 |
| Public Administration | 0.00 | 0.00 | 0.00 | 0.00 |
| REGION | | | | |
| NE | 0.12 | 0.20 | 0.28 | 0.22 |
| NW | 0.23 | 0.16 | 0.11 | 0.17 |
| West | 0.13 | 0.10 | 0.09 | 0.11 |
| East | 0.10 | 0.12 | 0.14 | 0.12 |
| CN | 0.15 | 0.18 | 0.16 | 0.18 |
| CS | 0.07 | 0.09 | 0.08 | 0.09 |
| SE | 0.13 | 0.10 | 0.10 | 0.09 |
| SW | 0.07 | 0.04 | 0.04 | 0.04 |
| ΔFIRM | | | | |
| Stayers | 0.30 | 0.35 | 0.38 | 0.34 |
| Changers | 0.46 | 0.40 | 0.35 | 0.43 |
| N | 70,692 | 4,320 | 4,704 | 4,384 |

NOTES: All variables are measured at individual level. These data are derived from the extended questionnaires of the **ENOE** survey. Standard errors for the means of the outcome variables are provided in parentheses. For proportions, these standard errors are derived using the binomial formula.

union of 2.2%.¹² Equally, the gap between leavers and always union individuals is found to be -0.01% in favour of always union members prior to leaving, and this falls to -5.8%, suggesting a difference-in-differences estimate of -6% for the wage loss concept.¹³ With respect to demographic characteristics the average joiner and leaver do not appear to be dissimilar.

Looking at the distribution of available non-wage benefits between joiners and never union members, there is a notable difference in the incidence of provision of these benefits. The unadjusted difference-in-difference estimates, calculated from Table 4.1, suggest that union joiners perceive an increase in the incidence of non-wage benefits in the range of 8.5–17.5 percentage points.¹⁴ For union leavers, the unadjusted difference-in-differences the decline in incidence of non-wage benefits is between 7.7–15 percentage points.¹⁵ The largest difference is found to be for bonuses where the incidence of paid holidays. This suggests that there are issues with compliance with FLL in the formal sector. Unfortunately, due to limitations with the data we are unable to investigate how the magnitude of the perceived bonuses vary across joiners/never union and leavers/always union individuals.

Many of the job characteristics reveal the same pattern. On average union ‘joiners’, ‘leavers’, and ‘always members’, are remarkably similar. The rest of the labour force, however, appears to be workers without a contract¹⁶, predominantly working in micro firms (i.e. those with fewer than ten workers). There seems to much more dispersion across different sectors, unlike for those union members, concentrated in large firms, often in the manufacturing sector.

4.4 Methodology

As outlined in the previous section, the objective of this chapter is to investigate the effects of joining/leaving a union on wages, bonuses, holidays and pension provision. Let us assume that the outcome of interest, denoted Y , for individual i in transition year t in quarter q is given as follows:

$$Y_{itq} = \alpha_i + \gamma_q + \phi P_t + \delta U_{itq} \times P_t + X_{itq}'\beta + \eta_{itq} \quad (4.1)$$

¹²The t-statistic for this is 1.63, suggesting that this is marginally statistically significant.

¹³The t-statistic for this is 2.22 suggesting it is highly statistically significant.

¹⁴The z statistics for these are 7.49, 11.36, and 9.14 for bonuses, paid holidays and pensions, respectively. All of these are highly significant.

¹⁵Where the relevant z statistics for these are 6.65, 7.46 and 6.5 for bonuses, paid holidays and pensions, respectively. All of these are highly significant.

¹⁶It should be noted that although a worker may not hold a written contract the Federal Labour Law explicitly states that once an employer-employee relation has begun one is entitled to all of the non-wage benefits described therein.

In this particular application Y_{itq} is either log wages (in December 2010 prices), or the incidence of non-wage benefits (*viz.* Bonus, Paid Holidays, or Pension provision).

The difference-in-difference model presented in expression (4.1) is a two-period model where α_i is a time invariant unobserved individual effect, γ_q is the quarter-year fixed effect, P_t is a dummy variable that is equal to 1 where $t = 1$. U_{itq} is a dummy variable which denotes the following two concepts: Firstly JOINERS, that is individuals who are not union members in time $t = 0$ but in $t = 1$ are found to have transitioned into a union job, and their natural comparison group are individuals who have never joined a union (that is, in both $t = 0$ and $t = 1$ they report no union affiliation). Secondly, there are LEAVERS, that is individuals who in $t = 0$ are union members and in $t = 1$ they report as no longer having union affiliation. Their comparison group are those individuals who in both $t = 0, 1$ report to be in a union. Thus, the model will be separately estimated for each group. The vector X_{itq} is a vector of individual and job specific characteristics. The parameter estimate of interest from equation (4.1) is the difference-in-differences estimate, which is given by $\hat{\delta}$. This estimate can be given the interpretation of the union wage/non-wage benefit gain/loss. The tables below exclusively report the estimates of this parameter. This parameter is estimated by using a two-period fixed effects model. The non-wage benefits difference-in-difference parameter is analogous to (4.1), and estimated by OLS using a linear probability model.

The vector X_{itq} contain age and its quadratic, tenure and its quadratic, marital status, firm size dummies, contract type, industry sectoral dummies, and state dummies, and state quarterly trends.

4.5 Results

Table 4.2 presents the estimates for the gains associated with *joining* a union. The table presents the estimate for the $\hat{\delta}$ parameter in expression (4.1). The estimates are for the pooled transitions over the whole time period 2005q1–2016q1. Individuals are separated into union ‘joiners’ and union ‘leavers’ with their respective comparison groups being those individuals who have never been unionised, and those who over the course of the survey always report belonging to a union. Thus, the estimate gives the ‘short-run’ effect of unionising when compared to the group of those individuals who never joined a union. The row of baseline estimates reflect the whole available sample, whilst each successive row represents the estimates for a particular sub-sample.

Table 4.2: Difference-in-Differences estimates of joining a union 2005q1–2016q1

| | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|---------|----------|---------------|----------|
| Baseline | 0.030* | 0.044*** | 0.138*** | 0.063*** |
| | (0.016) | (0.011) | (0.017) | (0.012) |
| <i>N</i> | 75,012 | 75,012 | 75,012 | 75,012 |
| Temporary Contract | 0.170** | 0.136** | 0.057 | 0.138** |
| | (0.080) | (0.058) | (0.060) | (0.060) |
| <i>N</i> | 32,979 | 32,979 | 32,979 | 32,979 |
| Permanent Contract | -0.037 | -0.002 | 0.113*** | 0.038*** |
| | (0.023) | (0.010) | (0.025) | (0.013) |
| <i>N</i> | 26,043 | 26,043 | 26,043 | 26,043 |
| Exclude Micro Businesses | 0.019 | 0.028** | 0.121*** | 0.051*** |
| | (0.018) | (0.011) | (0.019) | (0.012) |
| <i>N</i> | 39,914 | 39,914 | 39,914 | 39,914 |
| Permanent Exclude Micro | -0.040 | -0.001 | 0.110*** | 0.041*** |
| | (0.024) | (0.010) | (0.027) | (0.013) |
| <i>N</i> | 20,563 | 20,563 | 20,563 | 20,563 |
| Firm Stayers | 0.030 | 0.031* | 0.137*** | 0.049** |
| | (0.031) | (0.018) | (0.030) | (0.020) |
| <i>N</i> | 22,518 | 22,518 | 22,518 | 22,518 |
| Firm Changers | 0.003 | 0.070*** | 0.158*** | 0.087*** |
| | (0.024) | (0.018) | (0.028) | (0.020) |
| <i>N</i> | 34,509 | 34,509 | 34,509 | 34,509 |

NOTES: The model specification follows (4.1) in the text. Each column reports the difference-in-differences ($\hat{\delta}$) estimate obtained from the pooled time sample. This gives the effects of joining a union independent of the business cycle. The errors for these estimates are calculated using the White (1980) sandwich estimator. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of Table 4.1. The regressions also include State specific time trends. For definitions of the dependent variables see text in Section 4.3.

***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

Over the whole period the average wage gain for the average union ‘joiner’ is found to be weakly statistically significant. I find that on average, those individuals who join a union see their wages increase by 3% relative to never unionised individuals. In order to tease out the effect I re-estimated equation (4.1) on different sub-samples. It can be seen that the wage effects reported for the overall sample are mainly driven by those individuals who hold a temporary contract. Temporary workers who unionise see their wages increase by approximately 17% relative to their never unionised counterparts.

‘Never union’ individuals are predominantly clustered in micro firms, whilst union ‘joiners’ are on average more likely to be found amongst larger firms. This poses a potential issue in comparing these two sub-samples as it could be argued that small firms have fundamentally different labour relations, and are unlikely to even have a union presence. However, excluding this particular sub-sample yields a broadly similar story as that for the aggregate, namely that

there is no union wage gain.¹⁷ This evidence is thus consistent with the modest wage gaps of the ATET reported in Chapter 3.

The evidence presented for non-wage benefits is the first of its kind. The impact of the union gain on these fringe benefits has never been estimated. The poor macroeconomic performance of the Mexican economy in the 1980s and 1990s coupled with a decline in union membership altered the discourse of unions. The rhetoric of trade unions shifted towards the concept of the ‘social wage’ (Middlebrook, 1995). This language suggests that unions seek to maximise non-wage benefits for their rank-and-file. This is borne out by the estimates obtained. Union joiners are consistently and significantly more likely to be in receipt of ‘mandatory’ benefits as guaranteed by the FLL. Looking at the whole sample there is a modest increase in the probability of being in receipt of bonuses of 4.4 percentage points. This suggests a 3.7 percent increase in the incidence of bonuses if this is evaluated at the pre-transition average.¹⁸ Looking at the sub-samples confirms a similar pattern. The effect is highest for those in temporary contracts, whilst there appears to be no gains to unionisation for those workers who have permanent contracts. This may be explained, in part, by the legal entitlement that is afforded to permanent workers by the FLL. These guarantees are undefined for part-time workers and those with different contract types. Thus, union gains perhaps change the distribution of non-wage benefits for those workers. This would also explain the magnitude of increased incidence of these effects with respects to bonuses. Workers on temporary contracts who join a union experience an increase of 13.6 percentage points in the probability of being in receipt of an end-of-year bonus, relative to sub-sample of never union workers. This effect, when evaluated at the relevant pre-transition incidence implies an increase of 11.2%. As with the estimates for wages, excluding micro enterprises decreases the corresponding estimated $\hat{\delta}$ parameter. Equally, the effect on bonuses is positive regardless of whether an individual stays or changes their firm status.¹⁹ Bonuses in the Mexican context are a real and tangible addition to a worker’s salary. However, crucially, this fringe-benefit is disbursed only once per annum. It also does not count as a part of the ‘salary’ concept, thus, enjoying higher pay due to a bonus does not increase other proportional benefits such as employer pension contributions.

¹⁷In a separate exercise, not reported here, micro enterprises were excluded from all of the estimated sub-samples. The coefficients for firm changers and stayers do not differ materially from those reported in Table 4.2.

¹⁸This extensive margin can be computed by multiplying the mean proportion prior to transition by the estimated coefficient $\hat{\delta}$ of joiners. The relevant proportion for this calculation is available in table 4.1, and is 83%. So, $0.83 \times 0.044 = 0.037$.

¹⁹Again, excluding micro enterprises dampens the magnitude of the effects in some instances, and in others it increases, but nevertheless the effects reported remain significant.

A similar pattern is discernible from the other non-wage benefits. Joiners are found to be 13.8 and 6.3 percentage points more likely to be in receipt of paid holidays and have private pension schemes available for workers, respectively.²⁰ In these sets of non-wage benefits joiners are consistently found to have a higher probability of being in receipt of these ‘mandatory’ non-wage benefits, even if one has a permanent contract. These estimates are curious as under the [FLL](#) all individuals who work for firms should be registered with the Mexican Institute of Social Security.

However, the estimates suggest that the probability of being in receipt of these fringe benefits (which should be 100% for all full-time salaried formal workers) is higher for those who join unions. This suggests that unions are acting as a mechanism which ensures that employers provide workers with all of their legal entitlements. Unfortunately, without the ability to further delve into the magnitude of the non-wage benefits provided we are unable to determine to what extent union bargaining is increasing the magnitude of these benefits relative to their never union counterparts.

The estimated effects of leaving a union are presented in [Table 4.3](#). The estimates suggest that there is union wage loss associated with leaving a union. For the average union leaver this is found to be 4.2% relative to those individuals who are always unionised. Individuals who have temporary contracts are penalised with a punitive 30.5% decrease in hourly wages.²¹ The losses of leaving a union are more pervasive with respect to non-wage benefits.

²⁰These, when evaluated at their correspondent pre-transition incidences imply increases of 6.3 and 5 percent, respectively.

²¹However, due to the reduced sample size, one could argue there is selection on unobservables. Indeed, one of the ways in which unions affect wages is through overtime, if the difference-in-differences exercise is performed on hours worked it’s clear that this decrease is driven solely by changes in wages. A separate exercise on hours worked shows that there is actually a significant *increase* of approximately 6.6 hours associated with leaving a union. This suggests that the magnitude would be greater were it not for the compensating increase in hours.

Table 4.3: Difference-in-Differences estimates of leaving a union, 2005q1–2016q1

| | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|----------------------|----------------------|----------------------|----------------------|
| Baseline | -0.043** (0.020) | -0.048*** (0.012) | -0.092*** (0.023) | -0.052*** (0.014) |
| <i>N</i> | 9,088 | 9,088 | 9,088 | 9,088 |
| Temporary Contract | -0.365*** (0.110) | -0.123 (0.118) | -0.009 (0.124) | 0.035 (0.125) |
| <i>N</i> | 810 | 810 | 810 | 810 |
| Permanent Contract | -0.016 (0.026) | -0.005 (0.009) | -0.064** (0.029) | -0.027* (0.014) |
| <i>N</i> | 6,541 | 6,541 | 6,541 | 6,541 |
| Exclude Micro Businesses | -0.041** (0.020) | -0.040*** (0.012) | -0.097*** (0.024) | -0.046*** (0.014) |
| <i>N</i> | 8,390 | 8,390 | 8,390 | 8,390 |
| Permanent Exclude Micro | -0.015 (0.027) | -0.002 (0.009) | -0.074** (0.030) | -0.027* (0.014) |
| <i>N</i> | 6,224 | 6,224 | 6,224 | 6,224 |
| Firm Stayers | -0.054 (0.034) | 0.014 (0.018) | -0.056 (0.040) | -0.021 (0.022) |
| <i>N</i> | 3,282 | 3,282 | 3,282 | 3,282 |
| Firm Changers | -0.037 (0.031) | -0.095*** (0.021) | -0.114*** (0.037) | -0.075*** (0.023) |
| <i>N</i> | 3,533 | 3,533 | 3,533 | 3,533 |

NOTES: The model specification follows (4.1) in the text. Each column reports the difference-in-differences ($\hat{\delta}$) estimate obtained from the pooled time sample. This gives the effects of joining a union independent of the business cycle. The errors for these estimates are calculated using the White (1980) sandwich estimator. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of Table 4.1. The regressions also include State specific time trends. For definitions of the dependent variables see text in Section 4.3.

***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

The FLL entitles individuals with permanent contracts to an end-of-year bonus, paid holidays and a pension. My findings suggest that these entitlements may not necessarily be adhered to, as leaving a union is uniformly associated with decreases in the probability of receiving any non-wage benefits.²² However, when looking at the sub-sample of permanent workers the entitlements for bonuses are honoured. The exceptions are in the decrease in the probability of having the option of a private pension by 2.7 percentage points, which although numerically small, has potential implications in terms of the long term welfare of those leavers. Equally, there is a reduction of 6.4 percentage points in receiving paid holidays.²³ When workers in micro businesses are excluded, it becomes clear that there are reductions in the incidence for all of these mandatory benefits.

From a legal perspective if a worker leaves a permanent contract simultaneously as the event

²²It is worth nothing that even bonuses and paid holidays should be present for union leavers who change firms, this is because the law makes provision for individuals to receive the *pro rata* equivalent for both of these concepts.

²³Evaluating each of these at the respective incidence of their sub-sample suggests a decline in incidence of 2.4% for pensions and 4% for paid holidays.

of leaving a union, they would then lose their mandatory entitlement to non-wage benefits. The law suggests that a firm does not have a statutory obligation to provide paid holidays unless an individual has been working at the firm for at least a year. Equally, the bonuses are meant to reflect the period that an individual has been employed with the firm. In cases where they have been with the firm for a period of less than a year, employees are still entitled to *pro rata* bonus payments. Thus, it could be argued that the estimates provided reflect to some extent changes in contracting for individuals.

The estimates for the sub-sample of firm ‘stayers’ and firm ‘changers’ should, to some extent, assuage these concerns. Firm ‘stayers’ are those for whom the entitlements to these non-wage benefits should be unaffected by their leaving a union. My findings suggest that this sub-group is, as hypothesised, unaffected by leaving a union, leading me to conclude that union leavers are being affected due to facing unfavourable contracts in their new firms.

As a simple exercise to further elaborate this point, I re-estimated the regressions for those individuals who left and changed firm, distinguishing by reason between those who quit and those who lost their job.²⁴ Quitters may report quitting for numerous reasons, but these individuals are not subject to the same losses of non-wage benefits relative to those who quit and always remained in a union. However, the same cannot be said of the sample of individuals who faced involuntary job losses. For this sub-sample of individuals, there are substantial losses to non-wage benefits due to leaving a union. They endure a decline in non-wage benefits between 26.3 and 42.2 percentage points.²⁵

4.6 Robustness

There are three main concerns with regards to the specification underlying (4.1), which this sub-section will attempt to address. Firstly, the $\hat{\delta}$ parameter captures the union member effect upon wages or non-wage benefits under the assumption that, given the controls in vector X_{itq} , a clean estimate of the effect of the average outcome of transitions to or from a union is obtained. However, Table 4.1 shows that there are marked differences in characteristics, in particular between those individuals who are never union and those joining. This can be mitigated to some extent by adopting a matching approach. Secondly, one may have reservations that the

²⁴This sub-sample is defined as those who changed firm, and reported having lost their job—either due to their firm shutting down, or being made redundant. This sample is fewer than 300 individuals, and as such inference should be taken with caution.

²⁵When these are evaluated at their relative pre-transition means the loss is found to range between 28% to 60%.

choice of control group may be driving the results presented thus far. In order to address this, the following estimates are presented for swapped control groups. Finally, one may also be concerned that the $\hat{\delta}$ parameter reported may be tainted by the presence of misclassification in the union status of an individual. This could potentially manifest itself through attenuation bias in the coefficients. To allay fears around this latter issue estimates are reported below based on a series of simulations in which measurement error is randomly introduced. The results are reported in an appendix.

4.6.1 Conditional difference-in-differences

The parameter of interest has been the [ATET](#). The conditional difference-in-differences procedure is outlined in [Appendix E](#). In practice the approach that is implemented relies on a two-step procedure.

In the first step, a control function is estimated with a probit model on the relevant sample in order to obtain the propensity score. The model takes the following form:

$$\Pr(U_{i0q} = 1) = \Phi(\mathbf{X}'_{i0q}\beta) \quad (4.2)$$

Where the dependent variable denotes union joiners or leavers and their relevant control groups at time $t = 0$. A vector of covariates \mathbf{X}_{i0q} at time $t = 0$ is then used to control for the initial pre-transition scores, and $\Phi(\cdot)$ is the [CDF](#) of the normal distribution. From this model the propensity score for the i^{th} individual is obtained.

These are estimated for the whole sample, and allows me to identify the region of common support. This sample is kept for the next step. The matches are ranked in terms of their respective propensity scores. The Epanechnikov kernel with a bandwidth of 0.06 is used to smooth out the differences between scores. As it is unlikely that there are exact matches this procedure necessitates the generation of weights. Pairs of observations where the differences in observable characteristics between treated and control groups²⁶ are small will be given large weights, whilst those who are a poor match will be weighted lower.

²⁶*viz.* [Union joiners, never union] and [Union leavers, always union].

Table 4.4: Conditional difference-in-differences estimates of joining a union 2005q1–2016q1

| LHS | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|---------------------|---------------------|---------------------|---------------------|
| Baseline | 0.017 (0.018) | 0.037*** (0.010) | 0.115*** (0.019) | 0.059*** (0.011) |
| N | 47,628 | 47,628 | 47,628 | 47,628 |
| Temporary Contract | 0.139* (0.078) | 0.092 (0.061) | 0.033 (0.062) | 0.127** (0.053) |
| N | 19,161 | 19,161 | 19,161 | 19,161 |
| Permanent Contract | -0.048** (0.024) | -0.000 (0.010) | 0.111*** (0.028) | 0.031*** (0.012) |
| N | 16,659 | 16,659 | 16,659 | 16,659 |
| Exclude Micro Businesses | 0.007 (0.019) | 0.028** (0.013) | 0.109*** (0.019) | 0.052*** (0.014) |
| N | 25,496 | 25,496 | 25,496 | 25,496 |
| Permanent Exclude Micro | -0.051* (0.027) | 0.002 (0.010) | 0.103*** (0.029) | 0.032** (0.013) |
| N | 12,988 | 12,988 | 12,988 | 12,988 |
| Firm Stayers | 0.012 (0.030) | 0.027 (0.019) | 0.118*** (0.032) | 0.042** (0.019) |
| N | 16,707 | 16,707 | 16,707 | 16,707 |
| Firm Changers | -0.012 (0.022) | 0.063*** (0.018) | 0.142*** (0.031) | 0.087*** (0.020) |
| N | 19,291 | 19,291 | 19,291 | 19,291 |

NOTES: The model specification follows the two-step procedure outlined in the text. The Kernel utilised in the first step was an Epanechnikov with a bandwidth of 0.06. Each column reports the conditional difference-in-differences ($\hat{\delta}$) estimate obtained from the weighted fixed effects estimator on the pooled time sample that lies in the region of common support. This gives the effects of joining a union conditional on observable characteristics between treatment and control groups (*viz.* never union). The errors for these estimates are obtained from a bootstrapping procedure with 100 repetitions. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of [Table 4.1](#), with the exception of the firm change variable. The regressions also include State specific time trends. For definitions of the dependent variables see text in [Section 4.3](#). ***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

The second step employs a weighted fixed effects estimator using the weights obtained from the matching estimator. From this, the [ATET](#) parameter is given by $\hat{\delta}$ through running the same model as in [\(4.1\)](#). Whilst a large portion of sub-sample selection has been aimed at mitigating differences between union joiners and never union individuals, the approach considered in this section formally addresses these differences. The identification provided by this procedure is contingent on the observable characteristics between the two groups being a sufficient proxy for unobservables. Thus, matching on these characteristics may help mitigate the role of unobservables. If this assumption is not met, then the procedure will provide estimates for similar observed groups, but unobserved heterogeneity will still prevail.

The results of the conditional difference-in-differences are reported in [tables 4.4 and 4.5](#). These estimates are similar to the results presented thus far in [tables 4.2 and 4.3](#). However, the association previously found for firm staying joiners with respect to wages is no longer

significant, nor is the baseline wage findings for joiners. This suggests that to some extent the union joiners had better characteristics than their ‘never union’ counterparts. However, the result for temporary contract workers is upheld by use of this procedure. This finding is key as it suggests that unions are effective in protecting some of the most vulnerable workers in the economy, those with temporary contracts.

The estimated effects of leaving a union are found to be in line with those obtained from the matched sample of ‘leavers’ and ‘always union’ individuals. This exercise is notable for this group, as although there appears to be no real differences in average characteristics between these two groups, the estimates from the procedure reveal that there are no wage effects from leaving a union. It should be also noted that although the estimates provided in tables 4.4 and 4.5 rely on a bandwidth of 0.06, alternate bandwidths within the range [0.04–0.12] have been used, and these do not materially alter the estimates reported here.

Table 4.5: Conditional difference-in-differences estimates of leaving a union, 2005q1–2016q1

| LHS | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|---------------------|---------------------|----------------------|----------------------|
| Baseline | -0.052** (0.021) | -0.037** (0.015) | -0.088*** (0.024) | -0.041** (0.018) |
| <i>N</i> | 6,050 | 6,050 | 6,050 | 6,050 |
| Temporary Contract | -0.271 (0.210) | -0.030 (0.252) | 0.050 (0.269) | -0.001 (0.218) |
| <i>N</i> | 490 | 490 | 490 | 490 |
| Permanent Contract | -0.016 (0.027) | -0.006 (0.008) | -0.060* (0.034) | -0.031** (0.015) |
| <i>N</i> | 4,031 | 4,031 | 4,031 | 4,031 |
| Exclude Micro Businesses | -0.051** (0.025) | -0.034** (0.015) | -0.096*** (0.028) | -0.051*** (0.018) |
| <i>N</i> | 5,614 | 5,614 | 5,614 | 5,614 |
| Permanent Exclude Micro | -0.018 (0.028) | -0.003 (0.010) | -0.075** (0.036) | -0.037** (0.016) |
| <i>N</i> | 3,824 | 3,824 | 3,824 | 3,824 |
| Firm Stayers | -0.023 (0.035) | 0.013 (0.020) | -0.054 (0.053) | -0.011 (0.030) |
| <i>N</i> | 2,346 | 2,346 | 2,346 | 2,346 |
| Firm Changers | -0.085** (0.036) | -0.068** (0.030) | -0.090** (0.045) | -0.060* (0.030) |
| <i>N</i> | 2,216 | 2,216 | 2,216 | 2,216 |

NOTES: The model specification follows the two-step procedure outlined in the text. The Kernel utilised in the first step was an Epanechnikov with a bandwidth of 0.06. Each column reports the conditional difference-in-differences ($\hat{\delta}$) estimate obtained from the weighted fixed effects estimator on the pooled time sample that lies in the region of common support. This gives the effects of joining a union conditional on observable characteristics between treatment and control groups (*viz.* always union). The errors for these estimates are obtained from a bootstrapping procedure with 100 repetitions. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of Table 4.1, with the exception of the firm change variable. The regressions also include State specific time trends. For definitions of the dependent variables see text in Section 4.3. ***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

4.6.2 Inverted control groups

Table 4.6: Difference-in-differences estimates of joining a union 2005q1–2016q1, alternative control group

| | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|-------------------|---------------------|---------------------|---------------------|
| Baseline | 0.015 (0.021) | 0.048*** (0.012) | 0.132*** (0.023) | 0.074*** (0.014) |
| <i>N</i> | 9,024 | 9,024 | 9,024 | 9,024 |
| Temporary Contract | -0.090 (0.114) | 0.035 (0.128) | -0.058 (0.135) | 0.161 (0.113) |
| <i>N</i> | 950 | 950 | 950 | 950 |
| Permanent Contract | -0.026 (0.028) | 0.011 (0.010) | 0.134*** (0.029) | 0.031** (0.015) |
| <i>N</i> | 6,214 | 6,214 | 6,214 | 6,214 |
| Exclude Micro Businesses | -0.002 (0.022) | 0.034*** (0.012) | 0.123*** (0.024) | 0.060*** (0.014) |
| <i>N</i> | 8,346 | 8,346 | 8,346 | 8,346 |
| Permanent Exclude Micro | -0.030 (0.029) | 0.010 (0.010) | 0.121*** (0.030) | 0.030** (0.015) |
| <i>N</i> | 5,952 | 5,952 | 5,952 | 5,952 |
| Firm Stayers | -0.029 (0.038) | 0.064*** (0.020) | 0.158*** (0.039) | 0.075*** (0.023) |
| <i>N</i> | 3,305 | 3,305 | 3,305 | 3,305 |
| Firm Changers | 0.013 (0.033) | 0.057*** (0.021) | 0.144*** (0.039) | 0.062** (0.024) |
| <i>N</i> | 3,373 | 3,373 | 3,373 | 3,373 |

NOTES: The control group for joiners in these regressions are always union member individuals. The model specification follows the text. Each column reports the difference-in-differences ($\hat{\delta}$) estimate obtained from the pooled time sample. This gives the effects of joining a union independent of the business cycle. The errors for these estimates are calculated using the White (1980) sandwich estimator. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of Table 4.1. The regressions also include State specific time trends. For definitions of the dependent variables see text in Section 4.3.

***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

A concern that might be expressed about the estimates presented thus far relates to the choice of control group. The act of transitioning union status is not a laboratory experiment. There may be some ambiguity with respect to the appropriate comparison group. In order to verify that the selection of comparison group is not the driving factor with respect to the findings discussed, the same models have been re-estimated for a group where the control groups are swapped. Thus, joiners in this section will be compared with always union individuals, and *mutatis mutandis* for union leavers. Unsurprisingly there is no union wage gain for newcomers with respect to established union members. Remarkably, new union joiners do have an increased probability of holding all of the legally mandated non-wage benefits relative to their ‘always union’ counterparts. This suggests that perhaps the compensation effects of unionisation may be limited to the gains made at the time of the unionisation event. This finding holds regardless

of the sub-sample analysed. Permanent employees who unionise are found to have decreased wages, perhaps lending credence to the notion that workers may trade-off their salary for non-wage benefits.

The losses associated with leaving a union are robust to the selection of control group for leavers as well, and become greater when the comparison group is comprised those individuals who have never unionised. This deterioration for union leavers is apparent for all the sub-samples, and as such is independent of contract type and firm transitions.

Nevertheless, the results from this exercise further demonstrate that the effects of transitioning to/from a union are robust to the choice of the control group.

Table 4.7: Difference-in-differences estimates of leaving a union, 2005q1–2016q1, alternative control group

| | Wages | Bonus | Paid Holidays | Pension |
|--------------------------|----------|-----------|---------------|-----------|
| Baseline | -0.027* | -0.051*** | -0.115*** | -0.054*** |
| | (0.015) | (0.011) | (0.017) | (0.011) |
| <i>N</i> | 75,076 | 75,076 | 75,076 | 75,076 |
| Temporary Contract | -0.046 | -0.149** | -0.151*** | -0.099 |
| | (0.055) | (0.064) | (0.056) | (0.060) |
| <i>N</i> | 32,839 | 32,839 | 32,839 | 32,839 |
| Permanent Contract | -0.018 | -0.014 | -0.098*** | -0.012 |
| | (0.021) | (0.009) | (0.026) | (0.013) |
| <i>N</i> | 26,370 | 26,370 | 26,370 | 26,370 |
| Exclude Micro Businesses | -0.023 | -0.044*** | -0.121*** | -0.051*** |
| | (0.016) | (0.011) | (0.019) | (0.012) |
| <i>N</i> | 39,958 | 39,958 | 39,958 | 39,958 |
| Permanent Exclude Micro | -0.018 | -0.009 | -0.102*** | -0.012 |
| | (0.022) | (0.009) | (0.027) | (0.013) |
| <i>N</i> | 20,835 | 20,835 | 20,835 | 20,835 |
| Firm Stayers | -0.012 | -0.020 | -0.081** | -0.056*** |
| | (0.027) | (0.016) | (0.032) | (0.019) |
| <i>N</i> | 22,495 | 22,495 | 22,495 | 22,495 |
| Firm Changers | -0.052** | -0.077*** | -0.153*** | -0.060*** |
| | (0.023) | (0.018) | (0.025) | (0.018) |
| <i>N</i> | 34,669 | 34,669 | 34,669 | 34,669 |

NOTES: The control group for leavers in these regressions are never union member individuals. The model specification follows the text. Each column reports the difference-in-differences ($\hat{\delta}$) estimate obtained from the pooled time sample. This gives the effects of joining a union independent of the business cycle. The errors for these estimates are calculated using the [White \(1980\)](#) sandwich estimator. The regressions reported include the demographic and job specific characteristics outlined in panes (e) and (f) of [Table 4.1](#). The regressions also include State specific time trends. For definitions of the dependent variables see text in [Section 4.3](#). ***, **, * denote statistical significance at the 1, 5 and 10%, respectively.

4.6.3 Classification error

One final concern that can be addressed is that of classification error. This issue has been raised in the literature, and in particular in the context of measuring the longitudinal effect of unions. [Card \(1996\)](#) provides estimates for the USA using CPS data in conjunction with a correlated random effects model with misclassification errors. Utilising this approach, however, is contingent on knowing something about the rate of misclassification across the distribution of the outcome variable. For Mexico, no such survey exists that would allow one to have *a priori* knowledge regarding the rate of misclassification.

One can illustrate the effect of a random classification error through the use of a simulation. Assume the known state of joiners is determined at time $t = 0$, then a random selection is made to some percent of the estimation sample. This sub-sample has their union status altered to its opposite value. So, for example, if one decides to induce $n\%$ measurement error in the union variable, a $n\%$ random sub-sample is selected and their union status is recoded. So if one was a joiner they will be miscoded as a never union, and *vice versa*. This sample is then used to estimate the δ parameter and the simulation exercise is repeated a number of times. If attenuation bias is a concern, we should observe the parameter being diluted to zero.

The results for such an exercise are reported in [Appendix F](#). The results illustrate that the reported results are invariant to random measurement errors. A priori, there is no good reason to assume why the error would be non-random, but if this were the case and a suitable data generating process could be approximated, then this approach would allow one to bound the size of the ‘true’ effect.

4.7 Conclusions

The empirical analysis undertaken in this chapter provides evidence on the pay package gain (loss) associated with joining (leaving) a union in Mexico during a period of deunionisation.

I use a rich labour force survey of the Mexican labour market with a sample size of 35,346 male salaried private employees in the formal sector aged between 16–64. The real wage (in 2010 Pesos) is calculated for the hourly wages net of any non-wage benefits that individuals receive from their main job. A fixed effects model was applied to see what are the transitional gains in terms of wages or the probability of receipt of non-wage benefits.

The estimates presented provide a consistent story. With respect to wages, joiners are found

to be no better off than their ‘never unionised’ counterparts. However, workers who unionise and hold temporary contracts enjoy higher wages. For leavers, I find that there is a decline in wages. However, workers who exit unions and hold a temporary contract are subject to a wage decrease of 44%, but when matched on characteristics this effect reduces to 14.4%.²⁷

However, the real gains (and losses) associated with union status are the non-wage components of pay packages. Union joiners experience sizeable increases in the probability of being in receipt of mandatory benefits, such as bonuses, and paid holidays. The magnitudes for these gains vary but range between 4.4 and 13.4 percentage points, which when evaluated at pre-transition incidence rates suggest sizeable gains of 3.7–11.2% relative to those individuals who never unionise. When disentangling these returns, these findings appear to be unrelated to passive or active unionisation, denoted by those who stayed or left their firm during the union joining period. However, it appears that the workers who stand to benefit most are those for whom benefits are not guaranteed under the FLL. Union leavers are found to have a lower probability of holding non-wage benefits. This trend is detected in a consistently lower probability of holding legally mandated benefits, regardless of whether one has been at the same firm or not.

The findings presented in this chapter suggest that despite the decline in union membership over the last decade, unions have adapted their bargaining strategies. Union rhetoric of increasing a worker’s ‘social wage’ has some merit, and may help an individual maintain their living standards. Further, the evidence presented here suggests that unions are still an important institution in the Mexican labour market. In the absence of strong regulation they ensure that workers who decide to unionise see their compensation package reflect their legal entitlement. Individuals who choose to leave unions effectively trade these benefits, perhaps in exchange for retaining their wages at a previously union determined level.

²⁷This difference remains despite the approximate six hour *increase* in hours worked for the average union leaver. Thus, although wages are affected less, union leavers are now working more hours to achieve this rate.

Appendix E

Conditional Difference-in-Differences

The differences-in-differences estimate $\hat{\delta}$ is the [ATET](#). This may be re-cast within the [Rubin \(1974\)](#) framework of potential outcomes as follows

$$\begin{aligned}
 \text{ATET} &\equiv E(y_{1iq} - y_{0iq} | U_i = 1) \\
 &= E\{E(y_{1iq} - y_{0iq} | U_i = 1, X_i) | U_i = 1\} \text{(by iterated expectations)} \\
 &= E\{E(y_{1iq} | U_i = 1, X_i) - E(y_{0iq} | U_i = 1, X_i) | U_i = 1\} \\
 &= E\{E(y_{1iq} | U_i = 1, X_i) - E(y_{0iq} | U_i = 0, X_i) | U_i = 1\}
 \end{aligned} \tag{E.1}$$

This may be simplified as:

$$= E(\delta_X | U_i = 1)$$

The propensity score version of the [ATET](#) may be expressed as follows:

$$\begin{aligned}
 \text{ATET}^{psm} &\equiv E(y_{1iq} - y_{0iq} | U_i = 1) \\
 &= E\{E(y_{1iq} - y_{0iq} | U_i = 1, p(X_i)) | U_i = 1\} \text{(by iterated expectations)} \\
 &= E\{E(y_{1iq} | U_i = 1, p(X_i)) - E(y_{0iq} | U_i = 1, p(X_i)) | U_i = 1\} \\
 &= E\{E(y_{1iq} | U_i = 1, p(X_i)) - E(y_{0iq} | U_i = 0, p(X_i)) | U_i = 1\}
 \end{aligned} \tag{E.2}$$

Thus, the expression in [\(E.2\)](#) is directly analogous to [\(E.1\)](#). The difference lies in the use of a control function $p(X_i)$ which allows one to compute the propensity score. Thus, one estimates a Probit containing the X_i vector of characteristics. From this procedure one takes the sample of individuals that lie in the common support region, $0 < \hat{p}(X_i) < 1$, discarding all individuals

for whom $\hat{p}(X_i) = 1$. However, it is unlikely that one may find exact matches. Thus, one must use the distance between matched treated and control units as a weighting factor.

Smith and Todd (2005) show that the typical matching estimator can be expressed as:

$$\hat{\delta}_{ATE}^{psm} = \frac{1}{n_1} \sum_{i \in I_1 \cap S_p} = [y_{1iq} - \hat{E}(y_{0i} | U_i = 1, p(X_i))] \quad (\text{E.3})$$

$$= \frac{1}{n_1} \sum_{i \in I_1 \cap S_p} = [y_{1iq} - \sum_{j \in I_0} W(i, j) y_{0j}, I_1] \quad (\text{E.4})$$

where I_1 is the set of status changers, and their control group is denoted by I_0 . The region of common support is S_p , and n_1 the number of individuals in the set $I_1 \cap S_p$. Finally, $W(i, j)$ is the weights derived from the distance of matched observation i and j given by the estimated $\hat{p}(X_i)$ and $\hat{p}(X_j)$, respectively.

Appendix F

Classification error simulation

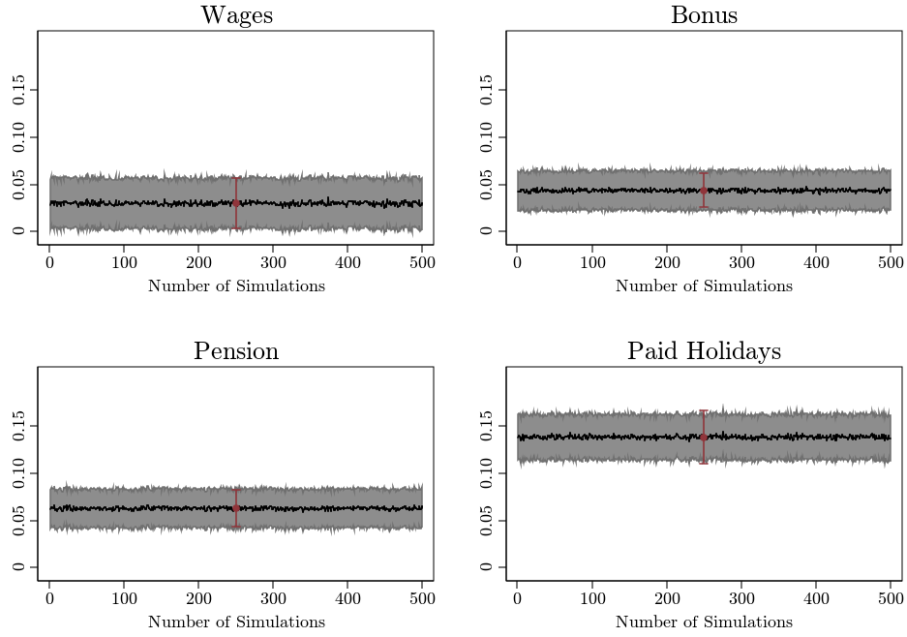
There is a concern in the union literature regarding the non-random selection into union status. Indeed, the use of longitudinal data, as in this chapter, has been criticised given issues of measurement error in the union status indicator could create a potential attenuation bias in the $\hat{\delta}$ estimates obtained. [Card \(1996\)](#) provides estimates for the USA using [CPS](#) data in conjunction with a correlated random effects model with misclassification errors. Utilising this approach, however, is contingent on knowing something about the rate of misclassification across the distribution of the outcome variable. Unfortunately, similar information for this survey is not available. However, one would expect that the introduction of measurement error in the union status of an individual would bias the estimates of the δ parameter downwards towards zero.

One approach that can be employed is to induce the measurement error in the union status and re-estimate the parameter. The proposed approach is as follows. First, the known state of joiners is determined at time $t = 0$, then a random selection is made to some percent of the whole estimation sample. This sub-sample has their union status altered to its opposite value. So, for example, if one decides to induce 5% measurement error in the union variable, a 5% random sub-sample is selected and their union status is recoded, so if one was a joiner they will be miscoded as a never union, and vice versa. This sample is then used to estimate the δ parameter and the simulation exercise is repeated a number of times. If attenuation bias is a concern, we should observe the parameter being diluted to zero. The plots shown in figures [F.1a](#) and [F.1b](#), report the outcomes of such an exercise for all of the main outcomes for the baseline regressions reported in tables [4.2](#) and [4.3](#).¹

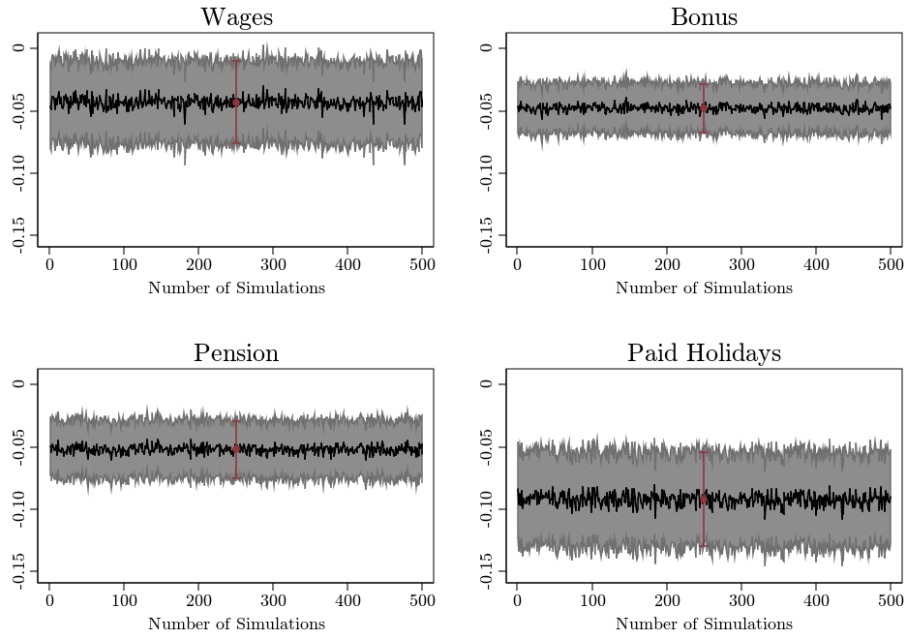
¹The simulations were run for all of the sub-samples, however, for brevity these are not reported.

The resulting exercise reveals that there is little to no difference in the estimates found. The graphs show in a solid black line the resulting parameter estimates given by each simulation with their associated confidence interval shown in grey. These can be compared to the estimate obtained from Tables 4.2 and 4.3, which is reproduced for clarity as a maroon dot with its associated confidence interval as a candle stick. As it can be seen a random 5% misclassification in the union status does not significantly alter the parameter estimates obtained.

Figure F.1: Plots of Simulations inducing 5% measurement error in treatment variable
(a) Joiners



(b) Leavers



NOTE: These plots are the results of a simulation inducing a 5% measurement error on the status of union joiners/transition at time $t = 0$. The Measurement error is the symmetric swapping of an individual's status. Thus, if one was a joiner and are selected as part of the 5% of recodes, they would be falsely attributed as never union, *mutatis mutandis* for leavers. This exercise was repeated 500 times per outcome and sub-sample and then the same difference-in-differences parameter as given in Tables 4.2 and 4.3 was computed 100 times. The black line is the plot of this estimate. The area shaded in grey is the confidence intervals from these. The estimate given by the red dot and red confidence intervals are those obtained from the unaltered data, and are reported in Tables 4.2 and 4.3.

Chapter 5

(You gotta) Strike if the Right (is the party!)

Strike Petitions, the business cycle and the electoral cycle in Mexico

5.1 Introduction

There is a large literature which has focused extensively on the importance of institutions for economic outcomes (La Porta et al., 1998; Botero et al., 2004; Djankov et al., 2002; Alesina and Giuliano, 2015; Aghion et al., 2011; Acemoglu and Robinson, 2010; Acemoglu et al., 2003, 2006). North (1990) defines institutions as the ‘rules of the game’, and there have been numerous studies that examine the formal state institutions and their effects on economic outcomes. There is also another branch of the institutionalist literature that suggests that institutional changes may have long-lasting effects (see Dell, 2010; Nunn, 2009; Acemoglu et al., 2011). One formal civil society and labour market institution which has been extensively researched is the trade union. This chapter investigates this institution and asks how unions behaved over a period in which other institutions were reformed. Roland (2004) notes that there are fast- and slow-acting institutions and suggests that politico-electoral institutions are fast-changing, whereas other institutions may take longer to change. This chapter will investigate how quickly private sector unions change their political behaviour in the face of a changing landscape. It is documented that unions have effects on wages, non-wage benefits, inequality, productivity, health and safety

(e.g. [Freeman, 2010](#); [Freeman and Medoff, 1984](#); [Hirsch and Addison, 1986](#)). These gains are bargained through the threat of strikes—the group withdrawal of labour—and this chapter provides a novel exploration of external influences on strike threats.

The theoretical literature on strikes is motivated by what [Kennan \(1986\)](#) calls the ‘Hicks Paradox’. This is the idea that if there was a theory which predicted when strikes will occur then all parties would agree beforehand on an outcome and thus avoid strike action. If this were the case then strikes would not occur, and the theory would cease to hold. In this view strikes are an inefficient outcome. Although strikes are the outcome of failed negotiations, their active role as a bargaining mechanism has been investigated. Much of the theoretical literature rests on the assumption that there are two agents in the bargaining negotiations: the union and the management, though [Ashenfelter and Johnson \(1969\)](#) introduced the role of the rank-and-file.¹ However, the role of unions can and does extend beyond the plant or sectoral levels. Unions also play a role in lobbying for legislation and local politics. Thus, the threat of strikes, although nominally about intra-firm conditions may be influenced by external factors, such as political outcomes. This role of politics in the context of private sector unions has been hitherto unresearched in the economics literature, and is one of the main contributions of this chapter.

This study attempts to investigate whether there is a relationship between the electoral cycle and strike threats. In order to inform upon this subject, I require a large sample of elections in a setting where the following conditions are met: (i) elections are free, democratic and competitive; (ii) they are matched to full information on the collective bargaining between employers and unions; (iii) the elected official has no control over union legislation; (iv) there is sufficient cross-sectional and temporal variation to be able to observe both multiple electoral cycles and business cycles.

The study focuses on Mexico, where due to institutional arrangements, the act of threatening to strike is recorded as a strike petition. I have access to the administrative records of the local state-level Arbitration and Conciliation Commission on petitions for the private sector in each of the 31 Mexican states. These are tripartite commissions comprised of employer associations, unions, and the local state government. Unions who wish to strike must first set out a petition to strike outlining the reasons for their strike. These petitions are then evaluated by the Arbitration and Conciliation Commission. All strike threats with no legal basis are removed at this stage, and a period of mediation between the union and the employer begins. If this process fails, then

¹Throughout this text the terms “rank-and-file” and union members will be used interchangeably, but they refer to those members of the union who do not hold any office within the union.

a union may strike. All formal petitions are lodged and it is these data that are used in the empirical analysis.

The analysis is structured in three stages. Firstly, an investigation of how petitions react to the business cycle finds that they behave much as strikes do in other countries, providing confirmation that strike threats are used as a bargaining tool.² When controls for electoral periods are introduced, there is evidence showing increases in petitions during electoral years. This gives the first indication that strike threats may be politically motivated.

In the second part of the analysis, I form a chain of evidence which isolates the impact of the electoral cycle on strikes threats by focusing on municipal elections. This is because these elections should be low stakes to a union: Municipal Presidents do not have any control in the arena of labour relations, nor regulation, and as such we should expect unions to have no preferences for Mayors, nor should we expect union strike threats to be related to these. I exploit close elections³ and employ a sharp [Regression Discontinuity \(RD\)](#) approach to compare those locations where there has been a narrow result, and the victor is drawn from one of Mexico's three main political parties.⁴ At the margin this allows me to unpack a causal effect from elections to strike threats. The findings suggest that the narrow election of right- ([PAN](#)) or left-wing ([PRD](#)) Mayors leads to increases in the rate of petitions two years after an election. As the periodicity of municipal elections is triennial, this suggests that unions are increasing the intensity of industrial relations (as measured by the rate of strike threats) to coincide with the following election campaign. I find no evidence for any effects of close [PRI](#) electoral victories on strike threats. The interpretation I give these causal findings from the [RD](#) clearly suggest that strike threats, an institutional tool to aid collective bargaining, are used by some unions in advance of elections as a campaigning tool.

In order to test this theory the final stage of the analysis models electoral turnout using a triple differences-in-differences approach. I compare those municipalities that had a narrow margin of elections, where a right- or left-wing where victorious, relative to those that did not. I find that the increased petition rates in these municipalities lead to large changes in electoral turnout in the following election, implying these elections act as a 'dog whistle' of sorts for organised labour to go and turn out to vote. I suggest that this vote may go to the traditional

²This is true for both manufacturing and non-manufacturing sectors.

³This is defined here as those with a margin of victory of 10 percentage points. For example, a win for a [Partido Acción Nacional \(PAN\)](#) coalition by 47 percent of the vote, where the second place winner obtained at least 37 percent of the vote.

⁴viz. [PAN](#), [Partido Revolucionario Democrático \(PRD\)](#), and [Partido Revolucionario Institucional \(PRI\)](#)

political masters of the ‘officialist’ unions (PRI).

The set of results when taken as a whole suggest that strike threats in Mexico are a powerful tool for collective bargaining and react to the business cycle. I argue that during the period of democratisation, although the ‘rules of the game’ changed, the actors remained committed to their pre-reform behaviour. Thus, whilst the nature of the institutional game is changing, some institutions are more slow changing than others.

This chapter contributes to several distinct literatures. First, it adds to the literature on the importance of institutions (Acemoglu et al., 2001; Acemoglu and Robinson, 2010; La Porta et al., 1998; Sokoloff and Engerman, 2000). In looking at the changes in institutions it is similar to the Acemoglu et al. (2011) study on the historical legal institutional changes and subsequent economic growth. Equally, it is similar to the literature that looks at the coevolution of culture and labour regulation as in Aghion et al. (2011). However, in contrast with this literature the work presented here allows me to investigate whether political institutional changes are affecting the behaviour of the ‘players’ of the game, or *vice versa*.

Second, it contributes to the empirical literature on strikes and union bargaining behaviour (Ashenfelter and Johnson, 1969; Kennan, 1986; Gunderson et al., 1986; Gunderson and Melino, 1990; Card, 1990a,b; Reilly, 1996; Baah, 2005). In particular, I motivate my analysis using the framework developed by Ashenfelter and Johnson (1969) where the bargaining problem is disaggregated into three core players: the employer, the rank-and-file and the union leadership. However, this chapter differs from the established literature by explicitly investigating strike threats rather than strikes (which are the outcome of failed bargaining).

Finally, this chapter contributes to the smaller literature on the interaction between unions and politics. Burton (1984) presents analysis of unions as a political institution which need not be exempt from economic analysis. He suggests that unions and the concept of ‘union voice’ can be viewed through the lens of public choice theory. In particular, the ease of exiting a union and the legislative institutions relevant to unions will determine the magnitude of union executive discretion. I argue that the legislative arrangements have benefited large unions for which the ‘paradox of participation’ implies a large degree of executive discretion, as documented by the findings in this study.

This chapter is structured as follows. Section 5.2 will give a brief background on the economic literature relating to unions and strikes. Section 5.3 outlines the institutional background on the state-trade union relationship, as well as a background to the legal framework that unions

operate within, and the political framework for Municipal Presidents. [Section 5.4](#) explains the data sources, [Section 5.5](#) reports the business cycle behaviour of strike petitions and that even after controlling for this there is evidence of electoral cycle effects. [Section 5.6](#) then looks at the causal effects of Municipal President elections on strike threats. I show that there is a discontinuity in petitions where there are narrow wins for the right- and left-wing parties and demonstrate that this finding is robust to alternative functional form specifications, as well as the size of the bandwidth. [Section 5.7](#), shows the implications of the result of increased threats by modelling electoral turnout between those municipalities which experienced narrow elections, and those that did not. Finally, [Section 5.8](#) concludes and discusses the implications of this research.

5.2 On unions and strike behaviour

Trade unions achieve wage gains for their rank-and-file mainly through collective bargaining. Much of the theoretical literature is dedicated to explaining the existence of strikes as they are cast as inefficient outcomes. These are subject to what [Kennan \(1986\)](#) calls the ‘Hicks Paradox’: the idea that if there was a theory which predicted when strikes will break out then all parties may agree beforehand on an outcome avoiding strike action. Assuming that both the union and management are rational agents, it becomes difficult to see how they fail to reach an agreement *ex ante* (see [Marceau and Musgrave, 1949](#); [Nash, 1950](#); [Cross, 1965](#); [Hicks, 1963](#)). One paper which succeeds in ignoring the paradox altogether is that of [Ashenfelter and Johnson \(1969\)](#) who develop an alternative view of collective bargaining, where there are three agents: the union, the rank-and-file members, and the management. This leads to divergent motivations when the collective bargaining process begins. The main difference with earlier theory is the explicit disaggregation of the union side of the bargaining process. The union leadership is interested in ensuring that the union as an entity thrives and survives, as well as the personal survival of the leadership within the union. Both of these ambitions are usually met through satisfying the rank-and-file’s expectations. However, they may diverge from the wishes of the union members if the union leaders are aware of the possibilities of success of the negotiation process. For example, if the rank-and-file expect wage increases that are larger than management will agree, the union leadership is likely to try and convince the membership to accept a smaller wage increase. This could result in two potential outcomes: success where a deal is reached, or failure

in the bargaining process and then a strike. In all of the theoretical models, bargaining is predicated on the threat of strike, and yet to date in the literature there has been no effort to explicitly model these types of threats.

The empirical literature has focused on modelling the incidence and duration of strikes. This is motivated by the suggestion that the incidence of strikes is inversely proportional to their cost. [Reder and Neumann \(1980\)](#) and [Kennan \(1980\)](#) argue that the very act of bargaining is expensive, and as such contracts will not contain clauses that cover all possible contingencies. However, a bargaining protocol could be established that could prevent costly strikes from occurring. Thus, if bargaining protocols exist then strikes will only occur when they are less costly. The early empirical literature focused on the outcome of strikes, and the side that won. (see [Bevan, 1880](#); [Moore, 1911](#); [Peterson, 1938](#); [Edwards, 1981](#); [Knowles, 1952](#)). It can be argued that these early findings are broadly supportive of the [Ashenfelter and Johnson \(1969\)](#) theory in that long strikes persist until workers make reductions to their wage demands. A number of studies however report an empirical regularity, the incidence of strikes is found to be pro-cyclical (see [Ashenfelter and Johnson, 1969](#); [Farber, 1981](#); [Gunderson et al., 1986](#); [Reilly, 1996](#); [Vroman, 1989](#)). But this is not necessarily found for all countries as [Ingram et al. \(1993\)](#) report that during the 1980s strikes were counter-cyclical in Britain.

As a complement to the literature that focuses on strike incidence, there is another strand which explicitly models strike durations (see [Hovarth, 1968](#); [Lancaster, 1972](#); [Gunderson and Melino, 1990](#); [Harrison and Stewart, 1989, 1993](#); [Campolietti et al., 2005](#); [Baah and Reilly, 2009](#); [Devereux and Hart, 2011](#)). This branch of the literature examines the role of public policy, the business cycle or other application specific covariates on the length of strikes. The business cycle is sometimes proxied by the inclusion of the unemployment rate but more often by the inclusion of detrended industrial production. The literature finds that strike durations are counter-cyclical.

From this brief review of the academic literature on strikes, it is fairly clear that most bargaining models are plagued by the ‘Hicks paradox’. The few models that have successfully avoided this scenario have been those that explicitly model the event of a strike, as opposed to the bargaining process. This chapter innovates on the existing literature by focusing exclusively on the bargaining signal as measured by the strike threat, rather than the outcome of failed negotiations — the strike.

5.3 Institutional Background

This section explains the institutional set-up of Mexico. I outline the relevant labour legislation, providing some information on electoral authorities, and finally some details on Municipal Presidents.

5.3.1 Labour legislation, unions and strikes

As outlined in [Chapter 2](#), the [FLL](#) places regulation of unions under the jurisdiction of the *Secretaría de Trabajo y Previsión Social* (STPS). However, this only applies to certain unions, and in general is not a straightforward matter. Public sector unions are subject to federal oversight, but equally some key industries are also subject to this jurisdiction, and as such the relevant Arbitration and Conciliation Commissions are federal in nature. However there are also ‘local’ jurisdiction Arbitration and Conciliation Commissions for whom oversight falls at state level. These commissions exist in every municipality within the country, and it is the role of these Local Arbitration and Conciliation Commissions that will be the subject of investigation here.

As part of the larger legal framework unions must also register with local Arbitration and Conciliation Commissions. These are tripartite institutions whose President is designated by the state Governor. It is also comprised of representatives of both union and employer organisations. The procedure to strike is therefore as follows. A union who intends to strike must first make their grievances known in writing to their employers. A copy of their grievance letter must then be sent to the Arbitration and Conciliation Commission. This initiates what is termed by the [FLL](#) as the ‘pre-strike period’. The grievance letter is termed a ‘petition to strike’, but may be considered a strike threat. The receipt of the petition by Commission triggers a conciliation meeting between the union and the employer, who will attempt to solve the issue. If the workers, or their representatives, fail to attend to this meeting, then the strike will be determined invalid by the Commission and as such illegal. It should be noted that the Commission is legally allowed to call this meeting at any time of day during any day of the week.⁵ If the mediation efforts fail, and there is a legal foundation for the strike, then formal strike action may commence. The mechanism by which the renewal of a collective bargaining contract is signalled is through a petition to strike ([Barba García, 2004](#)). Thus far, the procedure for strikes

⁵This is mandated under Article 928 of the [FLL](#), and naturally, this clause may be exploited, as technically a meeting could be called outside of business hours during the weekend.

has been presented as a mechanical process. In reality this procedure, whilst straightforward, is subject to significant levels of discretion by the state governor (Bensusán and Middlebrook, 2012b). Under the framework of the law the only valid reasons for threatening a strike are related to intra-firm complaints. Legally, there is no scope for strikes to be threatened over wider political issues.

A unique feature of the Mexican landscape is the distinct lack of ‘wildcat’, or illegal strikes. The regulation surrounding the licensing of unions is so stringent, and obtaining registration as a union is so onerous, that there is a distinct disincentive to illegally strike over conditions within the firm. Further legal disincentives for ‘wildcat strikes’ are in the form of large fines and even the threat of jail time for those illegally striking (Middlebrook, 1995, p.70) In addition to this, the penalties for proceeding with an illegal strike are set out by Article 463 of the FLL. This states that illegal strike action, as determined by the Arbitration and Conciliation Commission, may be used as a legitimate reason for termination of contracts for all union members who take part without the usual redundancy pay and notice period. Furthermore, the FLL guarantees employers the ability to hire replacement workers without any delay if union members are unwilling to return to work.⁶ If workers occupy the business premises illegally, this would not be considered a strike, nor strike action, and is liable to prosecution under penal code.

It is also worthwhile to note that although in many respects Mexico saw a series of institutional changes throughout the 1990s and 2000s, the legislation which oversaw the labour market had not really changed since the 1930s. There were some minor procedural reforms to the text of the FLL in the 1970s and 1980s, but neither of these affected the articles regarding the oversight of unions. Since 2012 there has been a major reform of the FLL, which came into effect in January 2013, which is outside the scope of the present analysis.

5.3.2 COFIPE, IFE and State Electoral authorities

In this section I outline the Mexican political system and the nature of the reforms which have taken place since the 1990s. As outlined earlier in Chapter 2 the judicial and electoral reforms witnessed in Mexico in the 1990s were undertaken as a result of the 1988 election, which is generally characterized as being rigged (Camp, 2012). The result of this was the creation of a new branch of government independent of political intervention in the form of the *Instituto Federal Electoral* (IFE)⁷, as legally mandated by the *Código Federal de Instituciones y Procedimientos*

⁶However, if there is a legal strike, then employers may not contract replacement workers.

⁷Federal Electoral Institute

ElectORAles (COFIPE).⁸ This was initially envisioned as another dependency of government, which fell under the oversight of Congress and the Executive branch.⁹ Of importance for this chapter is the reform of 1996, which required all electoral authorities to become independent of the state and have their own legal personality separate from the state. This in effect converted the previously existing state electoral authorities into a variety of electoral institutes, which oversaw elections for Governor and Municipal President.

The final piece of reform which is key for the credibility of this analysis is the independence of the judiciary. As outlined previously, the Judicial branch of government saw a series of reforms in the 1990s, alongside the introduction of the COFIPE. These reforms created the *Tribunal Electoral del Poder Judicial de la Federación* (TEPJF),¹⁰ which ensures that election disputes are resolved independent of Government intervention. As noted by Eisenstadt and Yelle (2012), the tribunal went to great lengths to demonstrate its political independence as early as the 1996 elections. The introduction of a strong judiciary institution ensures that the elections under analysis in this chapter are the result of free and fair elections, and thus are unlikely to be the result of manipulation.

5.3.3 Municipal Presidents

Mexico is comprised of 31 states, that are comprised of 2,438 separate municipalities. These have elections on a three year cycle. Municipalities elect representatives to the Town Hall, which is headed by the Municipal President through first-past-the-post elections.¹¹ Due to constitutional restrictions there is no re-election, and as such there are no issues of individual incumbency. Until recently,¹² the only way to be a candidate for an election was to be a member of a political party.

Since 1983 municipalities have been able to raise property taxes and other levies. The municipal budget is comprised of a fixed portion, which each municipality receives from the federal government, and a portion that they receive from the state government. This leaves some room for discretion for the state governor to allocate the budget as they see fit, with some evidence that governors distribute this to same-party individuals (Kahn, 2015). The

⁸Federal Code of Procedures and Electoral Institutions

⁹Indeed, the first president of the IFE was the then Interior Minister, Fernando Gutiérrez Barrios.

¹⁰Federal Electoral Tribunal of the Judiciary Power.

¹¹With the exception of Oaxaca, Chiapas and Sonora where there is a system called *usos y costumbres* used by indigenous communities to elect local leaders. This system was introduced as a means to increase political engagement, as the some of the last elections to be held in those municipalities had a voter turnout of less than 5%. This system operates in 570 municipalities out of the 2,438.

¹²Outside the period of the present study.

same constitutional amendment of 1983 gave Municipal Presidents control over utilities (water, sanitation, lighting), preventative policing (safety, traffic) and local maintenance. Notably for the analysis here, labour regulation falls outside their purview. Equally, it was not until the 1999 reform that municipalities were given a *political* character.¹³ It was this reform which raised the political competition within municipalities, and it will be this increased variation in electoral results that is exploited in the empirical analysis of this chapter.

¹³*i.e.* they were empowered to have divergent policy from their local state (Seele, 2012).

Table 5.1: Summary of Strike Petitions

| | Mean | Standard error |
|---|---------|----------------|
| <i>Total # Petitions</i> | | |
| All | 145,098 | |
| Officialist Union | 118,864 | |
| Independent Union | 26,234 | |
| <i>Total # by cause:</i> | | |
| Contract Signing | 69,869 | |
| Contract Revision | 39,122 | |
| Contract Fail | 19,487 | |
| Wages | 16,362 | |
| Other | 1,138 | |
| <i>Mean petitions:</i> | | |
| Contract Signing | 0.193 | (0.003) |
| Contract Revision | 0.108 | (0.002) |
| Contract Fail | 0.054 | (0.001) |
| Wages | 0.045 | (0.001) |
| Other | (0.003) | (0.000) |
| Electoral year | 0.033 | (0.000) |
| <i>Mean Number of Petitions per 10,000 population</i> | | |
| All | 0.025 | (0.000) |
| Independent Union | (0.006) | (0.000) |
| Officialist Unions | 0.019 | (0.000) |
| <i>by Manufacturing subsector:</i> | | |
| Food, Drink, Tobacco | 0.162 | (0.002) |
| Textiles, Clothing, Leather | 0.166 | (0.001) |
| Wood and Wood Products | 0.116 | (0.001) |
| Paper, Paper Products, Printing, Editing | 0.073 | (0.001) |
| Chemical Industries | 0.137 | (0.001) |
| Minerals | 0.159 | (0.001) |
| Basic Metals | 0.101 | (0.001) |
| Machinery and Equipment | 0.162 | (0.002) |
| Other Manufacturing | 0.309 | (0.002) |
| <i>by Macroregion:</i> | | |
| NE | 0.240 | (0.002) |
| NW | 0.134 | (0.001) |
| West | 0.170 | (0.002) |
| East | 0.281 | (0.001) |
| CN | 0.110 | (0.001) |
| CS | 0.180 | (0.002) |
| SE | 0.067 | (0.000) |
| SW | 0.273 | (0.000) |
| <i>Business Cycle measures</i> | | |
| Manufacturer Inflation | 10.714 | (0.071) |
| Unemployment Rate | 4.139 | (0.007) |

The unemployment level data is determined at state level and is derived from the [Encuesta Nacional de Empleo Urbano \(ENEU\)](#) and [ENOE](#) surveys run by INEGI for the appropriate time periods.

The manufacturer level of inflation was obtained from [INEGI](#) as the national level manufacturing subsector specific rate of inflation.

5.4 Data description

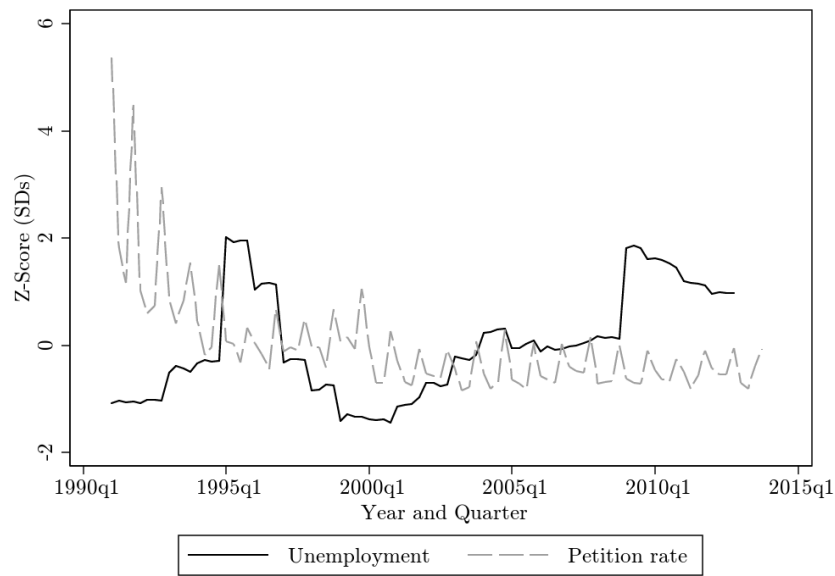
As outlined earlier a key research question entails investigating the relationship between the electoral cycle and strike threats. The attribute of Mexican labour law which I exploit relates to the requirement for all strike threats to be lodged at an Arbitration and Conciliation Commission. I utilise the disaggregated administrative records of strike petitions lodged with the 32 Local Arbitration and Conciliation Boards,¹⁴ thus excluding the public sector, and those firms in industries which fall under federal jurisdiction. The data have a temporal coverage from 1991–2012, and are collected on a monthly basis. The records contain information both on the petition rate per 10,000 of the population received by the board. These are disaggregated both at an industry and at a municipal level. The data include information on the motives of the petition (i.e. reason for the strike petition) under the general categories of ‘Contract Revision’, ‘Contract Failure’, ‘Contract Renewal’, ‘Wages’, and ‘All other causes’. Table 5.1 reports some summary statistics on strike threats. It is fairly clear that the number of strike threats has declined over the time period under investigation, as there are fewer petitions in the post 2000 period. The majority of petitions are procedural in nature and related to routine contract negotiation. There is a smaller subset related to one-off wage demands. The majority of petitions come from officialist unions, commensurate with their size and their larger membership (de la Garza Toledo, 2012). There is substantial variation in mean petition rates between manufacturing subsectors, but the table shows that there has been a decline in the average number of petitions since 2000.

Other data utilised by this chapter were obtained from INEGI, the Mexican national statistics institute. These data included access to vital statistics to derive the workplace accident death rate per 10,000 of the municipal population, and the manufacturing sub-sector specific rate of inflation. These are obtained at a two-digit level that matches the subsectors shown in table 5.1. It should be noted that the inflation data are only available from 1995, and that the high rates of inflation hinted at by the pre-2000 mean are driven by the 1995 peso crisis. The average rate of inflation faced by manufacturers, this has declined in every year since the data have become available. The ENEU and its replacement the ENOE were utilised to compute the unemployment rates at a quarterly level for all of the years in the sample.

¹⁴Despite having 31 states, there is also another Commission which oversees Mexico City. It should be noted that whilst the arbitration boards are state-level institutions, the disaggregated data are defined at municipal level.

Figure 5.1: Unemployment rate, manufacturer inflation and the petition rate, national averages 1991–2012

(a) Z-score of Unemployment rate



(b) Z-score of Manufacturer Inflation

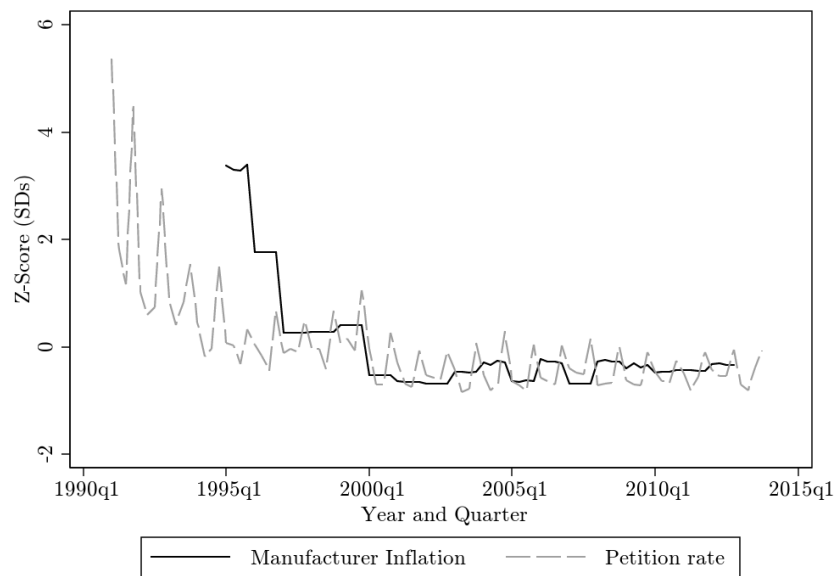
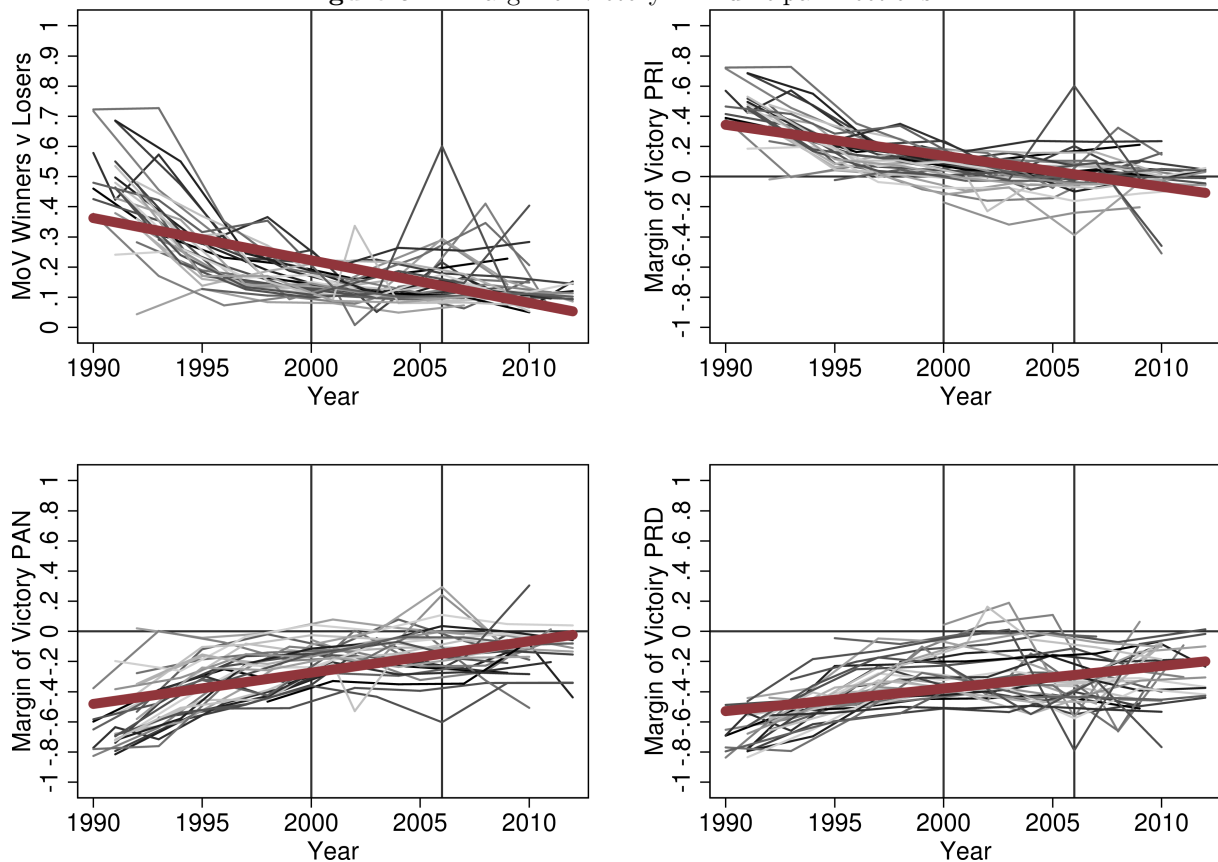


Figure 5.1 provides a visual indication of the national average rate of petitions as compared to both the unemployment rate and the rate of inflation faced by manufacturers. It is notable that although unemployment in Mexico has been relatively stable at 3–5% per annum, the 2008 recessionary period had a similar increase of unemployment as the 1994 peso crisis. However, one notable difference between the two is the behaviour of the average rate of petitions which has fallen. Despite, the seemingly cyclical peaks and troughs in this mean, there is considerable variation between states. In a sharp contrast the average prices faced by all manufacturers have been relatively stable in the period after the introduction of NAFTA.

Figure 5.2: Margin of victory in Municipal Elections



Note: Author's own calculations from electoral data. Each vertical line represents a Presidential Election.

The second part of the analysis will look at electoral outcomes for municipal presidencies. I obtained these from each of the 31 independent electoral authorities in Mexico, and some of the gaps were completed by IFE. These data represent electoral data covering the same period as the strikes data. Figure 5.2 provides some visual stylized facts about Mexican municipal elections. For each pane in the figure each of the monochrome lines represent the mean margin of victory at a state level, and the red line is the national trend obtained from a simple linear regression. The following electoral stylized facts can be observed. First, the electoral reforms

of the 1990s were successful, as they created competitive elections at municipal level. At the beginning of the period the state mean margin of victory was approximately 54%, whereas the mean margin of victory between winners and losers in 2012 was about 12%. This narrowing of electoral victories shows an increased belief in the democratic process, and the increasing importance of Municipal Presidents as political actors. The second pane shows that whilst the [PRI](#) are the most electorally successful party in Mexico, their electoral successes have diminished over time. In fact, by the 2000 election more than half of Mexican municipalities had been ruled by another party ([Seele, 2012](#)), showing that increasing municipal democracy was an influential factor in demonstrating that credible institutional changes had occurred. The third and fourth panes show that as the [PRI](#) electoral wins diminished, [PAN](#) and to a lesser extent the [PRD](#)'s electoral successes have increased.

[Table 5.2](#) presents the summary of electoral outcomes and strike petitions when aggregated around electoral years. The table reports the outcomes across all elections, and the three sub-samples of narrow elections, where the margin of victory/loss lies in the ± 10 percentage point window. As asserted before, it is clear that [PRI](#) are the most electorally successful party, as they won 64.0% of all municipal elections across the time-span 1991–2012. With [PAN](#) winning 21.7% and [PRD](#) 14.2%. These do not sum to 100%, as there is some overlap due to coalitions. One of the electoral strategies aggressively pursued by parties in the post 2000 period has been coalitions—often spanning ideological divides—to deny the opposition the likelihood of victory. I consider for my analysis all such wins to be equally attributable to all coalition partners. Indeed, coalitions have been a key innovation that has led to the dramatic narrowing of electoral victories seen in the earlier figures. The time-varying covariates do appear to differ across the three sub-samples of narrow electoral victories. And finally, it is worth noting that, on average, there seem to be more strike threats two years after an election. The fewest number of strikes are associated with [PRI](#) narrow victory municipalities, whereas municipalities narrowly won by [PAN](#) are most likely to be associated with more strikes. Equally, it can be noted that the large ‘officialist’ unions represent the predominant source of strike threats. This may be some evidence for the [Burton \(1984\)](#) view, suggesting that larger unions may suffer from the ‘paradox of participation’. As membership size increases, workers are less likely to participate in union decision-making processes, and as such we may see more union leadership discretion. This may lead to an increased number of strike threats during key political periods, such as the lead-up to elections.

Table 5.2: Summary of Elections and Petitions

| | All Elections | Narrow PAN | Narrow PRD | Narrow PRI |
|--|---------------|------------|------------|------------|
| Electoral Outcomes by party (%) | | | | |
| PAN wins | 21.734 | 47.656 | 27.104 | 18.260 |
| Margin of Victory / Loss PAN | -26.384 | -0.920 | -14.835 | -23.831 |
| PRD wins | 14.204 | 13.276 | 19.303 | 46.077 |
| Margin of Victory / Loss PRD | -35.207 | -29.488 | -22.189 | -1.231 |
| PRI wins | 64.041 | 44.622 | 51.643 | 44.365 |
| Margin of Victory / Loss PRI | 10.300 | -2.048 | 0.331 | -2.177 |
| Other Electoral outcomes (%) | | | | |
| PAN incumbency | 14.691 | 19.507 | 14.753 | 8.951 |
| PRD incumbency | 8.183 | 5.391 | 8.776 | 13.766 |
| PRI incumbency | 44.824 | 45.543 | 44.258 | 43.188 |
| PAN coalition | 12.459 | 23.273 | 14.897 | 25.178 |
| PRD coalition | 21.755 | 33.135 | 24.612 | 32.168 |
| PRI coalition | 24.390 | 35.925 | 28.711 | 30.635 |
| PAN governor | 14.246 | 22.866 | 16.558 | 9.023 |
| PRD governor | 10.060 | 10.864 | 12.712 | 24.501 |
| PRI governor | 74.894 | 65.348 | 69.718 | 63.873 |
| Electoral turnout | 60.774 | 62.554 | 62.261 | 61.485 |
| Other time-varying covariates | | | | |
| Workplace death rate _{t+1} (Per 10,000) | 15.461 | 8.993 | 8.806 | 5.860 |
| Workplace death rate _{t+2} (Per 10,000) | 38.265 | 18.362 | 19.088 | 11.251 |
| Unemployment rate _{t+1} (%) | 3.564 | 3.774 | 3.587 | 3.557 |
| Unemployment rate _{t+1} (%) | 3.468 | 3.601 | 3.426 | 3.427 |
| Average Petitions | | | | |
| One year after election | 8.625 | 12.102 | 8.238 | 4.513 |
| Two years after election | 27.907 | 44.876 | 29.976 | 15.513 |
| Independent Union _{t+1} | 1.147 | 1.493 | 1.050 | 0.553 |
| Independent Union _{t+2} | 3.693 | 4.856 | 3.376 | 1.995 |
| Officialist Union _{t+1} | 7.477 | 10.609 | 7.188 | 3.960 |
| Officialist Union _{t+2} | 24.214 | 40.020 | 26.600 | 13.518 |
| Average Petition Rate per 10,000 | | | | |
| One year after election | 0.531 | 0.643 | 0.514 | 0.402 |
| Two years after election | 1.757 | 2.299 | 1.755 | 1.540 |
| Independent Union _{t+1} | 0.084 | 0.094 | 0.079 | 0.065 |
| Independent Union _{t+2} | 0.289 | 0.367 | 0.290 | 0.191 |
| Officialist Union _{t+1} | 0.447 | 0.549 | 0.435 | 0.336 |
| Officialist Union _{t+2} | 1.469 | 1.933 | 1.465 | 1.348 |

The electoral data were collected from each of the 31 state electoral bodies, with supplementary data obtained from IFE.

Workplace death rate comes from vital statistics published by INEGI. The data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

The unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) surveys run by [INEGI](#) for the appropriate time periods.

5.5 Strike threats, the Business Cycle and the Electoral Cycle

As a starting point for this section, I investigate the behaviour of strike petitions—the signal reflecting union-employer bargaining—over the course of the sample. I model the rate of Petitions per 10,000 of the municipal population. The relationship to be estimated is as follows:

$$\text{Petition Rate}_{imst} = \alpha_m + \beta_1 \text{Unemployment}_{st} + \beta_2 \text{Inflation}_{it} + X'_{imst} \gamma + e_{imst} \quad (5.1)$$

The equation above will allow me to determine how strike petitions behave over the economic cycle. In order to do so, I exploit the administrative records of the Arbitration and Conciliation Commissions at a local level. These provide an exhaustive record of all petitions to strike reported in Mexico at a municipal level on a daily basis. I aggregate these data to monthly total Petitions per 10,000 of the municipal population, these are available for each i^{th} industry in the m^{th} municipality in the s^{th} state for month t . This measure is then regressed on the state-level quarterly *unemployment_{st}* rate, computed from the [ENEU](#) and the [ENOE](#) for the periods 1991q1–2004q4 and 2005q1–2012q4, respectively. This measure of the unemployment rate should capture the effects associated with the business cycle. I introduce an additional control in the form of the *inflation_{it}* rate for producers in manufacturing. This measure should encapsulate the increased uncertainty associated with high inflation periods. It could be surmised that when inflation is greater to a manufacturer, there may be higher levels of profits made by the firm, and as such unions will seek to bargain for some of the resultant rents. This measure is defined monthly at a national level, but varies at the two-digit manufacturing subsector level. These data cover the time period 01/1995–12/2012. For this reason, this control is introduced gradually into the analysis, as its inclusion reduces the sample size. I additionally include a series of controls such as *manufacturing_i* subsector dummies which capture the industry specific state of labour relations, *year_t* fixed effects which should capture year-specific events which may affect union-employer bargaining, *month_t* fixed effects, which should account for seasonality of petitions, and α_m municipal fixed effect.

If petitions run counter to the economic cycle then we would find $\beta_1 > 0$. This suggests that in periods of high unemployment, unions are more likely to threaten to strike. This may sound counterintuitive as work stoppage may seem less credible in adverse economic conditions. Nevertheless, a counter-cyclical frequency of strike threats would indicate that petitions play an

important role as a statutory instrument for bargaining worker conditions and wages. I argue that this hypothesis is consistent with the [Ashenfelter and Johnson \(1969\)](#) view of the world. Whilst the union leadership would find it hard to sell the consequences of a potential strike to their rank-and-file, the institutional framework implies that a forced period of negotiation would take place between employers and unions.

The inclusion of the rate of manufacturing inflation allows me to further investigate if during periods of higher prices there is increased bargaining by unions in an attempt to maintain their relative wage level, where this hypothesis would suggest $\beta_2 > 0$. The inclusion of this measure allows me to disentangle whether industry-specific uncertainty affects the demands for contract negotiations.

Columns 1–9 of Table [5.3](#) present the findings for [equation \(5.1\)](#). This is estimated using a municipal fixed effects estimator. The partial correlation in column 1 suggests that petitions go counter to the economic cycle, this a contrast to the findings of the literature with respect to American and Canadian strikes ([Vroman, 1989](#); [Gunderson and Melino, 1990](#); [Card, 1990a](#)) which suggest that strikes themselves are pro-cyclical. The estimates in columns 2, and 7–9 suggest that there are sizeable sector, seasonal and macroregional effects. When these are partialled out, there is a positive correlation between unemployment and strike threats. The coefficient in column 2 suggests that an increase in the unemployment rate by one percentage point increases the petition rate by 0.014 per 10,000 of the municipal population.¹⁵ This finding can be contrasted with [Vroman \(1989\)](#), who suggests that increases in unemployment decrease the probability of strikes. Naturally, these are not strictly comparable, but nevertheless reveal that strike threats do not necessarily capture the same thing as strikes themselves.

¹⁵For a municipality like Jiutepec in the state of Morelos—with a population of 122,000 and a sizeable manufacturing community—this would imply an increase of nearly two petitions.

Table 5.3: Strike Petitions over the Economic and Electoral Cycle

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|--|--------------------|---------------------|---------------------|---------------------|------------------|---------------------|---------------------|---------------------|---------------------|
| Unemployment Rate (%) | 0.016** (0.007) | 0.014** (0.007) | | | | | 0.014** (0.007) | 0.014** (0.007) | 0.014** (0.007) |
| Manufacturer Inflation (%) | | | -0.001** (0.000) | -0.001* (0.000) | | | -0.001* (0.000) | | -0.001* (0.000) |
| Election year | | | | | 0.004 (0.005) | 0.012* (0.007) | | 0.012* (0.007) | 0.012* (0.007) |
| Food, Drink, Tobacco | | 0.039*** (0.009) | | 0.041*** (0.009) | | 0.039*** (0.009) | 0.041*** (0.009) | 0.039*** (0.009) | 0.041*** (0.009) |
| Textiles, Clothing, Leather | | 0.032*** (0.006) | | 0.033*** (0.006) | | 0.032*** (0.006) | 0.033*** (0.006) | 0.032*** (0.006) | 0.033*** (0.006) |
| Paper, Paper Products, Printing, Editing | | 0.014** (0.006) | | 0.018*** (0.006) | | 0.015*** (0.006) | 0.017*** (0.006) | 0.014** (0.006) | 0.017*** (0.006) |
| Chemical Industries | | 0.019*** (0.007) | | 0.023*** (0.009) | | 0.019*** (0.007) | 0.023*** (0.009) | 0.019*** (0.007) | 0.022*** (0.009) |
| Minerals | | 0.015** (0.007) | | 0.016** (0.007) | | 0.015** (0.007) | 0.016** (0.007) | 0.015** (0.007) | 0.016** (0.007) |
| Basic Metals | | 0.015* (0.009) | | 0.021* (0.011) | | 0.015* (0.009) | 0.022* (0.012) | 0.016* (0.009) | 0.022* (0.012) |
| Machinery and Equipment | | 0.042*** (0.011) | | 0.043*** (0.011) | | 0.042*** (0.011) | 0.043*** (0.011) | 0.041*** (0.011) | 0.043*** (0.011) |
| Other Manufacturing | | 0.049*** (0.015) | | 0.052*** (0.017) | | 0.049*** (0.015) | 0.052*** (0.017) | 0.049*** (0.015) | 0.052*** (0.016) |
| R^2 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| N | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Macroregion time trends | No | Yes | No | Yes | No | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in [equation \(5.1\)](#).

Each column reports the estimate obtained for the pooled sample of Manufacturing firms, the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods.

The base category for manufacturing is Paper Products.

The rate of inflation is determined as the one-digit manufacturing subsector specific price inflation.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Formally testing whether increases in uncertainty, as faced by the firm, lead to increased demands for contract negotiations, no evidence is found for this proposition. Manufacturing subsector specific inflation decreases strike threats. Column 4 suggests that a five percentage point increase¹⁶ in the manufacturing rate of inflation decreases strike threats by 0.005 per 10,000 of the municipal population.¹⁷ The magnitude of this effect suggests that during periods of low uncertainty unions will increase their belligerence, perhaps in an attempt to capture greater rents that may be available in the economy. It should be noted that when the rate of inflation is partialled out, the effects of unemployment increase, showing that it is important to control for both these two opposing effects.

The columns 5, 6, 8 and 9 of [table 5.3](#) augment the analysis to include binary indicators for electoral year.¹⁸ The evidence here suggests that there is a sizeable effect of electoral years which is comparable in magnitude to the unemployment rate effect previously noted. Column 9 suggests that the mere fact of being a local election year in a municipality increases the number of strike petitions by 0.012 per 10,000 of the population, relative to non-electoral years.¹⁹ This finding is robust to specification and suggests that, although strike threats are related to the economic cycle, they are also related to the electoral cycle. This may be part confirmation for union leadership executive discretion as theorised by [Burton \(1984\)](#). The model developed by [Martin \(1984\)](#) further expands on the notion of the agency problem in collective bargaining as hinted in [Ashenfelter and Johnson \(1969\)](#). [Martin](#) shows that if unions are concentrated into large entities the union leadership is relatively unaccountable to their rank-and-file. Thus we may expect that the union leadership will be more willing to abuse their institutional tools for political ends, and those would be unrelated to the state of labour relations at firm level.

In order to tease out the above findings, I have replicated the specifications in column 9 from [table 5.3](#) on a set of disaggregated set of causes of strike petitions presented in [table 5.4](#). It should be noted that the specifications are identical to those previously reported. However, in order to conserve space, only the coefficients for unemployment, inflation and electoral year are presented.

The effects of the business and electoral cycle on the rate of petitions vary by cause. Increases in the unemployment rate increase the number of contract signing petitions and decrease wage

¹⁶The equivalent of a one standard deviation increase for all subsectors in the post 2000 period

¹⁷For Jiutepec, this would imply a decrease of 0.61 petitions.

¹⁸Defined as Electoral Year= 1 for being one calendar year from that municipality-specific electoral date, and zero otherwise.

¹⁹For a municipality such as Jiutepec, this would suggest an increase of 1.5 petitions.

Table 5.4: Effects of the Economic cycle by strike petition types

| per 10,000 | Petitions | Contract Signing | Contract Revision | Contract Failure | Wage |
|----------------------------|--------------------|---------------------|---------------------|------------------|---------------------|
| Unemployment rate (%) | 0.014** (0.007) | 0.014*** (0.004) | 0.002 (0.004) | 0.002 (0.001) | -0.003** (0.001) |
| Manufacturer Inflation (%) | -0.001* (0.000) | -0.000 (0.000) | -0.000 (0.000) | 0.000 (0.000) | -0.000** (0.000) |
| Election Year | 0.012* (0.007) | -0.001 (0.004) | 0.010*** (0.004) | 0.002 (0.003) | 0.002 (0.002) |
| Manufacturing FE | Yes | Yes | Yes | Yes | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes |
| Macroregion time trends | Yes | Yes | Yes | Yes | Yes |
| R ² | 0.581 | 0.432 | 0.314 | 0.274 | 0.449 |
| N | 37,475 | 37,475 | 37,475 | 37,475 | 37,475 |

NOTE: The regressions specification is identical to column 9 of table 5.3. The standard errors are clustered at municipal level and are reported in parentheses

Each column reports the estimate obtained for the pooled sample of Manufacturing firms, the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods.

The rate of inflation is determined as the one-digit manufacturing subsector specific price inflation.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

increase petitions, where a one percentage point increase in the state level unemployment rate decreases the petition rate per 10,000 of population by 0.014 and -0.003 respectively. Contract signing petitions are those that seek to negotiate a new collective bargaining contract, and encompass the whole of the remuneration package. Wage petitions are those which seek to have an extraordinary increase in wages that falls outside of normal bargaining. The opposite nature of these types of petitions reflect that the counter-cyclical nature of petitions is driven by the desire of union members to negotiate remuneration packages, which will see them weather adverse economic conditions better. Equally, the demand for off-contract negotiation cycle wage increases exhibit a significant decline. This result is broadly comparable to what has been reported by the literature on strikes.

The findings regarding petitions and the electoral cycle seem to originate from contract revision petitions. The rate at which unions seek to renegotiate existing contracts seem to be unrelated to the economic cycle. Nevertheless, there seems to be well determined electoral year effects in the demand for contract revision. This confirms the previous findings that there is an electoral-cycle relevant component to strike threats.²⁰

It is worth emphasising that, while it is perfectly legitimate for unions to threaten strikes through the institutional mechanism of petitions in response to changes in the economic cycle,

²⁰As a separate exercise the analysis above was re-run for non-manufacturing firms. These findings remain in comport with the effects for the manufacturing firms and thus are not reported here.

there is no reason for unions to systematically increase threats during electoral years. The next section will explore how election results exert a direct effect on strike threats.

5.6 Close elections lead to more strike threats

In order to further explore the causal nature of the first empirical finding that there is an association between strike threats and the electoral cycle, I will employ a sharp RD design (see [Thistlethwaite and Campbell, 1960](#); [Imbens and Lemieux, 2008](#); [van der Klaauw, 2008](#); [Lee and Lemieux, 2010](#)) using information on close municipal elections. The RD approach used here as applied to elections is due to [Lee \(2008\)](#). Given the count nature of the petitions data, these are transformed into the rate of petitions per 10,000 of the population. I employ a parametric estimator to obtain the RD estimates, which assumes the following functional form:

$$\text{Petition Rate}_{mst} = \alpha_m + \rho_t + \beta \text{PartyWin}_{mt} + f(\text{MoVParty}_{mst}) + Z_{mst}\theta + \eta_{mst} \quad (5.2)$$

The causal identification here is achieved by employing a parametric estimator within a RD design. The causal variable of interest in [equation \(5.2\)](#) is given by the treatment parameter β from the parametric regression, which is a binary indicator variable that takes the value of 1 where one of the three political parties won the municipal presidency (either alone or in a coalition) and zero otherwise. So, for example, in municipality m in state s in time t , if there is a significant effect of the estimated β parameter, assuming that there is a discontinuity whose variation is appropriately captured by the functional form, then the β parameter is interpretable as a causal effect from elections to petitions.

The regression outlined in [equation \(5.2\)](#) is also augmented with additional covariates, which are outlined in [table 5.2](#). These covariates include state-level unemployment rates, municipal year specific effects, and some such as workplace accident related deaths, controls that capture the political party of the governor of each municipality, incumbency dummies, and coalition dummies.²¹ The electoral calendar in Mexico operates such that even though there may be municipal elections in a given year across multiple states, there is no guarantee that these will occur on the same day. Thus, in the final specification electoral cycle fixed effects are introduced

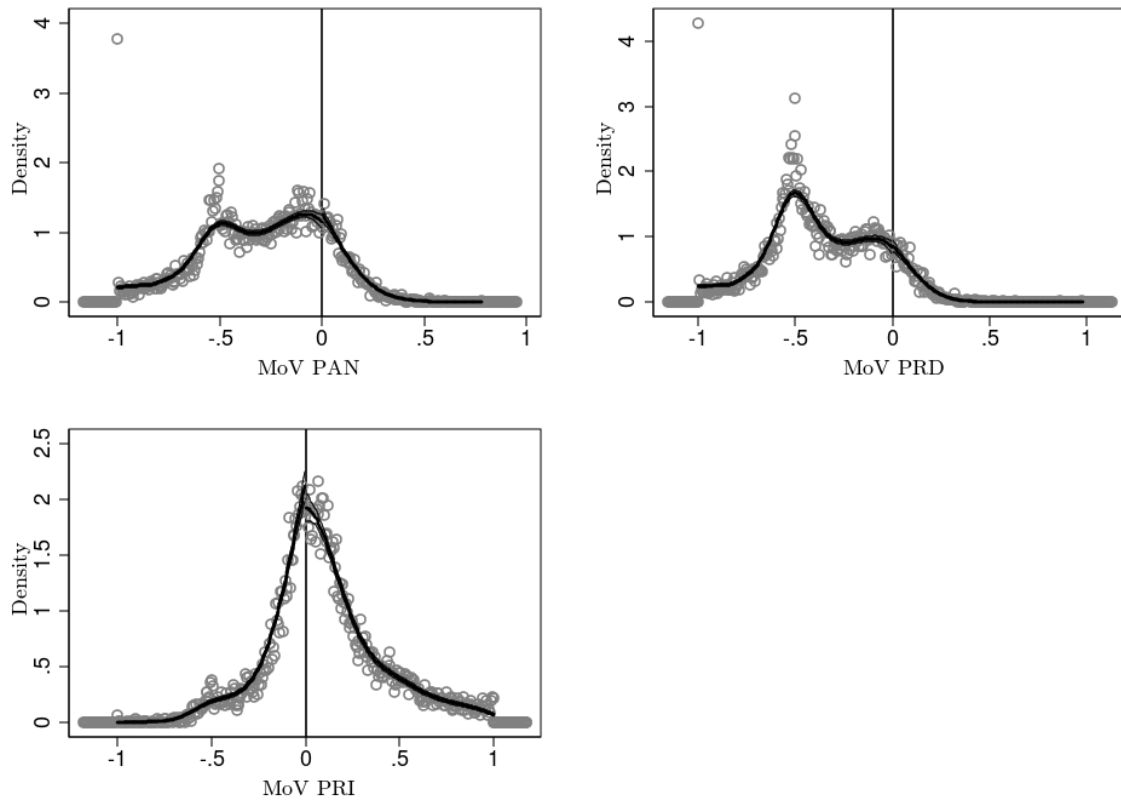
²¹Some of these were excluded from the earlier analysis, as they are not available in as high a frequency as required. The aggregation to years allow these to come into play.

and are defined to be the year in which there was at least one election (regardless of month).

Although the data utilised in this section are similar to those used in the previous section, these data differ in one key respect. Previously these had been disaggregated at a monthly level. However, due to the nature of electoral contests the most appropriate level for analysis is annual. The data are therefore aggregated as the sum total strike threats in the immediate 12 months after an election, as well as the total petition rate per 10,000 of population in the 12–24 month interval after an election.

The panel nature of the data, and the twenty year time span that this covers, suggest that there are likely important unobserved effects that are occurring at the municipal level. In order to net these out I employ municipal specific fixed effects. Due to the count nature of the petitions data, it would be inappropriate to estimate their relationship by OLS. The estimates presented in tables 5.5, 5.6 and 5.7 are obtained through a fixed effects estimator on the rate of petitions, which neatly sidesteps the count nature of petitions.²² This allows the estimates to represent the true causal effect in the relationship of interest.

Figure 5.3: Continuity along forcing variable



²²Nevertheless, these tables have also been estimated using petitions data as a count with a Negative Binomial fixed effects estimator. These findings are consistent to what is presented here.

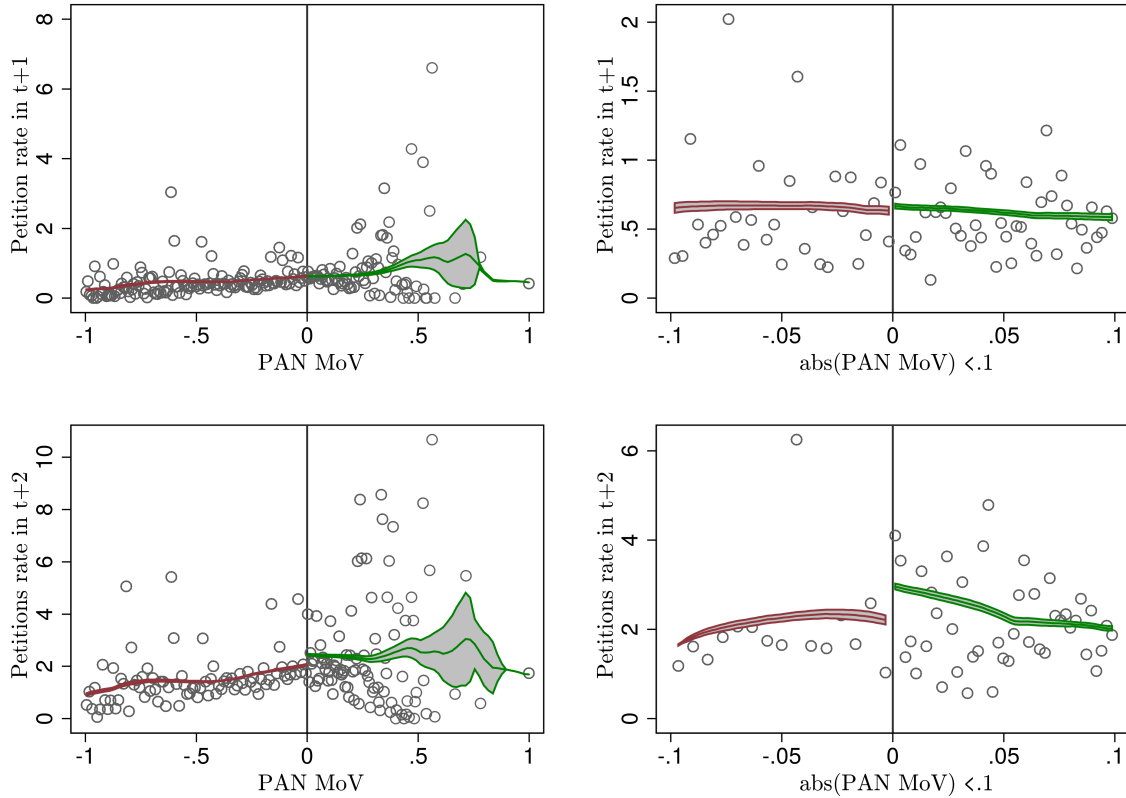
McCrary (2008) raises a concern for RD designs relating to the validity of the estimates being contingent on the inability of the running variable to be manipulated by agents. In the context of electoral results, manipulation can manifest in the form of electoral irregularities, this may be a concern in particular for marginal elections. Given that the identification strategy relies strongly on these results, falling foul of this assumption would invalidate the RD approach. I employed the test suggested by McCrary, which estimates a finely binned histogram of the forcing variable, and then used a Local Linear Regression (LLR) to estimate whether there is a discontinuity at the victory threshold. The use of LLR raises the issue of optimal bandwidth selection for this test. McCrary uses the Imbens and Kalyanaraman (2012) algorithm for selecting the appropriate bandwidth. The test is then effectively the log difference in height between the point estimate from the LLR using a bandwidth of the nearest n -points on both the left and the right of the discontinuity.²³ The results from this test can be seen in figure 5.3, which suggest that there is no discontinuity along the forcing variable. One thing that must be noted for the PRD and PAN diagrams is the ‘double hump’ of the forcing variable along the 50% mark as well as those elections where there is a narrow election with a margin of victory near the zero boundary. This mass of density along the 50% mark reflects the changing nature of Mexican politics. Prior to the 2000 election the PRD and PAN would not have been seen as credible contenders for municipalities, and this is representative of the PRI hegemony across all levels of government. If those elections prior to 2000 are excluded the second peak of density along those large losses disappears. Nevertheless, this may give rise to concerns that this may have some effect on the estimates obtained from the global parametric RD approach. In order to mitigate this, I re-estimate equation (5.2) across a variety of narrow electoral margin windows. These estimates should thus demonstrate that the effects derive from narrow elections and are not due to the large losses experienced prior to 2000.

As an additional robustness check on the continuity of the forcing variable I employ the test proposed by Cattaneo et al. (2016). This approach has the added benefit that it does not rely on the pre-binning of data into a histogram, and provides a test value that follows the robust-bias correction proposed in Calonico et al. (2014c). The test statistics for each of the PAN, PRD and PRI are as follows .718 (.473), -1.192 (.233) and -2.22 (.026), where the respective p-values are reported in parentheses. These test statistics suggest that there is no manipulation of the running variable for the PAN and PRD. In contrast to the McCrary test, the null of no

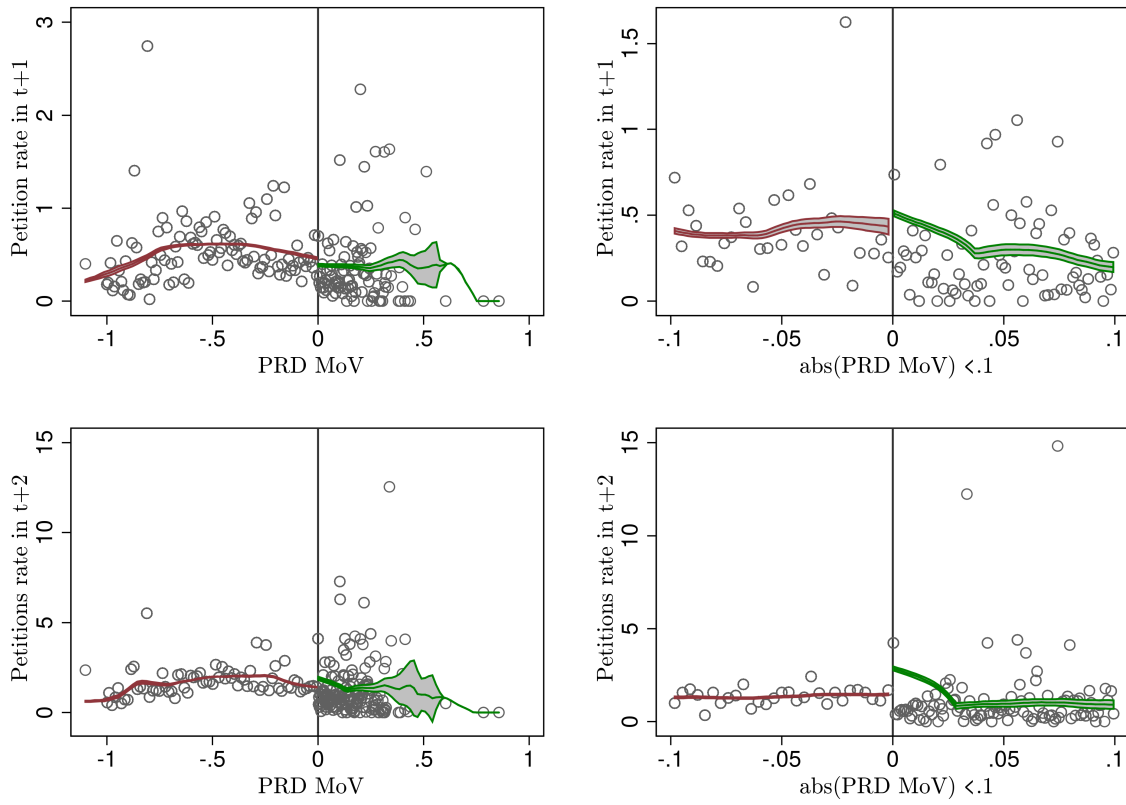
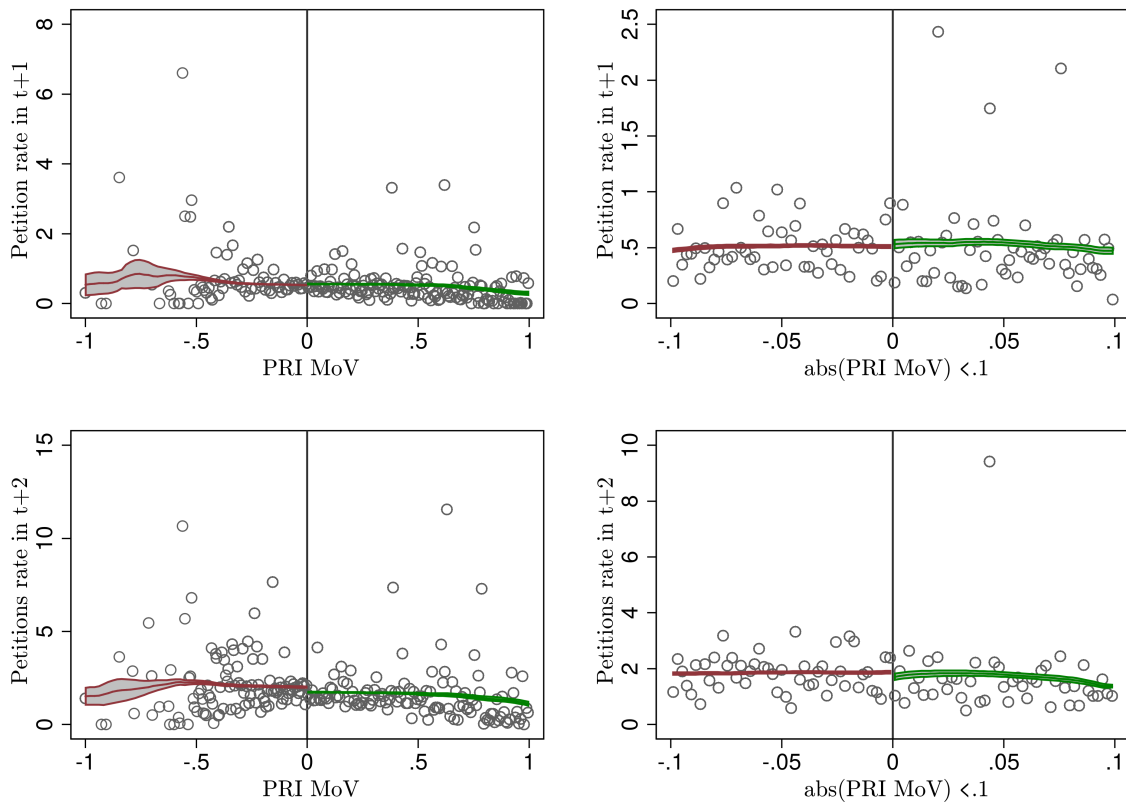
²³In practice to employ this test I used McCrary’s Stata module `-DCdensity-`.

discontinuity along the forcing variable cannot be rejected for the [PRI](#) party. This suggests that at the electoral margin, there may be manipulation of [PRI](#) results. This is consistent with the long established history of [PRI](#) electoral manipulation, which is well documented ([Gillingham, 2012](#); [Eisenstadt and Yelle, 2012](#); [Lujambio, 2001](#)). However, performing the test again on the post-2000 election sample, yield a test statistic of -1.628 (.1034) suggesting that the watershed elections of that year, where the [PRI](#) lost the presidency also witnessed the end of such electoral manipulation. Indeed, if one considers that narrow electoral margins are a new phenomenon in Mexican politics, with margins significantly narrowing since 2000, and the test is performed for the [PRI](#) only for the sub-sample of 10% closest elections, the finding is once again reversed with the test statistic of -0.712 (0.476).

Figure 5.4: Impact of PAN win on Strike Petitions rate



Figures 5.4, 5.5 and 5.6 allow visual inspection of the discontinuity and the petitions data. The plots were generated using the methods developed by [Calonico et al. \(2014c\)](#). These methods are robust methods that select the optimal bin size either side of the discontinuity. Each figure is comprised of four sub-figures, each of these plot the petition rate per 10,000 of population over the rating variable. The first and third panes plot the whole span of the rating variable [-1,1]

Figure 5.5: Impact of PRD win on Strike Petitions rate**Figure 5.6:** Impact of PRI win on Strike Petitions rate

representing losing and winning by 100 percent of the vote for the total petition rate per 10,000 of the population in a municipality one and two years after the election, respectively. For ease of viewing panes 2 and 4 of each figure plot the data, using the Calonico et al. (2014a) methods, over the window $[-.1, .1]$ over elections where 10% or less of the vote decided the outcome. The lines for all of the plots are the result of a local polynomial smoothed at either side of the discontinuity using the optimum bandwidth as determined by the Calonico et al. (2014c) algorithm.

It is noteworthy that all of the plots show a clear discontinuity on the petitions data across the margin of victory for all three parties. The plots suggest that locations that had a right-wing PAN mayoral victory perceive a higher petition rate per 10,000 of population both one year and two years following the election. The findings are similar, if less marked for the left-wing PRD party. The findings for the PRI party suggest that around the discontinuity a PRI election leads to fewer petitions.

The results from the global parametric RD exercise are reported in tables 5.5, 5.6 and 5.7 for the PAN, PRD and PRI parties, respectively. In each instance the functional form employed uses a quadratic polynomial around the discontinuity. This functional form was preferred due to the Gelman and Imbens (2014) suggestion to avoid high-order polynomials, as these cannot be satisfactorily chosen and the confidence intervals in these should be treated with care.

Table 5.5 suggests that the rate of strike threats is unaffected by one year after a right-wing narrow PAN election. This is found to be the case regardless of the specification. However, the estimates in columns 4–6, suggest that two years after the mayoral elections for the right-wing PAN party, there is an increase of approximately 0.992 petitions per 10,000 of the population. The mean population for a municipality where the PAN won is 128,838.²⁴ The estimates suggest that a right-wing electoral victory in the average sized municipality leads to an additional 12.4 strike threats, relative to those municipalities where any other party won.²⁵ When other covariates are introduced the coefficient reduces in size and there is a predicted increase of approximately 9.94 strike threats relative to those who voted other parties into power.²⁶

²⁴A similar sized town that elected a PAN mayor would be the municipality of San Pedro Cholula in the state of Puebla in 2012. The population in 2012 was 124,937 and it is an area with some manufacturing, and industry. They elected a PAN mayor in 2010.

²⁵This can be obtained by taking the coefficient in column 4 of Table 5.5 and multiplying it by the population of Cholula in tens of thousands (12.4947).

²⁶Note, that it should be clear that this effect scales with the size of the municipality and thus the magnitude of the effect will vary between [0.05, 146.44] extra petitions. Where the smallest municipality that elected a right-wing mayor had a population of 633 in 2012 and the largest, Iztapalapa borough in Mexico city with a population of 1,839,700 in 2006.

Table 5.5: Impact of PAN election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PAN win | 0.087 (0.106) | 0.013 (0.103) | 0.016 (0.104) | 0.992*** (0.295) | 0.787*** (0.276) | 0.796*** (0.274) |
| MoV | -0.227 (0.441) | -0.106 (0.443) | -0.106 (0.447) | 0.351 (1.274) | 0.068 (1.293) | 0.059 (1.297) |
| PAN win \times MoV | -0.855 (0.860) | -0.169 (0.898) | -0.193 (0.907) | -9.010*** (2.163) | -6.565*** (2.148) | -6.549*** (2.173) |
| MoV ² | -0.021 (0.403) | -0.001 (0.420) | 0.002 (0.424) | 0.794 (1.198) | 0.806 (1.193) | 0.790 (1.195) |
| PAN win \times MoV ² | 1.287 (0.877) | 0.071 (0.837) | 0.124 (0.830) | 7.536*** (2.400) | 4.204* (2.186) | 4.194* (2.161) |
| PRD governor | | 0.423*** (0.110) | 0.427*** (0.110) | | -0.042 (0.219) | -0.040 (0.220) |
| PRI governor | | 0.492*** (0.103) | 0.495*** (0.104) | | 0.296 (0.215) | 0.314 (0.219) |
| Incumbent | | -0.068 (0.044) | -0.094** (0.047) | | 0.064 (0.125) | -0.006 (0.134) |
| Workplace death rate (per 10,000) | | 0.168*** (0.054) | 0.168*** (0.054) | | 0.049* (0.029) | 0.049* (0.028) |
| Unemployment rate (%) | | 0.012 (0.022) | 0.011 (0.021) | | 0.240*** (0.057) | 0.241*** (0.057) |
| In coalition | | 0.342*** (0.065) | 0.350*** (0.068) | | 1.013*** (0.168) | 1.049*** (0.173) |
| Constant | 0.472*** (0.083) | 0.011 (0.145) | -0.079 (0.153) | 1.688*** (0.237) | 0.362 (0.467) | 0.059 (0.408) |
| R^2 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.02 |
| N | 8,052 | 8,052 | 8,052 | 8,052 | 8,052 | 8,052 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

The estimates are obtained from a conditional fixed effects negative binomial estimator. In order to interpret the coefficients, one must exponentiate the coefficient. The extensive margin can be obtained by multiplying the coefficient with the exponentiated sample mean for that sub-sample.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.6: Impact of PRD election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PRD win | 0.248*** (0.082) | 0.269*** (0.074) | 0.256*** (0.074) | 1.351*** (0.338) | 1.262*** (0.325) | 1.218*** (0.321) |
| MoV | 0.180 (0.307) | 0.325 (0.317) | 0.364 (0.317) | -0.136 (1.246) | -0.003 (1.281) | 0.110 (1.263) |
| PRD win \times MoV | -3.222*** (0.673) | -3.742*** (0.710) | -3.764*** (0.701) | -12.367*** (2.942) | -11.098*** (2.752) | -11.093*** (2.716) |
| MoV ² | 0.468 (0.317) | 0.455 (0.325) | 0.491 (0.322) | 0.261 (1.250) | 0.448 (1.278) | 0.532 (1.268) |
| PRD win \times MoV ² | 2.694 (1.721) | 3.498** (1.508) | 3.453** (1.620) | 15.800*** (5.207) | 13.790*** (4.859) | 13.238*** (4.987) |
| PRI governor | | 0.117*** (0.037) | 0.119*** (0.037) | | 0.115 (0.139) | 0.131 (0.137) |
| PAN governor | | -0.294*** (0.079) | -0.291*** (0.078) | | -0.264 (0.191) | -0.259 (0.189) |
| Incumbent | | 0.119 (0.124) | 0.103 (0.126) | | -0.030 (0.229) | -0.110 (0.239) |
| Workplace death rate (per 10,000) | | 0.161*** (0.052) | 0.161*** (0.052) | | 0.049 (0.033) | 0.049 (0.031) |
| Unemployment rate (%) | | 0.033 (0.022) | 0.033 (0.021) | | 0.261*** (0.058) | 0.262*** (0.059) |
| In coalition | | -0.071 (0.056) | -0.066 (0.054) | | 0.169 (0.135) | 0.196 (0.129) |
| Constant | 0.499*** (0.065) | 0.368*** (0.119) | 0.309** (0.131) | 1.594*** (0.251) | 0.542** (0.232) | 0.256 (0.327) |
| R^2 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 |
| N | 8,055 | 8,055 | 8,055 | 8,055 | 8,055 | 8,055 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.7: Impact of PRI election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PRI win | -0.049 (0.069) | -0.019 (0.069) | -0.028 (0.070) | -0.493*** (0.169) | -0.445*** (0.169) | -0.470*** (0.172) |
| MoV | 0.484 (0.524) | 0.316 (0.520) | 0.342 (0.525) | 1.088 (1.314) | 0.981 (1.290) | 1.016 (1.286) |
| PRI win \times MoV | 0.031 (0.621) | -0.280 (0.613) | -0.314 (0.616) | 0.489 (1.568) | -0.026 (1.665) | -0.121 (1.636) |
| MoV ² | 0.296 (0.532) | 0.245 (0.529) | 0.309 (0.529) | -0.507 (1.657) | -0.702 (1.696) | -0.689 (1.696) |
| PRI win \times MoV ² | -0.617 (0.661) | -0.219 (0.656) | -0.275 (0.662) | -0.705 (1.750) | 0.193 (1.696) | 0.213 (1.704) |
| PRD governor | | -0.070** (0.035) | -0.069** (0.035) | | -0.346*** (0.129) | -0.366*** (0.130) |
| PAN governor | | -0.382*** (0.088) | -0.381*** (0.089) | | -0.289* (0.175) | -0.297* (0.177) |
| Incumbent | | 0.030 (0.048) | -0.004 (0.062) | | 0.114 (0.120) | -0.013 (0.127) |
| Workplace death rate (per 10,000) | | 0.144*** (0.054) | 0.143*** (0.054) | | 0.035 (0.029) | 0.035 (0.028) |
| Unemployment rate (%) | | 0.063*** (0.023) | 0.063*** (0.023) | | 0.282*** (0.078) | 0.284*** (0.077) |
| In coalition | | -0.206*** (0.059) | -0.207*** (0.059) | | -0.092 (0.283) | -0.082 (0.275) |
| Constant | 0.533*** (0.052) | 0.409*** (0.123) | 0.347*** (0.112) | 1.998*** (0.126) | 0.983*** (0.229) | 0.752*** (0.213) |
| R^2 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 |
| N | 7,865 | 7,865 | 7,865 | 7,865 | 7,865 | 7,865 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Looking at the results for the left-wing PRD party it becomes clear that increases in the rate of strike threats are due to elections but perhaps unrelated to political ideology. The estimates in table 5.6 imply that those municipalities that elect a left-wing PRD mayor exhibit systematically higher rates of petitions both one year and two years after a PRD victory. Columns 3 and 6—my preferred specifications—suggest that the rate of strike threats *increase* both one and two years after a left-wing win by the PRD party. The rate increases by 0.256 and 1.218 petitions per 10,000 of the municipal population one and two years after the election. To put this into context, the average size for a municipality won by the PRD is of 78,638.²⁷ For the average municipality won by the PRD, the effects implicit in column 3 suggest that one year after an election there will be approximately 2 more strike petitions, relative to non-PRD Municipalities. Whilst, in the lead-up to the following election, the model predicts an additional 9.5 petitions.²⁸ As with the previous findings the magnitude of the effect is diminished by the introduction of other controls, with the smallest effect associated with introducing electoral cycle fixed effects.

The results from Table 5.7 for the PRI party are in stark contrast to the PAN and PRD parties. I find that despite the discontinuity visible in Figure 5.6, once a global modelling strategy is employed, there is a negative effect from PRI municipal wins on the number of strike threats two years after a PRI election. The estimates for column 6 suggest that the rate of strike threats reduces by 0.47 per 10,000 of the municipal population two years after an election. The average population in PRI winning Municipalities is 75,171.²⁹ For the average sized municipality the estimates suggest that they would see a decline of 3.54 petitions. However, there are two things that must be borne in mind with regards to this finding.

(i) PRI are the most electorally successful party in Mexican politics. Both legitimately, and indeed through well known incidents of fraud (Camp, 2003). It should come as no surprise that as outlined in Chapter 2 on the history of unions, PRI are the party which has the closest historical links with ‘officialist’ unions. Those unions which are formally a part of the party³⁰, and were complicit in maintaining this party in power during their 71 year rule of the country (Lastra Lastra, 2002a). Once these facts are taken into account, the veracity of the reported effects must be interpreted with care.

²⁷This is roughly equivalent to the population of the municipality of Salina Cruz (pop. 77,825) in the state of Oaxaca, which elected a left-wing mayor in 1998.

²⁸Note that the population of municipalities won by PRD range from 633 to 1,830,000, so the effect range will lie somewhere in the range of [0.016,47.053] on year after the election and [0.077,223.869] two years after an election.

²⁹This is similar to Jesús Maria in Aguascalientes in 2001, with a 75,499, this municipality elected a PRI Municipal President in 2001.

³⁰Indeed, some union leaders were postulated by PRI as senators and congressmen (Middlebrook, 1995).

(ii) Identification may be compromised by instances of electoral fraud, and the failure of these data to pass the Cattaneo et al. (2016) manipulation test as previously noted for the pre-2000 period.

The findings presented in this section demonstrate that there are important effects on strike threats originating from certain electoral results. These effects are found to span political lines, affecting municipalities where both right-wing and left-wing mayors were elected. The identification of these effects has thus far relied on a global parametric strategy, exploiting all of the data. The RD approach, however, is only valid on the assumption that it is those observations that are close to the discontinuity that are as good as random. As such, it could be argued that the magnitude of the effects presented thus far are identified with excess variation which should not be taken into account. Tables 5.8, 5.9 and 5.10 relax this assumption through restricting the sample to only those elections that can be termed as narrow. I define narrow elections arbitrarily as those whose margin of victory lies within the window $[-.1, .1]$, that is where 10% or less of the vote settled the outcome. The findings for PAN and PRD presented previously are robust to estimation within a more restrictive window. Another issue worthy of comment, is that estimation with the subset of narrow elections strengthens the results, where column 6 of each respective table suggests that narrow electoral victories lead to an increase in the rate of strike threats by 1.507 (1.456) two years after a narrow win for the right (left) in a municipal election.³¹ The robustness exercise reported above changed the estimates for the PRI party, and these are no longer found to be statistically significant.

³¹If these are evaluated for the average sized Municipality which elected a right- and (left-) wing mayor these effects imply an increase of 18.82 (11.33) additional petitions relative to all other municipalities.

Table 5.8: Impact of narrow PAN election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PAN win | 0.221 (0.186) | 0.035 (0.191) | 0.056 (0.194) | 1.740*** (0.605) | 0.978* (0.587) | 1.057* (0.589) |
| MoV | 4.557 (5.964) | 5.573 (5.963) | 5.317 (6.065) | -10.105 (18.059) | -7.751 (17.953) | -9.409 (17.718) |
| PAN win \times MoV | -26.016*** (9.141) | -21.540** (9.346) | -20.654** (8.906) | -48.386* (27.135) | -15.990 (26.425) | -11.795 (25.836) |
| MoV ² | 41.890 (57.179) | 52.704 (56.954) | 52.881 (57.286) | -171.177 (151.756) | -139.344 (149.029) | -150.217 (147.589) |
| PAN win \times MoV ² | 138.802 (104.520) | 86.860 (111.234) | 78.826 (107.070) | 623.043** (264.250) | 280.055 (261.517) | 258.175 (261.080) |
| PRD governor | | 0.333 (0.219) | 0.325 (0.218) | | -0.635 (0.491) | -0.695 (0.505) |
| PRI governor | | 0.412* (0.218) | 0.402* (0.213) | | -0.452 (0.501) | -0.470 (0.499) |
| Incumbent | | -0.171 (0.134) | -0.239 (0.178) | | -0.009 (0.241) | -0.184 (0.259) |
| Workplace death rate (per 10,000) | | 0.265* (0.142) | 0.269* (0.145) | | 0.044 (0.120) | 0.015 (0.119) |
| Unemployment rate (%) | | 0.042 (0.045) | 0.043 (0.044) | | 0.302*** (0.088) | 0.305*** (0.088) |
| In coalition | | 0.287*** (0.111) | 0.315*** (0.110) | | 1.148*** (0.255) | 1.217*** (0.260) |
| Constant | 0.767*** (0.138) | 0.314 (0.255) | 0.053 (0.265) | 2.055*** (0.468) | 1.071 (0.707) | 0.433 (0.632) |
| R^2 | 0.01 | 0.02 | 0.03 | 0.03 | 0.06 | 0.07 |
| N | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Narrow wins are defined as those where the margin of victory is within the window $[-.1, .1]$, for alternate specifications which vary this assumption please see table 5.12.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.9: Impact of narrow PRD election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PRD win | 0.278* (0.142) | 0.251* (0.141) | 0.264* (0.146) | 1.532** (0.677) | 1.263** (0.624) | 1.456** (0.668) |
| MoV | 1.890 (4.517) | 2.542 (4.662) | 2.388 (4.698) | 11.556 (14.230) | 13.681 (14.225) | 9.727 (13.756) |
| PRD win \times MoV | -12.210* (6.816) | -11.702* (6.963) | -12.179* (7.262) | -110.489*** (38.680) | -100.845*** (37.046) | -100.894*** (37.318) |
| MoV ² | 22.464 (41.110) | 27.762 (42.388) | 25.834 (42.645) | 93.096 (126.905) | 112.898 (127.687) | 78.118 (123.935) |
| PRD win \times MoV ² | 54.993 (61.572) | 41.667 (61.443) | 48.054 (64.487) | 828.693** (354.702) | 706.591** (329.549) | 765.870** (338.706) |
| PRI governor | | 0.079 (0.049) | 0.068 (0.049) | | 0.316 (0.200) | 0.354* (0.195) |
| PAN governor | | -0.053 (0.089) | -0.073 (0.095) | | -0.347 (0.299) | -0.280 (0.310) |
| Incumbent | | 0.089 (0.079) | 0.086 (0.086) | | -0.089 (0.166) | -0.256 (0.180) |
| Workplace death rate (per 10,000) | | 0.012 (0.061) | 0.003 (0.059) | | 0.013 (0.122) | 0.004 (0.120) |
| Unemployment rate (%) | | 0.008 (0.033) | 0.009 (0.033) | | 0.132** (0.057) | 0.110* (0.059) |
| In coalition | | 0.112 (0.074) | 0.125* (0.073) | | 0.718** (0.309) | 0.726** (0.323) |
| Constant | 0.369*** (0.106) | 0.251 (0.181) | 0.240 (0.187) | 1.613*** (0.327) | 0.801* (0.413) | 0.044 (0.617) |
| R^2 | 0.02 | 0.03 | 0.04 | 0.07 | 0.08 | 0.10 |
| N | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Narrow wins are defined as those where the margin of victory is within the window $[-.1, .1]$, for alternate specifications which vary this assumption please see table 5.12.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.10: Impact of narrow PRI election on strike petition rate

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PRI win | -0.076 (0.141) | -0.063 (0.139) | -0.069 (0.141) | -0.779 (0.731) | -0.709 (0.716) | -0.737 (0.712) |
| MoV | 2.551 (5.184) | 2.989 (5.219) | 2.960 (5.162) | 6.592 (14.230) | 4.450 (14.007) | 3.519 (14.087) |
| PRI win \times MoV | -2.174 (6.545) | -2.834 (6.693) | -2.767 (6.544) | 19.759 (34.787) | 21.318 (35.052) | 20.746 (34.040) |
| MoV ² | 8.931 (53.064) | 11.522 (52.918) | 11.123 (51.870) | 66.616 (137.834) | 42.329 (136.387) | 27.494 (136.937) |
| PRI win \times MoV ² | -4.437 (69.530) | -5.521 (69.102) | -5.912 (70.484) | -294.975 (304.077) | -252.481 (283.626) | -221.794 (264.974) |
| PRD governor | | -0.044 (0.054) | -0.043 (0.054) | | -0.508* (0.287) | -0.538* (0.291) |
| PAN governor | | -0.114 (0.138) | -0.110 (0.138) | | 0.105 (0.281) | 0.143 (0.290) |
| Incumbent | | 0.173* (0.095) | 0.138 (0.096) | | 0.677* (0.390) | 0.414 (0.273) |
| Workplace death rate (per 10,000) | | 0.125 (0.102) | 0.140 (0.103) | | -0.054 (0.105) | -0.038 (0.087) |
| Unemployment rate (%) | | 0.077** (0.038) | 0.078** (0.038) | | 0.036 (0.273) | 0.022 (0.282) |
| In coalition | | -0.168 (0.110) | -0.163 (0.107) | | 0.594 (0.687) | 0.592 (0.658) |
| Constant | 0.582*** (0.093) | 0.266* (0.136) | 0.179 (0.140) | 1.924*** (0.270) | 1.218* (0.661) | 0.683* (0.401) |
| R^2 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 |
| N | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Narrow wins are defined as those where the margin of victory is within the window $[-.1, .1]$, for alternate specifications which vary this assumption please see table 5.12.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t , the unemployment level data is determined at state level and is derived from the [ENEU](#) and [ENOE](#) for the appropriate time periods. The work place deaths data are derived from administrative records for those unexplained deaths that occurred in a manufacturing or construction site, and are defined per 10,000 of the municipal population.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

The explanation I have offered with regards to why the PRI party are unaffected relies on the historic association between the PRI and the ‘officialist’ unions. However, in order to formally test this hypothesis I would need to disentangle the RD effects estimated by a union submitting the petition to strike. Given the administrative nature of the data, I have access to such information. The RD parameter of interest β is given in table 5.11 for all three political parties. I define ‘officialist’ unions to be those large trade unions congresses which have dominated Mexican unionisation.³² The findings from this exercise strengthens my argument. It can be seen that for the PAN and PRD that the increase in petitions associated with the election of a Municipal President solely comes from the ‘officialist’ unions. As asserted earlier one way to understand these results is to appreciate that ‘officialist’ unions are members of large confederations, where the ‘paradox of participation’ is in full force (see Burton, 1984; Downs, 1957). Given their large membership, we may expect that union engagement is low. Furthermore, given the large national standing of these unions, there is likely to be union leadership discretion. I interpret this finding in this instance to imply that the leadership of these large unions are perhaps more interested in furthering their national goals, as opposed to the demands of their rank-and-file. One may also situate this finding in the model sketched out by Rosa (1984) where the union may derive political rents through acting as a campaigning tool for the PRI party.

³²These are: *Confederación de Trabajadores de México* (CTM); *Confederación Regional Obrera Mexicana* (CROM); *Conferación Obrera Regional* (COR); *Congreso General de Trabajadores* (CGT); and *Conferación Revolucionaria de Trabajadores* (CRT). All of these trade unions congresses belong to the PRI aligned *Congreso del Trabajo* (CT).

Table 5.11: Impact of Municipal President elections on strike petition rate, by petitioner type

| | Petition Rate +1 (1) | Petition Rate +1 (2) | Petition Rate +1 (3) | Petition Rate +2 (4) | Petition Rate +2 (5) | Petition Rate +2 (6) |
|--------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| PAN win | | | | | | |
| Officialist Union | 0.107 (0.165) | -0.057 (0.174) | -0.047 (0.176) | 1.612*** (0.580) | 0.854 (0.563) | 0.943* (0.562) |
| <i>N</i> | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 |
| Independent Union | 0.114 (0.077) | 0.092 (0.064) | 0.104 (0.073) | 0.128 (0.091) | 0.124 (0.098) | 0.113 (0.104) |
| <i>N</i> | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 | 2,025 |
| PRD win | | | | | | |
| Officialist Union | 0.291** (0.127) | 0.255** (0.126) | 0.268** (0.131) | 1.546** (0.637) | 1.321** (0.582) | 1.504** (0.636) |
| <i>N</i> | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 |
| Independent Union | -0.013 (0.053) | -0.004 (0.053) | -0.005 (0.051) | -0.014 (0.155) | -0.058 (0.149) | -0.048 (0.143) |
| <i>N</i> | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 | 1,465 |
| PRI win | | | | | | |
| Officialist Union | -0.044 (0.128) | -0.033 (0.126) | -0.038 (0.129) | -0.494 (0.438) | -0.437 (0.433) | -0.468 (0.432) |
| <i>N</i> | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 |
| Independent Union | -0.032 (0.042) | -0.031 (0.040) | -0.031 (0.040) | -0.285 (0.389) | -0.271 (0.380) | -0.268 (0.377) |
| <i>N</i> | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 | 2,984 |
| Covariates | No | Yes | Yes | No | Yes | Yes |
| Electoral Cycle FE | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes |

NOTES: Regressions all follow general specification outlined in (5.2). The standard errors are clustered at municipal level and are reported in parentheses.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t+1$ and $t+2$ in a given municipality that had an election in t . The covariates included replicate the specifications previously shown previously. These include: unemployment rate, unexplained workplace deaths, coalition dummies, incumbency dummies, governorship dummies, a quadratic polynomial around the discontinuity.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

5.6.1 Robustness Checks

In this subsection I report a number of robustness checks for the main findings of this chapter. These checks attenuate some of the concerns of the identification strategy employed. The main concern considered by this section is that the causal parameter (β) from (5.2) may be sensitive to changes in the estimation window or the functional form of the local linear regression. I report tables 5.12, 5.13, 5.14 and 5.15 as evidence to the contrary. These tables provide narrower bandwidths for each of the three main political parties, where each cell reports the crucial $\hat{\beta}$ parameter. This is estimated and reported for both petitions in $t + 1$ and $t + 2$. It is clear that the results are robust to either the inclusion or exclusion of covariates, and in general the results are not dependent on the length of the estimation window. Indeed the narrowing of the bandwidth shows that the effects for these extremely narrow windows are larger than those reported by 10 percentage point window. With regards to the functional form of the RD local linear regression, Tables 5.14 and 5.15 suggest that when interpreting the optimal polynomial, the results of the main text remain unaltered. There is a causal effect from narrow elections on Strike threat rates in municipalities where PAN and PRD won by a margin of 10 percentage points or less. If anything, interpreting the optimal polynomial estimates as determined by the Akaike Information Criterion (AIC)³³ suggest larger estimates than those reported in the main body of the text.

A final robustness check to the RD estimates is the estimation of non-parametric estimates of the regression discontinuity. These were estimated using both the plug-in bandwidth estimator suggested by Imbens and Kalyanaraman (2012), and the standard errors reported reflect the robust-bias correction suggested by Calonico et al. (2014c). I also employed the optimal bandwidth estimator suggested by Calonico et al., and in practice all of these were estimated using the Calonico et al. (2014b) Stata module. The results from this exercise are reported in Appendix H. The results remain invariant to this approach. In summary, the findings suggest that there is a strongly robust causal effect from narrow right- and left-wing victories to ‘officialist’ strike threats two years after a narrow election.

³³Lee and Lemieux (2010) suggest using Akaike’s cross-validation criterion, however, this is shown by Stone (1977) to be asymptotically minimised by minimising the AIC.

Table 5.12: Impact of alternate bandwidths in local linear regression on narrow election results with no controls

| MoV | PAN | | PRD | | PRI | |
|----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 2% | 0.656 (0.419) | 5.368*** (1.740) | 1.347*** (0.382) | 0.727 (1.265) | -0.008 (0.454) | -0.034 (1.039) |
| <i>N</i> | 562 | 562 | 432 | 432 | 650 | 650 |
| 3% | 0.666** (0.334) | 4.558*** (1.239) | 1.029*** (0.327) | 1.511 (1.037) | -0.779* (0.459) | -1.990* (1.096) |
| <i>N</i> | 747 | 747 | 560 | 560 | 959 | 959 |
| 4% | 0.586** (0.293) | 3.962*** (1.069) | 0.506 (0.335) | 0.531 (0.940) | -0.473 (0.326) | -1.302 (0.825) |
| <i>N</i> | 894 | 894 | 669 | 669 | 1,225 | 1,225 |
| 5% | 0.356 (0.267) | 3.336*** (0.901) | 0.603** (0.245) | 1.513 (0.938) | -0.227 (0.260) | 0.330 (0.961) |
| <i>N</i> | 1,079 | 1,079 | 809 | 809 | 1,538 | 1,538 |
| 6% | 0.255 (0.219) | 2.657*** (0.744) | 0.443** (0.204) | 2.002** (0.951) | -0.127 (0.200) | -0.918 (0.625) |
| <i>N</i> | 1,254 | 1,254 | 933 | 933 | 1,814 | 1,814 |
| 7% | 0.301 (0.194) | 1.885*** (0.727) | 0.364* (0.190) | 1.909** (0.882) | -0.094 (0.179) | -0.866 (0.905) |
| <i>N</i> | 1,471 | 1,471 | 1,075 | 1,075 | 2,150 | 2,150 |
| 8% | 0.212 (0.195) | 2.032*** (0.685) | 0.295* (0.172) | 1.866** (0.826) | -0.085 (0.169) | -0.982 (0.879) |
| <i>N</i> | 1,667 | 1,667 | 1,193 | 1,193 | 2,425 | 2,425 |
| 9% | 0.225 (0.189) | 1.939*** (0.635) | 0.281* (0.156) | 1.767** (0.748) | -0.048 (0.152) | -0.862 (0.804) |
| <i>N</i> | 1,850 | 1,850 | 1,329 | 1,329 | 2,719 | 2,719 |
| 10% | 0.221 (0.186) | 1.740*** (0.605) | 0.278* (0.142) | 1.532** (0.677) | -0.076 (0.141) | -0.779 (0.731) |
| <i>N</i> | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |

NOTES: Regressions all follow general specification outlined in (5.2), with no covariates and replicate the functional form of columns 1 and 4 of tables 5.8, 5.9 and 5.10. The standard errors reported in parentheses are clustered at the municipal level. Each column reports the estimate obtained for the parameter β in (5.2) for the appropriate time periods as given in the column heading.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.13: Impact of alternate bandwidths in local linear regression on narrow election results with controls

| MoV | PAN | | PRD | | PRI | |
|----------|-------------------|---------------------|---------------------|--------------------|--------------------|-------------------|
| | Petitions | Petitions | Petitions | Petitions | Petitions | Petitions |
| | Rate +1 (1) | Rate +2 (2) | Rate +1 (3) | Rate +2 (4) | Rate +1 (5) | Rate +2 (6) |
| 2% | 0.886 (0.574) | 4.603** (2.027) | 1.589*** (0.406) | 1.465 (0.936) | -0.134 (0.446) | 0.930 (1.193) |
| <i>N</i> | 562 | 562 | 432 | 432 | 650 | 650 |
| 3% | 0.950* (0.540) | 4.030*** (1.387) | 1.028*** (0.327) | 1.667** (0.812) | -0.798* (0.450) | -1.495 (1.041) |
| <i>N</i> | 747 | 747 | 560 | 560 | 959 | 959 |
| 4% | 0.747* (0.419) | 3.304*** (1.143) | 0.409 (0.355) | 0.610 (0.801) | -0.489 (0.317) | -1.007 (0.781) |
| <i>N</i> | 894 | 894 | 669 | 669 | 1,225 | 1,225 |
| 5% | 0.162 (0.349) | 2.552*** (0.928) | 0.581** (0.255) | 1.239* (0.723) | -0.225 (0.260) | -0.120 (0.772) |
| <i>N</i> | 1,079 | 1,079 | 809 | 809 | 1,538 | 1,538 |
| 6% | -0.072 (0.286) | 1.529* (0.844) | 0.456** (0.212) | 1.838** (0.777) | -0.053 (0.204) | -0.979 (0.836) |
| <i>N</i> | 1,254 | 1,254 | 933 | 933 | 1,814 | 1,814 |
| 7% | 0.050 (0.231) | 0.967 (0.764) | 0.372* (0.204) | 1.908** (0.812) | -0.051 (0.176) | -0.881 (0.995) |
| <i>N</i> | 1,471 | 1,471 | 1,075 | 1,075 | 2,150 | 2,150 |
| 8% | -0.012 (0.214) | 1.190* (0.691) | 0.288 (0.183) | 1.782** (0.772) | -0.059 (0.166) | -0.941 (0.907) |
| <i>N</i> | 1,667 | 1,667 | 1,193 | 1,193 | 2,425 | 2,425 |
| 9% | 0.057 (0.200) | 1.178* (0.617) | 0.267* (0.162) | 1.640** (0.713) | -0.030 (0.150) | -0.798 (0.755) |
| <i>N</i> | 1,850 | 1,850 | 1,329 | 1,329 | 2,719 | 2,719 |
| 10% | 0.056 (0.194) | 1.057* (0.589) | 0.264* (0.146) | 1.456** (0.668) | -0.069 (0.141) | -0.737 (0.712) |
| <i>N</i> | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |

NOTES: Regressions all follow general specification outlined in (5.2), with covariates and replicate the functional form of columns 3 and 6 of tables 5.8, 5.9 and 5.10. The standard errors reported in parentheses are clustered at the municipal level. Each column reports the estimate obtained for the parameter β in (5.2) for the appropriate time periods as given in the column heading.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.14: Impact of alternate polynomial functional forms on narrow election results with no controls

| | PAN | | PRD | | PRI | |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Polynomial spline of order: | | | | | | |
| Zero | -0.081 (0.107) | 0.618*** (0.200) | 0.086* (0.049) | 0.207 (0.128) | 0.050 (0.066) | -0.121 (0.121) |
| N | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |
| AIC | 6,749.470 | 9,489.294 | 1,828.861 | 5,658.524 | 9,266.278 | 17,471.887 |
| One | 0.111 (0.142) | 1.037** (0.449) | 0.242** (0.097) | 0.800** (0.358) | -0.069 (0.098) | -0.330 (0.350) |
| AIC | 6,745.210 | 9,465.081 | 1,815.892 | 5,631.381 | 9,268.344 | 17,475.278 |
| Two | 0.221 (0.186) | 1.740*** (0.605) | 0.278* (0.142) | 1.532** (0.677) | -0.076 (0.141) | -0.779 (0.731) |
| AIC | 6,742.272 | 9,456.979 | 1,813.233 | 5,568.928 | 9,272.309 | 17,477.915 |
| Three | 0.259 (0.198) | 2.627*** (0.760) | 0.383** (0.179) | 1.878** (0.820) | -0.133 (0.188) | -0.602 (0.597) |
| AIC | 6,741.506 | 9,441.413 | 1,793.293 | 5,541.002 | 9,274.155 | 17,480.774 |
| Four | 0.510** (0.239) | 3.374*** (0.858) | 0.379* (0.207) | 1.675* (0.877) | -0.421* (0.251) | 0.135 (0.872) |
| AIC | 6,740.669 | 9,425.681 | 1,776.923 | 5,538.304 | 9,273.513 | 17,481.532 |
| Five | 0.480** (0.233) | 3.219*** (0.848) | 0.370* (0.202) | 1.684** (0.858) | -0.391 (0.239) | 0.037 (0.744) |
| AIC | 6,740.618 | 9,428.848 | 1,778.385 | 5,539.287 | 9,273.062 | 17,481.675 |
| Optimal order of the polynomial | 5 | 4 | 4 | 1 | 0 | 0 |
| N | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |

NOTES: Regressions all follow general specification outlined in (5.2), with no covariates and replicate the functional form of columns 1 and 4 of tables 5.8, 5.9 and 5.10. The bandwidth for the local linear regression lies within the window $[-1, 1]$. The standard errors reported in parentheses are clustered at the municipal level. Optimal polynomial is that which minimises the AIC.

Each column reports the estimate obtained for the parameter β in (5.2) for the appropriate time periods as given in the column heading.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table 5.15: Impact of alternate polynomial functional forms on narrow election results with controls

| | PAN | | PRD | | PRI | |
|------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 | Petitions Rate +1 | Petitions Rate +2 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Polynomial spline of order: | | | | | | |
| Zero | -0.140 (0.113) | 0.464*** (0.178) | 0.090 (0.056) | 0.149 (0.130) | 0.062 (0.069) | -0.097 (0.119) |
| N | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |
| AIC | 6,728.720 | 9,398.945 | 1,826.981 | 5,607.759 | 9,255.009 | 17,468.119 |
| One | -0.011 (0.147) | 0.701* (0.421) | 0.227** (0.099) | 0.685** (0.341) | -0.061 (0.098) | -0.398 (0.389) |
| AIC | 6,730.084 | 9,391.739 | 1,818.676 | 5,590.100 | 9,256.787 | 17,471.064 |
| Two | 0.056 (0.194) | 1.057* (0.589) | 0.264* (0.146) | 1.456** (0.668) | -0.069 (0.141) | -0.737 (0.712) |
| AIC | 6,730.487 | 9,394.067 | 1,816.772 | 5,540.195 | 9,260.733 | 17,474.126 |
| Three | 0.077 (0.214) | 1.753** (0.756) | 0.382** (0.189) | 1.812** (0.808) | -0.096 (0.187) | -0.593 (0.637) |
| AIC | 6,731.975 | 9,389.644 | 1,799.602 | 5,519.977 | 9,262.945 | 17,476.715 |
| Four | 0.329 (0.274) | 2.440*** (0.851) | 0.395* (0.218) | 1.639* (0.858) | -0.392 (0.248) | 0.041 (0.739) |
| AIC | 6,735.508 | 9,384.596 | 1,780.858 | 5,520.891 | 9,261.950 | 17,477.941 |
| Five | 0.298 (0.267) | 2.273*** (0.844) | 0.382* (0.212) | 1.651** (0.839) | -0.362 (0.237) | -0.045 (0.651) |
| AIC | 6,733.441 | 9,386.974 | 1,782.399 | 5,519.698 | 9,261.500 | 17,480.107 |
| Optimal order of the polynomial | 0 | 4 | 4 | 5 | 0 | 0 |
| N | 2,025 | 2,025 | 1,465 | 1,465 | 2,984 | 2,984 |

NOTES: Regressions all follow general specification outlined in (5.2), with covariates and replicate the functional form of columns 3 and 6 of tables 5.8, 5.9 and 5.10. The bandwidth for the local linear regression lies within the window $[-1, 1]$. The standard errors reported in parentheses are clustered at the municipal level. Optimal polynomial is that which minimises the AIC.

Each column reports the estimate obtained for the parameter β in (5.2) for the appropriate time periods as given in the column heading.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

5.7 Strike threats stimulate electoral turnout

So far I have shown that strike threats are not only associated with elections, but the election of certain political parties directly increases the petition rate in the lead-up to the following election. At the end of the previous section, I hypothesized that the reason there is an increased number of strike petitions is that they are being misused as an electoral campaigning tool. In order to test this hypothesis I collected data from all of the state electoral institutes on electoral turnout at municipal level. This is distinct from the electoral district, as there is no direct one-to-one mapping between the two geographies. I argue that electoral turnout is stimulated by strike threats over and above the amount that would be affected by the mere existence of narrow elections in those municipalities ‘treated’ by having narrow elections.

Therefore, the most appropriate model to test my hypothesis is a triple differences-in-differences model³⁴ of the following form:

$$\begin{aligned} \text{Turnout}_{mst} = & \alpha_m + \rho_t + \psi_{st} + \delta \text{NarrowOutcome}_{mst-3} + \phi \text{Petition Rate}_{mst-1} \\ & + \gamma (\text{Narrow}_{mst-3} \times \text{Petition Rate}_{mst-1}) + \mathbf{X}_{mst}'\theta + \epsilon_{ms} \end{aligned} \quad (5.3)$$

where α is the fixed effect for the m^{th} municipality, ρ is the fixed effect for the t^{th} year, ψ is the specific time trend for the s^{th} state. δ is the standard differences-in-differences estimate of the impact of having a narrow election in the m^{th} municipality in the previous election on the following election. The variable *NarrowOutcome* is defined as follows: it takes the value of 1 for those municipalities that in the previous mayoral elections had a margin of victory of 10 percentage or less, and where a given party has won or been runner up, and zero otherwise. Two *NarrowOutcome* variables will be used in this analysis. *Narrow PAN* and *Narrow PRD*. These measure whether previous electoral results yield some influence in the following election turnout. ϕ is the effect of the Petition rate on turnout. \mathbf{X} is a matrix of controls, that are both varying at municipality and state level. These include municipal population, Presidential fixed effects, an indicator if a given state s is concurrently running gubernatorial elections or presidential elections, the rate of unemployment at state level. ϵ is the municipal error term. Finally, γ is the parameter of interest, as it disentangles the turnout variation due to strike threats in the

³⁴Time has been re-indexed to the next election, so the previous narrow election is now $t - 3$ and the causal effect in the previous section is found for $t - 1$.

period prior to electoral year t .

The interpretation that can be given to the γ parameter is the variation due to the increased intensity in the state of industrial relations, as measured by strike threats for those municipalities that experienced a narrow electoral contest. I estimate the model separately for those municipalities that experienced a narrow right-wing or left-wing wins, and a final set of model estimates that include both differences-in-differences estimates in a single model.

Table 5.16 reports the results for this exercise. There are no direct effects from narrow outcome elections where the right-wing party was competitive. Whereas as shown by column 4 municipalities with a narrow left-wing outcome in the previous electoral cycle saw an increase in electoral turnout at the following election by approximately 1.2 percentage points. These effects are reduced by the inclusion of the unemployment rate in the year before the election. When dummies for presidential election years and gubernatorial election years, are introduced the effects from a narrow electoral win disappear. However, once state time trends, presidency fixed effects and electoral-year fixed effects are introduced the magnitude is roughly halved. This suggests that there are important temporal effects that need to be accounted for in modelling electoral turnout. These temporal effects should in themselves not be surprising. Over the time period in the sample there were several electoral and judicial reforms which would increase confidence in the electoral process and thus increase turnout.

Strike threats are found to have a direct effect upon electoral turnout but once additional controls are introduced this effect disappears as in columns 2, 3, 5, 6, 8, 9. However, Column 1 implies that whilst there is no direct impact in narrowly contested right-wing municipalities, there is a joint effect channelled through the intensity of the strike threat rate one year prior to the following election. The γ coefficient suggests that for those municipalities who in the previous election had a right-wing mayor or runner up, exhibit an increase of 0.480 percentage points in electoral turnout per each additional strike threat per 10,000 of the municipal population. When additional temporal controls are introduced the magnitude of this effect is roughly halved. For those municipalities that where the left were electorally competitive, strike threats do not stimulate electoral turnout. When accounting for presidential fixed effects, electoral cycle fixed effects and state time trends I find that increases in the petition rate reduce electoral turnout by 0.809 per each additional strike threat per 10,000 of the population.

Table 5.16: Triple Difference-in-Differences estimates of Electoral Turnout (%)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|--|----------------------|----------------------|-----------------------------|----------------------|----------------------|-----------------------------|----------------------|----------------------|-----------------------------|
| Narrow PAN | -0.235 (0.596) | -0.760 (0.540) | -0.341 (0.482) | | | | -0.207 (0.595) | -0.701 (0.540) | -0.300 (0.482) |
| Narrow PAN× Petition rate _{t-1} | 0.480** (0.231) | 0.403** (0.185) | 0.298* (0.170) | | | | 0.477** (0.231) | 0.399** (0.185) | 0.295* (0.169) |
| Narrow PRD | | | | 2.111*** (0.516) | 1.645*** (0.422) | 1.184*** (0.397) | 2.109*** (0.515) | 1.611*** (0.423) | 1.172*** (0.397) |
| Narrow PRD× Petition rate _{t-1} | | | | -0.149 (0.904) | -0.719* (0.425) | -0.809* (0.429) | -0.151 (0.887) | -0.716* (0.422) | -0.807* (0.427) |
| Petition Rate _{t-1} | 0.254** (0.116) | 0.053 (0.052) | 0.014 (0.038) | 0.277** (0.130) | 0.074 (0.065) | 0.032 (0.046) | 0.256** (0.118) | 0.057 (0.055) | 0.019 (0.040) |
| Unemployment Rate _{t-1} | | -1.142*** (0.177) | -1.453*** (0.221) | | -1.141*** (0.177) | -1.440*** (0.221) | | -1.139*** (0.177) | -1.445*** (0.221) |
| Presidential election | | 1.460 (1.787) | -6.309 (11.771) | | 1.463 (1.789) | -6.184 (11.762) | | 1.454 (1.784) | -6.310 (11.764) |
| Governor election | | 2.549*** (0.459) | 2.521*** (0.436) | | 2.593*** (0.459) | 2.551*** (0.435) | | 2.570*** (0.458) | 2.533*** (0.435) |
| Constant | 58.440*** (0.259) | 66.800*** (2.161) | 23,781.191* (12,248.885) | 58.352*** (0.257) | 66.637*** (2.153) | 23,776.717* (12,240.488) | 58.358*** (0.258) | 66.721*** (2.157) | 23,676.957* (12,237.546) |
| Presidency FE | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| State Time trends | No | No | Yes | No | No | Yes | No | No | Yes |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| R ² | 0.01 | 0.28 | 0.40 | 0.01 | 0.28 | 0.40 | 0.01 | 0.28 | 0.40 |
| N | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 |
| AIC | 45269.26 | 43296.78 | 42174.8 | 45262.54 | 43294.15 | 42172.21 | 45260.51 | 43291.64 | 42172.51 |

NOTES: Regressions all follow general specification outlined in (5.3). The standard errors are reported in parentheses and are clustered at state level.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

I will interpret the model in column 9, as this accounts for important temporal variation, as well as disentangling the effects of the narrow electoral victories and petitions. The model itself also minimises the [AIC](#), thus suggesting that this model has the best fit amongst those presented. Each marginal petition decreases (increases) electoral turnout in those municipalities where the [PRD](#) ([PAN](#)) won by 0.807 (0.295) of a percentage point per additional petition per 10,000 of the population. In order to get perspective on what these estimates imply I will now provide an illustration of the implied effect for municipalities where both [PAN](#) and [PRD](#) won narrow electoral victories.

Earlier in this chapter the causal effect of narrow [PRD](#) and [PAN](#) victories was derived from (5.2) by the estimates of the β parameter. The estimand for γ is valid for all municipalities where a narrow electoral contest took place, however, the β estimate is only causal where the named parties (viz. [PAN](#), [PRD](#)) won. Thus, a back-of-the-envelope calculation may be made evaluating the implied causal effect on the turnout of the following election by multiplying it by the γ estimate from equation (5.3).³⁵ Thus, we know that municipalities where a [PAN](#) mayor was elected by a narrow margin of ± 10 percentage points perceived a causal increase of 1.057 petitions per 10,000 of the population as suggested in column 6 of [table 5.8](#). If we multiply both of these estimates this suggests that there is an increase of 0.311 percentage points in electoral turnout per 10,000 of the municipal population as a result of the increased number of petitions. The estimated standard error associated with this point estimate is 0.208. This suggests that the estimate is marginally statistically significant at a 10% level.

Now, to derive the effect of a narrow left-wing victory. The coefficient in column 9 of [table 5.16](#) suggests in municipalities that had a narrow left-wing victory for each additional petition per 10,000 of the population there is a decrease in electoral turnout of 0.807 percentage points. From column 6 of [table 5.9](#) we know that narrow [PRD](#) victories at the 10 percentage point margin increase the petition rate by 1.456 per 10,000 of the municipal population. Thus, if we take the product of both of these estimates which suggests that each additional petition *decreases* turnout by 1.75 percentage points. The standard error for this point estimate is 0.638, which suggests this finding is significant at 5%. The magnitude of this effect is roughly half of the expected increase due to gubernatorial elections.

³⁵To test the significance of this prediction the analytical variance can be derived using the delta method, this is found to be:

$$V(\hat{\beta} \cdot \hat{\gamma}) = V(\hat{\beta}) \cdot V(\hat{\gamma}) + V(\hat{\beta}) \cdot \hat{\gamma}^2 + V(\hat{\gamma}) \cdot \hat{\beta}^2$$

Table 5.17 disaggregates the difference-in-differences exercise by union type. It is notable that for municipalities where there was a narrow right-wing victory, the turnout effect is being channelled by the increases in strike threats by independent unions. Evaluating the compound effect for narrow left-wing victory is obtained by evaluating the causal change in petitions due to officialist unions two years after the narrow election. From column 6 of table 5.11 we know that left-wing elections are associated with an increase of 1.5 petitions per 10,000 of the municipal population. The product of that estimate with the relevant differences-in-differences parameter in column 6 of table 5.17 suggests that this increase in petitions is associated with a decline in electoral turnout of 1.65 percentage points. The standard error for this point estimate is 0.624, suggesting that this is significant at 1%. This decline in turnout is comparable with the decline in turnout due to a one percentage point increase in state-level unemployment. No such effects are detected for PAN narrow elections.

This section had the explicit goal of demonstrating that the increases in the petition rate following narrow right- and left-wing victories matter. I have shown that whilst numerically these effects may appear small when these are evaluated at the average causal increases suggested in Section 5.6, these effects are non-trivial relative to other electoral year effects. Implicit in the calculations performed in this section, is the following causal chain: An narrow-win of PRD (PAN) election happens in time t , in time $t + 2$ there are 1.456 (1.056) more strike threats in those contested municipalities; the additional strike threats stimulate increases in turnout for the election in $t + 3$ by -1.75 (.311) percentage points. Whilst in of themselves these magnitudes are not sufficient to swing the margin of the following election,, these findings suggest that unions via strike threats, may play an role in mobilising the electorate. If one considers that electoral advertising is strongly regulated by IFE, then this could potentially constitute illegal electoral campaigning.

Table 5.17: Triple Difference-in-Differences estimates of Electoral Turnout (%), by union type

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|----------------------|----------------------|-----------------------------|----------------------|----------------------|-----------------------------|----------------------|----------------------|-----------------------------|
| Narrow PAN | -0.154 (0.604) | -0.724 (0.546) | -0.311 (0.488) | | | | -0.120 (0.604) | -0.663 (0.546) | -0.268 (0.487) |
| Narrow PAN× OU Petition Rate _{t-1} | 0.177 (0.388) | 0.253 (0.322) | 0.170 (0.286) | | | | 0.168 (0.388) | 0.247 (0.287) | 0.164 (0.287) |
| Narrow PAN× IU Petition Rate _{t-1} | 1.477** (0.723) | 0.879** (0.403) | 0.690** (0.317) | | | | 1.502** (0.730) | 0.885** (0.407) | 0.698** (0.317) |
| Narrow PRD | | | | 2.053*** (0.490) | 1.637*** (0.420) | 1.178*** (0.395) | 2.056*** (0.491) | 1.604*** (0.421) | 1.166*** (0.396) |
| Narrow PRD× IU Petition Rate _{t-1} | | | | 4.898** (2.110) | 0.801 (1.830) | 0.951 (2.012) | 4.967** (2.103) | 0.843 (1.836) | 0.989 (2.014) |
| Narrow PRD× OU Petition Rate _{t-1} | | | | -0.785 (0.751) | -0.960** (0.407) | -1.095*** (0.379) | -0.794 (0.742) | -0.960** (0.407) | -1.096*** (0.378) |
| OU Petition Rate _{t-1} | 0.365*** (0.137) | 0.158 (0.107) | 0.143 (0.099) | 0.384*** (0.139) | 0.183* (0.110) | 0.169* (0.099) | 0.381*** (0.139) | 0.174 (0.109) | 0.163 (0.101) |
| IU Petition Rate _{t-1} | 0.027 (0.210) | -0.152 (0.112) | -0.231** (0.117) | 0.073 (0.252) | -0.131 (0.131) | -0.223* (0.119) | 0.003 (0.204) | -0.169 (0.113) | -0.252** (0.120) |
| Unemployment Rate _{t-1} | | -1.152*** (0.178) | -1.461*** (0.221) | | -1.153*** (0.178) | -1.450*** (0.221) | | -1.150*** (0.178) | -1.452*** (0.221) |
| Presidential election | | 1.384 (1.789) | -6.433 (11.772) | | 1.383 (1.791) | -6.302 (11.762) | | 1.344 (1.788) | -6.433 (11.760) |
| Governor election | | 2.523*** (0.460) | 2.497*** (0.436) | | 2.567*** (0.459) | 2.526*** (0.435) | | 2.542*** (0.459) | 2.508*** (0.436) |
| Constant | 58.408*** (0.260) | 66.909*** (2.171) | 23.639.517* (12,238.635) | 58.328*** (0.260) | 66.781*** (2.163) | 23,631.023* (12,230.316) | 58.327*** (0.259) | 66.857*** (2.167) | 23,494.295* (12,219.626) |
| Municipal FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Presidency FE | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| State Time trends | No | No | Yes | No | No | Yes | No | No | Yes |
| R ² | 0.01 | 0.28 | 0.40 | 0.01 | 0.28 | 0.40 | 0.01 | 0.28 | 0.40 |
| N | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 | 6,354 |
| AIC | 45269.69 | 43298.49 | 42175.4 | 45261.6 | 43295.82 | 42172.05 | 45258.91 | 43294.6 | 42173.81 |

NOTES: Regressions all follow general specification outlined in (5.3). The standard errors are reported in parentheses and are clustered at state level.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

5.8 Summary and Discussion

This chapter set out to answer the following questions: Do Union strike threats follow the business cycle? Do Union strike threat follow political cycle? I addressed this question by exploiting the administrative records of the local jurisdiction Arbitration and Conciliation commissions that govern union activity in Mexico. Utilising this extensive database, I look at strike threats in the private sector, during a period of increased democratisation and political institution improvement. My findings are three-fold:

The key findings are as follows. Petitions increase as the state-level unemployment rate increases; this may be consistent with [Reder and Neumann \(1980\)](#) view of strikes as inversely proportional to their cost (strike threats are cheap after all). The cost of threatening to strike, or striking increases at an economic trough, as such suggesting that strike threats are counter-cyclical. Inflationary episodes decrease the number of strike threats, suggesting that collective bargaining is usually performed during periods of certainty. When the models are extended to include a dummy for municipal electoral year effects yields a positive finding. Municipalities, and mayors, in particular, do *not* have any control over the field of labour relations in the private sector, as such we should expect *ex ante* that there should be no electoral year effects, and yet the mere fact of being a municipal election year increases the rate of strikes by 0.012 per 10,000 of the municipal population. This effect dominates the cyclical effects previously discussed.

The analysis then focuses on whether there are direct causal effects from close municipal elections to strike threats. I exploit the quasi-random nature of close municipal elections to conduct a [RD](#) exercise. This yields the finding that when the right or left- win this leads to an increase of 0.796 (1.218) petitions per 10,000 of the municipal population. If these are evaluated at the mean municipal populations where the right- and left-wing win then these effects suggest an increase of 10.2 (9.6) more petitions than all other Municipalities. I find no change to strike threat behaviour for the centrist [PRI](#) party. This finding is found to be robust to the inclusion of state level controls, and alternate bandwidth specifications. This finding is particularly troublesome since a mayor has no control over any regulation regarding unions. Unions themselves should have no preferences, nor misuse petitions against Municipal Presidents.

The lack of a significant finding for the [PRI](#) party, suggests that there may be a direct partisan motive by unions and of executive discretion in the union leadership. I posit that

contrary to the analysis of [Bensusán and Middlebrook \(2012a\)](#), ‘officialist’ unions continued their partisan support for the [PRI](#). Whilst this did not necessarily translate into increased numbers of strikes, the evidence I provide suggests that the rate of strike threats increased. I argue that these strike petitions—a tool for bargaining—are misused for electoral purposes by the union leadership. In the final part of the analysis I demonstrate that the increased rate of threats two years after an election has an effect upon electoral turnout in the key municipalities where the [PRI](#) has a chance to recapture power. I employ a differences-in-differences approach. I compare those municipalities that had a close election, relative to those that did not. When this is interacted with petitions, I find that one extra marginal petition per 10,000 of the municipal population increases turnout in municipalities where there was a narrow win for the right (left) by 0.295 (-0.807) of a percentage point. This is an important finding, when a back-of-the-envelope calculation is performed for the average municipality where the right- (left-)wing win, it implies an increase (decrease) in electoral turnout of 0.311 (-1.75), which is sizeable when compared to the added turnout due to having a year of gubernatorial elections, where these increase turnout by 2.49%.

Finally, I answer the question: Are trade unions a fast- or a slow-changing institution? The findings presented in this chapter suggest that over the time period under investigation—when strong independent political institutions were being built—unions reflected the slow-changing nature of societal norms. They did not change their behaviour in the face of a changing political landscape. This is to some extent consistent with the findings in the literature that suboptimal institutions persist in the slow changing nature of cultural norms (see [Nunn, 2009](#); [Dell, 2010](#); [Guiso et al., 2013](#); [Alesina and Giuliano, 2015](#)). However, unlike culture, unions can be reformed, just as with the institutional improvement surrounding the electoral authorities. In particular rules surrounding internal union democracy may be an area where legislative changes may reduce the agency problem which leads to a divergence between union leadership aims and the wishes of the rank-and-file.

Appendix G

Continuity of Covariates

This appendix reports the results of a series of robustness tests for spuriousness in the RD design. A concern may be that the effect observed is spuriously discontinuous. It has been suggested in the RDD literature that one may visually inspect the balance of the covariates across the discontinuity (Lee and Lemieux, 2010). If one finds that there is no discontinuous effect on the covariates, then, the RD design is valid and the covariates may be included in the local linear regressions. Below I reproduce such diagrams for each political party (*viz.* PAN, PRD, PRI). In all three cases, there is no visible discontinuity in the covariates along the forcing variable. This suggests that the RD findings reported in the text are not spurious, and the rate of unexplained workplace deaths at municipal levels, and the state level unemployment rates are valid covariates.

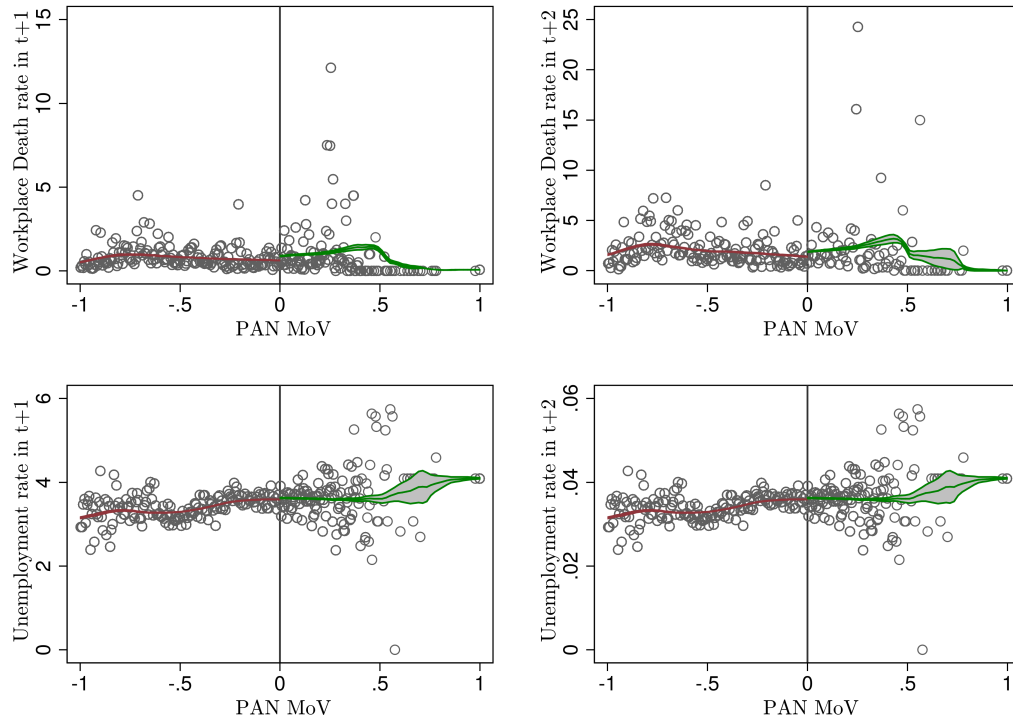
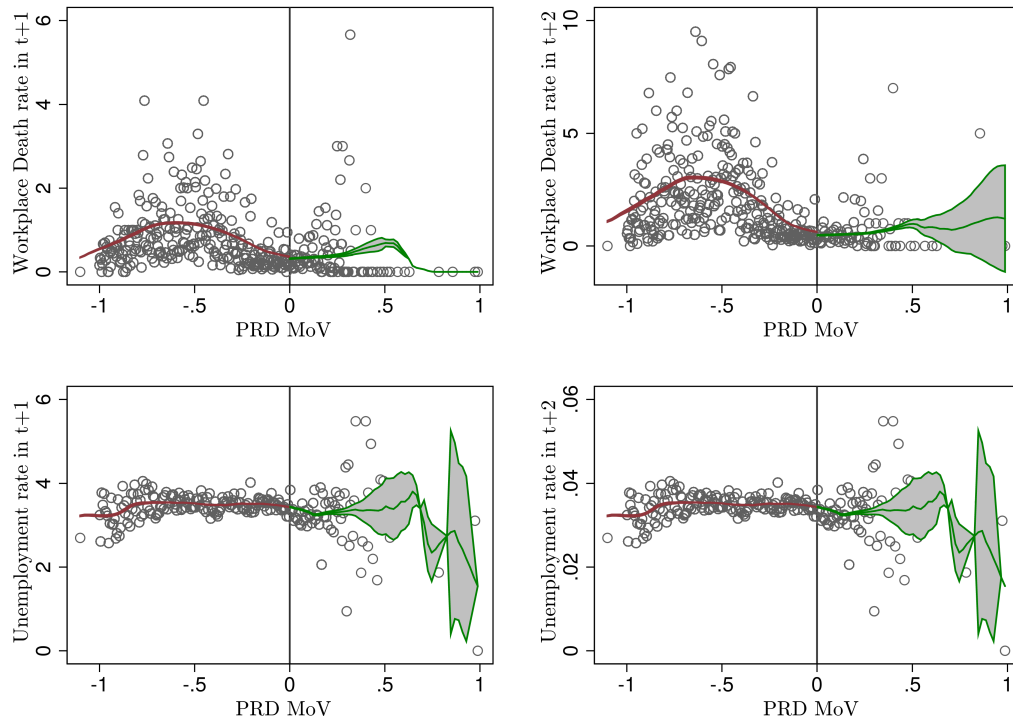
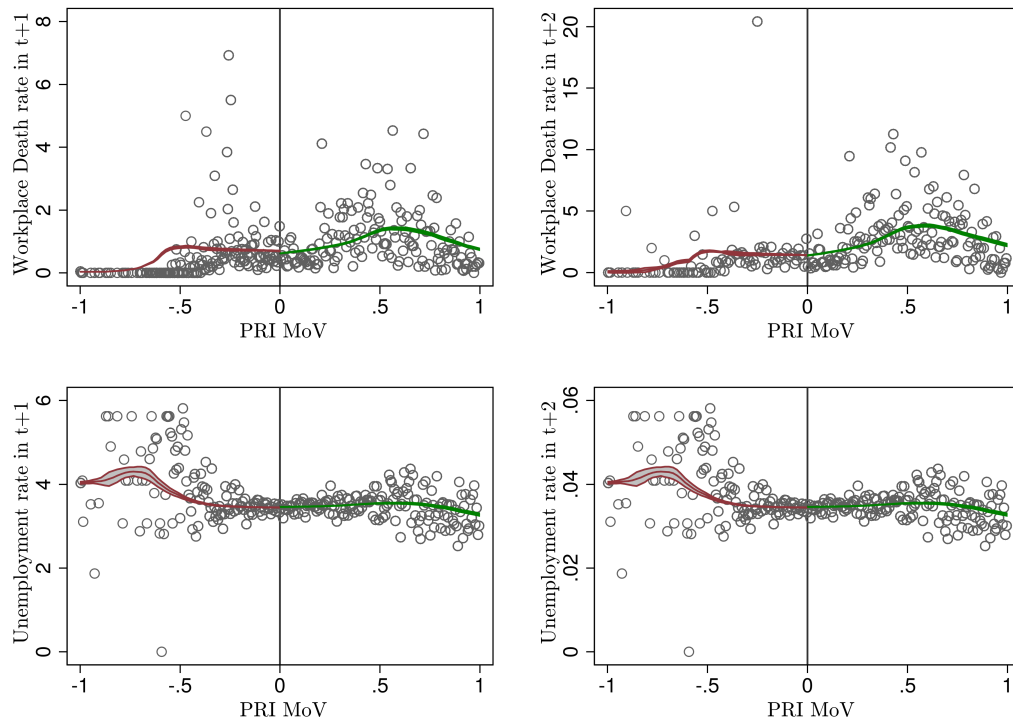
Figure G.1: Continuity PAN Covariates**Figure G.2:** Continuity PRD Covariates

Figure G.3: Continuity PRI Covariates

Appendix H

Non-parametric regression discontinuity

Table H.1: Impact of narrow PAN elections on strike petition rate, non parametric estimates

| | Petition Rate +1 | | Petition Rate +2 | |
|-------------------|---------------------|------------------|---------------------|---------------------|
| | IK BW | CCT BW | IK BW | CCT BW |
| All Union | 0.156 (0.151) | 0.143 (0.146) | 1.192** (0.535) | 1.250** (0.496) |
| h | 0.197 | 0.124 | 0.157 | 0.122 |
| N | 3,414 | 2,427 | 2,895 | 2,392 |
| Independent Union | 0.039 (0.047) | 0.047 (0.047) | -0.168 (0.263) | -0.185 (0.255) |
| h | 0.226 | 0.129 | 0.292 | 0.305 |
| N | 3,759 | 2,496 | 4,397 | 4,526 |
| Officialist Union | 0.099 (0.128) | 0.105 (0.129) | 1.312*** (0.421) | 1.421*** (0.434) |
| h | 0.189 | 0.133 | 0.129 | 0.104 |
| N | 3,300 | 2,558 | 2,491 | 2,095 |

NOTES: Regressions are all estimated using non-parametric methods outlined in [Calonico et al. \(2014b\)](#).

Narrow wins here are optimally computed using the [Imbens and Kalyanaraman \(2012\)](#) and [Calonico et al. \(2014c\)](#) bandwidth estimators, these are columns IK and CCT, respectively where the reported parameter h is the bandwidth utilised.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t . The standard errors reported below in parentheses are the result of the [Calonico et al. \(2014c\)](#) robust-bias corrected procedure.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table H.2: Impact of narrow PRD elections on strike petition rate, non parametric estimates

| | Petition Rate +1 | | Petition Rate +2 | |
|-------------------|---------------------|-------------------|---------------------|---------------------|
| | IK BW | CCT BW | IK BW | CCT BW |
| All Union | 0.143 (0.148) | 0.117 (0.182) | 1.445*** (0.391) | 1.966*** (0.476) |
| h | 0.270 | 0.107 | 0.143 | 0.059 |
| N | 3,063 | 1,541 | 1,913 | 920 |
| Independent Union | -0.023 (0.071) | -0.037 (0.080) | -0.093 (0.110) | -0.095 (0.100) |
| h | 0.226 | 0.163 | 0.113 | 0.125 |
| N | 2,717 | 2,126 | 1,603 | 1,720 |
| Officialist Union | 0.140 (0.111) | 0.204* (0.114) | 1.683*** (0.376) | 2.076*** (0.435) |
| h | 0.199 | 0.084 | 0.146 | 0.054 |
| N | 2,462 | 1,238 | 1,956 | 873 |

NOTES: Regressions are all estimated using non-parametric methods outlined in [Calonico et al. \(2014b\)](#).

Narrow wins here are optimally computed using the [Imbens and Kalyanaraman \(2012\)](#) and [Calonico et al. \(2014c\)](#) bandwidth estimators, these are columns IK and CCT, respectively where the reported parameter h is the bandwidth utilised.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t + 1$ and $t + 2$ in a given municipality that had an election in t . The standard errors reported below in parentheses are the result of the [Calonico et al. \(2014c\)](#) robust-bias corrected procedure.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Table H.3: Impact of narrow PRI elections on strike petition rate, non parametric estimates

| | Petition Rate +1 | | Petition Rate +2 | |
|-------------------|---------------------|-------------------|---------------------|-------------------|
| | IK BW | CCT BW | IK BW | CCT BW |
| All Union | -0.029 (0.170) | -0.061 (0.129) | -0.390 (0.435) | -0.153 (0.411) |
| h | 0.161 | 0.145 | 0.212 | 0.173 |
| N | 4,359 | 4,018 | 5,158 | 4,554 |
| Independent Union | 0.020 (0.043) | 0.018 (0.047) | -0.075 (0.106) | 0.131 (0.178) |
| h | 0.151 | 0.193 | 0.224 | 0.161 |
| N | 4,159 | 4,886 | 5,311 | 4,354 |
| Officialist Union | -0.033 (0.309) | -0.049 (0.104) | -0.319 (0.484) | -0.291 (0.298) |
| h | 0.298 | 0.149 | 0.198 | 0.160 |
| N | 6,048 | 4,113 | 4,962 | 4,332 |

NOTES: Regressions are all estimated using non-parametric methods outlined in [Calonico et al. \(2014b\)](#).

Narrow wins here are optimally computed using the [Imbens and Kalyanaraman \(2012\)](#) and [Calonico et al. \(2014c\)](#) bandwidth estimators, these are columns IK and CCT, respectively where the reported parameter h is the bandwidth utilised.

Each column reports the estimate obtained for the Petition rate per 10,000 of population in $t+1$ and $t+2$ in a given municipality that had an election in t . The standard errors reported below in parentheses are the result of the [Calonico et al. \(2014c\)](#) robust-bias corrected procedure.

***, **, * denote statistical significance at the 1%, 5% and 10%, respectively.

Chapter 6

Conclusion

This thesis has investigated the behaviour of Mexican unions. Mexico has been the subject of the largest academic literature on union effects for developed countries, and I set out to update this knowledge and expand it by documenting union effects to wages and non-wage benefits over the last decade. I also document the perverse institutional behaviour of unions during two recent decades, when Mexico witnessed a democratic transition and the creation of strong political and judicial institutions. The last decade, and backdrop for this thesis, witnessed further changes to the Mexican electoral and political system with the passing of a long-promised labour market reform. It was also a time of economic uncertainty, characterised by the ‘great recession’ of 2008, and a further recession in 2012.

6.1 Summary and reflection of findings

Labour relations in Mexico must be understood in the context of the authoritarian regime run by *Partido Revolucionario Institucional* (PRI), which ruled the country for 71 years. As was reviewed in [Chapter 2](#), this political hegemony was made possible due to the co-opting of organised labour movements. Worker groupings were effectively organised into another sub-branch of the PRI party. Their role was to ensure that union workers turned out to vote for the party. This level of control was achieved by providing large trades unions congresses such as *Congreso del Trabajo* (CT) and *Confederación de Trabajadores de México* (CTM) leverage over its rank-and-file through coercive laws which ensured that union membership was not only desirable to workers, but essential to maintaining their job. The use of exclusion clauses and the lack of internal democracy within unions created an effective tool for maintaining

union members within the system. If that was the ‘stick’, the ‘carrot’ was in the form of enhanced non-wage benefits and regular wage increases. However, this control system came to an abrupt halt as the 1980s debt crisis put stresses on the public purse, and changed the nature of Mexican politics. PRI was faced with a series of [International Monetary Fund \(IMF\)](#) structural adjustment programmes. These programmes entailed a mass sell-off of public enterprises, and a reorientation of the Mexican economy towards an export-oriented system. Unions navigated this uncertain climate by changing the nature of their discourse from one which sought to maximise wage increases, and instead fought for higher ‘social’ wages, that is, higher non-wage benefits. Nevertheless, this change in politics saw unions lose the privileged position they had previously held within PRI.

The election of Carlos Salinas de Gortari in the controversial 1988 presidential elections, created the impetus for the political reforms during the 1990s. The introduction of [Instituto Federal Electoral \(IFE\)](#) and an independent judicial oversight over elections created the pre-conditions for democratisation that would lead to the watershed 2000 presidential elections, which would see an end to PRI’s unbroken run of holding the top political office of the country. At the time, some feared that unions still loyal to the PRI would ensure the country would be ungovernable ([Bensusán and Middlebrook, 2012a](#)). These views ignored the fragmentation which had occurred within organised labour throughout the 1990s. The upheaval caused by the crises in 1980s and the structural changes in the Mexican economy meant that ‘officialist’ unions began falling out of favour, and the death of Fidel Velázquez¹ signalled a change in labour relations. During this period independent unionism became a credible alternative, however unlike ‘officialist’ unions they did not adopt the same deferential approach to the state and employers. Some, influenced by company unions allied with business and [Partido Acción Nacional \(PAN\)](#), whilst others wished to hold government to account and sought to remain internally democratic, and allied with [Partido Revolucionario Democrático \(PRD\)](#), and of course ‘officialist’ unions remained broadly aligned to the PRI.

It is here where the analysis in this thesis begins. In the spirit of [Freeman and Medoff \(1984\)](#), in [Chapter 3](#) I asked: “What have Mexican unions done to wages in the past decade?” This question was explored by employing a two-fold approach. In the first part of the analysis I focus on estimating the union wage mark-up, whilst in the second I seek to assess the effect of unions across the wage distribution. The analysis in this chapter exploited the [Encuesta Nacional de](#)

¹Recall that he was Secretary General of the [CTM](#) since 1943.

Ocupación y Empleo (ENOE) labour force survey, a panel dataset which began in 2005 and is conducted quarterly, to inform on union behaviour in the past 11 years. The contribution of this chapter to the wider academic literature was in the form of a careful consideration of union treatment effects, and the updating of knowledge to encompass the last decade.

The raw union-nonunion wage gap was found to range between 18–22% for the period 2005q1–2016q1. This was the more thoroughly interrogated through the estimation of wage equations using OLS. These estimates were then utilised to provide the basis for implementing the well known Oaxaca–Blinder decomposition (Oaxaca, 1973; Blinder, 1973) in order to estimate the adjusted wage gap. When asking the question: “What would be the average gap if a nonunion worker were to unionise?” the findings suggest a wage mark-up that lies between 6.7–13%. Thus, suggesting that whilst the majority of the raw wage differential is explained by the relatively better characteristics of unionised individuals, there is a modest and non-trivial union effect on wages.

The veracity of these estimates is then investigated through the application of various methods. Firstly, one issue raised by the academic literature concerns the non-random nature of union attachment. This concern relates to the fact that individuals who unionise are not a random draw from the population in terms of observable and unobservable characteristics, and it is perhaps those with better characteristics that select into unions. As widely acknowledged (Robinson, 1989; Rios-Avila and Hirsch, 2014), overcoming this issue is tricky. I employed a (Lee, 1978) endogenous switching model to account for this selection. The stringent nature of government regulation of strikes was exploited to obtain identifying instruments. The strike procedure and the usage of strike petitions yields a high-quality dataset which includes all strike threats that fall under state jurisdiction. The heterogeneity between independent and ‘officialist’ unions were then utilised to estimate two separate petition rates with a one year lag. These data are used as an instruments for an individual’s selection into union status. The results suggest that for Mexico, using the instrument set there is no selection into unions. Instead the findings suggest that there are unobservable characteristics which determine nonunion attachment which are negatively related to wages. The selectivity corrected wage differential is then computed using a similar approach to that of Duncan and Leigh (1980). The findings when computing the Average Treatment Effect on the Non-treated (ATEN) suggest that they are remarkably invariant to selection, where the effect is found to be statistically significant. An estimate of the Average Treatment Effect on the Treated (ATET) is obtained by exploiting the panel nature of

ENOE, and thus estimating a model with individual fixed-effects. In this application the union wage gap for those that switch union status is found to be 2% over the last decade.

I then provided a synthesis of all of the estimated treatment effects as suggested in all of these different estimates and compare them to previous estimates of the union mark-up reported in the literature. I conclude that the discrepancies in size are due to the conceptual differences in the estimated treatment effects. When these are considered jointly a coherent narrative emerges. My findings indicate that a union wage mark-up exists, and the [Average Treatment Effect \(ATE\)](#) oscillates between 7–10%. This estimate averages the findings of the [ATET](#) and [ATEN](#). The estimates from a naïve application of individual fixed-effects estimators conflate the effect of union ‘joiners’ and ‘leavers’ without properly accounting for the fact that these are opposite effects, and this explains the attenuation in the estimates. A more careful consideration of the [ATET](#) provided the subsequent focus of [Chapter 4](#).

One regularity found in the economics literature refers to the ‘sword-of-justice’ effect ([Callan and Reilly, 1993](#); [Metcalf et al., 2001](#)) that unions exert across the wage distribution. This refers to the observed compression in the dispersion of wages of union members. The existence of this effect is hinted at by estimates of the variance from wage equations from both OLS and the [Lee \(1978\)](#) model. A simple analysis of these reveals that union wages have systematically lower variance than those in the nonunion sector. I then estimated a variance decomposition for these two models. These findings suggest that unions decrease the dispersion of wages. This is then further explored through the use of conditional quantile regression techniques ([Koenker and Bassett, 1978](#)). This also permits for a more flexible approach at determining the magnitude of the union wage mark-up across the conditional wage distribution. The findings suggest that in the Mexican context, this sword is blunt. There is evidence that unions reduce dispersion in the wage distribution, but this seems to only be possible during non-recessionary periods. This equity is enforced through higher returns at the bottom end of the conditional wage distribution, with returns decreasing as one progresses up out the distribution. It is, however, at the upper ends of the wage distribution where the ‘sword-of-justice’ glints, unions appear to reduce the wages of those at the 90th percentile of the conditional wage distribution, relative to their non-unionised counterparts.

Taken as a whole, the findings from this chapter are suggestive of unions being a weakly equalising force in the labour market, that cannot perfectly shelter their workers from wider macroeconomic forces. Nevertheless, the heterogeneity in union types uncovered by the contex-

tualisation, and the slight increase in unionisation rates during the early 2000s, suggest that the estimates of the ATE may not be a good characterisation the union mark-up, and thus explain happenings in the Mexican labour market.

Chapter 4 asks “Are there are gains and losses associated with joining and leaving a union?” This chapter adopts a differences-in-differences approach to determine what benefits new union ‘joiners’ and ‘leavers’ perceive during the previous eleven years. The findings suggest that joining and leaving a union is associated with no wage gains and small wage losses respectively, unlike what the literature reports for most industrialised economies. The lack of wage increases for new joiners and leavers are suggestive of the narrative which emerged in the estimates of the ATET from Chapter 3, namely that unions are fairly weak. The discrepancy in wage differences between both of these papers can be explained by the conceptual difference between instrument ‘compliers’ with actual union ‘joiners’. In the first, the individuals identified as ‘joiners’ may in fact be individuals whose wages have already been subject to union wage bargaining practices for a number of years, whilst in this chapter, ‘joiners’ are those who were observed transitioning into a union. The relatively ‘new’ nature of these union joiners implies that it is unlikely that unionisation would be able to immediately lead to an increase the wages of their workers. Equally, those who leave unions will not necessarily lose their union bargained wages immediately. However, there are exceptions to these statements, namely those individuals who exit (enter) a union and hold temporary contracts. These subgroups were found to incur relatively large losses (increases) in wages relative to their always (never) unionised counterparts. These findings suggest that unions, whilst perhaps ineffective for the average worker, still seek to improve the lot of marginalised workers.

Nevertheless, the findings from Chapter 4 suggest that the real gains and losses associated with unionisation are not to be found in ones wages, but rather in terms of non-wage benefits. This chapter contributed to the wider literature by providing the first estimates of the real gains (losses) associated with joining (leaving) a union, otherwise known as the ATET, with respect to non-wage benefits. The findings revealed that joining (leaving) a union increased (decreased) the probability of being in receipt of legally guaranteed benefits such as bonuses, paid holidays and pensions. The findings suggested a flagrant disregard of the law, which is concerning. This disregard for the law reflects the poor enforcement of the *Ley Federal del Trabajo* (FLL) and is suggestive of weak regulatory institutions. The estimated magnitudes for gains varied but were found to range between 4.4 and 13.4 percentage points, which when evaluated at pre-transition

incidence rates suggested sizeable gains of 3.7-11.2% relative to those individuals who never unionised. A caveat with these estimates, is that although these are the [ATET](#) there may be other concurrent changes, such as job moves, that may be associated with these findings. As such I sought to disentangle the estimated effects between those individuals who were firm stayers and those who were firm movers. The estimates allow me to determine whether the union effects are related to passive or active unionisation. The result from this exercise suggested that those who stand to benefit the most from unionisation, are those for whom non-wage benefits are not guaranteed under the [FLL](#). Finally, the robustness of the findings was confirmed through the application of a set of conditional differences-in-differences regressions, those accounted for the differing characteristics between those joiners and leavers who are concentrated in larger and smaller firms, respectively.

The findings that emerged from this chapter confirm the change in bargaining strategy as suggested in [Chapter 2](#). The change in union dialectic from wages to ‘social wages’, is reflected in the higher non-wage benefits enjoyed by union joiners. These gains may also have a direct effect upon a worker’s pocket, as they may be perceived in monetary terms. Whilst the evidence I presented is unable to go further and attach a magnitude to the size of the gains, the greater incidence of bonuses, and paid holidays have a direct translation to higher pay. Whilst these may be lump-sum payments, they represent ways in which workers are able to improve their conditions. Thus, despite the continued decline in union density, unions have still an important role to play in voicing worker’s preferences with respect to wider compensation and ensuring that employers are compliant with the law. A final caveat to this interpretation must be addressed, the estimates from this chapter represent the average gains and losses of individuals to joining and leaving a union. However, the nature of the union question asked in [ENOE](#) does not allow me to disaggregate these effects by type of union. So, these estimates are unable to inform on the effects of union heterogeneity, without further assumptions. However, it does not seem unreasonable to assume that workers will only unionise into those unions that they perceive to be effective, and so if ‘officialist’ unions are perceived to be inefficient, then the [ATET](#) from joining may be perceived as the independent union gain. Conversely, the [ATET](#) of leaving, could be interpreted as the loss associated with leaving an ‘officialist’ union. Unfortunately, as hinted, this proposition is untestable due to the nature of the data.

Finally, [Chapter 5](#) was a novel investigation, which provided the first empirical estimates of the political behaviour of unions in Mexico. In this chapter I sought to elucidate whether the

relationship between unions and political parties continued to exist during the period 1991–2012. This period is notable as it spans the extensive political and judicial reforms of the 1990s. I exploited the administrative data on all strike threats that fell under local jurisdiction level, during the period of political institutional improvement. The analysis in this chapter was in three distinct stages. First, I documented the behaviour of strike threats along the business and economic cycle. Secondly, having found a tentative association between strike threats and the political cycle, I sought to investigate if this relationship was causal through an application of [Regression Discontinuity \(RD\)](#). In the final portion of the analysis, I present and test a mechanism by which the increased rates of strike threats are affecting future elections.

The chapter documented the behaviour of strike threats over the economic cycle, with the key findings that petitions are pro-cyclical, which confirms their role as a tool for contract bargaining. I then introduced controls for electoral years and found that despite the [FLL](#) stipulation that strike threats only deal with intra-firm complaints, there was an association between threats and electoral years.

This association was the basis for the main analysis presented, in which I asked: “Are strike threats partially caused by the political cycle?” Using results for Municipal President elections I sought to answer this question. This electoral level was chosen, as Municipal Presidencies have an independent political character, that is, they may set divergent policy to that in their respective state. But notably, Mayors have no control over labour politics. The causal nature of the relationship was explored through an application of [RD](#). Under this approach, one may claim that narrow elections, defined here as those for whom the margin of victory lay within 10 percentage points, at the margin are as-good-as random. This allows me to identify a causal relationship, using this quasi-experimental approach, I found a causal effect from close elections of right- and left-wing mayors on strike threats two years after an election. Narrow electoral victories of the right-wing ([PAN](#)) (left-wing, [PRD](#)) party increased the number of strike threats by 1.057 (1.456) per 10,000 of the municipal population two years after an election. These findings were further interrogated by unpicking the effects by type of union. The estimates were unequivocal, the effects were found to originate from the behaviour of ‘officialist’ unions. These findings were found robust to alternate specifications.

Lastly, I proposed a channel by which the increased incidence of strike threats had a further effect on politics. I posited that strike threats acted as a type of unofficial campaigning for upcoming elections. To test this hypothesis a differences-in-differences model was employed to

estimate electoral turnout for those municipalities that had narrow electoral wins for the right and left. When the product of those estimates and the causal findings from the RD is computed the estimate suggests that the causal effect leads to sizeable increases (decreases) in turnout when the right- (left-)wing win in the following election. These are of the order of 0.311 (1.75) percentage points for the right- and left-wing, respectively. These are comparable in magnitude to the increased turnout rates associated with gubernatorial election years and may be sizeable enough to swing marginal elections.

The portrait that emerged of Mexican unions from this investigation was a complex and nuanced one. It may be contrasted to the metaphorical Curate's egg. On the one hand, unions act as a weak regulator for the FLL, as was described in Chapter 4. They ensure that the most vulnerable workers receive their legal entitlements. On the other hand, as illustrated in Chapter 5 unions may display perverse behaviour such as exploiting strike threats for political means which go beyond the interests of their rank-and-file. So, how can we reconcile the two? Throughout the whole of this investigation I have sought to disentangle the duality of Mexican unions. There are the mostly 'good' independent unions, and there are the somewhat 'bad' 'officialist' unions. I suggested that workers who unionise will be more likely to join the 'good' unions, and the evidence of strike threats suggests that the politicised behaviour is entirely deriving from 'officialist' unions.

6.2 Implications of research

From this research agenda a number of broader implications arise. These may be aggregated into methodological points and policy recommendations.

I will begin with the methodological points. First, in Chapter 3, I demonstrated that it is important to consider carefully what each estimate of treatment effects really tell us. As it was clear, I obtained numerous estimates, which on first sight are rival. However, once these were carefully considered, and the counterfactual question inherent in each was formulated, it became clear that each of these was providing evidence under a number of different scenarios. Thus, it is up to researchers to evaluate which effect is relevant. I opt for the weighted sum of the ATET and ATEN implicit in the ATE.

The literature has been dominated by concern over the issue of selection. Proving that there is none is an onerous task for any research. In this work, I have attempted to identify instruments

which allow me to do just that. I exploit clauses in [FLL](#) which require unions to issue strike petitions to Arbitration and Conciliation Commissions. This yields a fine grained dataset of all strike threats that fall under local jurisdiction over the period 1991–2014. I posit, in the light of the findings of [Chapter 5](#), that the rate of strike threats for independent and ‘officialist’ unions may act as signalling mechanisms which prospective union members may decipher differently. Thus, if independent unions are viewed as being effective, then a higher rate of strike threats will suggest an active trades unions movement, that workers may seek to join. Conversely, given the history between ‘officialist’ unions and the state, increases in that strike threat rate may discourage workers from joining as this may reflect the wishes of the union leadership. The estimates presented from the [Lee \(1978\)](#) model estimated are indicative, that with these set of instruments selection of unobservable characteristics into the union sector is not a feature of the last decades. Perhaps, paradoxically, I found that selection was more often into the private nonunion sector.

Now considering the broad policy conclusions. An undercurrent that has gone throughout this whole research agenda, has been the understanding that context is key. The contextualisation chapter went to great lengths to describe how labour legislation was exploited by [PRI](#) as a means to control unions, this is the legacy of history. The institutions inherited from previous political regimes, may still exert effects in the future, even after the regime has fallen. As can be surmised, the lack of labour market reform after democratisation was due to deference of unions, as it was feared at the time that the country would become ungovernable ([Bensusán and Middlebrook, 2012a](#)). When the fabled reform finally materialised in 2012, it was the chapters which most needed reform that were left untouched. It is likely that the benefits of unions to their membership would increase, if internal democracy was embedded in unions. As suggested by the findings from [Chapter 4](#), where people choose to join a union, there are gains. Thus, changes to the internal regulation of unions, such as secret ballots, would go to great lengths in increasing the potential for unions to express worker ‘voice’ more effectively than they already have. In particular, this would be beneficial to those who are already in unions, rather than those yet to unionise.

There appear to be large counterfactual ‘gains’ for individuals, as measured by the [ATEN](#), if they choose to unionise, but looking at those who did transition into the union sector, I did not observe higher wages. It was revealed that unions mainly have an effect upon non-wage benefits as the real ‘gains’ to unionisation. Workers who unionised are more likely to hold these

than those who never unionise. However, this is a troubling finding as the non-wage benefits investigated in this thesis are all mandatory. This suggests that there is very little compliance with the [FLL](#) in the labour market. A larger point, is that whilst it is good that unions ensure their members receive their legally mandated benefits, it is important for *Secretaría de Trabajo y Previsión Social* (STPS) to inspect and ensure that the law is applied to all, and that effective compliance prevails. These findings are also broadly suggestive that institutional improvement in Mexico has been uneven, with the focus being on those institutions that [Roland \(2004\)](#) has identified as fast acting.

This research sought to measure the effect of unions in Mexico for working age males in the private sector. I intentionally avoided the thorny issue of public sector unions. There is a literature for developed countries which shows that these follow fundamentally different labour relation regimes and wage determination processes. For Mexico, as mentioned in the context chapter, this is reflected by the application of a different chapter of the [FLL](#). And so, whilst I have little to say with respect to these, it must be noted that disentangling the public sector union effect is fraught with difficulties, as there is also a public sector wage premium which must be contended with.

It would be disingenuous to pretend that unions do not serve a dual purpose. [Chapter 5](#) showed that unions are an institution in the labour market, but at the same time they are actors in the political arena. The evidence presented here has shown that strike petitions, a legal instrument whose purpose is to seek negotiation, are being systematically abused as a result of narrow left- and right-wing victories. I showed that this behaviour was coming from ‘officialist’ unions. It seems that if these are being used as a protest, or a motivating factor for elections, this is inefficient as it absorbs resources in the Arbitration and Conciliation Commissions, who have to consider other petitions, which themselves may be legitimate. An approach to mitigate these is perhaps to add a cost to the union in issuing a strike threat. This would discourage ‘cheap’ words, and thus would discourage these sort of illegal practices. One could imagine that part of any bargaining outcome would include this cost. Whilst this proposal raises equity concerns about ‘poorer’ unions being able to raise complaints, a pricing structure could be worked out to minimise this concern.

Finally, one last implication regards institutions. In the foregone research, it is clear that whilst some outcomes in Mexico have been improved through greater engagement with democracy and institutional improvement, some institutions such as the [FLL](#) are not only weakly

enforced, but actively flaunted. Given the large literature suggesting that institutions are the fundamental cause for long-run growth, then it seems salient to note that the institutions which have been successful in creating change all share similarities. Although they are public institutions, these are politically autonomous. IFE and the judiciary have been purposefully moved out of reach of meddling by the Executive branch and they have overseen important changes in Mexican society. Thus, if regulation of those institutions which are perceived as ‘slow-acting’, such as oversight over labour matters, were made independent of the Executive then perhaps the failure in enforcement would be resolved.

6.3 Future Research Agenda

The work presented in this thesis has prompted various ideas which may be fruitful in future research. A few of these will now be outlined.

The analysis in [Chapter 3](#) with respect to the ‘sword-of-justice’ could be improved through the application of a more modern decomposition such as the Recentered Influence Function (RIF) approach of [Firpo et al. \(2009\)](#). Equally, a careful measure of the conditional ATET could be obtained for selected quantiles of interest by employing the quantile fixed-effects estimator proposed by [Koenker \(2004\)](#); [Abrevaya and Dahl \(2008\)](#).

The analysis of [Chapter 4](#) sought to explain how much of the changes in non-wage benefit holding was due to changes in jobs. A similar exercise on the effects of job transitions across the labour market and wage cyclicalities as in [Devereux and Hart \(2006\)](#) would be fruitful.

Finally, the analysis presented in [Chapter 5](#) provides evidence of the misuse of legal instruments. I proposed a mechanism by which unions seek to influence the electoral outcome of the following election. One of the things I wish to work on in future is to try and explore the transmission mechanism a little bit further and see if there are other ancillary effects coming from the increased rate of petitions towards the wider economy and society.

Glossary

Administradoras de Fondos de Retiro Retirement Fund Administrators. Introduced after the 1997 pension reform. These are privately managed defined contribution pension vehicles. There are currently 21 to chose from, and are run by large financial organisations. [21](#), [191](#)

Bloque de Unidad Obrera Worker Unity Block. [191](#)

Código Federal de Instituciones y Procedimientos Electorales Federal Code or Electoral Procedures and Institutions. Introduced in 1990. See [Chapter 2](#). [26](#), [125](#), [190](#), [191](#)

Casa del Obrero Mundial House of the World Worker [191](#)

Comité Nacional de Defensa Proletaria National Committee of Proletarian Defense. A forerunner to the [CTM](#) Was comprised of a meeting of the most important labour organisations including the [Confederación General de Obreros y Campesinos de México](#) (CGOCM), [Confederación Sindical Unitaria de México](#) (CSUM), and the [Sindicato de Trabajadores Ferrocarrileros de la República Mexicana](#) (STFRM), amongst others. [11](#), [191](#)

Confederación General de Obreros y Campesinos de México General Confederation of Peasants and Workers of Mexico. [187](#), [191](#)

Confederación Regional Obrera Mexicana Regional Confederation of Mexican Workers. The first trades union congress to join both agricultural workers and industrial workers. Was crucial during the [Partido Laborista Mexicano](#) (PLM) presidencies of Obregón and Calles. Its Secretary General, Morones was minister of labour, and was key in the introduction of novel policies which would be the basis for [PRI](#) control of unions. Fell out of favour after the assassination of Obregón. [8](#), [152](#), [189](#), [192](#)

Confederación Revolucionaria de Obreros y Campesinos 192

Confederación Sindical Unitaria de México Sindicalist Unitarian Confederation of Mexico. The trades unions wing of the *Partido Comunista Mexicano* (PCM) 187, 192

Confederación de Trabajadores de México Confederation of Mexican Workers, a trades union congress, founded in 1936. Officially part of PRI as the labour sector. 5, 10, 152, 175, 192

Conferación Obrera Regional Regional Confederation of Workers. 152, 191

Conferación Revolucionaria de Trabajadores Revolutionary Confederation of Workers. 152, 192

Congreso General de Trabajadores General Congress of Workers. 152, 191

Congreso del Trabajo Work Congress. Was a trades unions congress which joined CTM with other major competing congresses in the 1960s. It served as a super structure of control over other unions by the PRI. 12, 152, 175, 192

Encuesta Nacional a Trabajadores de Empleo, Salarios, Tecnología Y Capacitación en el sector Survey of Workers, Wages, Technology and Training in the Manufacturing Sector. An establishment-level survey run on an irregular basis by *Instituto Nacional de Estadística, Geografía e Informática* (INEGI). 192

Encuesta Nacional de Empleo Urbano Mexican Labour Force Survey, carried out between 1987–2004 by INEGI. 127, 188, 192

Encuesta Nacional de Ingresos y Gastos de los Hogares 16, 34, 192

Encuesta Nacional de Ocupación y Empleo National Survey of Employment and Occupation. A Mexican Household survey, run by INEGI, replaced *Encuesta Nacional de Empleo Urbano* (ENEU). Has run since 2005q1. ix, 3, 16, 31, 88, 177, 192

Frente Autentico de Trabajo Authentic Work Front. A new union founded in the 1980s, rose to prominence in the 1990s as an independent union, committed to internal democracy. 2, 193

Instituto Federal Electoral Federal Electoral Institute. Was the fourth branch of government that oversaw all elections between 1994–2015. From 1996 onwards was completely

independent of Government intervention. Has been replaced by the National Electoral Institute. [26](#), [124](#), [176](#), [193](#)

Instituto Nacional de Estadística, Geografía e Informática The Mexican Statistics Agency. [40](#), [92](#), [188](#), [193](#)

Instituto Nacional del Fondo de la Vivienda para los Trabajadores Institute of the National Fund for Worker Housing. Latin America's largest mortgage issuer. It was originally introduced in the 1950s to meet a constitutional obligation of employers to provide clean and salubrious housing to their employees. [21](#), [193](#)

Instituto de Seguridad Social y Servicios de Trabajadores del Estado Social Security and Institute of State Workers. The public sector analogue of *Instituto Mexicano de Seguro Social* (IMSS). [21](#), [193](#)

Instituto Mexicano de Seguro Social Mexican Instituto of Social Security. A dependency of government introduced in 1943. Its oversight is to oversee public health, pensions and social security provision. [20](#), [93](#), [189](#), [193](#)

Ley Federal del Trabajo Federal Labour Law. First introduced in 1931 under the Ortiz Rubio Presidency. It formalised many of the *Confederación Regional Obrera Mexicana* (CROM) practices with respect to union regulation. Saw minor amendments in the 1970s and 1980s and was the subject of a reform in 2012. For more detail see [Chapter 2](#). [1](#), [9](#), [10](#), [31](#), [88](#), [179](#), [193](#)

Partido Acción Nacional National Action Party. It follows a Christian Conservative agenda, and between 1939–2000 served as the opposition to PRI. [6](#), [119](#), [176](#), [194](#)

Partido Comunista Mexicano Mexican Communist Party. [188](#), [194](#)

Partido Laborista Mexicano Mexican Labour Party. This party was the political wing to the CROM, successfully postulated Obregón and Calles to the presidency. After CROM fell out of power and *Partido Nacional Revolucionario* (PNR) was founded this party fell into irrelevance. [8](#), [187](#), [194](#)

Partido Liberal Constitucional Liberal Constitutional Party. An early Mexican party that arose from the Revolution, became marginalised after 1920 coup by Huerta. [194](#)

Partido Nacional Revolucionario National Revolutionary Party. Founded by Calles, for more detail see [Chapter 2](#). [9](#), [189](#), [194](#)

Partido Nueva Alianza New Alliance Party, founded by Alba Esther Gordillo, the leader of [Sindicato Nacional de Trabajadores de la Educación \(SNTE\)](#). This party acts as the political wing of the [SNTE](#) union. [194](#)

Partido Revolucionario Democrático Party of the Democratic Revolution. Founded in 1989 after the controversial 1988 presidential elections. It is Mexico's left-wing party. [15](#), [119](#), [176](#), [194](#)

Partido Revolucionario Institucional Revolutionary Institutional Party, the successor to [PNR](#) and [Partido de la Revolución Mexicana \(PRM\)](#). Collectively these three parties ruled Mexico for 71 years. [2](#), [5](#), [32](#), [119](#), [175](#), [194](#)

Partido de la Revolución Mexicana Party of the Mexican Revolution. Was the rebranded [PNR](#) under Cárdenas. Officially subsumed [CTM](#) as one its the four constituent 'sectors'. [11](#), [190](#), [194](#)

Secretaría de Trabajo y Previsión Social Secretariat for Labour and Social Provision. Government ministry with oversight over labour. [10](#), [123](#), [184](#), [195](#)

Sindicato Mexicano de Electricistas Mexican Union of Electricians [194](#)

Sindicato Nacional de Trabajadores de la Educación [190](#), [194](#)

Sindicato de Trabajadores Ferrocarrileros de la República Mexicana Union of Railroad Workers of the Mexican Republic. [187](#), [195](#)

Tribunal Electoral del Poder Judicial de la Federación Electoral Tribunal of the Judicial Power of the Federation. The Judiciary tribunal overseeing elections and the implementation of [Código Federal de Instituciones y Procedimientos Electorales \(COFIPE\)](#). [26](#), [125](#), [195](#)

Universidad Nacional Autónoma de México National Autonomous University of Mexico. It is the oldest university in Latin America, and also the largest. [24](#), [195](#)

AEE Average Endowment Effect [50](#)

AFORES *Administradoras de Fondos de Retiro* 21, 22, 191, *Glossary: Administradoras de Fondos de Retiro*

AIC Akaike Information Criterion 154, 157, 158, 162

Anderson-Rubin Test A joint test of instrument exogeneity and overidentification. For more details see [Anderson and Rubin \(1949\)](#). 191

AR Anderson-Rubin Test 191, *Glossary: Anderson-Rubin Test*

ATE Average Treatment Effect 50, 65, 72, 178, 179, 182

ATEN Average Treatment Effect on the Non-treated 49, 58, 61, 65, 177, 178, 182, 183

ATET Average Treatment Effect on the Treated 49, 53, 58, 61, 63, 65, 87, 99, 103, 104, 111, 177–180, 182, 185

BUO *Bloque de Unidad Obrera* 191, *Glossary: Bloque de Unidad Obrera*

CDF Cumulative Density Function 51, 103

CGOCM *Confederación General de Obreros y Campesinos de México* 187, 191, *Glossary: Confederación General de Obreros y Campesinos de México*

CGT *Congreso General de Trabajadores* 152, 191, *Glossary: Congreso General de Trabajadores*

CLR Conditional Likelihood Ratio 191, *Glossary: Conditional Likelihood Ratio*

CNDP *Comité Nacional de Defensa Proletaria* 11, 191, *Glossary: Comité Nacional de Defensa Proletaria*

COFIPE *Código Federal de Instituciones y Procedimientos Electorales* 26, 27, 124, 125, 190, 191, *Glossary: Código Federal de Instituciones y Procedimientos Electorales*

COM *Casa del Obrero Mundial* 191, *Glossary: Casa del Obrero Mundial*

Conditional Likelihood Ratio A joint test, that is decomposable to its constituent parts of instrument exogeneity and overidentification. For more details see [Moreira \(2003\)](#). 191

COR *Conferación Obrera Regional* 152, 191, *Glossary: Conferación Obrera Regional*

CPI Consumer Price Index 42, 94

- CPS** Current Population Survey 90, 113, 192, *Glossary: Current Population Survey*
- CROC** *Confederación Revolucionaria de Obreros y Campesinos* 192, *Glossary: Confederación Revolucionaria de Obreros y Campesinos*
- CROM** *Confederación Regional Obrera Mexicana* 8–12, 152, 189, 192, *Glossary: Confederación Regional Obrera Mexicana*
- CRT** *Conferación Revolucionaria de Trabajadores* 152, 192, *Glossary: Conferación Revolucionaria de Trabajadores*
- CSUM** *Confederación Sindical Unitaria de México* 187, 192, *Glossary: Confederación Sindical Unitaria de México*
- CT** *Congreso del Trabajo* 12, 13, 152, 175, 192, *Glossary: Congreso del Trabajo*
- CTM** *Confederación de Trabajadores de México* 5, 6, 10–15, 21, 152, 175, 176, 187, 188, 190, 192, *Glossary: Confederación de Trabajadores de México*
- Current Population Survey** A USA household survey. 90, 192
- EEC** Expenditures for Employee Compensation 90, 91, 192, *Glossary: Expenditures for Employee Compensation*
- ENESTYC** *Encuesta Nacional a Trabajadores de Empleo, Salarios, Tecnología Y Capacitación en el sector manufacturero* 16, 192, *Glossary: Encuesta Nacional a Trabajadores de Empleo, Salarios, Tecnología Y Capacitación en el sector manufacturero*
- ENEU** *Encuesta Nacional de Empleo Urbano* 127, 128, 132, 133, 135, 137, 144–146, 149–151, 188, 192, *Glossary: Encuesta Nacional de Empleo Urbano*
- ENIGH** *Encuesta Nacional de Ingresos y Gastos de los Hogares* 16, 34, 39, 44, 45, 63, 192, *Glossary: Encuesta Nacional de Ingresos y Gastos de los Hogares*
- ENOE** *Encuesta Nacional de Ocupación y Empleo* ix, 3, 16, 31, 34, 39, 40, 42–46, 53, 56, 62, 73, 74, 88, 92, 94, 95, 127, 128, 132, 133, 135, 137, 144–146, 149–151, 176, 178, 180, 192, *Glossary: Encuesta Nacional de Ocupación y Empleo*
- Expenditures for Employee Compensation** A USA labour force survey 90, 192

- FAT** *Frente Autentico de Trabajo* 2, 193, *Glossary: Frente Autentico de Trabajo*
- FIML** Full Information Maximum Likelihood 52, 81
- FLL** *Ley Federal del Trabajo* 1, 9–11, 14, 17–20, 22, 30–33, 41, 42, 88, 89, 96, 99–101, 109, 123, 124, 179–184, 193, *Glossary: Ley Federal del Trabajo*
- IFE** *Instituto Federal Electoral* 26, 124, 125, 130, 163, 176, 185, 193, *Glossary: Instituto Federal Electoral*
- IMF** International Monetary Fund 12, 176
- IMSS** *Instuto Mexicano de Seguro Social* 20, 93, 189, 193, *Glossary: Instuto Mexicano de Seguro Social*
- INEGI** *Instituto Nacional de Estadística, Geografía e Informática* 16, 40, 42, 92, 94, 127, 128, 132, 188, 193, *Glossary: Instituto Nacional de Estadística, Geografía e Informática*
- INFONAVIT** *Instituto Nacional del Fondo de la Vivienda para los Trabajadores* 21, 193, *Glossary: Instituto Nacional del Fondo de la Vivienda para los Trabajadores*
- ISSSTE** *Instituto de Seguridad Social y Servicios de Trabajadores del Estado* 21, 193, *Glossary: Instituto de Seguridad Social y Servicios de Trabajadores del Estado*
- LATE** Local Average Treatment Effect 87
- LLR** Local Linear Regression 140, 193, *Glossary: Local Linear Regression*
- Local Linear Regression** A nonparametric technique which exploits data along a bandwidth taking the h nearest points for the linear regression. 140, 193
- NAFTA** North American Free Trade Agreement 31, 91, 130, 193, *Glossary: North American Free Trade Agreement*
- National Longitudinal Survey of Older Men** A USA survey 90, 193
- NLSOM** National Longitudinal Survey of Older Men 90, 193, *Glossary: National Longitudinal Survey of Older Men*
- North American Free Trade Agreement** A free trade agreement between Canada, Mexico and the USA. Signed in 1994. 31, 91, 193

OLS Ordinary Least Squares 53, 54, 177

PAN *Partido Acción Nacional* 6, 15, 22–25, 27, 119, 131, 140, 143, 147, 148, 152, 154, 162, 163, 176, 181, 194, *Glossary: Partido Acción Nacional*

PANAL *Partido Nueva Alianza* 194, *Glossary: Partido Nueva Alianza*

Panel Study of Income Dynamics A USA panel survey 90, 194

PCM *Partido Comunista Mexicano* 188, 194, *Glossary: Partido Comunista Mexicano*

PLC *Partido Liberal Constitucional* 29, 194, *Glossary: Partido Liberal Constitucional*

PLM *Partido Laborista Mexicano* 8, 9, 29, 187, 194, *Glossary: Partido Laborista Mexicano*

PNR *Partido Nacional Revolucionario* 9–11, 23, 29, 189, 190, 194, *Glossary: Partido Nacional Revolucionario*

PRD *Partido Revolucionario Democrático* 15, 22, 25, 119, 131, 140, 143, 147, 148, 152, 154, 162, 176, 181, 194, *Glossary: Partido Revolucionario Democrático*

PRI *Partido Revolucionario Institucional* 2–6, 11, 12, 14, 15, 22–27, 29, 30, 32, 119, 120, 131, 140, 141, 143, 147, 148, 152, 165, 166, 175, 176, 183, 187, 188, 194, *Glossary: Partido Revolucionario Institucional*

PRM *Partido de la Revolución Mexicana* 11, 23, 24, 29, 30, 190, 194, *Glossary: Partido de la Revolución Mexicana*

PSID Panel Study of Income Dynamics 90, 194, *Glossary: Panel Study of Income Dynamics*

QES Quality of Employment Survey 90, 194, *Glossary: Quality of Employment Survey*

Quality of Employment Survey A USA labour market survey 90, 194

RD Regression Discontinuity 119, 138, 140, 143, 148, 152, 154, 165, 167, 181, 182

SME *Sindicato Mexicano de Electricistas* 194, *Glossary: Sindicato Mexicano de Electricistas*

SNTE *Sindicato Nacional de Trabajadores de la Educación* 190, 194, *Glossary: Sindicato Nacional de Trabajadores de la Educación*

STFRM *Sindicato de Trabajadores Ferrocarrileros de la República Mexicana* 187, 195, *Glossary: Sindicato de Trabajadores Ferrocarrileros de la República Mexicana*

STPS *Secretaría de Trabajo y Previsión Social* 10, 15, 123, 184, 195, *Glossary: Secretaría de Trabajo y Previsión Social*

TEPJF *Tribunal Electoral del Poder Judicial de la Federación* 26, 125, 195, *Glossary: Tribunal Electoral del Poder Judicial de la Federación*

UNAM *Universidad Nacional Autónoma de México* 24, 195, *Glossary: Universidad Nacional Autónoma de México*

Bibliography

- Abrevaya, J. and C. M. Dahl (2008). The effects of birth inputs on birthweight. *Journal of Business & Economic Statistics* 26(4), 379–397.
- Acemoglu, D., D. Cantoni, S. Johnson, and J. A. Robinson (2011, December). The Consequences of Radical Reform: The French Revolution. *American Economic Review* 101(7), 3286–3307.
- Acemoglu, D., S. Johnson, and J. A. Robinson (2001, December). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review* 91(5), 1369–1401.
- Acemoglu, D., S. Johnson, and J. A. Robinson (2006). Institutions as the Fundamental Cause of Long-Run Growth. In P. Aghion and S. A. Durlauf (Eds.), *Handbook of Economic Growth*, Volume 1A, pp. 385–472. North Holland: Elsevier.
- Acemoglu, D., S. Johnson, J. A. Robinson, and Y. Thaicharoen (2003). *Journal of Monetary Economics* 50(1), 49–123.
- Acemoglu, D. and J. Robinson (2010). The Role of Institutions in Growth and Development. *Review of Economics and Institutions* 1(2).
- Addison, J., P. Teixeira, K. Evers, and L. Bellman (2013, May). Indicative and Updated Estimates of the Collective Bargaining Premium in Germany. Discussion Paper 7474, IZA, Bonn.
- Aghion, P., Y. Algan, and P. Cahuc (2011, 02). Civil Society And The State: The Interplay Between Cooperation And Minimum Wage Regulation. *Journal of the European Economic Association* 9(1), 3–42.
- Alesina, A. and P. Giuliano (2015, December). Culture and Institutions. *Journal of Economic Literature* 53(4), 898–944.
- Anderson, T. W. and H. Rubin (1949, 03). Estimation of the parameters of a single equation in a complete system of stochastic equations. *Annals of Mathematical Statistics* 20(1), 46–63.
- Arbache, J. S. and F. G. Carneiro (1999). Unions and Interindustry Wage Differentials. *World Development* 27(10), 1875–1883.
- Ashenfelter, O. and G. E. Johnson (1969). Bargaining Theory, Trade Unions, and Industrial Strike Activity. *The American Economic Review* 59(1), 35–49.
- Baah, A. Y. (2005). An Empirical Analysis of the Labour Market and Trade Union Effects in Ghana. PhD Thesis, University of Sussex.
- Baah, A. Y. and B. Reilly (2009). An Empirical Analysis of Strike Durations in Ghana from 1980 to 2004. *Labour* 23(3), 459–479.

- Barba García, H. (2004). La contratación colectiva en México. In J. A. Bouzas Ortiz (Ed.), *La reforma laboral que necesitamos*, Chapter 6, pp. 123–183. Mexico City: Universidad Nacional Autónoma de México.
- Bensusán, G. (2007). Los determinantes institucionales de los contratos de protección. In J. A. Bouzas Ortiz (Ed.), *Contratación Colectiva de Protección en México: Informe a la Organización Regional Interamericana de Trabajadores*, pp. 12–48. Mexico City: Universidad Nacional Autónoma de México.
- Bensusán, G. and K. J. Middlebrook (2012a). El Sindicalismo y la democratización en México. *Foro Internacional* 52(4), 796–835.
- Bensusán, G. and K. J. Middlebrook (2012b). Organized Labour and Politics in Mexico. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 335–364. Oxford: Oxford University Press.
- Bensusán, G. and K. J. Middlebrook (2012c). *Organized Labour and Politics in Mexico: Changes, Continuities and Contradictions*. London: Institute for the study of the Americas.
- Bevan, G. P. (1880). The Strikes of the Past Ten Years. *Journal of the Statistical Society of London* 43(1), 35–64.
- Bhandari, A. K. (2008). Union membership effect on wage premiums: Evidence from organized manufacturing industries in India. Discussion Paper 3747, IZA, Bonn.
- Black, D., A. Haviland, S. Sanders, and L. Taylor (2006, May). Why Do Minority Men Earn Less? A Study of Wage Differentials among the Highly Educated. *The Review of Economics and Statistics* 88(2), 300–313.
- Blinder, A. (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources* 8(3), 436–455.
- Blunch, N.-H. and D. Verner (2004). Asymmetries in the Union Wage Premium in Ghana. *The World Bank Economic Review* 18(2), 237–252.
- Booth, A. L. and M. L. Bryan (2004). The union membership wage-premium puzzle: Is there a free rider problem? *Industrial and Labor Relations Review* 57(3), pp. 402–421.
- Botero, J. C., S. Djankov, R. L. Porta, F. L. de Silanes, and A. Shleifer (2004). The Regulation of Labor. *The Quarterly Journal of Economics* 119(4), 1339–1382.
- Bruhn, K. (2012). PRD and the Mexican Left. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 210–233. Oxford: Oxford University Press.
- Buchinsky, M. (1998). The dynamics of changes in the female wage distribution in the usa: A quantile regression approach. *Journal of Applied Econometrics* 13(1), 1–30.
- Budd, J. W. (2004). Non-wage forms of compensation. *Journal of Labor Research* 25(4), 597 – 622.
- Budd, J. W. (2005). The effect of unions on employee benefits: Updated employer expenditure results. *Journal of Labor Research* 26(4), 669 – 676.
- Budd, J. W. and A. Brey (2003). Unions and Family Leave: Early Experience under the Family and Medical Act. *Labor Studies Journal* 28(1), 85–105.
- Budd, J. W. and B. P. McCall (1997). The effect of unions on the receipt of unemployment insurance benefits. *Industrial and Labor Relations Review* 50(3), pp. 478–492.

- Budd, J. W. and K. Mumford (2004). Trade Unions and Family-Friendly Policies in Britain. *Industrial and Labor Relations Review* 57(2), 204–222.
- Budd, J. W. and I.-G. Na (2000). The union membership wage premium for employees covered by collective bargaining agreements. *Journal of Labor Economics* 18(4), pp. 783–807.
- Burton, J. (1984). The Economic Analysis of the Trade Union as a Political Institution. In J.-J. Rosa (Ed.), *The Economics of Trade Unions: New Directions*, Chapter Chapter 6. New York: Kluwer Nijhoff.
- Butcher, K. F. and C. E. Rouse (2001). Wage effects of unions and industrial councils in south africa. *Industrial and Labor Relations Review* 54(2), pp. 349–374.
- Callan, T. and B. Reilly (1993). Unions and the Wage Distribution in Ireland. *The Economic and Social Review* 24(4), 297–312.
- Calonico, S., M. D. Cattaneo, and R. Titiunik (2014a, December). Optimal Data-Driven Regression Discontinuity Plots. *Journal of the American Statistical Association* 110(512), 1753–1769.
- Calonico, S., M. D. Cattaneo, and R. Titiunik (2014b, December). Robust data-driven inference in the regression-discontinuity design. *Stata Journal* 14(4), 909–946.
- Calonico, S., M. D. Cattaneo, and R. Titiunik (2014c, November). Robust Nonparametric Confidence Intervals for RegressionDiscontinuity Designs. *Econometrica* 82, 2295–2326.
- Camp, R. A. (2003). *Politics in Mexico: The Democratic Transformation* (Fourth ed.). Oxford: Oxford University Press.
- Camp, R. A. (2012). The Democratic Transformation of Mexican Politics. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 3–27. Oxford: Oxford University Press.
- Campolietti, M., R. Hebdon, and D. Hyatt (2005). Strike Incidence and Strike Duration: Some New Evidence from Ontario. *Industrial and Labor Relations Review* 58(4), 610–630.
- Card, D., T. Lemieux, and W. C. Ridell (2008). Unions and Wage Inequality. In J. T. Bennett and B. E. Kaufman (Eds.), *What Do Unions Do? A Twenty-Year Perspective*, Chapter 5, pp. 114–159. London: Transaction Publishers.
- Card, D. E. (1990a). Strikes and Bargaining: A Survey of the Recent Empirical Literature. *The American Economic Review* 80(2), 410–415.
- Card, D. E. (1990b). Strikes and Wages: A Test of an Asymmetric Information Model. *The Quarterly Journal of Economics* 105(3), 625–659.
- Card, D. E. (1996). The Effect of Unions on the Structure of Wages: A Longitudinal Analysis. *Econometrica* 64(4), 975–979.
- Card, D. E. (2001). The Effect of Unions on Wage Inequality in the U.S. Labor Market. *Industrial and Labor Relations Review* 54(2), 296–315.
- Card, D. E. (2004). Unions and Wage Inequality. *Journal of Labor Research* 25(4), 520–559.
- Carr, B. (1976). *El movimiento obrero y la política en México, 1910–1929*. Mexico City: Sep-Setentas.

- Casoni, A., G. J. Labadie, and G. Fachola (2005). The Economic Effects of Unions in Latin America: Their Impact on Wages and the Economic Performance of Firms in Uruguay. In P. Kuhn and G. Márquez (Eds.), *What Difference Do Unions Make? Their Impact on Productivity and Wages in Latin America*, Chapter 5, pp. 101–142. Washington DC: Inter-American Development Bank.
- Cattaneo, M. D., M. Jansson, and X. Ma (2016, January). Simple Local Regression Distribution Estimators with an Application to Manipulation Testing. Working paper, University of Michigan.
- Cotton, J. (1988, May). On the Decomposition of Wage Differentials. *The Review of Economics and Statistics* 70(2), 236–43.
- Cross, J. G. (1965). A Theory of the Bargaining Process. *The American Economic Review* 55(1/2), 67–94.
- de la Garza Toledo, E. (2006). Apéndice: la polémica acerca de la tasa de sindicalización en México. In E. de la Garza Toledo and C. Salas (Eds.), *La situación del trabajo en México, 2006*, Chapter IV.4.A, pp. 486–496. Mexico City: Plaza y Valdez.
- de la Garza Toledo, E. (2012). La polémica acerca de la tasa de afiliación sindical revisada al 2010. In E. de la Garza Toledo (Ed.), *La situación del trabajo en México, 2012: El trabajo en la crisis*, Chapter III.2, pp. 453–472. Mexico City: Plaza y Valdes.
- Dell, M. (2010, November). The Persistent Effects of Peru’s Mining Mita. *Econometrica* 78(6), 1863–1903.
- Devereux, P. J. and R. A. Hart (2006, October). Real Wage Cyclicity of Job Stayers, Within-Company Job Movers, and Between-Company Job Movers. *ILR Review* 60(1), 105–119.
- Devereux, P. J. and R. A. Hart (2011). A Good Time to Stay Out? Strikes and the Business Cycle. *British Journal of Industrial Relations* 49(S1), s70–s92.
- DiNardo, J., N. M. Fortin, and T. Lemieux (1996, September). Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach. *Econometrica* 64(5), 1001–44.
- DiNardo, J. and D. S. Lee (2004). Economic Impacts of New Unionization on Private Sector Employers: 1984–2001. *The Quarterly Journal of Economics* 119(4), 1383–1441.
- Djankov, S., R. L. Porta, F. L. de Silanes, and A. Shleifer (2002). The Regulation of Entry. *The Quarterly Journal of Economics* 117(1), 1–37.
- Dolton, P. J. and G. H. Makepeace (1985). The Statistical Measurement of Discrimination. *Economic Letters* 18, 391–395.
- Downs, A. (1957). *An Economic Theory of Democracy*. New York: Harper and Row.
- Duncan, G. M. and D. E. Leigh (1980). Wage Determination in the Union and Nonunion Sectors: A Sample Selectivity Approach. *Industrial and Labor Relations Review* 34(1), 24–34.
- Edwards, P. K. (1981). *Strikes in the United States 1881–1974*. New York: St. Martin’s Press.
- Ehrenberg, R. G. and J. L. Schwarz (1986). Public-Sector Labor Markets. In O. Ashenfelter and R. Layard (Eds.), *Handbook of Labor Economics*, Volume II, Chapter 22, pp. 1219–1268. North Holland: Elsevier.

- Eisenstadt, T. A. and J. Yelle (2012). Ulysses, the Sirens and Mexico's Judiciary: Increasing Precommitments to Strengthen the Rule of Law. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 210–233. Oxford: Oxford University Press.
- Elder, T. E., J. H. Goddeeris, and S. J. Haider (2010, January). Unexplained gaps and Oaxaca-Blinder decompositions. *Labour Economics* 17(1), 284–290.
- Fairris, D. (2003). Unions and Wage Inequality in Mexico. *Industrial and Labour Relations Review* 56(3), 481–497.
- Fairris, D. (2006). Union Voice Effects in Mexico. *British Journal of Industrial Relations* 44(4), 781–800.
- Fairris, D. (2007). ¿Que hacen los sindicatos en México? *Estudios Económicos* 22(2), 185–240.
- Farber, H. S. (1981). Union Wages and the Minimum Wage. Working Paper 278, MIT, Cambridge MA.
- Fields, G. S. and G. Yoo (2000). Falling Labor Income Inequality in Korea's Economic Growth: Patterns and Underlying Causes. *Review of Income and Wealth* 46(2), 139–159.
- Finkel, J. (2005). Judicial reform as insurance policy: Mexico in the 1990s. *Latin American Politics and Society* 47(1), 87–113.
- Firpo, S., N. M. Fortin, and T. Lemieux (2009). Unconditional Quantile Regressions. *Econometrica* 77(3), 953–973.
- Fortin, N., T. Lemieux, and S. Firpo (2011). Decomposition methods in economics. In O. Ashenfelter and D. Card (Eds.), *Handbook of Labor Economics*, Volume IVa, Chapter 1, pp. 1–102. North Holland: Elsevier.
- Frandsen, B. R. (2012, 30 January). Why Unions Still Matter: The Effects of Unionization on the Distribution of Employee Earnings. Job Market Paper MIT.
- Freeman, R. B. (1980, October). Unionism and the Dispersion of Wages. *Industrial and Labor Relations Review* 34(1), 3–23.
- Freeman, R. B. (1981). The Effect of Unionism on Fringe Benefits. *Industrial and Labor Relations Review* 34(4), pp. 489–509.
- Freeman, R. B. (2010). Labor Regulations, Unions, and Social Protection in Developing Countries: Market Distortions or Efficient Institutions? In D. Rodrik and M. Resenzweig (Eds.), *Handbook of Development Economics*, Volume V, Chapter 70, pp. 4657–4702. North Holland: Elsevier.
- Freeman, R. B. and J. L. Medoff (1984). *What Do Unions Do?* New York: Basic Books.
- Fuchs, V. R., A. B. Krueger, and J. M. Poterba (1998). Economists' Views about Parameters, Values, and Policies: Survey Results in Labor and Public Economic. *Journal of Economic Literature* 36(3), 1387–1425.
- Gelman, A. and G. Imbens (2014, August). Why high-order polynomials should not be used in regression discontinuity designs. Working Paper 20405, National Bureau of Economic Research.
- Gillingham, P. (2012). Mexican Elections, 1910–1994: Voters, Violence and Veto Power. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 53–76. Oxford: Oxford University Press.

- Gosling, A. and S. Machin (1995, May). Trade Unions and the Dispersion of Earnings in British Establishments, 1980-90. *Oxford Bulletin of Economics and Statistics* 57(2), 167–84.
- Greene, W. (2008). *Econometric Analysis* (6th ed.). New Jersey: Pearson Prentice Hall.
- Greene, W. H. (1981). Sample selection bias as a specification error: A comment. *Econometrica* 49(3), 795–798.
- Guiso, L., P. Sapienza, and L. Zingales (2013). Long-term Persistence. Technical report.
- Gunderson, M., J. Kervin, and F. Reid (1986). Logit Estimates of Strike Incidence from Canadian Contract Data. *Journal of Labor Economics* 4(2), 257–276.
- Gunderson, M. and A. Melino (1990). The Effects of Public Policy on Strike Duration. *Journal of Labour Economics* 8(3), 295–316.
- Harrison, A. and M. Stewart (1989). Cyclical Fluctuations in Strike Durations. *The American Economic Review* 79(4), 827–841.
- Harrison, A. and M. Stewart (1993). Strike Duration and Strike Size. *The Canadian Journal of Economics* 26(4), 830–849.
- Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica* 47(1), 153–161.
- Hernández Laos, E. (2006). La productividad en México: origen y distribución (1960-2002). In C. de la Garza Toledo, Enrique and Salas (Ed.), *La situación del trabajo en México, 2006*, Chapter II.3, pp. 151–170. Mexico City: Plaza y Vázquez.
- Hicks, J. R. (1963). *The Theory of Wages*. London: Macmillan.
- Hirsch, B. T. and J. T. Addison (1986). *The Economic Analysis of Unions: New Approaches and Evidence*. Winchester, MA: Allen & Unwin.
- Hirsch, B. T., D. A. Macpherson, and J. M. DuMond (1997). Workers’ compensation reciprocity in union and nonunion workplaces. *Industrial and Labor Relations Review* 50(2), pp. 213–236.
- Hirschman, A. O. (1971). *Exit, Voice, and Loyalty*. Cambridge, MA: Harvard University Press.
- Hofmeyr, J. F. and R. E. B. Lucas (2001). The Rise in Union Wage Premiums in South Africa. *Labour* 15(4), 685–719.
- Hovarth, W. J. (1968). A Statistical Model for the Durations of Wars and Strikes. *Behavioral Science* 13(1), 18–28.
- Imbens, G. and K. Kalyanaraman (2012). Optimal bandwidth choice for the regression discontinuity estimator. *The Review of Economic Studies* 79(3), 933–959.
- Imbens, G. W. and T. Lemieux (2008, February). Regression discontinuity designs: A guide to practice. *Journal of Econometrics* 142(2), 615–635.
- Ingram, P., D. Metcalf, and J. Wadsworth (1993). Strike incidence in british manufacturing in the 1980s. *Industrial and Labor Relations Review* 46(4), pp. 704–717.
- Jann, B. (2008). The Blinder–Oaxaca decomposition for linear regression models. *The Stata Journal* 8(4), 453–479.
- Jarrell, S. B. and T. D. Stanley (1990). A Meta-Analysis of the Union-Nonunion Wage Gap. *Industrial and Labor Relations Review* 44(1), 54–67.

- Johnson, G. E. and K. C. Youmans (1971). Union Relative Wage Effects by Age and Education. *Industrial and Labor Relations Review* 24(2), 171–179.
- Kahn, T. (2015). Viceroy in the States? The Political Economy of Subnational Fiscal Federalism in Mexico. Working paper, School of Advanced International Studies Johns Hopkins University.
- Kennan, J. (1980). Pareto Optimality and the Economics of Strike Duration. *Journal of Labor Research* 1(1), 78–94.
- Kennan, J. (1986). The Economics of Strikes. In O. Ashenfelter and R. Layard (Eds.), *Handbook of Labor Economics*, Volume II, Chapter 19, pp. 1091–1137. North Holland: Elsevier.
- Knowles, K. G. J. C. (1952). *Strikes: a study in industrial conflict*. Oxford: Basil Blackwell.
- Koenker, R. (2004). Quantile regression for longitudinal data. *Journal of Multivariate Analysis* 91(1), 74 – 89.
- Koenker, R. W. and G. Bassett (1978). Regression quantiles. *Econometrica* 46(1), 33–50.
- Kornfeld, R. (1993). The Effects of Union Membership on Wages and Employee Benefits. *Industrial and Labor Relations Review* 47(1), 114–128.
- Krauze, E. (2012, November). La Dictadura Perfecta. *Letras Libres* (167).
- La Porta, R., F. Lopez-de Silanes, A. Shleifer, and R. W. Vishny (1998, December). Law and Finance. *Journal of Political Economy* 106(6), 1113–1155.
- Lancaster, T. (1972). A Stochastic Model for the Duration of a Strike. *Journal of the Royal Statistical Society. Series A (General)* 135(2), 257–271.
- Landerretche, O., N. Lillo, and E. Puentes (2011). The Union Effect on Wages in Chile: A Two-Stage Approach Using Panel Data. Documento De Trabajo SDT 332, Departamento De Economía Universidad de Chile, Santiago.
- Landerretche, O., N. Lillo, and E. Puentes (2013). The Union Effect on Wages in Chile: A Two-Stage Approach Using Panel Data. *Labour*, n/a–n/a.
- Lastra Lastra, J. M. (2002a). El sindicalismo en México. In J. L. Soberanes Fernández (Ed.), *Anuario Mexicano de Historia del Derecho* (1st ed.), Volume XIV, Chapter 2. Mexico City: Universidad Autónoma de México.
- Lastra Lastra, J. M. (2002b). Inconstitucionalidad de la cláusula de exclusión. In P. Kurczyn and M. C. Mácias Vázquez (Eds.), *Libertad Sindical: Cláusula de Exclusión*, Chapter 4, pp. 39–59. Mexico City: UNAM Centro de Investigaciones Jurídicas.
- Lee, D. S. (2008). Randomized experiments from non-random selection in U.S. House elections. *Journal of Econometrics* 142(2), 675–697.
- Lee, D. S. and T. Lemieux (2010, June). Regression Discontinuity Designs in Economics. *Journal of Economic Literature* 48(2), 281–355.
- Lee, L.-F. (1978). Unionism and Wage Rates: A Simultaneous Equations Model with Qualitative and Limited Dependent Variables. *International Economic Review* 19(2), 415–433.
- Lee, L.-F. (1983). Generalised econometric models with selectivity. *Econometrica* 51(2), 507–512.

- Levitsky, S. and S. Mainwaring (2006). Organized Labor and Democracy in Latin America. *Comparative Politics* 39(1), 21–42.
- Lewis, G. H. (1986a). Union Relative Wage Effects. In O. Ashenfelter and R. Layard (Eds.), *Handbook of Labor Economics*, Volume II, Chapter 20, pp. 1139–1181. North Holland: Elsevier.
- Lewis, H. G. (1963). *Unionism and Relative Wages in the United States: An Empirical Inquiry*. Chicago: University of Chicago Press.
- Lewis, H. G. (1986b). *Union Relative Wage Effects: A Survey*. Chicago: University of Chicago Press.
- Lokshin, M. and Z. Sajaia (2004). Maximum likelihood estimation of endogenous switching regression models. *Stata Journal* 4(3), 282–289(8).
- Lujambio, A. (2001). Democratization through Federalism? The National Action Party Strategy 1939–2000. In K. J. Middlebrook (Ed.), *Party Politics and the Struggle for Democracy in Mexico*, Chapter 2, pp. 47–94. San Diego: Center for US–Mexican Studies. University of California.
- Main, B. and B. Reilly (1992). Women and the union wage gap. *Economic Journal* 102(410), 49–66.
- Manquilef-Bächler, A. A., W. Arulampalam, and J. C. Smith (2009, April). Differences in Decline: Quantile Regression Analysis of Union Wage Differentials in the United Kingdom, 1991–2003. Discussion Paper 4138, IZA (Institute for the Study of Labour).
- Marceau, L. R. and R. A. Musgrave (1949). Strikes in Essential Industries: A Way Out. *Harvard Business Review* 27(3), 286–292.
- Martin, D. L. (1984). The Agency Problem in a Nonproprietary Theory of Union Behaviour. In J.-J. Rosa (Ed.), *The Economics of Trade Unions: New Directions*, Chapter Chapter 6. New York: Kluwer Nijhoff.
- McCrary, J. (2008, February). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics* 142(2), 698–714.
- Melly, B. (2006). Estimation of counterfactual distributions using quantile regression. *Labour Economics* 12(4), 577–590.
- Menezes-Filho, N., H. Zylberstajn, J. P. Chahad, and E. Pazello (2005). Unions and the economic performance of Brazilian establishments. In P. Kuhn and G. Márquez (Eds.), *What Difference Do Unions Make? Their Impact on Productivity and Wages in Latin America*, Chapter 4, pp. 77–100. Washington DC: Inter-American Development Bank.
- Metcalf, D., K. Hansen, and A. Charlwood (2001). Unions and the Sword of Justice: Unions and Pay Systems, Pay Inequality, Pay Discrimination and Low Pay. *National Institute Economic Review* 176(1), 61–75.
- Middlebrook, K. J. (1995). *The Paradox of Revolution: Labor, the State, and Authoritarianism in Mexico*. Baltimore: Johns Hopkins Press.
- Miller, P. and C. Mulvey (1992). Trade Unions, Collective Voice and Fringe Benefits. *Economic Record* 68(201), 125–141.
- Montgomery, E. and K. Shaw (1997). Pensions and Wage Premia. *Economic Enquiry* 35(3), 510–522.

- Moore, H. L. (1911). Wages and Strikes. In *Laws of Wages: An Essay in Statistical Economics* (2nd (1911) ed.), Chapter V. New York: Macmillan.
- Moreira, M. J. (2003, 07). A Conditional Likelihood Ratio Test for Structural Models. *Econometrica* 71(4), 1027–1048.
- Nash, J. F. (1950). The Bargaining Problem. *Econometrica* 18(2), 155–162.
- Neuman, S. and R. L. Oaxaca (2004). Wage Decompositions with Selectivity-Corrected Wage Equations: A Methodological Note. *The Journal of Economic Inequality* 2(1), 3–10.
- Neumark, D. (1988). Employers' Discriminatory Behaviour and the Estimation of Wage Discrimination. *Journal of Human Resources* 23(3), 279–295.
- North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- Nunn, N. (2009, 05). The Importance of History for Economic Development. *Annual Review of Economics* 1(1), 65–92.
- Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review* 14(3), 693–709.
- Oaxaca, R. and M. R. Ransom (1998). Calculation of approximate variances for wage decomposition differentials. *Journal of Economic and Social Measurement* 24(1), 55–61.
- Oaxaca, R. and M. R. Ransom (1999). Identification in Detailed Wage Equations. *The Review of Economics and Statistics* 81(1), 154–157.
- Panagides, A. and H. A. Patrinos (1994, March). Union-Nonunion Wage Differentials in the Developing World: A Case Study of Mexico. Policy Research Working Paper 1264, World Bank, Washington DC.
- Park, K. S. (2008, August). Non-Standard Employment. In R. B. Freeman, S. Kim, and J. Keum (Eds.), *Beyond Flexibility Roadmaps for Korean Labor Policy*, Chapter 11, pp. 261–277. Seoul: Korea Labor Institute.
- Pencavel, J. H. (1974). Relative Wages and Trade Unions in the United Kingdom. *Econometrica* 41(164), 194–210.
- Peterson, E. (1938). Review of Strikes in the United States. *Monthly Labor Review* 46(5), 1047–1067.
- Popli, G. K. (2007, June). Rising Wage Inequality in Mexico, 1984–2000: A Distributional Analysis. *Journal of Income Distribution* 16(2), 49–67.
- Puhani, P. (2000). The heckman correction for sample selection and its critique. *Journal of Economic Surveys* 14(1), 53–68.
- Ramírez Sánchez, M. A. (2011). Los sindicatos blancos de Monterrey (1931–2009). *Frontera Norte* 23(46), 177–210.
- Reder, M. W. and G. R. Neumann (1980). Conflict and Contract: The Case of Strikes. *Journal of Political Economy* 88(5), 867–886.
- Reilly, B. (1996). Strike incidence and the business cycle in Ireland. *Applied Economics* 28(6), 765–771.

- Reimers, C. W. (1983). Labor market discrimination against hispanic and black men. *The Review of Economics and Statistics* 65(4), 570–579.
- Rios-Avila, F. and B. T. Hirsch (2012, July). Unions, Wage Gaps, and Wage Dispersion: New Evidence from the Americas. Discussion paper 6757, IZA, Bonn.
- Rios-Avila, F. and B. T. Hirsch (2014, 01). Unions, Wage Gaps, and Wage Dispersion: New Evidence from the Americas. *Industrial Relations: A Journal of Economy and Society* 53(1), 1–27.
- Robinson, C. (1989). Union Endogeneity and Self-Selection. *Journal of Labor Economics* 7(1), 106–112.
- Robinson, C. and N. Tones (1984). Union Wage Differentials in the Public and Private Sector: A Simultaneous Equations Specification. *Journal of Labor Economics* 2(1), 106–127.
- Roland, G. (2004). Understanding institutional change: Fast-moving and slow-moving institutions. *Studies in Comparative International Development* 38(4), 109–131.
- Rosa, J.-J. (1984). Toward a theory of the union firm. In J.-J. Rosa (Ed.), *The Economics of Trade Unions: New Directions*, Chapter Chapter 7. New York: Kluwer Nijhoff.
- Rubin, D. B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology* 66(5), 688–701.
- Schultz, P. T. and G. Mwabu (1998). Labor Unions and the Distribution of Wages and Employment in South Africa. *Industrial and Labor Relations Review* 51(4), 680–703.
- Seele, A. (2012). Municipalities and Policymaking. In R. A. Camp (Ed.), *Oxford Handbook of Mexican Politics*, pp. 101–118. Oxford: Oxford University Press.
- Slichter, S. H., J. J. Healy, and R. E. Livernash (1960). *The Impact of Collective Bargaining on Management*. Washington DC: The Brookings Institution.
- Słoczyński, T. (2013, March). Population Average Gender Effects. IZA Discussion Papers 7315, Institute for the Study of Labor (IZA).
- Słoczyński, T. (2015a, May). Average Wage Gaps and OaxacaBlinder Decompositions. IZA Discussion Papers 9036, Institute for the Study of Labor (IZA).
- Słoczyński, T. (2015b, 08). The OaxacaBlinder Unexplained Component as a Treatment Effects Estimator. *Oxford Bulletin of Economics and Statistics* 77(4), 588–604.
- Smith, J. A. and P. E. Todd (2005). Does matching overcome LaLonde’s critique of nonexperimental estimators. *Journal of Econometrics* 125, 305–353.
- Sokoloff, K. L. and S. L. Engerman (2000, Summer). Institutions, Factor Endowments, and Paths of Development in the New World. *Journal of Economic Perspectives* 14(3), 217–232.
- Standing, G. (1992). Do unions impede or accelerate structural adjustment? Industrial versus company unions in an industrialising labour market. *Cambridge Journal of Economics* 16(3), 327–354.
- Stewart, M. B. (1983). Relative Earnings and Individual Union Membership in the United Kingdom. *Economica* 50(198), 111–125.
- Stone, M. (1977). An asymptotic equivalence of choice of model by cross-validation and akaike’s criterion. *Journal of the Royal Statistical Society. Series B (Methodological)* 39(1), 44–47.

- Swindinsky, R. and M. Kupferschmidt (1991). Longitudinal Estimates of the Union Effects on Wages, Wage Dispersion and Pension Fringe Benefits. *Relations Industrielles* 46(4), 819–838.
- Thistlethwaite, D. L. and D. T. Campbell (1960). Regression-discontinuity analysis: An alternative to the ex post facto experiment. *Journal of Educational Psychology* 51(6), 309–317.
- Throop, A. W. (1968). The Union-Nonunion Wage Differential and Cost-Push Inflation. *The American Economic Review* 58(1), 79–99.
- Tulio Esquinca, M. and J. Melgoza Valdivia (2006). La afiliación sindical y premio salarial en México. In E. de la Garza Toledo and C. Salas (Eds.), *La situación del trabajo en México, 2006*, Chapter IV.4, pp. 459–485. Mexico City: Plaza y Valdez.
- van der Klaauw, W. (2008, 06). Regression-Discontinuity Analysis: A Survey of Recent Developments in Economics. *LABOUR* 22(2), 219–245.
- Vroman, S. (1989). A Longitudinal Analysis of Strike Activity in U.S. Manufacturing: 1957–1984. *The American Economic Review* 79(4), 816–826.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48(4), 817–838.
- Zapata, F. (2005). *Tiempos Neoliberales en México*. Mexico City: Colegio de México.