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Did India's Economic Reforms Generate Jobs?

**Essays on Economic Liberalisation, Labour Market Flexibility and Employment in
the Indian Manufacturing Sector (1990-2006)**

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**Thesis submitted in fulfilment of the requirements of the PhD Economics programme
of**

The University of Sussex

May 2017

Declaration

I hereby declare that this thesis has not been, and will not be, submitted in whole or in part to another University for the award of any other degree. I affirm that all the material presented in this thesis is original work that I have undertaken with guidance and input from my supervisors. Any errors or omissions are my own.

Signature:

Nihar S. Shembavnekar

19 May 2017

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Abstract

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Degree for which this thesis is submitted: PhD Economics

Title:

Did India's Economic Reforms Generate Jobs?

Essays on Economic Liberalisation, Labour Market Flexibility and Employment in the Indian Manufacturing Sector (1990-2006)

Whether economic liberalisation generates employment in developing countries remains a matter of debate in academic and policy circles. This thesis explores the labour market implications of a series of liberalising product market reforms initiated in India in the 1990s.

The analysis of Chapter 2 indicates that declines in input tariffs are associated with increased formal firm employment across all Indian states, while FDI reform is associated with increased (reduced) formal firm employment in states with flexible (inflexible) labour markets (1990-1997). The FDI effect holds for permanent employment in both groups of states but only affects casual (contract) employment to a significant extent in states with flexible labour markets. The evidence is supportive of the baseline results being driven by product market competition within the formal sector.

Chapter 3 reveals that tariff liberalisation is not associated with significant changes in employment in informal enterprises, possibly because these enterprises rarely engage in international trade. However, on average and *ceteris paribus*, delicensing (FDI reform) is associated with statistically significant increases in informal employment and informal enterprise numbers in states with inflexible (flexible) labour markets (1990-2001). There is some evidence that the delicensing effect is attributable to increases in product market competition in delicensed industries in the post-reform period. The mechanism underlying the result associated with FDI liberalisation is more uncertain and could be one or a combination of competition and collaborative linkages between informal and formal manufacturers.

Chapter 4 examines the impact of a post-1996 policy reform ('SSI dereservation'), which liberalised product markets that had long been reserved for small businesses, on employment in informal manufacturing enterprises. On average and *ceteris paribus*, dereservation is associated with increased employment in larger informal 'establishments', but not in tiny household enterprises (1995-2006), attributable in part to increases in product market competition with large formal firms.

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“You didn’t get there on your own. I’m always struck by people who think, well, it must be because I was just so smart. There are a lot of smart people out there. It must be because I worked harder than everybody else. Let me tell you something: There are a whole bunch of hardworking people out there. If you were successful, somebody along the line gave you some help.”

- Barack Hussein Obama II, former President (2009-2017) of the United States of America (13 July 2012, presidential election campaign speech, Roanoke, Virginia)

Working on this thesis has been an invaluable experience for me in more ways than one. I have gained a veritable treasure trove of learning in terms of economics, econometrics, history, Stata skills, time management and much else. Inevitably there will be errors and imperfections in this document, and I assume full responsibility for any shortcomings. I would like to begin by acknowledging the help and support that I have received from a large number of sources in the course of this unique journey along the route of doctoral research.

To begin, I would like to express my gratitude to my PhD supervisors, Dimitra Petropoulou and Andrew Newell. For well over three years, I have benefited from their unstinting support and guidance on my thesis, often generously proffered at points in time when they were extremely occupied with their own research and other commitments. I have discussed my questions and concerns regarding the thesis, as well as employment avenues following submission, with my supervisors on a regular basis, and they have contributed tremendously in improving the quality of the research undertaken in this thesis. I am therefore deeply indebted to them and thank them for their input and assistance.

As is commonly the case, my doctoral studies progressed in a non-linear trajectory, with several points of success and failure, both of which I savour (the latter perhaps more so!) in terms of learning. It would have been highly difficult, if not impossible, to maintain a sense of psychological equilibrium over the last three and a half years, in the absence of the friendships and networks that I have formed in this period. I am thankful to a large number of friends, colleagues and faculty members at the University of Sussex for their support. The work discussed in this thesis was first presented in internal seminars in the university, where it encountered an excellent mix of positive reception and constructive criticism. The analysis that I have undertaken in this document would have been much the poorer in the absence of this feedback. Special thanks are due to L. Alan Winters, Richard Tol, Barry Reilly, Sonja Fagernas and Amalavoyal Chari of the University of Sussex, for devoting additional time

towards reading and commenting on large parts of individual chapters. Comments and feedback received on more refined versions of these chapters from participants in a number of academic conferences are also greatly appreciated. In addition, I would like to acknowledge the official examiners of this thesis, Giordano Mion and Uma Kambhampati, for providing highly relevant and constructive feedback from the perspective of potential future publication of some of the material presented in the thesis.

Several PhD students rely on a wider community of academics for support in the course of their doctoral studies, and I am no exception. In this context, I am exceedingly grateful to Shanthi Nataraj of the RAND Corporation for unhesitatingly having shared her meticulously compiled data on India's economic reforms in the 1990s, as also the concordance between India's Annual Survey of Industries Commodity Codes (ASICC) and small scale industry dereservation product coding that was used in Martin *et al* (2017). I am convinced that the data generously shared by Shanthi saved me weeks of tedious work in the initial weeks of my research. Further thanks are due to Shanthi for offering constructive comments on an early draft of Chapter 2 and Chapter 3 of this thesis, and for being very forthcoming in responding to email queries that I addressed to her on a number of occasions regarding work that she had previously undertaken in areas of relevance for this thesis.

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While I commenced working on this thesis in 2013, the foundations of this work are rooted in strides taken in earlier years. Having grown up largely in India prior to 2007, I am grateful to a large number of relatives, friends and school and university teachers for supporting and encouraging me in my educational endeavours. My maternal grandmother, Usha Joshi, has

always been extremely supportive of my progress, and my (late) other grandparents always placed great emphasis on reading and higher education. In later years, I have drawn inspiration from the encouragement and goodwill proffered by my sister, Sayali Shembavnekar, and my brother-in-law, Yash Kulkarni, as well as a large number of other relatives and extended family. I take this opportunity to express many thanks to all these individuals.

Finally, I have no hesitation in dedicating this thesis to my parents, Suhas Shembavnekar and Swati Shembavnekar. I would scarcely have travelled this far without their unwavering support, their numerous sacrifices, and their conviction that I would succeed on occasions when that seemed highly improbable even from my own, generally optimistic perspective. Words are inadequate to express my gratitude to them. If I have learned one thing in the course of my doctoral studies, it is that the adage that 'Rome was not built in a day' might also validly claim that 'Rome was not built in one generation'.

Nihar S. Shembavnekar

19 May 2017

Dedicated to my parents

Chapter 1: Introduction

1.1 A primer in India's economic development (1950-1990)

“The achievement we celebrate today is but a step, an opening of opportunity, to the greater triumphs and achievements that await us. Are we brave enough and wise enough to grasp this opportunity and accept the challenge of the future?”

- Jawaharlal Nehru, former Prime Minister (1947-1964) of India
(14 August 1947, “Tryst with Destiny” – Speech on the Granting of Indian Independence)

As a newly independent developing economy in the 1950s, India adopted economic policies that had distinctly socialist leanings. Inspired by the strides made by the erstwhile USSR, the young Indian economy was largely geared towards government regulation and national self-sufficiency (Sivadasan, 2009). Trade policy was extremely restrictive and favoured import substitution, with exporters and importers alike facing a wide range of punitive tariff and non-tariff barriers. In tandem, domestic industrial policy imposed several constraints on businesses – most notoriously in the form of the infamous license policy (the ‘License Raj’) – and thereby stifled entrepreneurship and growth (Aghion *et al*, 2008). Over time, this regulatory regime engendered a productivity decline in the 1970s and became a byword for red tape, graft, inefficiency and government monopoly in a number of sectors.

In the 1980s, a few reforms were initiated in an attempt to reverse the productivity decline of the previous decade. Until 1985, all manufacturing firms with over 50 employees (over 100 employees if electricity was not used) and with assets above a specified threshold were required to obtain a license from the government. Chari (2011) and Sharma (2008) document that this policy was extremely restrictive and discouraged market entry and competition. This domestic license regime was partially liberalised in 1985, with roughly one in three three-digit manufacturing industries being ‘delicensed’. In this context, the term ‘delicensing’ implies that firms in a given industry or industries were no longer required to

obtain such a license. In the domain of trade policy, however, tariffs on manufactured imports remained stubbornly high.

The piecemeal reforms of the 1980s proved inadequate in the face of growing fiscal and external macroeconomic imbalances. To worsen matters, a spike in oil prices owing to the Gulf War, a decline in remittance inflows from the Middle East, political uncertainty and a drop in demand for exports to major trade partners all combined to engender substantial capital outflows and, subsequently, a balance-of-payments crisis in 1990-91.

1.2 Reform forged in the crucible of crisis (1991-1997)

In August 1991, the Indian government approached the International Monetary Fund (IMF) to request a Stand-By Arrangement to help it tide over its external payments crisis. The IMF agreed to provide the requisite support conditional on the government undertaking a series of comprehensive structural reforms, including measures for substantive trade and industry policy liberalisation. Against a backdrop of an external payments crisis and global economic headwinds, the Indian government had little choice but to initiate these reforms. In one sense, this was an episode of 'reform by stealth', with wide ranging policy shifts being set in motion in a very short span of time that allowed for virtually no lobbying or opposition (Jenkins, 1999). Given the circumstances, it may plausibly be argued that these reforms constituted an exogenous shock for the economy. Sivadasan (2009) and Topalova and Khandelwal (2011) provide additional detail in this context.

The New Industrial Policy endorsed in 1991 provided a roadmap for reform and the five-year Export Import (Exim) Policy that came into effect in April 1992 encapsulated the new trade policy. Under the trade liberalisation programme initiated in 1992, the import license regime applying to nearly all capital goods and intermediate inputs was abolished. Tariffs

were liberalised by capping peak tariff rates and by reducing the number of tariff bands. Further, the Indian rupee was devalued relative to the US dollar and a dual exchange rate was introduced.

In the 1991-1997 period, the average Indian final goods tariff (ad valorem) on manufactured imports fell from 95 per cent to 35 per cent (Harrison *et al*, 2013). However, as Table 1 reveals, the declining trend in final goods tariffs masked considerable dispersion around the mean, with peak tariffs remaining prohibitive. Under the terms of the support extended by the IMF, the deepest tariff cuts were applied to those industries with the highest pre-reform tariff levels. This simplification and harmonisation of the tariff regime was followed by an increase in imports, in particular imports of intermediate inputs.

Table 1: Summary statistics by year: Final goods tariffs, input tariffs, delicensing and FDI liberalisation (1985-1997)*

Year	Final goods tariffs (%)				Input tariffs (%)				% DEL	% FDI
	Mean	Min	Max	SD	Mean	Min	Max	SD		
1985	88.97	0.00	203.91	32.83	57.89	23.42	86.82	11.73	35	0
1986	95.37	0.00	242.22	37.95	60.29	23.97	88.30	11.23	36	0
1987	94.75	0.00	242.22	37.60	58.63	23.67	79.50	10.25	36	0
1988	94.86	0.00	248.89	37.53	59.33	23.89	83.09	10.55	36	0
1989	95.54	0.00	281.25	40.34	59.44	23.89	83.11	10.58	37	0
1990	95.68	0.00	281.25	40.56	59.45	23.90	83.22	10.57	37	0
1991	95.68	0.00	281.25	40.56	59.44	23.90	83.22	10.57	84	38
1992	63.48	0.00	281.25	27.71	39.73	20.54	53.27	5.42	84	38
1993	63.92	22.50	340.63	31.03	38.53	20.42	54.35	5.31	86	38
1994	64.46	11.28	400.00	36.06	37.34	8.92	55.42	6.06	86	38
1995	53.57	12.08	320.75	30.86	30.11	8.64	48.97	5.32	86	38
1996	42.41	0.00	254.27	24.85	22.76	8.15	42.51	5.15	86	38
1997	34.15	0.00	176.67	18.59	18.37	6.37	32.95	4.09	89	45

Source: Final goods tariff data and input tariff data obtained from Nataraj (2011); 132 three-digit NIC (1987) industries included. Min: Minimum; Max: Maximum; SD: Standard deviation. * “% DEL” and “% FDI” refer to the proportions of industries that were delicensed and FDI liberalised (respectively) up to a given year.

Final goods tariffs declined precipitously in 1992, which was the first year of reform implementation following the balance-of-payments crisis of 1990-91. Tariffs on intermediate inputs (hereafter, ‘input tariffs’, described in Section 2.3.2) also fell and

converged in the post-1991 period, although they display less variance relative to final goods tariffs. The scatterplots in Figure 1(a) and Figure 1(b) capture tariff levels in 1989 and the declines that occurred in the 1989-2000 period for final goods and input tariffs, illustrating how the highest pre-reform tariff rates were subjected to the largest cuts. This was purposefully undertaken in the case of final goods tariffs, with input tariffs consequentially undergoing interlinked, albeit not equivalent, declines. The two outliers visible to the right of the graph in Figure 1(a) are the wine manufacturing industry and the spirit distillation, rectification and blending industry. The final goods tariffs for both of these industries amounted to over 250 per cent in 1989, but they were subjected to considerably smaller reductions relative to other industries with very high tariff rates in 1989. This might be indicative of these industries having enjoyed political protection from the tariff cuts, even in the face of the exceptional situation that the Indian economy faced in 1991. Robustness checks which drop these 'outlier' industries from the relevant baseline regressions are discussed in Section 2.6.2 and Section 3.5.1. These checks show that my findings are not influenced, both magnitude and direction wise, by the omission of these outliers.

Figure 1(c) plots pairwise declines in final goods tariffs and input tariffs over the 1989-2000 period. The resulting scatterplot suggests that while there may be a positive association between the shifts in tariff rates¹, it is not sufficiently strong for multicollinearity to pose major concerns. An alternative way to visualise the pervasiveness of India's tariff liberalisation in the 1991-1997 period is to plot the declines in final goods tariff rates across different percentiles in the tariff distribution (Nataraj, 2011), which I undertake for the

¹ The correlation coefficient for the changes in final goods and input tariffs over the 1989-1994 period is 0.4144, while that for the corresponding changes over the 1989-2000 period is 0.5371.

median and the fifth and ninety-fifth percentiles of final goods tariff rates (1985-1997) in Figure 1(d).

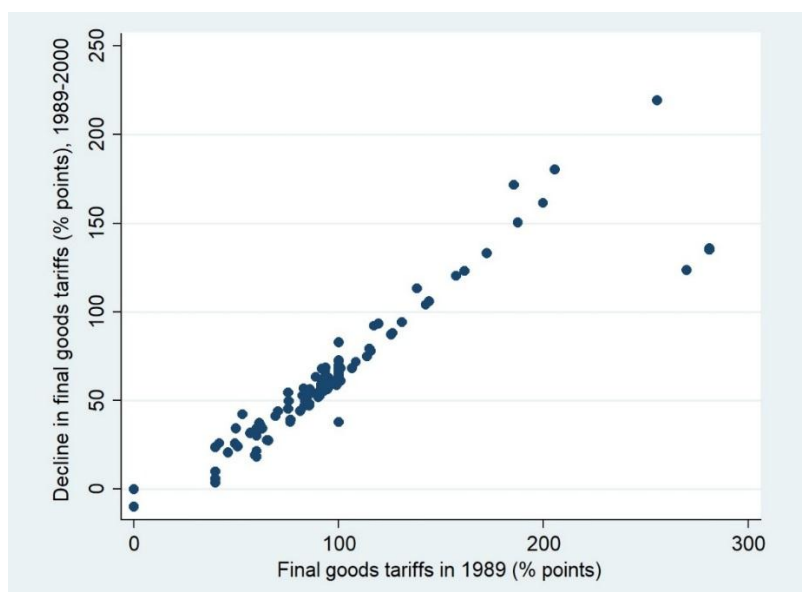
In 1997, a new five-year Exim Policy was endorsed to consolidate the trade liberalisation and reform process. Tariff reductions continued in the post-1997 period, albeit with less urgency and at a slower pace, as is visible in Figure 1(d). Topalova and Khandelwal (2011) argue that endogeneity concerns for this period are likely to be greater relative to the immediate post-reform (1991-1997) period, on the grounds that in contrast to the 1991-1997 period, the later tariff reductions are more likely to have been targeted at protecting less efficient industries. In Chapter 2 and Chapter 3, I undertake a number of checks to address this concern.

In addition, domestic economy deregulation, which had been promoted in ‘piecemeal’ fashion in the 1980s, received an impetus in the 1990s. This deregulation assumed numerous guises, most prominent among which were the quasi-elimination of the notorious industrial license regime and increases in the foreign direct investment (FDI) thresholds applicable to a number of manufacturing industries. As regards the licensing regime, a majority of industries that had not been freed from licensing constraints in 1985 were delicensed in 1991, with only a handful liberalised in later years (Table 1). Prior to 1991, most industries were characterised by a 40 per cent FDI ceiling. In 1991 and in the following years, this ceiling was raised to 51 per cent for a number of industries, with ‘automatic’ FDI approval, and other regulations concerning FDI were liberalised (Sivadasan, 2009). In tandem with the final goods tariff rate harmonisation of the 1990s, Figure 1(d) captures the increase in the proportion of three digit industries (as defined under India’s National Industrial Classification of 1987) that underwent delicensing and FDI liberalisation in the 1985-1997 period. While these domestic reforms were initiated more sporadically relative

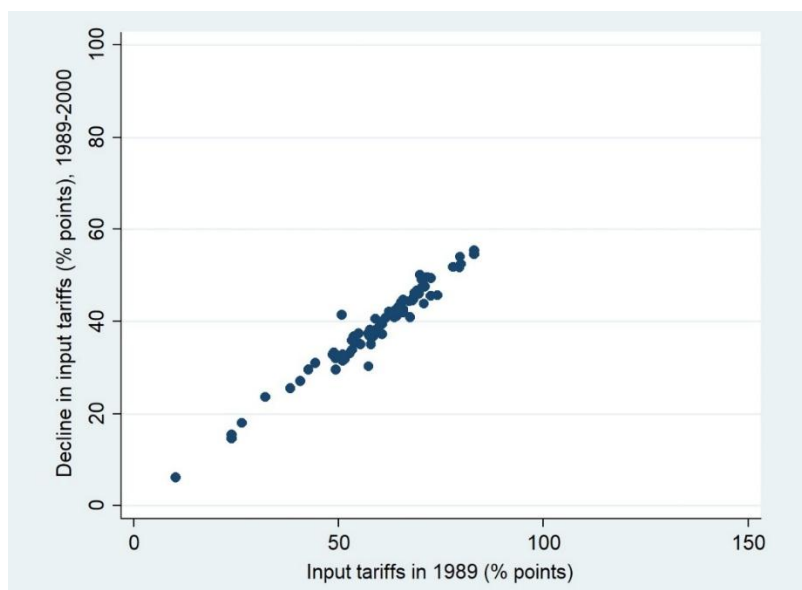
to the concurrent tariff reductions, they are characterised by sufficient variation across industries and over time to enable a firm level analysis for the 1990s. The analyses in Chapter 2 and Chapter 3 use survey data for more than one post-1991 cross-section, which arguably facilitates a reasonably comprehensive consideration of the implications of the reforms.

Figure 1: Economic reform in India (1985-2000)

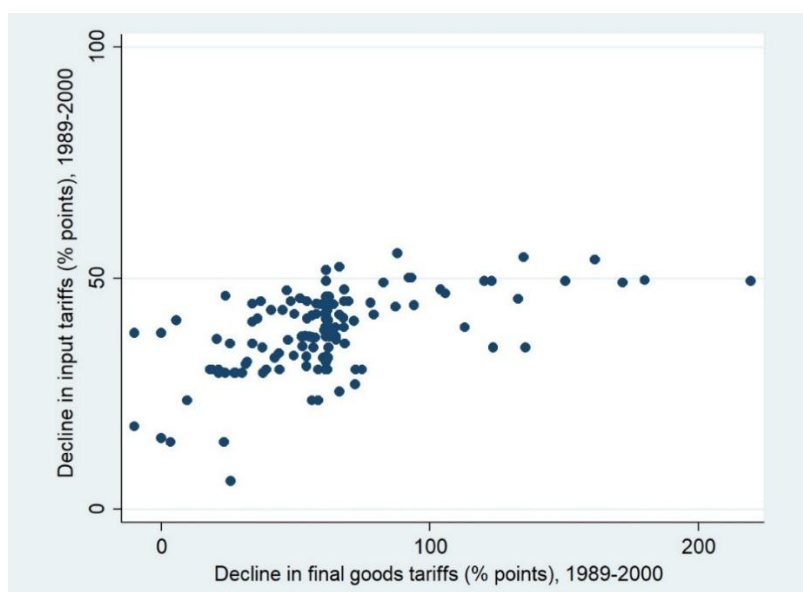
(a) Final goods tariffs (1989) and declines in final goods tariffs (1989-2000)²



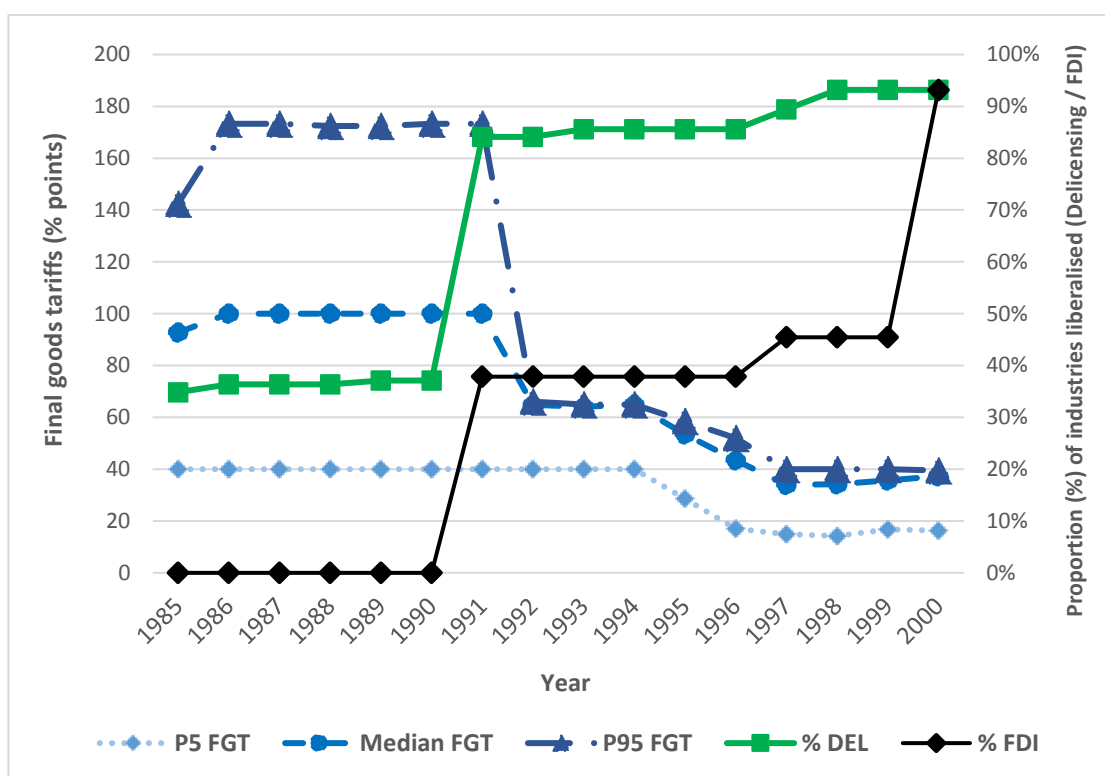
(b) Input tariffs (1989) and declines in input tariffs (1989-2000)



(c) Declines in final goods tariffs and declines in input tariffs (1989-1994)



(d) Selected final goods tariff rate percentiles, delicensing and FDI reform (1985-1997)*



Source: Data on final goods tariffs, input tariffs, delicensing and FDI reform in India (1985-1997) from Nataraj (2011); the final goods and input tariff data were compiled by Nataraj (2011) on the basis of Government of India estimates and India's Input-Output Transactions Table (IOTT). * "Px FGT" represents the xth final goods tariff rate percentile (for instance, "P5" represents the fifth final goods tariff rate percentile). "Median FGT" denotes the median final goods tariff rate. "% DEL" and "% FDI" refer to the proportions of three digit industries (as defined under India's National Industrial Classification of 1987) that were delicensed and FDI liberalised, respectively, up to a given year.

On the whole, the reforms of the early nineties resulted in the Indian economy becoming substantially more open relative to its position in the first four decades following independence. As a proportion of GDP, the share of overall trade increased considerably, from 15 per cent in the 1980s to about 27 per cent in 2000 and further to 47 per cent in 2006 (Alessandrini *et al*, 2011). In Chapter 2 and Chapter 3, I analyse the implications of India's tariff liberalisation, delicensing and FDI reforms for employment in firms operating in manufacturing industries, which were the targets of this momentous policy shift.

1.3 Dereservation reform (1997-2010)

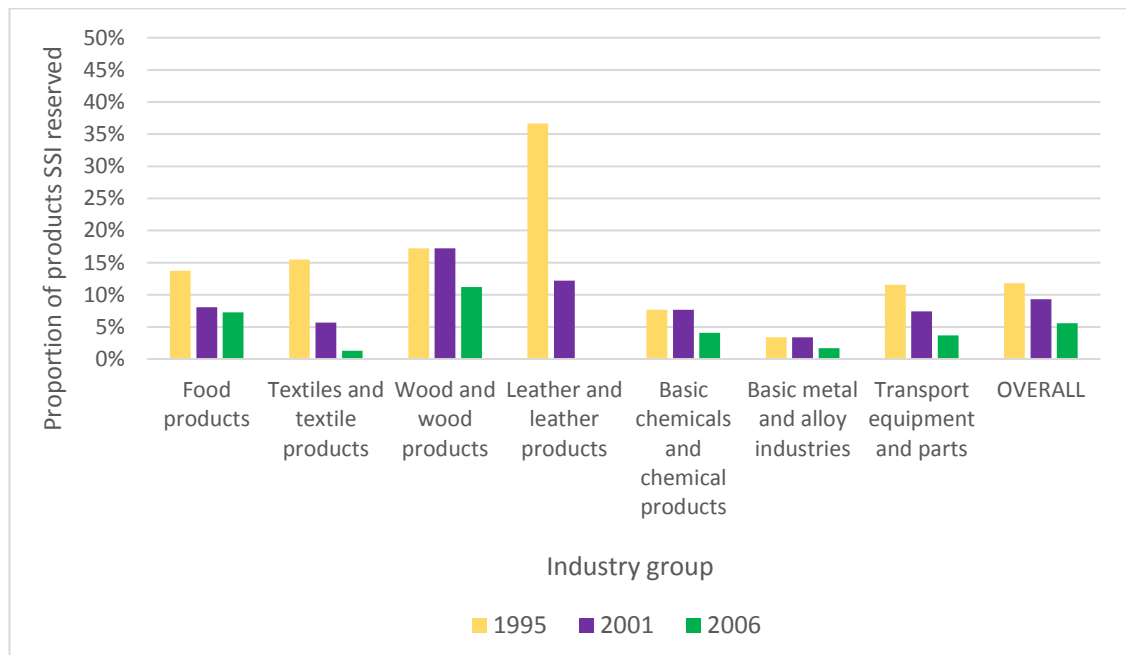
While large business houses have long tended to dominate press coverage of India's manufacturing sector, most manufacturing enterprises in India are small entities. In recognition of this fact, beginning in the 1960s, the Government of India sought to encourage the growth of small enterprises by reserving a number of products for small scale industry (SSI) manufacturing. Initially, a small enterprise was defined as one employing up to 50 workers and having fixed assets valued at up to Rs. 500,000 (Martin *et al*, 2017). With the passage of time, only the fixed asset threshold was retained. This threshold increased in line with rising historical cost indices and amounted to Rs. 10 million in 1996.

The number of SSI reserved products grew steadily up to the mid-1990s. This proved to be the 'high water mark' of SSI reservation, with the list of reserved products accounting for approximately 20 per cent of all manufacturing products in 1996. Large business houses already operating in the newly reserved product markets were permitted to continue doing so, with the proviso that any increases in production or entry into reserved product spaces would require them to export 75% or more of their output (Mohan, 2002). In light of India's

highly restrictive export licensing regime of the time, this is likely to have ensured the effectiveness or ‘bite’ of the new reservation regime.

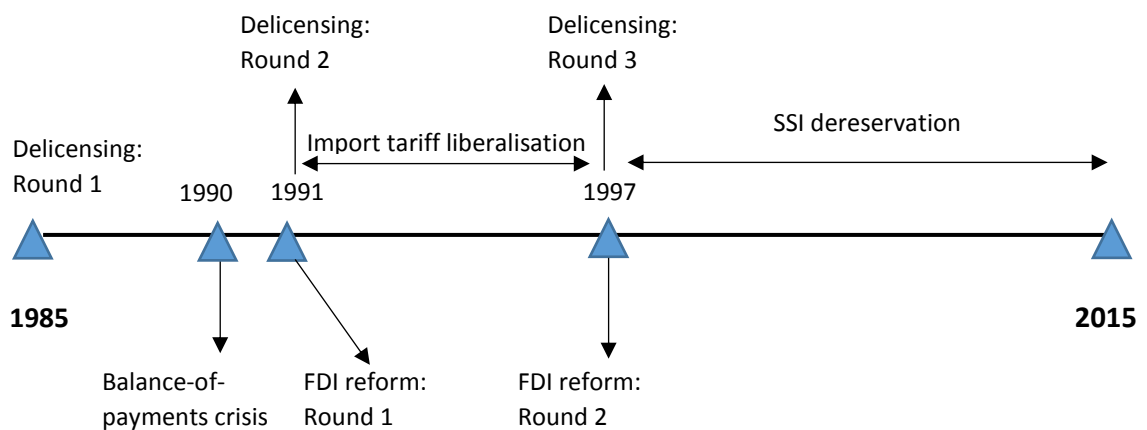
By the mid-1990s, it was felt that SSI reservation, while well intentioned, had become somewhat redundant. With the liberalisation of India’s trade policies and domestic licensing regime in the early part of the decade, it was argued that large enterprises could circumvent the SSI reservation policy by importing reserved products or by introducing fair substitutes that were unreserved. Tewari and Wilde (2014) document how the idea of SSI dereservation gradually gained favour in government and academic circles. Eventually, beginning in 1997, the hitherto reserved products were dereserved over time, with small groups being dereserved in 1997 and 1999 and larger numbers being dereserved in 2001 and the following years through to 2010, when only a minuscule proportion of products remained on the reserved list (these were dereserved in 2015).

Importantly, Tewari and Wilde (2014) provide evidence that the timing of SSI dereservation was quasi-random across industries and that endogeneity is unlikely to be an issue for analysts of this reform episode. By 2006, the share of reserved products had declined considerably across industry groups, and in 2010 it was close to zero for most two digit industry categories. Figure 2 illustrates the uneven pattern of dereservation for a selection of industry categories. In Chapter 4, I explore the extent to which manufacturing sector employment responded to the removal of the SSI reservation policy, a question of some considerable policy significance in light of Mohan’s (2002) contention that the overall development of India’s manufacturing base had, over time, been substantially hobbled by this ostensibly innocuous policy.

Figure 2: Proportion of SSI reserved products in selected industry groups (1995-2006)

Source: Author's estimates based on data made available by the Ministry of Micro, Small and Medium Enterprises (MSME) of the Government of India

To aid the reader in reference, Figure 3 provides a timeline of the economic reforms outlined in Section 1.2 and Section 1.3.

Figure 3: Timeline of economic reforms undertaken in India (1985-2015)

Source: Author's discussion in Section 1.2 and Section 1.3 of this thesis

Chapter 2: Economic Reform, Labour Market Flexibility and Employment in Formal Manufacturing Firms in India

2.1 Introduction

In the latter half of the twentieth century, a number of developing economies initiated comprehensive economic reform policies. A balance-of-payments crisis necessitating IMF assistance, preceded by a period of tepid growth and a growing realisation that the *status quo* was unsustainable, triggered this process in India in 1991. As discussed in Section 1.2, the Indian government subsequently implemented a series of far reaching economic reforms in the 1991-1997 period. Over two decades later, gaps persist in the literature that explores the labour market impacts of this reform programme. A number of studies, Nunn and Trefler (2013) and Ahsan (2013) being among the more recent, have documented that this impact is likely to be influenced by domestic institutions. However, this view has received scant attention in the Indian context, in particular at a ‘micro’ or firm level.

This chapter contributes to addressing this gap in the literature by analysing the impact of India’s economic reforms in the 1990s on employment in formal manufacturing firms. In this context, the term ‘formal’ extends to all manufacturing businesses that employ ten or more workers and use electricity (for a small number of manufacturers that do not use electricity, the employment threshold rises to twenty workers). These firms are ‘formal’ in the sense that India’s Factories Act of 1948 requires them to register with the state government, which brings these firms under the purview of labour market legislation and other forms of regulation, as outlined in Amirapu and Gechter (2017). Although these firms account for a tiny fraction of all manufacturing firms in India, government survey data suggest that they

produce approximately three-quarters of manufactured output and account for 70 per cent of gross value added in manufacturing.

I also examine the extent to which the impacts of the reforms depend on differences in labour market flexibility at the state (provincial) level. This is key, given that inflexible labour market regulation is commonly cited as an impediment to investment and growth in manufacturing output and productivity (Ahsan and Pagés, 2009). Further, as labour market regulation is binding only for the formal sector, any direct effect arising from its interplay with economic reform is likely to be focused on formal firms. I capture state level variations in labour market flexibility using the ‘FLEX 2’ indicator proposed by Hasan *et al* (2012). Unless otherwise specified, I use the terms ‘states with flexible labour markets’ and ‘states with inflexible labour markets’ to refer to states that are characterised as having flexible labour markets (score 1) and inflexible labour markets (score 0) by this ‘FLEX 2’ variable. Described in detail in Section 2.3.3, this indicator builds on the seminal state level labour legislation based measure proposed by Besley and Burgess (2004) by accounting for perceptions regarding the effectiveness of implementation of legislation.

The analysis in this chapter uses survey data compiled by the Central Statistics Office (CSO) through the Annual Survey of Industries (ASI) for formal manufacturing firms. It benefits from the rich cross-industry variation in India’s policy changes in the 1990s, particularly visible in the import tariff reductions that were enforced in this period. Moreover, the reform package of 1991 was an unanticipated event, which helps to obviate the usual concerns inherent in any analysis of the consequences of such measures. This chapter is the first to examine the impact of declines in both final goods and input tariffs on firm level employment in India.

The results are suggestive of substantial employment shifts in the formal manufacturing sector in the post-reform period, with input tariffs (described in Section 2.3.2) and FDI reform being statistically and economically significant explanatory variables. On average, a one percentage point decline in input tariffs is associated with an employment increase of 0.68 per cent in the average formal firm in states with inflexible labour markets, and an employment increase of 0.66 per cent in the average formal firm in states with flexible labour markets (1990-1997). Further, FDI reform is associated with average formal firm employment falling (rising) by 11.5 (9.3) per cent in states with inflexible (flexible) labour markets. These results are highly robust to a battery of sensitivity checks. Given the timing of the FDI liberalisation and the extent to which input tariffs declined in India through the 1990s, these estimates suggest that *ceteris paribus*, following the reforms, employment in the average formal firm increased by approximately 27.3 per cent in states with flexible labour markets and by roughly 7.5 per cent in states with inflexible labour markets. These findings uphold the notion that the interactions between the reform measures and states' labour market flexibility have implications for employment in formal firms. Overall, no significance attaches to reductions in final goods tariffs. Delicensing, while not associated with significant firm level employment changes, precedes a significant rise in the number of formal firms in the average industry in states with flexible labour markets.

The remainder of this chapter is organised as follows. Section 2.2 undertakes a brief review of the literature. Section 2.3 describes the data, while Section 2.4 outlines the empirical methodology. Main findings are presented in Section 2.5, with further analysis and robustness checks discussed in Section 2.6. Section 2.7 concludes.

2.2 Context

2.2.1 Literature review

2.2.1.1 Impacts of economic reform on firm level employment

The turn of the millennium witnessed an upsurge in academic interest in the impacts of economic reform programmes on firm level employment, both in terms of theoretical contributions and empirical work. Substantial ambiguity persists as regards these employment effects.

One or more of a number of mechanisms may underpin any observed impact of economic reform on firm level employment. For instance, a reduction in final goods tariffs might be expected to result in a more competitive domestic product market landscape, on account of an increase in imports. This could induce domestic manufacturers to shed surplus labour in a bid to cut costs and remain competitive. On the other hand, in sectors where product quality is more variable, domestic manufacturers might seek to employ more labour, particularly skilled labour, following a final goods tariff cut.

Furthermore, as outlined in Section 1.2, a reduction in final goods tariffs across the manufacturing sector as a whole implies a decline in input tariffs for the average manufacturer. This would arguably lead to lower input prices, not only for imported inputs but also, over time and through general equilibrium effects, for indigenous inputs that were previously more expensive under the higher tariff regime. Facing lower input prices for manufactured items, employers might be incentivised to hire more, rather than less, workers in the post-tariff reform period. Whether such employment effects (arising from lower input prices in the post-reform period) move in the same direction as any effects attributable to final goods tariff cuts is an empirical issue. To the extent that some of these

effects might cancel each other out, any impacts of significance that I observe in this study, either attaching to the final goods or input tariff reductions, might be taken to be net effects. Also, as outlined in Section 1.2, while the final goods and input tariff reductions in India in the 1989-2000 period were evidently positively correlated, there is sufficient variation between these two variables. The large sample sizes of the datasets used for the analyses in Chapters 2 and 3 also go a long way towards mitigating any threat that moderate multicollinearity might in theory pose to the statistical significance of the results.

In considering employment impacts, then, declines in tariffs on intermediate goods (input tariffs) are arguably as important to assess as final goods tariff cuts. The question of which among the alternative channels discussed above would be dominant is an empirical issue. The OECD (2012) provides an excellent overview of the extensive literature that examines the links between trade liberalisation and employment. While there is some evidence that declines in input tariffs are associated with changes in formal sector employment, the direction of the effect does not appear to be uniform (see for instance Menezes-Filho and Muendler, 2011; Paunov, 2011; Sharma, 2013; Kis-Katos and Sparrow, 2015; and Groizard *et al*, 2015).

As regards India's trade reforms, most studies have tended to focus on tariffs on final goods, or final goods tariffs, and their implications for firm level productivity. However, an increasing body of evidence suggests that declines in tariffs on intermediate inputs (input tariffs) have a greater positive impact on firm level productivity in the formal sector, relative to final goods tariffs. Amiti and Konings (2007) arrive at this conclusion in a study focusing on Indonesian firms and Nataraj (2011) obtains a similar result for formal firms in India. These results make a strong case for simultaneously examining final goods and input tariff declines in a study of the implications of trade liberalisation for employment.

Moreover, the firm level implications of India's delicensing and FDI reforms remain poorly studied. Aghion *et al* (2008) establish that delicensing had implications for state level employment in India. The principal goal behind the delicensing reform was to slash some of the 'red tape' that had long been a major barrier to market entry. Therefore, a scenario in which delicensing may affect firm level employment, both through the entry of new firms and changes in employment in incumbent firms, becomes plausible. Similarly, with FDI reform (in terms of liberalisation of existing caps on FDI equity), it could be argued that firm level employment might undergo quantitative and qualitative increments on account of a greater likelihood of knowledge transfers, technology spillovers and related factors (Javorcik, 2015). In tandem with the trade reforms, delicensing and FDI liberalisation might also have 'extensive margin' implications for market or industry size, on account of competition driven effects or collaborative or supply chain linkages between formal firms. This chapter contributes to building an evidence base in these areas.

2.2.1.2 Does labour market flexibility matter?

A number of studies, including Goldberg and Pavcnik (2003) and Bosch *et al* (2007), suggest that firm level employment is at least as much a function of the degree of domestic labour market flexibility as it is of economic policy shifts. Intuitively, the notion that the impact of economic reforms on labour markets is affected by domestic institutions is appealing. In other words, the impact of economic reforms on domestic labour markets is arguably likely to hinge on the interaction between policy change and domestic institutions, in particular labour market regulation.

This interaction could lead to a number of alternative outcomes, which makes the evaluation of the net effect an empirical question. For instance, in areas with more flexible labour markets, employers are arguably more likely to take on or shed additional labour

following any given policy reform, relative to areas with less flexible labour markets. This could be reflected both in terms of a greater likelihood of post-reform increases in employment on the one hand, and greater variation in observed firm level employment, in areas with more flexible labour markets. In this thesis, I restrict my attention to estimating the net average effect of the reforms of interest on firm level employment in Indian states with relatively more, as opposed to relatively less, flexible labour markets. In this section, I summarise the literature that considers the relevance of such a distinction for differential employment outcomes. The specific measure of labour market flexibility that I use in my baseline regressions is discussed at some length in Section 2.3.3.

The impacts of labour market regulation on employment outcomes have long constituted an area of research interest. Botero *et al* (2004) study labour laws in 85 countries and conclude that more inflexible labour markets (in terms of higher levels of labour regulation) tend to have larger unofficial segments and higher unemployment. Given the federal structure of its economy and the fact that its numerous states (provinces) have considerable autonomy in terms of amending and implementing centrally driven labour market regulation, India offers fertile ground in this context. Besley and Burgess (2004) exploit the state and time level variation in amendments made to the Industrial Disputes Act (IDA) of 1947 up to 1990 to derive labour market flexibility scores that vary across states and over time (these are discussed in more detail in Section 2.3.3). Founded upon these scores, their analysis concludes that states that tended to make more ‘pro-worker’ amendments over time tended to witness inferior outcomes in terms of employment, output, investment, productivity and urban poverty, relative to states that tended to make more ‘pro-employer’ amendments over time.

Recent research is supportive of complementarities between the nationwide industry level reforms undertaken in India and domestic labour market flexibility. Aghion *et al* (2008) argue that manufacturing output in states that made more ‘pro-worker’ amendments as per the Besley-Burgess methodology tended to be lower following the delicensing reforms undertaken in India in the 1990s, relative to states where amendments tended to be ‘pro-employer’. Along related lines, Gupta *et al* (2009) find that after the delicensing reforms were initiated, states with more inflexible (‘pro-worker’) labour laws tended to undergo slower employment growth, while states with less competitive product market regulation registered slower output growth. Topalova and Khandelwal (2011), however, use the Besley-Burgess measure to suggest that formal firms in states with more ‘pro-worker’ legislation experienced higher productivity gains in the wake of India’s tariff liberalisation.

A recent study by Hasan *et al* (2012) examines the extent to which final goods tariff liberalisation has differential impacts on the unemployment rate in Indian states with relatively more flexible and less flexible labour markets, as evaluated using the Besley-Burgess measure, the measure due to Gupta *et al* (2009) and an additional measure (‘FLEX 2’, described in Section 2.3.3). Hasan *et al* (2012) conclude that labour market flexibility is conducive to employment growth in the post-liberalisation period, particularly in industries that are net exporters. However, this analysis has limitations. It is conducted at a high level of industry aggregation, does not assess input tariff declines, and does not consider employment in formal and informal enterprises separately. In comparison, the current study focuses on formal firms, uses a more disaggregated industry classification and explores the effects of declines in both final goods tariffs and input tariffs, in addition to domestic industrial policy reforms. In Chapter 3, I study the implications of India’s economic reforms and differences in regional labour market flexibility for informal enterprises.

2.3 Data

2.3.1 Labour market data

I use repeated cross-sections of data compiled by the Annual Survey of Industries (ASI), which covers all large firms (defined as having 100 or more employees in the period of my analysis) and a sample of smaller firms. The ASI provides inverse sampling probability based weights, which enable me to arrive at results that apply to the population of formal firms. In the baseline regressions, employment is captured in terms of the total number of paid employees, hereafter referred to as 'paid employment'. The baseline dependent variable is the natural logarithm of paid employment.

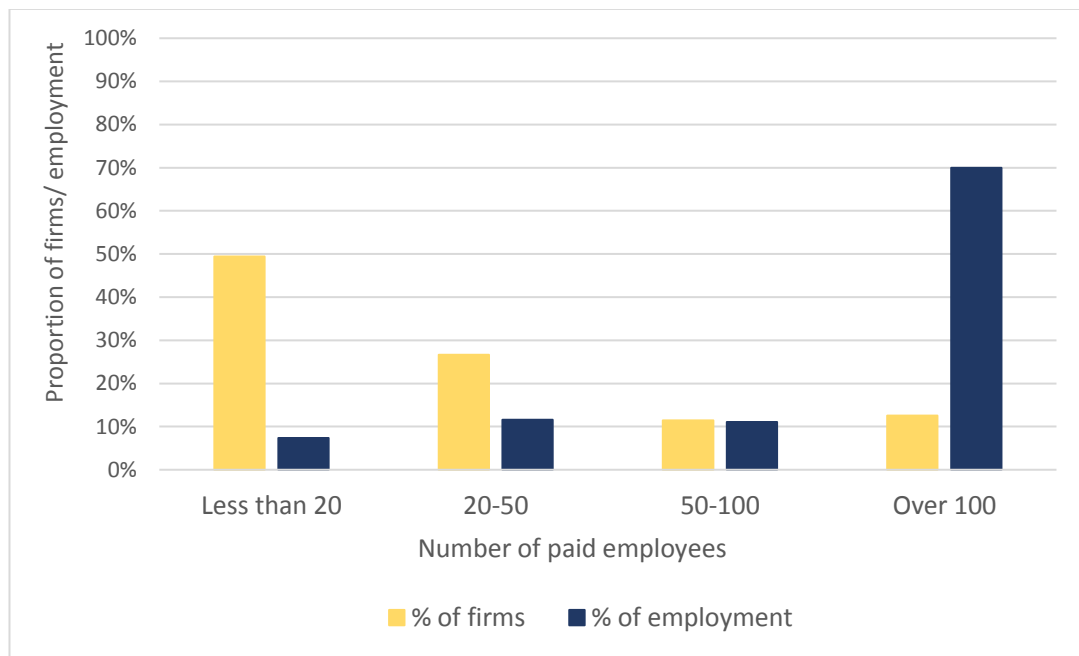
My dataset comprises formal firms surveyed in the periods 1989-90, 1993-94, 1994-95 and 1996-97. For convenience, I refer to these periods as 1990, 1994, 1995 and 1997 in this chapter. As such, I observe firms in one pre-reform period (1990) and three post-reform periods (1994, 1995 and 1997). The ASI adopted the same sampling strategy and the same industrial classification, the National Industrial Classification (NIC) of 1987, across these four surveys. As the data do not comprise a firm level panel, I am unable to analyse market entry and exit, but I discuss the mechanisms through which the effects that are observed might operate.

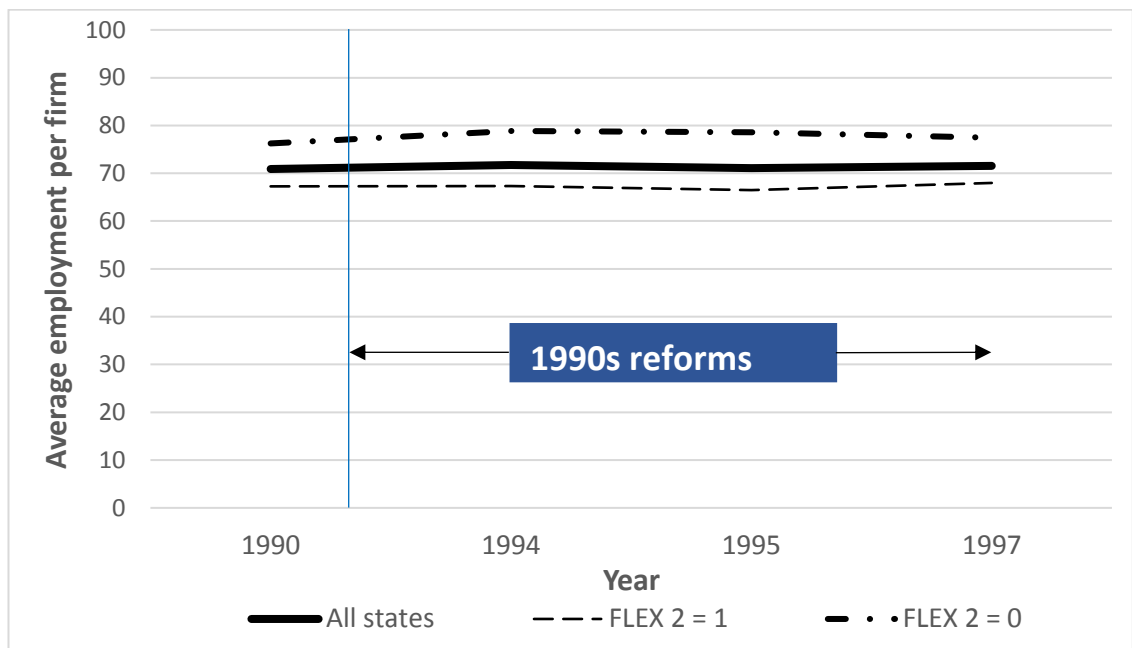
The pooled distribution of paid employment for the population of formal firms is presented in Figure 4(a). The average formal firm has 71 paid employees, a number that registers very little variation over the 1990-1997 period. While over 75 per cent of formal firms have less than 50 paid employees, large operators with over 100 paid employees account for almost 70 per cent of paid employment in the formal sector. Figure 4(b) illustrates that on average, formal firms in states with less flexible labour markets (the definition of which is discussed

further in Section 2.3.3) tend to be a little larger than their counterparts in states with more flexible labour markets, but there is no visible increasing or decreasing trend in either number over the 1990-1997 period. In this chapter, I explore whether the policy changes initiated in the 1990s had differing, and potentially mutually negating, formal firm employment effects, which could in theory be masked by the stable average employment estimates that are visible in Figure 4(b).

Figure 4: Employment in formal manufacturing firms in India (1990-1997)

(a) Formal firm and paid employment shares by firm size (1990-1997)



(b) Average employment per formal firm (1990-1997)

Source: ASI survey data (1990, 1994, 1995, 1997) As inverse sampling probability based multipliers have been used to aggregate the raw data, these distributions are representative of the population of formal firms. The measure of labour market flexibility used in Figure 4(b) is the 'FLEX 2' measure due to Hasan *et al* (2012) and is described in Section 2.3.3.

The construction of the pooled dataset poses a number of challenges. As the state specific labour market flexibility measure used applies to sixteen states, I discard firms located in most other states. The exception is the national capital region (Delhi), which accounts for a large number of firms relative to the states that are excluded and is assigned an inflexible labour market status in the baseline on account of a lack of relevant data. The baseline results hold if Delhi and Jammu & Kashmir (which is classified as being a state with an inflexible labour market, as discussed in Section 2.3.3 below) are, instead, assumed to be flexible labour markets (this is discussed in Section 2.6.3). Restricting the dataset to the sixteen states of interest and Delhi does not appear to be a serious concern, as these regions consistently account for over 95 per cent of Indian GDP and, further, the firms retained in my sample account for over 80 per cent of formal manufacturing employment in each period.

I exclude firms that are reported to have been closed from my analysis and account for extreme outliers by ‘winsorizing’ the employment distribution for each year at the 0.1st and 99.9th percentiles. This entails setting the values of a selected fraction, in this case 0.1 per cent, of observations at the top and bottom end of a distribution to equal the values of the corresponding top and bottom percentiles. In circumventing the issues that might arise from extreme outliers unduly affecting parameter values, this practice also seeks to address possible errors in data entry. Further, I observe that a number of formal firms report employing less than ten persons. Some of these firms may have undertaken temporary reductions in employment (Nataraj, 2011), while others may have registered to be able to trade or raise equity. I therefore include these firms in my analysis while also undertaking a check to ensure that my findings are robust to their exclusion. A small number of formal firms provide zero or missing values for raw material use and/or physical product manufacturing; again, following Nataraj (2011), I drop these firms from the baseline, as they are likely to be engaged only in trading activity, but I conduct a check to establish that their inclusion does not affect the key results. These checks are outlined in Section 2.6.3.

2.3.2 Data on the 1990s reforms

I use annual data on final goods and input tariff rates for the 1985-1997 period, compiled by Nataraj (2011) at the three-digit National Industrial Classification (NIC) of 1987 level. The final goods tariff data are based on the Government of India’s Customs Tariff Working Schedules and the United Nations Conference on Trade and Development – Trade Analysis Information System (UNCTAD-TRAINS) database, whereas the input tariff data are computed using sectoral final goods tariffs and the Indian Input-Output Transactions Table (IOTT). For example, as explained in Nataraj (2011), if leather goods and textiles comprise 80 per cent and 20 per cent of the inputs used by the footwear industry, the input tariff for

the latter equals 0.8 times the final goods tariff for leather goods plus 0.2 times the final goods tariff for textiles. I follow Harrison *et al* (2013) in using input tariffs constructed on the basis of manufacturing and non-manufacturing industry final goods tariffs, and in undertaking a robustness check for which input tariffs constructed using only manufacturing industry final goods tariffs are used (the results of this check differ in part from my baseline findings in terms of statistical significance, and are discussed in Section 2.6.3). The IOTT classifies industries into only 62 relevant groups as opposed to the NIC (1987) classification, for which over 130 industry codes exist for which final goods tariff data are available. In spite of this limitation, a considerable degree of variation is observable in input tariffs across NIC (1987) industries. Summary statistics are provided in Table 1 (Section 1.2). Final goods and input tariffs are measured in terms of fractions in the dataset (so that, for instance, a tariff rate of 80 per cent corresponds to 0.80).

To control for the delicensing and FDI regime reforms undertaken in India in the period of interest, I use industry and time varying indicator variables that are also due to Nataraj (2011). These data were first used by Aghion *et al* (2008). The delicensing and FDI reform variables assume a value of '1' for a given industry in a specific year if that industry was delicensed or FDI liberalised by the year in question, and are otherwise equal to '0'. As discussed in Section 1.2, approximately one-third of three-digit NIC (1987) manufacturing industries (and a little over one-third of the industries represented in my dataset) had been delicensed in 1985. After the 1991 reform episode, the proportion of delicensed industries increased to almost 90 percent, while approximately 40 per cent of industries were FDI liberalised.

2.3.3 Measure of labour market flexibility

The measure of state level labour market flexibility used in this study, labelled 'FLEX 2', is due to Hasan *et al* (2012). This measure is founded upon the workhorse measure developed by Besley and Burgess (2004).

Besley and Burgess (2004) use the IDA of 1947, passed by the central government, as their baseline. They exploit the fact that fifteen major Indian states made a series of amendments to this Act in the 1958-1990 period to develop an econometric strategy that accounts for state level regulatory variation. Besley and Burgess (2004) consider sixteen states in their analysis, but the state of Jammu & Kashmir made no amendment to the IDA in the 1958-1990 period. In total, the other fifteen states made 113 amendments. Besley and Burgess (2004) assign a code of '1' to each amendment they deem to be 'pro-worker', a code of '-1' to amendments they find to be 'pro-employer' and a code of '0' to 'neutral' amendments. Following this, they assign to each state a score of '1', '-1' or '0' in each year when the state passed at least one amendment, based on the dominant direction of amendments passed. For instance, a state which passed three pro-worker amendments ('1+1+1') and one pro-employer amendment ('-1') in 1965 gains a score of one (for having been predominantly pro-worker, in the sense that '1+1+1+(-1)' exceeds zero) for 1965. The year specific scores assigned to each state are then cumulated over time for all relevant years (those years in which the state made at least one amendment) to arrive at a final state specific score for 1990, on the basis of which the state is classified as being pro-worker, pro-employer or neutral in any given year.

Gupta *et al* (2009) modify the Besley and Burgess (2004) measure to account for a number of suggestions offered by Bhattacharjea (2006) and for OECD (2007) survey research that assesses areas in which states have undertaken measures pertinent to the implementation

of labour laws (including but not limited to the IDA). The labour market flexibility indicator developed by Gupta *et al* (2009) is labelled 'FLEX 3' by Hasan *et al* (2012), who construct an additional measure that they refer to as 'FLEX 2'. The Besley-Burgess measure, with a minor correction incorporated for the state of Madhya Pradesh, is labelled 'FLEX 1' by Hasan *et al* (2012). Also rooted in the Besley-Burgess measure, the 'FLEX 2' index inverts the final Besley-Burgess scores of three states: Gujarat, Kerala and Maharashtra. Hasan *et al* (2012) point out that World Bank (2005) research supports the view that Gujarat and Maharashtra, assigned overall scores of '1' (pro-worker status) by Besley and Burgess, are generally regarded favourably by business representatives, whereas Kerala, although designated to be pro-employer by Besley and Burgess, is perceived to have a 'poor investment climate'. Gujarat and Maharashtra are typically considered to be prime business locations by Indian businessmen, whereas Kerala is not. The World Bank's (2005) research presents firm level survey findings in which managers rank Maharashtra and Gujarat highly, labelling them to be 'Best Investment Climate' states more consistently than other states. Kerala, conversely, attains a 'Poor Investment Climate' ranking. Small and medium-sized firms report having been subjected to twice as many factory inspections in 'Poor Investment Climate' states as in 'Best Investment Climate' states, suggesting that the enforcement of ostensibly 'pro-worker' amendments to the IDA is likely to be less stringent in the latter type of state. Further, firms perceive that 'over-manning' (the gap between optimal and actual employment levels given current output levels) is on average less visible in Maharashtra and Gujarat than elsewhere. In 'Poor Investment Climate' states (such as Kerala), restrictive labour regulations were considered to be a primary driver of 'over-manning', whereas in 'Best Investment Climate' states, 'over-manning' (lower than in other states in the first place) was perceived more favourably, in the sense that it was considered to occur when firms expected higher future growth. In summary, the 'FLEX 2' index assigns scores of -1, -1

and 1 to Gujarat, Maharashtra and Kerala respectively. Table 2 summarises the ‘FLEX 1’ (Besley and Burgess’ index), ‘FLEX 2’ and ‘FLEX 3’ scores for each state.

Table 2: Summary of labour market flexibility indices*

State	Measure of labour market flexibility*		
	FLEX 1	FLEX 2	FLEX 3
Andhra Pradesh	1	1	1
Assam	0	0	0
Bihar	0	0	0
Gujarat	0	1	0
Haryana	0	0	0
Karnataka	1	1	1
Kerala	1	0	0
Madhya Pradesh	0	0	0
Maharashtra	0	1	0
Orissa	0	0	0
Punjab	0	0	0
Rajasthan	1	1	1
Tamil Nadu	1	1	1
Uttar Pradesh	0	0	1
West Bengal	0	0	0

Source: Besley and Burgess (2004) – FLEX 1; Hasan *et al* (2012) – FLEX 2; Gupta *et al* (2009) – FLEX 3

*Recoded scores: 1 = flexible labour market regulation, 0 = inflexible labour market regulation

In this study, I use the ‘FLEX 2’ indicator as the baseline measure of labour market flexibility, as it takes account not only of the nature of labour market regulation but also of business managers’ perceptions regarding the enforcement of the same in terms of state specific investment environments. Dougherty (2008) notes that there were no major state level amendments to the IDA between 1990 and 2004. There were only eight state level IDA amendments in the post-1990 period, of which the only amendments of relevance for labour market outcomes were made by the state of Gujarat in 2004, which falls outside the period of interest for my analysis. As my analysis is focused on the 1990-1997 time period, the ‘FLEX 2’ indicator varies only across states and not over time.

As I interact the ‘FLEX 2’ measure with the final goods and input tariffs in my regressions, I recode the ‘FLEX 2’ index to facilitate the interpretation of my findings. Along the lines of Hasan *et al* (2012), states with flexible (‘pro-employer’) labour markets receive a score of ‘1’ (rather than ‘-1’, as is the case in the Besley-Burgess scores), whereas states with neutral or

inflexible ('pro-worker') labour markets receive a score of '0' (rather than '1' for the states with inflexible labour laws, as is the case in the Besley-Burgess index).

Table 3 provides summary firm level employment statistics for the sample as a whole and separately for states with flexible and inflexible labour markets, as defined using the 'FLEX 2' measure. As the ASI surveys all large formal firms (generally specified to be firms having 100 or more employees in the 1990-1997 surveys) in each year while undertaking sampling for smaller formal firms, the sample employment distribution is skewed to the right in comparison with the population employment distribution (the latter is illustrated in Figure 4, Section 2.3.1, for the pooled dataset). The average firm in the sample has 115 paid employees. While this figure is slightly higher in states with inflexible labour markets (120) than in states with flexible labour markets (113), it is quite stable over time in both groups of states. Median paid employment for the sample is also stable and amounts to approximately 25 across all states.

The final column of Table 3 also shows that the total weighted numbers of paid employees in the population represented by these firms increased over the 1990-1997 period, both in states with more flexible labour markets and less flexible labour markets. These totals account for less than 20 per cent of overall employment in the Indian manufacturing sector, with the remainder being accounted for informal enterprises. Nonetheless, as stated in Section 2.1, formal firms have long accounted for over 70 per cent of output and gross value added in Indian manufacturing. Together, these observations underline the fact that Indian formal firms are substantially more productive than their informal counterparts, and strengthen the case for an analysis of the extent to which the reforms of the 1990s affected employment in these firms. In this chapter, I attempt to estimate the extent to which the 'macro' level formal employment increase is attributable to each major policy reform

undertaken in India in the 1990s, at the firm and industry level. The analysis explores whether the observed net employment increase masks varying responses to individual policies in states with more and less flexible labour markets.

Table 3: Summary statistics for paid employment* in formal firms (1990-1997)

Year	Observations	Mean	Median	Standard deviation	Minimum	Maximum	Weighted total**
Overall							
1990	41463	116.50	24.00	407.02	1	7479	4830441
1994	47576	116.81	25.67	387.67	1	7619	5557393
1995	48435	114.71	25.00	369.14	1	6715	5556124
1997	48724	116.52	26.00	357.97	1	6192	5677288
Overall	186198	115.12	25.00	379.83	1	7619	21621246
States with flexible labour markets (FLEX 2 = 1)							
1990	23109	114.45	23.00	386.95	1	7282	2644720
1994	27325	113.21	25.00	367.54	1	6869	3093462
1995	27830	110.80	25.00	347.13	1	6125	3083672
1997	28312	113.49	26.00	341.98	1	6192	3213061
Overall	106576	112.92	25.00	360.04	1	7282	12034915
States with inflexible labour markets (FLEX 2 = 0)							
1990	18354	119.09	25.00	430.96	1	7479	2185721
1994	20251	121.67	27.00	413.25	1	7619	2463931
1995	20605	119.99	26.00	396.88	1	6715	2472451
1997	20412	120.72	27.00	379.01	1	5975	2464228
Overall	79622	120.40	26.00	404.76	1	7619	9586331

Source: ASI data (1990-1997) The data are unweighted and apply only to the sample of formal firms surveyed in each year. * The employment distribution for each year has been ‘winsorized’ at the 0.1st and 99.9th percentiles. ** This refers to the total number of paid employees in the population represented by the formal firms in the sample dataset, derived using the survey weights provided for each firm surveyed in the sample dataset.

2.4 Method

The analysis in this chapter harnesses the variation in policy change over time and across industries to identify the impact of economic reform on employment, while accounting for state level differences in labour market flexibility.

The preliminary regression that I employ is of the form:

$$\ln(emp)_{ijkt} = \alpha_0 + \alpha_1 TAR_{jt-2} + \alpha_2 INT_{jt-2} + \alpha_3 DEL_{jt-2} + \alpha_4 FDI_{jt-2} + \delta_t + \delta_j + \delta_k + \varepsilon_{ijkt} \quad (1)$$

where $\ln(emp)_{ijkt}$ is the natural logarithm of paid employment in firm i in industry j and state k at time t ; TAR_{jt-2} and INT_{jt-2} are two year lags of final goods and input tariffs; DEL_{jt-2} and

FDI_{jt-2} are time varying indicator variables capturing whether industry j underwent delicensing and FDI regime reforms two years prior to year t ; and δ_t , δ_j and δ_k are year, industry and state fixed effects. To explore any overarching associations between the reforms and average firm level employment, irrespective of variations in state level flexibility, I use equation (1) as a primary firm level specification.

I also use a variant of equation (1) to undertake panel fixed effects analysis at a broader, three-digit industry level, for the economy as a whole as well as separately for states with flexible and inflexible labour markets. This analysis, discussed in Section 2.5.2, considers the implications of the reforms for the ‘extensive margins’ of firm numbers and aggregate employment at the industry level (in logarithms). These industry level regressions are weighted by the pre-reform (1990) industry levels of the dependent variable in each case. Following Martin *et al* (2017), this analysis is restricted to industries that have ten or more firms in each weighted cross-section, a step which omits only a small number of industries.

The expanded baseline specification that I use to examine the implications of differences in state level labour market flexibility is similar to that used by Hasan *et al* (2012):

$$\ln(emp)_{ijkt} = \alpha_0 + \alpha_1 TAR_{jt-2} + \beta_1 TAR_{jt-2} LM_k + \alpha_2 INT_{jt-2} + \beta_2 INT_{jt-2} LM_k + \alpha_3 DEL_{jt-2} + \beta_3 DEL_{jt-2} LM_k + \alpha_4 FDI_{jt-2} + \beta_4 FDI_{jt-2} LM_k + \delta_t + \delta_j + \delta_k + \varepsilon_{ijkt} \quad (2)$$

where LM_k is a time invariant indicator variable capturing the degree of labour market flexibility in state k (the ‘FLEX 2’ measure) and the other variables follow the description provided for equation (1). As LM_k is time invariant, its level effect is subsumed within δ_k , the state fixed effects term.

In the specification presented in equation (1), the overall impact of the reforms on employment is the sum of the coefficients α_1 , α_2 , α_3 and α_4 . In the expanded specification of equation (2), this impact derives from the sums $\alpha_1 + \beta_1$ (for final goods tariff liberalisation),

$\alpha_2 + \beta_2$ (for input tariff liberalisation), $\alpha_3 + \beta_3$ (for delicensing) and $\alpha_4 + \beta_4$ (for FDI reform). In each instance, the first term captures the direct impact linked with the reform in question, whereas the interaction term (involving LM_k) presents a measure of the indirect effect associated with the interplay between the reform and state level labour market flexibility. The sum of the two coefficients thus yields a measure of the net impact of each reform measure on average firm level employment. This varies across states, with the interaction based effect amounting to zero for states with inflexible labour markets (as the 'FLEX 2' variable equals zero for these states).

As discussed in Hasan *et al* (2012), significant interstate migration flows could pose a threat to my identification strategy, by resulting in overestimation of the β coefficients. Although my tariff measures are state invariant, it could be argued that substantial tariff declines might result in larger numbers of workers moving out of states with more flexible labour markets, relative to states with less flexible labour markets. However, as Hasan *et al* (2012) document, work undertaken by Dyson *et al* (2004), Anant *et al* (2006), Munshi and Rosenzweig (2009) and Topalova (2010) suggests that migration within India has tended to be insubstantial in recent decades, with interstate migration levels having been particularly low. This indicates that any worker flows engendered by the trade reforms were limited, with spillovers straddling state borders likely to have been rare.

2.5 Results

2.5.1 Baseline regressions: Firm level

To begin, I assess whether the reforms are associated with statistically significant employment shifts at the firm level, irrespective of variations in regional labour market flexibility. In the first three columns of Table 4, I therefore run variations of equation (1)

presented in Section 2.4. As specified in Section 2.3.2, all the tariffs are entered into the dataset in fractional form (for instance, a tariff of 80 per cent is entered as 0.80). As a result, given that the dependent variable is in logarithmic form, we may directly interpret the coefficients attaching to the tariff variables as proportional changes associating with a percentage point change in the tariffs, without having to multiply them by 100.

Final goods tariff reductions are associated with a weakly statistically significant reduction in paid employment. However, this coefficient is unstable and substantially outweighed by the coefficient attaching to the input tariff variable. A one percentage point decline in input tariffs is associated with paid employment rising by approximately 0.74 per cent on average (Table 4, Column 3), with this result being highly statistically significant across specifications. Controlling for final goods and input tariff changes, delicensing and FDI reform are not associated with statistically significant changes in paid employment. When I use the natural logarithm of total employment as an alternative dependent variable, all the above mentioned findings are virtually unchanged (Table 4, Columns 4 to 6).

Table 4: Economic reforms and employment in formal firms (1990-1997)

	Dependent variable: ln (Paid employment)			Dependent variable: ln (Total employment)		
	(1)	(2)	(3)	(4)	(5)	(6)
Final goods tariffs	0.063* (0.035)	0.055 (0.036)	0.061* (0.036)	0.061* (0.033)	0.052 (0.034)	0.059* (0.034)
Input tariffs	-0.753*** (0.168)	-0.706*** (0.170)	-0.737*** (0.174)	-0.675*** (0.162)	-0.619*** (0.163)	-0.653*** (0.167)
Delicensing	0.019 (0.023)		0.020 (0.024)	0.021 (0.022)		0.023 (0.023)
FDI reform		0.005 (0.024)	0.009 (0.025)		0.007 (0.023)	0.012 (0.024)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160883	160883	160883	160984	160984	160984
R-squared	0.204	0.204	0.204	0.203	0.203	0.203

Dependent variable: natural logarithm of number of paid employees (Columns 1, 2, 3) and natural logarithm of total number of persons engaged (Columns 4, 5, 6) 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In Table 5, I explore the extent to which state level differences in labour market flexibility have a bearing on the effects of the reforms, using alternative forms of the expanded

baseline specification of equation (2) discussed in Section 2.4. I focus on the results that are statistically significant at the significance level of 0.05. First, I confirm that final goods tariff reductions are not associated with significant changes in paid employment in all states, with the weakly significant negative effect visible in Table 4 being restricted to states with flexible labour markets, as defined using the 'FLEX 2' indicator described in Section 2.3.3 (Table 5, Row 1 and 'Row 1 + Row 2'). On the other hand, lower input tariffs are associated with significantly increased paid employment in all states. More precisely, in states with inflexible labour markets, a one percentage point reduction in input tariffs is associated with paid employment rising by 0.68 per cent (Table 5, Column 3, Row 3). In states with flexible labour markets, a one percentage point reduction in input tariffs is associated with paid employment increasing by 0.66 per cent (Table 5, Column 3, 'Row 3 + Row 4'). The corresponding p-value of 0.001 indicates that this result is highly statistically significant even at the 0.01 significance level.

As the delicensing and FDI reform variables are indicator variables and are not rescaled in a manner similar to the tariffs, the coefficients that attach to them must be multiplied by 100 for appropriate interpretation, given the logarithmic form of the dependent variable. Table 5 reveals that delicensing is not linked with significant changes in paid employment in all states. Interestingly, however, labour market flexibility appears to matter in terms of the response of paid employment to FDI reform. In states with inflexible labour markets, FDI liberalisation is associated with a significant fall of approximately 11.5 per cent in paid employment (Table 5, Column 3, Row 7). Conversely, in states with flexible labour markets, FDI liberalisation is associated with paid employment being significantly higher by an average of 9.3 per cent (Table 5, Column 3, 'Row 7 + Row 8'). Again, these results are upheld when I use the natural logarithm of total employment as an alternative dependent variable (Table 5, Columns 4 to 6).

Table 5: Economic reforms, labour market flexibility and employment in formal firms (1990-1997)

	Dependent variable: ln (Paid employment)			Dependent variable: ln (Total employment)		
	(1)	(2)	(3)	(4)	(5)	(6)
Final goods tariffs	-0.030 (0.078)	-0.037 (0.078)	-0.020 (0.075)	-0.023 (0.073)	-0.031 (0.074)	-0.014 (0.070)
Final goods tariffs * FLEX 2	0.154 (0.122)	0.161 (0.122)	0.132 (0.115)	0.138 (0.114)	0.147 (0.115)	0.117 (0.108)
Input tariffs	-0.609*** (0.214)	-0.729*** (0.202)	-0.680*** (0.211)	-0.531** (0.207)	-0.646*** (0.195)	-0.597*** (0.205)
Input tariffs * FLEX 2	-0.182 (0.228)	0.044 (0.211)	0.021 (0.216)	-0.170 (0.218)	0.041 (0.204)	0.018 (0.209)
Delicensing	0.046 (0.059)	0.021 (0.024)	0.084 (0.061)	0.054 (0.057)	0.024 (0.023)	0.089 (0.059)
Delicensing * FLEX 2	-0.040 (0.081)		-0.098 (0.083)	-0.047 (0.080)		-0.101 (0.081)
FDI reform	0.010 (0.026)	-0.105** (0.045)	-0.115** (0.045)	0.013 (0.025)	-0.092** (0.043)	-0.103** (0.043)
FDI reform * FLEX 2		0.191*** (0.066)	0.208*** (0.067)		0.174*** (0.063)	0.192*** (0.063)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.124*	0.124*	0.111*	0.115*	0.116*	0.103*
Std Error	0.066	0.066	0.063	0.062	0.062	0.059
p-value (combined effect = 0)	0.061	0.059	0.078	0.065	0.060	0.082
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.791***	-0.684***	-0.659***	-0.701***	-0.605***	-0.579***
Std Error	0.209	0.202	0.199	0.199	0.192	0.190
p-value (combined effect = 0)	0.000	0.001	0.001	0.000	0.002	0.002
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.007		-0.013	0.007		-0.012
Std Error	0.037		0.036	0.036		0.036
p-value (combined effect = 0)	0.854		0.707	0.854		0.737
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8		0.086**	0.093**		0.082**	0.089**
Std Error		0.038	0.039		0.036	0.037
p-value (combined effect = 0)		0.022	0.017		0.022	0.016
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160883	160883	160883	160984	160984	160984
R-squared	0.204	0.205	0.205	0.203	0.204	0.205

Dependent variable: natural logarithm of number of paid employees (Columns 1, 2, 3) and natural logarithm of total number of persons engaged (Columns 4, 5, 6) 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

To summarise, these results suggest that on the whole, paid employment in India's formal manufacturing firms in the 1990s responded primarily to reduced input tariffs and FDI regime changes, and did not register significant changes in response to reductions in final goods tariffs and the delicensing reforms. Lower tariffs on inputs go hand-in-hand with significantly higher paid employment across all states. FDI reform is associated with a significant rise in paid employment in states with flexible labour markets, and a significant reduction in paid employment in states with inflexible labour markets.

The absence of significance for the baseline final goods tariff coefficients aligns with the findings of Kambhampati *et al* (1997) and Kambhampati and Parikh (2005), which suggest that India's final goods tariff reductions may have had mutually offsetting positive and negative impacts, and therefore an insignificant net impact, on formal sector employment, on account of their potentially double-edged effects on firm level markups or profitability. Employing the alternative, 'macro' level techniques of factor content analysis, growth accounting and labour demand modelling, Sen (2009) draws broadly the same conclusion. Moreover, recent work by De Loecker *et al* (2016) points to marginal input costs having declined more substantially than final output prices following India's trade liberalisation, on account of significant markup increments. Input tariff declines may therefore be a more prominent driver of changes in firm level input cost allocation, including for labour input, relative to final goods tariff cuts.

2.5.2 Industry level results

The results discussed in Section 2.5.1 may be driven either by actual changes in average firm level employment in response to the reforms or, alternatively, on account of shifts in the 'extensive margins' of industry level firm numbers or employment. While I am unable to study firm entry and exit owing to the lack of firm level panel data, I explore the potential for extensive margin shifts by constructing industry level data on firm numbers and employment, using the survey weights provided in the firm level data for aggregation. Following the discussion in Section 2.4, having thus obtained an industry level panel dataset, I regress the natural logarithm of industry level employment or firm numbers on the reform variables, controlling for industry and time fixed effects.

The results of this exercise are presented in Table 6. Input tariff declines and FDI reform, as well as final goods tariff reductions, are not associated with significant changes in industry

level employment or firm numbers across all states. This suggests that the effects associated with the former two reforms in Section 2.5.1 may be restricted to subsets of formal firms, or to firms operating in specific industries. Importantly, Table 6 reveals the delicensing reform to be associated with significantly increased formal firm numbers in states with flexible labour markets, but not in inflexible labour markets. Specifically, over the 1990-1997 period, delicensing is associated with the number of formal firms rising by between 8 per cent and 9 per cent in the average delicensed industry in states with flexible labour markets, *ceteris paribus*. As delicensing is not associated with significant changes in firm level employment (Section 2.5.1), this appears to be an effect working purely on the ‘extensive margin’ of industry expansion. As delicensing facilitated business creation in industries that were previously regulated to a great extent (Section 1.1), this effect may be driven by shifts in the product market landscape. I explore this point further in Section 2.5.4.

Table 6: Economic reforms and formal sector employment: Industry level effects (1990-1997)

A: All states	Dependent variable (in natural logarithms):		
	Paid employment	Total employment	Number of firms
	(1)	(2)	(3)
Final goods tariffs	0.042 (0.061)	0.039 (0.059)	-0.057 (0.045)
Input tariffs	-0.544 (0.363)	-0.518 (0.357)	0.151 (0.249)
Delicensing	0.052 (0.046)	0.056 (0.046)	0.079** (0.036)
FDI reform	0.026 (0.045)	0.017 (0.045)	0.019 (0.034)
Observations	556	556	556
R-squared	0.240	0.215	0.379
B: States with flexible labour markets (FLEX 2 = 1)			
Final goods tariffs	-0.026 (0.118)	-0.043 (0.115)	-0.068 (0.059)
Input tariffs	-0.610 (0.441)	-0.551 (0.431)	0.003 (0.300)
Delicensing	0.068 (0.073)	0.069 (0.072)	0.086** (0.042)
FDI reform	0.012 (0.058)	0.004 (0.056)	-0.005 (0.036)
Observations	520	520	520
R-squared	0.234	0.213	0.386
C: States with inflexible labour markets (FLEX 2 = 0)			
Final goods tariffs	0.100* (0.057)	0.113* (0.060)	-0.041 (0.052)
Input tariffs	-0.363 (0.412)	-0.364 (0.406)	0.271 (0.291)
Delicensing	0.022	0.029	0.045

	(0.057)	(0.057)	(0.037)
FDI reform	0.035	0.024	0.052
	(0.056)	(0.057)	(0.038)
Observations	484	484	484
R-squared	0.116	0.098	0.169

Dependent variable: natural logarithm of industry level paid employment/ industry level total employment/ number of formal firms (Column 1/ Column 2/ Column 3) All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

2.5.3 Implications for the Indian labour market

The discussion in Section 2.5.1 implies that the changes in paid employment associated with the reforms of the 1990s are of a substantial magnitude. The average declines in final goods and input tariffs in the manufacturing industries in my dataset for the 1988-1995 period amount to 41.3 percentage points and 29.2 percentage points. The median declines in final goods and input tariffs for the 1988-1995 period are very similar, amounting to 41.5 percentage points and 27.8 percentage points respectively. Given these numbers, the results discussed in Section 2.5.1 indicate that if other variables are held constant over this period, paid employment in formal firms in industries that underwent the median input tariff decline increased by approximately 19 per cent in states with inflexible labour markets, and by approximately 18 per cent in states with flexible labour markets (I restrict my attention to those results that are statistically significant at a significance level of 0.05). As an example of how these numbers are arrived at, since a one percentage point fall in input tariffs is associated with average paid employment increasing by 0.68 per cent in states with inflexible labour markets, the median input tariff reduction of 27.8 percentage points would be associated with paid employment increasing by 19 per cent on average in those states (27.8 multiplied by 0.68).

At the same time, as discussed in Section 2.5.1, being in an FDI liberalised industry is associated with paid employment decreasing by 11.5 per cent in states with inflexible labour markets, and increasing by 9.3 per cent in states with flexible labour markets. Taken

together with the above mentioned effects relating to the input tariff declines, this indicates that on average and *ceteris paribus*, paid employment in formal firms in FDI liberalised industries that underwent the median input tariff decline increased by 7.5 per cent in states with inflexible labour markets. The corresponding effect in states with flexible labour markets was substantially higher and amounted to 27.3 per cent, on account of the input tariff declines and FDI reforms both being associated with positive employment shifts. Given that the mean and median for formal firm employment in the 1990-1997 period amount to 74 and 20 respectively (Section 2.3.1), these are economically meaningful effects, in particular for states with flexible labour markets, where the number of formal firms also increased in industries that were delicensed in the 1990s (Section 2.5.2).

2.5.4 Increases in product market competition

The reforms of the 1990s arguably led to increased product market competition over time. In particular, the sharp reductions in final goods tariffs, as discussed in Section 1.2, resulted in Indian manufacturers facing increased import competition. This may have engendered domestic product market compositional changes of the type described by the Melitz (2003) model, with larger, more productive domestic firms expanding and gaining market share at the expense of less productive incumbents. In addition, the delicensing reform streamlined the process of setting up a large registered business, thereby creating a more conducive environment for new entrants to challenge incumbents in several manufacturing industries. While a thorough examination of this potentially crucial driver of employment changes in formal firms in the 1990s is perhaps outside the scope of the current study and its data, I analyse some of its implications in this subsection.

First, I exploit the fact that one key manufacturing sector policy was left untouched up to 1997. This policy instrument, the small scale industry (SSI) reservation policy, is outlined in

Section 1.3. Under this policy, Indian policy makers had, over time, reserved specific manufactured products for production in small firms, defined in terms of an investment threshold. Product information is provided by approximately 85 per cent of the formal firms in my dataset. A subset of these firms, accounting for 25 to 30 per cent of formal manufacturers in the 1990-1997 period, produce at least one of these reserved products, while the rest manufacture products that were never reserved. Firms producing at least one reserved product are consistently and significantly smaller than those producing items that were never reserved: on average, firms in the former category employ 79 paid persons, whereas their counterparts in the second category employ 144 paid persons.

As the SSI reservations were only lifted in 1997 and thereafter (and for the most part, as discussed in Section 1.3, in the post-2000 period), firms producing SSI reserved items are likely to have experienced a lower degree of product market competition than other firms. I explore this possibility in Table 7. Column 2 of Table 7 contains results that apply to firms producing at least one SSI reserved item, which register a general loss of significance relative to the baseline. For these firms, declining input tariffs are associated with large and significant employment enhancing effects only in states with flexible labour markets. Further, the baseline FDI effects lose significance for firms in these less competitive product markets (as defined by products that were SSI reserved). In states with inflexible labour markets, final goods tariff reductions are associated with a significant increase in employment in these firms on average and *ceteris paribus*, with no corresponding significance being obtained for states with flexible labour markets. On the other hand, the results of the baseline specification for firms producing items that were never SSI reserved (Table 7, Column 3) are very similar to the overall baseline numbers (Table 7, Column 1), both for input tariff declines and for FDI liberalisation. This indicates that the competition

channel may be relevant to the current analysis, with firm level employment in less competitive industries potentially being somewhat less responsive to the reforms.

Table 7: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Exploring product market competition through the lens of SSI reservation

	Baseline (All firms)	Firms producing at least one SSI reserved item (less competitive)	Firms producing (only) items that were never SSI reserved (more competitive)
Final goods tariffs	-0.020 (0.075)	-0.373** (0.179)	0.089 (0.055)
Final goods tariffs * FLEX 2	0.132 (0.115)	0.677** (0.321)	-0.037 (0.077)
Input tariffs	-0.680*** (0.211)	-0.131 (0.401)	-0.698*** (0.221)
Input tariffs * FLEX 2	0.021 (0.216)	-0.759 (0.486)	0.198 (0.236)
Delicensing	0.084 (0.061)	0.127* (0.070)	0.067 (0.062)
Delicensing * FLEX 2	-0.098 (0.083)	-0.087 (0.088)	-0.129 (0.091)
FDI reform	-0.115** (0.045)	-0.022 (0.068)	-0.098** (0.039)
FDI reform * FLEX 2	0.208*** (0.067)	0.094 (0.081)	0.164*** (0.054)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.111*	0.305*	0.052
Std Error	0.063	0.183	0.057
p-value (combined effect = 0)	0.078	0.096	0.362
Flexible labour markets: Effects of changes in input tariffs			
Row 3 + Row 4	-0.659***	-0.891**	-0.500**
Std Error	0.199	0.406	0.215
p-value (combined effect = 0)	0.001	0.029	0.020
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	-0.013	0.040	-0.063
Std Error	0.036	0.062	0.043
p-value (combined effect = 0)	0.707	0.516	0.143
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.093**	0.072	0.066*
Std Error	0.039	0.057	0.036
p-value (combined effect = 0)	0.017	0.205	0.071
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	160883	41529	94764
R-squared	0.205	0.171	0.235

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

An alternative measure of competition in three digit industries in the formal sector is the four firm concentration ratio (CR4), which captures the proportion of each industry's output that is accounted for by the four largest firms in that industry. The lower the CR4 estimate, the more competitive an industry may be perceived to be, as the largest firms account for a relatively small share of industry output. Conversely, industries with higher CR4 ratios are

arguably less competitive, with the largest firms commanding a more substantial market share. The data reveal that the CR4 estimate declined in most (90 per cent of) three digit manufacturing industries in the 1990-1995 period, which is suggestive of increases in product market competition driven by the economic liberalisation of the 1990s.

I compute the CR4 statistic for every three digit industry in 1990, with output measured in terms of gross sale values, and run the baseline specification separately for industries with concentration ratios above and below the 1990 median. The results are presented in Table 8. I find that the employment enhancing effects of lower input tariffs apply to firms in both groups of industries in states with inflexible labour markets, but hold only for more competitive industries (characterised by a CR4 ratio below the 1990 median) in states with flexible labour markets. The baseline FDI effects are robust only in the case of more competitive industries. Further, in states with flexible labour markets, delicensing is associated with significant increases in firm level employment only in less competitive industries, a finding that I discuss further below.

Table 8: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Analysis based on four firm concentration ratio (CR4) in 1990 (the proportion of industry level output accounted for by the four largest firms in 1990)

	Baseline (All firms)	Firms in industries with CR4 above median in 1990 (less competitive)	Firms in industries with CR4 below median in 1990 (more competitive)
Final goods tariffs	-0.020 (0.075)	0.226** (0.110)	-0.053 (0.083)
Final goods tariffs * FLEX 2	0.132 (0.115)	-0.136 (0.127)	0.157 (0.127)
Input tariffs	-0.680*** (0.211)	-0.915** (0.450)	-0.626*** (0.230)
Input tariffs * FLEX 2	0.021 (0.216)	0.877** (0.346)	-0.021 (0.236)
Delicensing	0.084 (0.061)	-0.057 (0.065)	0.093 (0.071)
Delicensing * FLEX 2	-0.098 (0.083)	0.212*** (0.074)	-0.129 (0.097)
FDI reform	-0.115** (0.045)	-0.106 (0.069)	-0.123** (0.049)
FDI reform * FLEX 2	0.208*** (0.067)	0.208** (0.097)	0.222*** (0.072)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.111*	0.089	0.104
Std Error	0.063	0.113	0.070
p-value (combined effect = 0)	0.078	0.431	0.139
Flexible labour markets: Effects of changes in input tariffs			

Row 3 + Row 4	-0.659***	-0.039	-0.647***
Std Error	0.199	0.423	0.223
p-value (combined effect = 0)	0.001	0.927	0.004
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	-0.013	0.155***	-0.036
Std Error	0.036	0.058	0.041
p-value (combined effect = 0)	0.707	0.007	0.385
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.093**	0.103	0.099**
Std Error	0.039	0.078	0.042
p-value (combined effect = 0)	0.017	0.190	0.020
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	160883	23244	137639
R-squared	0.205	0.210	0.206

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Further, in Table 9, I undertake industry level regressions separately for industries characterised by higher and lower CR4 ratios as defined for Table 8, to explore whether the results discussed in Section 2.5.2 are different for these industry groups. The finding that delicensing is associated with a significant *ceteris paribus* increase in the number of formal firms in the average industry in states with flexible labour markets, holds only for more competitive industries (in other words, industries with lower CR4 ratios). This is supportive of the notion that the effects which I observe in the baseline are driven, at least to some extent, by product market competition.

Table 9: Economic reforms and formal sector employment: Industry level effects for firm numbers (1990-1997) based on four firm concentration ratio (CR4) in 1990

A: All states	Dependent variable: ln (number of formal firms in three digit industry)		
	All industries	Industries with CR4 above median in 1990 (less competitive)	Industries with CR4 below median in 1990 (more competitive)
Final goods tariffs	-0.057 (0.045)	0.097 (0.078)	-0.064 (0.054)
Input tariffs	0.151 (0.249)	-0.922* (0.489)	0.208 (0.291)
Delicensing	0.079** (0.036)	-0.046 (0.078)	0.096** (0.044)
FDI reform	0.019 (0.034)	0.015 (0.061)	0.019 (0.038)
Observations	556	252	304
R-squared	0.379	0.167	0.458
B: States with flexible labour markets (FLEX 2 = 1)			
Final goods tariffs	-0.068 (0.059)	-0.023 (0.081)	-0.054 (0.069)
Input tariffs	0.003 (0.300)	-0.890* (0.528)	-0.050 (0.360)
Delicensing	0.086**	-0.042	0.112**

	(0.042)	(0.087)	(0.051)
FDI reform	-0.005	-0.032	-0.011
	(0.036)	(0.085)	(0.041)
Observations	520	224	296
R-squared	0.386	0.139	0.472
C: States with inflexible labour markets (FLEX 2 = 0)			
Final goods tariffs	-0.041	0.166	-0.062
	(0.052)	(0.132)	(0.060)
Input tariffs	0.271	-0.727	0.367
	(0.291)	(0.612)	(0.322)
Delicensing	0.045	-0.018	0.051
	(0.037)	(0.102)	(0.042)
FDI reform	0.052	0.122	0.046
	(0.038)	(0.081)	(0.041)
Observations	484	184	300
R-squared	0.169	0.110	0.217

Dependent variable: natural logarithm of industry level number of formal firms. All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In Table 9, delicensing is not associated with significant shifts in formal employment and enterprise numbers in less competitive industries. Viewed in light of the results in Table 8, which suggest that delicensing is linked with increased employment in the average firm in less competitive industries, this may be interpreted as a sign of less competitive industries having been more vulnerable to Melitz (2003) type structural changes, with smaller, less productive formal firms exiting the market following increased competition in the post-reform period. In the absence of a firm level panel, however, caution is warranted in this context.

2.5.5 Composition of employment

The baseline regressions discussed in Section 2.5.1 focus on the implications of the economic reforms of the 1990s for overall firm level employment, with paid employment being the key dependent variable. This variable comprises workers who are directly employed by firms, workers hired through contractors (or ‘contract workers’), supervisory and managerial employees and other paid personnel (such as staff working on sales, marketing and administration issues). I proceed to analyse whether the impacts of the

reforms differ across these employee categories.

This exercise yields a number of nuanced findings. Given that directly employed male workers tend to account for a majority of paid employees in most firms in the dataset, it is perhaps unsurprising that the baseline results apply most prominently to this group (Table 10, Column 1). Approximately one third of firms report having directly employed female workers, but the only result of significance for this category is increased employment in firms in states with flexible labour markets, in response to the input tariff declines (Table 10, Column 2).

Although employed by a little less than 20 per cent of firms in the sample, contract workers constitute a case of some interest in this context, as state level labour market laws do not apply to them. As such, firms may have sought to hire more contract workers, relative to direct hires, in the post-reform period. I find that across all states, input tariff declines are not associated with significant shifts in contract employment (Table 10, Column 3). However, FDI reform is associated with a significant rise in the average number of contract workers hired by firms in states with flexible labour markets, with no effect of significance visible in states with inflexible labour markets.

In essence, in states with flexible labour markets, FDI reform is on average associated with increases in the number of directly employed adult male workers and contract workers, as also other staff (Table 10, Column 5), at the firm level. In states with inflexible labour markets, FDI reform is associated with reduced employment of directly hired adult male workers, supervisory or managerial employees and other staff (Table 10, Columns 1, 4 and 5). On the other hand, the baseline employment enhancing effect associated with lower input tariffs is reflected in significant increases in firm level employment of directly hired

adult male workers in all states, with no corresponding significance attaching to contract employment.

Table 10: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Results by employee type

	Directly employed adult male workers	Directly employed adult female workers	Contract workers	Supervisory/ managerial level employees	Other employees
Final goods tariffs	0.059 (0.059)	-0.114 (0.143)	-0.138 (0.107)	0.098** (0.047)	0.031 (0.057)
Final goods tariffs * FLEX 2	-0.016 (0.088)	0.225 (0.167)	0.245* (0.129)	-0.018 (0.063)	-0.001 (0.084)
Input tariffs	-0.676*** (0.212)	-0.222 (0.369)	0.025 (0.412)	-0.275 (0.196)	-0.323 (0.206)
Input tariffs * FLEX 2	0.223 (0.198)	-0.552* (0.331)	-0.204 (0.378)	-0.034 (0.190)	0.405** (0.192)
Delicensing	0.032 (0.039)	0.225* (0.125)	0.204 (0.144)	0.019 (0.049)	-0.018 (0.034)
Delicensing * FLEX 2	-0.055 (0.053)	-0.208 (0.143)	-0.202 (0.178)	-0.067 (0.059)	-0.020 (0.044)
FDI reform	-0.117*** (0.041)	-0.191* (0.109)	0.035 (0.081)	-0.094*** (0.035)	-0.106*** (0.032)
FDI reform * FLEX 2	0.180*** (0.055)	0.211 (0.132)	0.196** (0.088)	0.105*** (0.039)	0.193*** (0.046)
Flexible labour markets: Effects of changes in final goods tariffs					
Row 1 + Row 2	0.043	0.111	0.107	0.080*	0.030
Std Error	0.055	0.072	0.106	0.045	0.054
p-value (combined effect = 0)	0.428	0.126	0.313	0.078	0.578
Flexible labour markets: Effects of changes in input tariffs					
Row 3 + Row 4	-0.452**	-0.774***	-0.179	-0.310*	0.082
Std Error	0.205	0.265	0.430	0.182	0.176
p-value (combined effect = 0)	0.027	0.004	0.677	0.089	0.641
Flexible labour markets: Effects of delicensing					
Row 5 + Row 6	-0.023	0.017	0.001	-0.048*	-0.037
Std Error	0.029	0.049	0.083	0.028	0.026
p-value (combined effect = 0)	0.430	0.729	0.987	0.087	0.148
Flexible labour markets: Effects of FDI reform					
Row 7 + Row 8	0.062**	0.021	0.231***	0.011	0.087***
Std Error	0.032	0.049	0.078	0.026	0.029
p-value (combined effect = 0)	0.049	0.674	0.003	0.667	0.003
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	153284	51979	30221	122368	131267
R-squared	0.219	0.312	0.187	0.149	0.181

Dependent variable: natural logarithm of number of employees of the relevant type (as specified in column headings)
 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

An additional possibility is that the number of firms employing contract workers or using imported inputs, or both, may have increased in the post-reform period. Saha *et al* (2013) find that rises in import penetration in India in the 1998-2004 period went hand-in-hand with increased employment of contract workers, particularly in states with relatively

inflexible labour markets. Table 11 examines this question at the industry level and indicates that FDI reform is associated with a significant increase in the number of firms hiring contract labour at the industry level. In line with the firm level results presented in Table 10, this increase is restricted to states with flexible labour markets. No significance attaches to the tariff variables and delicensing, which suggests that the findings of Saha *et al* (2013) may be restricted to the post-1997 period. As regards the number of firms using imported inputs, no significance is visible for any of the reform variables in Table 11.

Table 11: Economic reforms and formal sector employment: Industry level effects for the number of firms employing contract workers / using imported inputs (1990-1997)

A: All states	ln (number of firms employing contract workers)	ln (number of firms using imported inputs)
Final goods tariffs	-0.082 (0.117)	-0.148 (0.194)
Input tariffs	-0.739 (0.518)	1.986 (1.251)
Delicensing	0.087 (0.082)	-0.215 (0.262)
FDI reform	0.135* (0.077)	-0.320 (0.260)
Observations	544	479
R-squared	0.251	0.507
B: States with flexible labour markets (FLEX 2 = 1)		
Final goods tariffs	-0.168 (0.143)	-0.316 (0.237)
Input tariffs	-0.539 (0.629)	2.231 (1.477)
Delicensing	0.103 (0.097)	-0.160 (0.243)
FDI reform	0.219** (0.097)	-0.176 (0.261)
Observations	504	440
R-squared	0.224	0.433
C: States with inflexible labour markets (FLEX 2 = 0)		
Final goods tariffs	-0.096 (0.117)	-0.208 (0.247)
Input tariffs	-0.318 (0.707)	1.181 (1.264)
Delicensing	0.001 (0.097)	-0.298 (0.202)
FDI reform	0.065 (0.085)	-0.095 (0.191)
Observations	467	378
R-squared	0.144	0.384

Dependent variable: natural logarithm of number of formal firms employing contract workers/ using imported inputs
All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

2.6 Further analysis and robustness checks

2.6.1 Trade orientation

Employment shifts at the firm level in the post-reform period may have varied across industries characterised by different degrees of trade orientation, in terms of export intensity or import competition. The first two columns of Table 12 present results for export oriented industries and other industries as classified by Nouroz (2001). In this context, it is important to note that the industries considered by Nouroz (2001) follow the industry classification used in India's Input-Output Transactions Table (IOTT) of 1990, which uses broader industry headings relative to the NIC (1987) industry codes, so that over 130 NIC industries correspond to 62 IOTT industry groups (Section 2.3.2). Nevertheless, in Table 12, I find that the baseline significance attaching to FDI reform is upheld only for firms in industries not classified as being export oriented by Nouroz (2001). As regards the input tariff coefficients, significance is lost (at the 5 per cent significance level) for firms in export oriented industries, but is retained for other industries. In summary, employment in firms in export oriented industries appears to have been less responsive to the reforms.

As only a fairly small number of industries are classified as being export oriented by Nouroz (2001), I use data on industrial exports and imports, obtained from India's IOTT of 1990, to undertake an alternative check in this direction. I compute export-output and import-output ratios for each IOTT industry group and divide the firms in my sample into groups defined by whether these ratios are above or below the median for their industry of operation. The results obtained using this mode of industry grouping are presented in the final four columns of Table 12. As regards export orientation, Columns 3 and 4 of Table 12 confirm that input tariff declines are associated with significant employment shifts in non-export oriented industries (with export-output ratios falling below the 1990 median). However, the baseline

findings associated with FDI reform appear to be restricted to firms in export oriented industries (with export-output ratios exceeding the 1990 median).

In terms of import-output ratios, I find that all my baseline results of significance hold for industries where these ratios are below the 1990 median (Column 5 and Column 6, Table 12). Conversely, as might be expected, the coefficients attaching to final goods tariffs are larger (although still not statistically significant) in the case of industries with import-output ratios exceeding the 1990 median. This provides further suggestive evidence that collinearity between the final goods and input tariffs reductions is unlikely to be an issue for this thesis.

Table 12: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Results by trade orientation of industry of operation

	Export oriented (Nouroz 2001)	Non- export oriented (Nouroz 2001)	Export- output ratio above median (1990 IOTT)	Export- output ratio below median (1990 IOTT)	Import- output ratio above median (1990 IOTT)	Import- output ratio below median (1990 IOTT)
Final goods tariffs	-0.723 (0.573)	-0.017 (0.075)	-0.318* (0.167)	0.127** (0.051)	-0.071 (0.072)	-0.002 (0.087)
Final goods tariffs * FLEX 2	0.349 (0.587)	0.126 (0.115)	0.539** (0.247)	-0.074 (0.075)	0.200** (0.094)	0.076 (0.137)
Input tariffs	-1.742** (0.837)	-0.620*** (0.217)	-0.121 (0.390)	-0.898*** (0.257)	0.167 (0.294)	-0.773*** (0.254)
Input tariffs * FLEX 2	-0.293 (0.428)	0.044 (0.228)	-0.388 (0.432)	-0.057 (0.244)	-0.266 (0.213)	0.018 (0.289)
Delicensing	-0.208* (0.123)	0.123* (0.067)	-0.024 (0.051)	0.076 (0.080)	0.029 (0.050)	0.141* (0.079)
Delicensing * FLEX 2	0.178 (0.154)	-0.145 (0.092)	0.033 (0.060)	-0.058 (0.121)	0.003 (0.068)	-0.164 (0.108)
FDI reform	-0.061 (0.110)	-0.119** (0.048)	-0.153*** (0.058)	-0.020 (0.055)	-0.041 (0.044)	-0.151** (0.065)
FDI reform * FLEX 2	-0.029 (0.129)	0.255*** (0.071)	0.253*** (0.077)	0.014 (0.072)	0.058 (0.048)	0.249** (0.097)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	-0.374	0.109*	0.221*	0.053	0.129*	0.075
Std Error	0.439	0.064	0.114	0.061	0.074	0.080
p-value (combined effect = 0)	0.394	0.089	0.052	0.383	0.081	0.353
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-2.035***	-0.576***	-0.509*	-0.955***	-0.099	-0.755***
Std Error	0.776	0.207	0.299	0.288	0.284	0.250
p-value (combined effect = 0)	0.009	0.005	0.089	0.001	0.727	0.003
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	-0.030	-0.022	0.008	0.018	0.032	-0.022
Std Error	0.075	0.040	0.042	0.056	0.044	0.046
p-value (combined effect = 0)	0.692	0.579	0.839	0.750	0.466	0.624
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	-0.090	0.136***	0.100**	-0.006	0.017	0.099*

Std Error	0.082	0.040	0.049	0.044	0.038	0.053
p-value (combined effect = 0)	0.276	0.001	0.040	0.892	0.646	0.065
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23887	136996	96814	64069	57795	103088
R-squared	0.179	0.214	0.179	0.252	0.108	0.257

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

2.6.2 Endogeneity of tariff liberalisation policy

As explained in Section 1.2, the tariff declines that were phased in during the initial years of reform (1991-1997) were arguably an exogenous event, although tariff policy endogeneity might be an issue in the post-1997 period, when the pressure to adhere to externally imposed guidelines had waned. Bown and Tovar (2011) present evidence which suggests that political economy considerations acquired considerable importance in the formulation of India's trade policy in the late 1990s, as opposed to their having been of little relevance to the tariff liberalisation episode of 1991-1997. Although my dataset focuses on employment shifts in the 1990-1997 period, I explore whether tariff endogeneity poses problems for my results in a number of ways.

First, I regress final goods and input tariffs on lagged industry level employment (in logarithmic and absolute terms) and lagged industry employment shares for the formal sector in alternative specifications, including year and industry fixed effects throughout. The time lags used vary over one to three years. In all instances, as demonstrated in Table 13, there is no evidence of any association between formal industry employment levels and tariff rates in later years.

Table 13: Tariff endogeneity check – regression of tariffs on lagged formal industry employment

Period (dependent variable)	t+1	t+2	t+3
Dependent variable: Final goods tariffs			
ln (Formal employment – paid)	0.005810 (0.061842)	0.017725 (0.023411)	0.025388 (0.019702)
ln (Formal employment – total)	0.004561 (0.061523)	0.019872 (0.022773)	0.023948 (0.019359)

Absolute formal employment (paid)	-0.000000 (0.000000)	0.000000 (0.000000)	0.000001 (0.000000)
Share of formal employment (paid)	-4.120364* (1.600927)	-0.750120 (0.924981)	0.803087 (0.895980)
Dependent variable: Input tariffs			
ln (Formal employment – paid)	-0.036929 (0.031397)	0.000577 (0.008518)	-0.000784 (0.006740)
ln (Formal employment – total)	-0.032653 (0.029948)	0.002355 (0.008517)	-0.000268 (0.006744)
Absolute formal employment (paid)	-0.000000 (0.000000)	-0.000000 (0.000000)	-0.000000 (0.000000)
Share of formal employment (paid)	-6.129283** (2.239942)	-0.745511 (0.534617)	0.048776 (0.513832)

The independent variables are measured in period t. All specifications include period and industry fixed effects. Standard errors, in parentheses, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5%

*: Significant at 10%

Second, I run separate regressions of the changes in final goods and input tariffs on the lagged changes in formal industry level paid employment, including period and industry fixed effects throughout. As evidenced in Table 14, there is no significant association between changes in formal employment and tariff changes in subsequent periods. Topalova and Khandelwal (2011) report that the changes in final goods tariffs and input tariffs in the 1987-1997 period are not significantly associated with a wide range of 1987 formal industry characteristics, including log employment, log output and the capital-to-labour ratio. In Table 14, I also confirm that the period-to-period final goods and input tariff changes are not correlated with pre-existing formal industry employment levels.

Table 14: Tariff endogeneity check – regression of changes in tariffs on lagged changes in formal paid employment (industry level)

Period (dependent variable)	t+1	t+2	t+3
Dependent variable: Change in final goods tariffs			
Change in ln (formal employment)	0.097508 (0.076559)	0.057736 (0.044515)	0.022285 (0.035028)
ln (formal employment)	0.219995* (0.107854)	0.097065 (0.057578)	0.074310 (0.057011)
Change in absolute formal employment	0.000001 (0.000001)	0.000001 (0.000001)	0.000001* (0.000000)
Absolute formal employment	0.000002** (0.000001)	0.000001* (0.000001)	0.000002* (0.000001)
Dependent variable: Change in input tariffs			
Change in ln (formal employment)	0.019153 (0.024563)	0.014280 (0.015291)	-0.001239 (0.010634)
ln (formal employment)	0.069189* (0.031352)	0.003984 (0.016301)	0.007497 (0.013051)
Change in absolute formal employment	0.000001* (0.000001)	0.000000 (0.000000)	0.000000 (0.000000)

Absolute formal employment	0.000002 (0.000001)	-0.000000 (0.000000)	-0.000000 (0.000000)
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The independent variables are measured in period t . All specifications include period and industry fixed effects. Standard errors, in parentheses, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5%

*: Significant at 10%

As an additional check, I drop two industries that were highly protected in the pre-reform period, yet were subjected to visibly low tariff declines relative to other industries with comparably high tariff rates in the 1991-1997 period³. Figure 2(a) in Section 1.2 suggests that some endogeneity may have seeped into tariff policy as regards these two industries even in the face of the IMF backed reforms of 1991, given that the high degree of tariff protection enjoyed by these industries in the pre-reform period was relaxed to a lesser extent in the reform years relative to other industries with comparably high pre-reform tariffs. Column 2 of Table 15 reveals that the omission of these outliers leaves the baseline results virtually unchanged in terms of both magnitude and significance (the comparison is with the figures presented in Table 5, Column 3, which are reproduced in Column 1 of Table 15 for convenience).

2.6.3 Additional checks

To assess whether my results are influenced by state level characteristics other than the flexibility of labour market regulation, I run a regression in which I add state-year interaction fixed effects to my baseline specification. The results, presented in Column 3 of Table 15, indicate that all the baseline results are similar in magnitude and significance following the addition of these interactions. This suggests that the baseline statistical significance of the interplay between the reforms and labour market flexibility is retained after accounting for other state level trends.

Table 15: Economic reforms, labour market flexibility and employment in formal firms (1990-1997):

³ These industries are the wine manufacturing industry and the distillation, rectification and blending of spirits industry. See Figure 1(a).

Tariff endogeneity check – Dropping outlier industries (Wine manufacturing and the distillation, rectification and blending of spirits) and adding state-year interaction fixed effects

	Baseline (All firms)	Dropping outlier industries	Adding state-year interactions
Final goods tariffs	-0.020 (0.075)	-0.085 (0.090)	-0.016 (0.075)
Final goods tariffs * FLEX 2	0.132 (0.115)	0.241* (0.141)	0.133 (0.114)
Input tariffs	-0.680*** (0.211)	-0.583** (0.228)	-0.984*** (0.281)
Input tariffs * FLEX 2	0.021 (0.216)	-0.141 (0.254)	0.445 (0.377)
Delicensing	0.084 (0.061)	0.085 (0.061)	0.099 (0.063)
Delicensing * FLEX 2	-0.098 (0.083)	-0.100 (0.083)	-0.118 (0.091)
FDI reform	-0.115*** (0.045)	-0.113** (0.045)	-0.117*** (0.045)
FDI reform * FLEX 2	0.208*** (0.067)	0.204*** (0.066)	0.200*** (0.070)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.111*	0.156**	0.117*
Std Error	0.063	0.075	0.063
p-value (combined effect = 0)	0.078	0.037	0.062
Flexible labour markets: Effects of changes in input tariffs			
Row 3 + Row 4	-0.659***	-0.725***	-0.539**
Std Error	0.199	0.210	0.228
p-value (combined effect = 0)	0.001	0.001	0.018
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	-0.013	-0.015	-0.019
Std Error	0.036	0.036	0.040
p-value (combined effect = 0)	0.707	0.676	0.641
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.093**	0.091**	0.083**
Std Error	0.039	0.039	0.038
p-value (combined effect = 0)	0.017	0.019	0.031
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
State-Year FE	No	No	Yes
Observations	160883	160255	160883
R-squared	0.205	0.204	0.207

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Next, as an initial round of delicensing had been undertaken for some industries in 1985-86 (Section 1.1), it could be argued that firms in these industries may have responded differently to the reforms of the 1990s. I therefore examine whether the results differ for firms in industries that were delicensed by 1986, as opposed to the remainder (a large majority of which were delicensed in 1991). The key baseline results for input tariff declines hold for both groups of industries (Column 2 and Column 3, Table 16). However, I find that FDI liberalisation had a significant effect on employment in formal firms only in industries

that were delicensed by 1986. This may be suggestive of the chronology of different reform measures being relevant to future, longer run analyses of reform impacts.

In light of recent work by Haltiwanger *et al* (2013) that suggests that young firms may be likely to grow faster than older firms in general, I proceed to include a control for firm age, captured in terms of the number of years of operation reported by the firms surveyed in my dataset (Column 4, Table 16). While this variable is subject to some measurement error, I find that my findings are robust to its inclusion. Further, using either of the ‘FLEX 1’ or ‘FLEX 3’ variables discussed in Section 2.3.3 as an index of state level labour market flexibility, instead of the ‘FLEX 2’ indicator used in the baseline, does not lead to substantial changes in the results (Column 5 and Column 6, Table 16). While these measures are positively correlated, it is reassuring to note that the headline findings do not hinge on the use of a particular measure.

Table 16: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Robustness checks – Accounting for the timing of delicensing, firm age, and alternative measures of labour market flexibility

	Baseline (All firms)	Delicensed by 1986	Not delicensed by 1986	Controlling for firm age	FLEX 1 instead of FLEX 2	FLEX 3 instead of FLEX 2
Final goods tariffs	-0.020 (0.075)	-0.135 (0.096)	0.110* (0.066)	-0.045 (0.075)	0.068 (0.054)	0.071 (0.061)
Final goods tariffs * FLEX	0.132 (0.115)	0.392** (0.153)	-0.156* (0.083)	0.165 (0.116)	-0.011 (0.122)	0.009 (0.120)
Input tariffs	-0.680*** (0.211)	-0.722** (0.289)	-0.823*** (0.254)	-0.600*** (0.203)	-0.846*** (0.201)	-0.961*** (0.230)
Input tariffs * FLEX	0.021 (0.216)	-0.014 (0.252)	0.281 (0.264)	-0.049 (0.210)	0.740*** (0.265)	0.580** (0.262)
Delicensing	0.084 (0.061)			0.092 (0.062)	0.061 (0.042)	0.034 (0.050)
Delicensing * FLEX	-0.098 (0.083)			-0.094 (0.084)	-0.103 (0.083)	-0.038 (0.088)
FDI reform	-0.115** (0.045)	-0.158*** (0.050)	0.021 (0.067)	-0.113** (0.045)	-0.071** (0.028)	-0.094*** (0.035)
FDI reform * FLEX	0.208*** (0.067)	0.304*** (0.081)	-0.060 (0.096)	0.208*** (0.069)	0.200*** (0.071)	0.230*** (0.070)
Firm age				0.008*** (0.001)		
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.111*	0.257***	-0.046	0.120*	0.057	0.081
Std Error	0.063	0.092	0.063	0.064	0.089	0.080
p-value (combined effect = 0)	0.078	0.005	0.469	0.060	0.517	0.313
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.659***	-0.736**	-0.542**	-0.649***	-0.106	-0.381*
Std Error	0.199	0.305	0.266	0.192	0.203	0.203

p-value (combined effect = 0)	0.001	0.016	0.042	0.001	0.602	0.061
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	-0.013			-0.003	-0.042	-0.004
Std Error	0.036			0.035	0.053	0.050
p-value (combined effect = 0)	0.707			0.944	0.430	0.937
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.093**	0.147***	-0.040	0.095**	0.129**	0.136***
Std Error	0.039	0.053	0.058	0.040	0.060	0.051
p-value (combined effect = 0)	0.017	0.006	0.495	0.017	0.031	0.008
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160883	77692	83191	159872	160883	160883
R-squared	0.205	0.099	0.277	0.211	0.206	0.206

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. The measure of labour market flexibility used in Columns 1, 2, 3 and 4 is the 'FLEX 2' measure, whereas Columns 5 and 6 use alternative measures, as specified in the column headings. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In all of the results presented so far in this chapter, the reform measures have been lagged by two years. In Table 17, I examine the extent to which the baseline figures in Table 5 (Column 3) are affected if a one-year or three-year lag is used instead of a two-year lag. Columns 2 and 3 of Table 17 suggest that these modifications yield figures that are similar in magnitude and significance to the baseline numbers. Further, the exclusion of any one of the post-reform cross-sections that I use also leaves the baseline findings largely unchanged (Table 17, Columns 4 to 6), which indicates that the results discussed in Section 2.5.1 are not heavily reliant on retaining a specific post-reform survey sample in the dataset.

Table 17: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Robustness checks – Modifying the baseline reform time lag and excluding individual post-reform cross-sections

	Baseline (All firms, time lag: 2 years)	Time lag: 1 year	Time lag: 3 years	Excluding 1994	Excluding 1995	Excluding 1997
Final goods tariffs	-0.020 (0.075)	-0.039 (0.078)	-0.084 (0.065)	-0.041 (0.079)	-0.015 (0.069)	0.003 (0.070)
Final goods tariffs * FLEX 2	0.132 (0.115)	0.165 (0.123)	0.126 (0.098)	0.178 (0.119)	0.122 (0.103)	0.120 (0.101)
Input tariffs	-0.680*** (0.211)	-0.574*** (0.197)	-0.306** (0.154)	-0.766*** (0.226)	-0.703*** (0.212)	-0.866*** (0.225)
Input tariffs * FLEX 2	0.021 (0.216)	-0.090 (0.199)	-0.062 (0.196)	-0.062 (0.216)	0.014 (0.199)	0.261 (0.229)
Delicensing	0.084 (0.061)	0.085 (0.061)	0.088 (0.060)	0.066 (0.058)	0.078 (0.058)	0.060 (0.059)
Delicensing * FLEX 2	-0.098 (0.083)	-0.100 (0.083)	-0.115 (0.080)	-0.074 (0.076)	-0.076 (0.076)	-0.057 (0.078)
FDI reform	-0.115**	-0.112**	-0.092**	-0.109**	-0.118***	-0.123***

	(0.045)	(0.045)	(0.044)	(0.047)	(0.045)	(0.044)
FDI reform * FLEX 2	0.208***	0.203***	0.199***	0.199***	0.209***	0.214***
	(0.067)	(0.065)	(0.064)	(0.067)	(0.067)	(0.066)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.111*	0.127**	0.042	0.137**	0.107*	0.122**
Std Error	0.063	0.061	0.047	0.065	0.061	0.062
p-value (combined effect = 0)	0.078	0.037	0.367	0.035	0.080	0.049
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.659***	-0.665***	-0.368**	-0.829***	-0.689***	-0.604***
Std Error	0.199	0.172	0.153	0.217	0.204	0.202
p-value (combined effect = 0)	0.001	0.000	0.017	0.000	0.001	0.003
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	-0.013	-0.015	-0.027	-0.007	0.002	0.004
Std Error	0.036	0.038	0.034	0.037	0.034	0.035
p-value (combined effect = 0)	0.707	0.691	0.431	0.841	0.947	0.919
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.093**	0.091**	0.108***	0.090**	0.091**	0.091**
Std Error	0.039	0.038	0.037	0.040	0.038	0.039
p-value (combined effect = 0)	0.017	0.017	0.004	0.027	0.018	0.020
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160883	160883	160883	119735	119075	118602
R-squared	0.205	0.205	0.205	0.205	0.204	0.209

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Results deriving from a battery of supplementary checks are also presented in the Appendix.

First, Column 2 of Table A1 shows that the baseline findings are robust to changing the 'FLEX 2' indicator value for Delhi and Jammu & Kashmir from 0 to 1 (following the discussion in Section 2.3.1). Second, Column 3 of Table A1 shows that dropping formal firms that report having fewer than ten paid employees does not affect the headline estimates. Third, Column 4 of Table A1 establishes that including formal firms that report zero or missing values for raw material use and/or physical product manufacturing does not affect the baseline results. Fourth, as stated in Section 2.3.2, I find that the input tariff coefficients lose statistical significance, although their signs are unchanged, if input tariffs based only on manufacturing industry final goods tariffs are used instead of the baseline input tariffs, which are based on final goods tariffs applying to both manufacturing and non-manufacturing industries (Column 5, Table A1). This is arguably only a minor concern in the context of the current study, as the baseline input tariffs are a more comprehensive measure of input costs given that they account for changes in the real prices of non-

manufacturing industry inputs, especially as regards agricultural goods, while the alternative ‘manufacturing only’ input tariffs do not account for the same. Topalova (2010) presents evidence that India’s final goods tariffs on agricultural products excepting cereals and oilseeds were slashed in tandem with the manufacturing industry tariff cuts of the 1990s. This suggests that a measure of manufacturing sector input tariffs that accounts for real price changes in agricultural markets is preferable to an alternative that fails to do so.

Furthermore, Nataraj (2011) notes that while India’s tariff reductions were applied virtually to the entire manufacturing sector in the 1990s, non-tariff barriers (such as import licensing) were relaxed more selectively, with protection for consumer goods being maintained for a longer period. In Column 2 and Column 3 of Table A2, I explore whether the baseline findings differ for firms in consumer and capital (or basic) goods industries, as classified in Nouroz (2001). The significance of the input tariff effects is robust for both groups of industries across all states. However, in states with flexible labour markets, these effects are substantially stronger for firms in capital goods industries, which may be attributable to the simultaneous dismantling of tariff and non-tariff barriers in these industries. Interestingly, FDI reform significantly associates with employment shifts only in consumer goods industries, which may be an artefact of the sequencing of FDI liberalisation in India in the 1990s.

Goldberg *et al* (2010) document that India’s trade reforms, in particular the lowering in imported input prices, led to an increase in output in the manufacturing sector on account of firms using a wider range of inputs. As this effect may have been stronger for multi-product manufacturers, I examine whether employment impacts are stronger for these firms, as opposed to single product manufacturers (Column 4 and Column 5, Table A2). This reveals that the baseline results are indeed stronger for firms manufacturing multiple

products, which is in line with the findings of De Loecker *et al* (2016). In addition, I confirm that my findings are driven by firms that are wholly privately owned, which comprise over 90 per cent of the sample (Column 6 and Column 7, Table A2). Finally, following Aghion *et al* (2008), I establish that dropping individual states from the analysis leaves the baseline findings largely unchanged in magnitude and significance (Tables A3, A4 and A5).

2.7 Concluding comments

This chapter exploits the initiation of a quasi-exogenous round of tariff liberalisation and concurrent domestic policy reform to examine changes in employment in formal Indian manufacturing firms in the 1990s. It also analyses the extent to which differences in state level labour market flexibility influence these changes.

The results point to input tariff declines and FDI reform, hitherto virtually ignored by the literature exploring post-liberalisation employment shifts, being associated with significant employment shifts in formal firms. Lower input tariffs are associated with employment gains across all states, with the average formal firm hiring more directly employed workers following declines tariffs in input supplying industries. FDI reform is, on average, associated with reduced employment in firms in states with inflexible labour markets, with this reduction visible across all categories of permanent (non-contract based) employment. On the other hand, in states with flexible labour markets, FDI reform is associated with increments in firm level employment, encompassing directly employed workers as well as contract workers. At a broader, industry level, the delicensing reform is associated with significant increases in formal firm numbers, only in states with flexible labour markets.

In summary, India's import tariff reductions in the 1990s affected formal firm level employment more on account of cheaper input costs benefiting manufacturers across the

country, as opposed to effects driven by changes in final goods tariffs. The latter could be surmised to be more dependent on responses from existing and potential importers, which might undergo a longer run transition. Future research could examine this question further, in addition to probing the implications for FDI policy reform for longer term FDI inflows and their employment implications.

The evidence is supportive of the baseline results being driven by product market competition within the formal sector. Both the firm and industry level findings are robust in magnitude and significance for industries characterised as being more competitive. In particular, the employment changes associated with delicensing and FDI reform tend to be restricted to more competitive industries, highlighting the relevance of competition to structural change and, potentially, improved formal sector productivity in the longer run. While other mechanisms such as value chain linkages involving formal (and possibly informal) businesses may also have a role to play, they are beyond the scope of the current study and dataset.

The results of this study derive from a dataset that shows evidence of robustness, as regards employment shifts, to tariff endogeneity concerns. They retain significance following minor changes to the baseline time lag and dataset composition (in terms of the inclusion or omission of specific post-reform survey cross-sections). There is some evidence that the employment enhancing effects associated with reductions in input tariffs are more prominent in industries that are relatively less export oriented and import intensive. This may be indicative of vertical linkages or agglomeration externalities that operate across industries characterised by varying degrees of trade orientation, although that remains an area for future research.

As policy makers in developing economies tend to emphasise increases in formal employment as a key goal of economic liberalisation, these findings are of general interest. They contribute to the growing literature examining the role of interactions between India's 1991 reforms and variations in domestic state level institutional characteristics in driving post-reform economic outcomes. The results highlight that an analysis of the implications of economic reform for firm level employment is incomplete unless shifts in input tariffs and variations in regional labour market flexibility are accounted for. They strongly indicate that a consideration of the impacts of economic reform on the formal sector continues to be a highly relevant research question, notwithstanding the persistent primacy of informality in developing economy labour markets.

Chapter 3: Economic Reform, Labour Market Flexibility and Employment in Informal Manufacturing Enterprises in India

3.1 Introduction

As discussed in Section 2.1, the labour market impacts of economic liberalisation and variations in domestic institutional features in developing economies remain somewhat poorly studied. Existing research on the impacts of the extensive and largely unanticipated economic reforms undertaken by the Indian government in the 1991-1997 period (Section 1.2) largely avoids the issue of economic duality that is typical of developing economies. Put differently, the literature rarely distinguishes between registered, or formal, manufacturing firms and the unregistered or ‘informal’ manufacturing sector, which encompasses all manufacturing firms employing less than ten (twenty) workers and using (not using) electricity. Estimated to account for 99 per cent of firms and approximately 80 per cent of employment in the Indian manufacturing sector, economic outcomes in the informal sector merit as much academic and policy interest as those in the formal sector.

This chapter seeks to address this gap in the literature by analysing the impact of India’s economic reforms in the 1990s on employment in small, informal manufacturing enterprises. I also examine the extent to which this impact depends on differences in labour market flexibility at the state (provincial) level. Following the analysis in Chapter 1, I capture state level variations in labour market flexibility using the ‘FLEX 2’ index proposed by Hasan *et al* (2012), which builds on the seminal measure proposed by Besley and Burgess (2004).

Informal enterprises rarely engage directly in international trade, were not targeted by India’s licensing regime and FDI caps, and are not subject to the labour market regulations with which formal firms are legally bound to comply. Any interactions between economic

reform and states' labour market flexibility are therefore arguably unlikely to have a direct effect on employment in the informal sector. However, there is some evidence that there are linkages between the formal and informal manufacturing sectors in India. On the one hand, these linkages may be driven by factors such as vertical integration, outsourcing and agglomeration, as suggested by Mukim (2015) and Ghani *et al* (2013a, 2013b). On the other, as posited in recent work by Allen and Schipper (2016), formal and informal manufacturers may compete with each other in some industries. The conclusions of Kathuria *et al* (2013) are supportive of the hypothesis that India's reform programme affected enterprise level efficiency in the informal manufacturing sector, with net productivity gains accruing to informal manufacturers (albeit, on average, to a lower degree relative to formal firms). Accounting for spillover effects in the informal sector, arising from the interaction of economic reform and labour market flexibility, is therefore of relevance for policy makers. I examine the plausibility of alternative channels, in particular that of product market competition, in this chapter, although the fact that my dataset is not a panel precludes a rigorous analysis of market entry and exit.

The analysis in this chapter uses survey data compiled by the National Sample Survey Office (NSSO) through quinquennial surveys of informal manufacturing enterprises. It benefits from the rich cross-industry variation in India's policy changes in the 1990s, particularly visible in the import tariff reductions that were enforced. The reform package of 1991 was an unanticipated event, which helps to obviate the usual concerns inherent in any analysis of the consequences of such measures. This chapter is the first to examine the impact of declines in both final goods and input tariffs on employment in informal enterprises in India. Its findings contribute to the literature by establishing that India's delicensing and FDI reforms are associated with significant shifts in informal sector employment.

The results indicate that reductions in final goods and input tariffs are not associated with significant employment shifts at the informal enterprise level. However, on average and *ceteris paribus*, delicensing is associated with a statistically significant increase of 10.8 per cent in informal enterprise level employment in states with inflexible labour markets, while no corresponding significant change is registered in states with flexible labour markets. FDI reform, on the other hand, is associated with informal enterprise level employment rising by an average of 9.9 per cent only in states with flexible labour markets, *ceteris paribus*, with no corresponding significant change visible in states with inflexible labour markets.

At a broader, three digit industry level, delicensing goes hand-in-hand with informal enterprise numbers rising by 32 per cent in states with inflexible labour markets, while FDI reform is associated with a corresponding increase of over 51 per cent in states with flexible labour markets. These increases are restricted to tiny, household only informal manufacturers as opposed to slightly larger enterprises that hire outside labour. In line with the enterprise level findings, no significance attaches to final goods reductions and input tariff declines.

There is some evidence that the delicensing effect is attributable to increases in product market competition between formal and informal entities. Greater competition within the formal sector also appears to be a predictor of informal sector expansion in recently delicensed industries, possibly on account of structural shifts of the type predicted in Melitz (2003). The mechanism underlying the result associated with FDI liberalisation is more uncertain and could be one or a combination of competition or collaborative linkages between informal and formal manufacturers.

The remainder of this chapter is organised as follows. Section 3.2 undertakes a brief review of the literature. Section 3.3 describes the data and discusses the empirical methodology.

Main findings are presented in Section 3.4, with a range of robustness checks discussed in Section 3.5. Section 3.6 concludes.

3.2 Context

The turn of the millennium witnessed an upsurge in academic interest in the impacts of tariff liberalisation programmes on firm level employment, both in terms of theoretical contributions and empirical work. The literature has largely focused on final goods tariff declines, with substantial ambiguity persisting as regards employment effects. When it comes to distinguishing between the formal and informal sectors, informality has commonly been modelled at the individual or employee level. This may be attributable to the fact that a majority of studies exploit micro data from Latin American economies, most prominently from Brazil, that permit the identification of worker level informality (see for instance Goldberg and Pavcnik, 2003; Soares, 2005; Aleman-Castilla, 2006; Bosch *et al*, 2007; Fugazza and Fiess, 2010; and Paz, 2014). In the Indian context, given that informality is captured at the enterprise level rather than the worker level, the relevance of these studies is limited.

As discussed in Section 3.1, economic liberalisation is perhaps unlikely to have directly affected employment in informal manufacturing enterprises in India. Nonetheless, to the extent that there are linkages between the formal and informal sectors, either on account of product market competition or through ‘collaborative’ supply chains, it is easy to imagine how a policy change that affects employment in formal firms might lead to changes in informal sector employment. For instance, if final goods tariff cuts and delicensing engender increased product market competition among formal firms in a given industry (along the lines discussed in Section 2.5.4), the least productive formal firms might exit the market over time, through a Melitz (2003) type market restructuring process. This could arguably be

followed by a rise in informality in that industry, as the informal sector picks up some of the 'slack' in the labour market. This story could be expected to be stronger in industries that are also characterised by a greater degree of product market competition between formal and informal (as opposed to only among formal) operators, where the informal sector is more likely to function as a 'shock absorber' for a net employment loss in the formal sector.

On the other hand, if the formal firms and informal enterprises in an industry are engaged in collaborative linkages, it could be argued that an observed increase in formal sector employment would be complemented by a larger informal sector in that industry, and *vice versa*. In this sense, although the direct impact of input tariff declines and FDI reform might be restricted to formal firms, there could be spillovers into employment in informal enterprises. Although input tariff declines, for example, apply to imported inputs in the first instance, they could trigger general equilibrium effects in an industry's input supplying sectors and, over time, impose downward pressure on domestic input prices. In such a scenario, informal enterprise employment could respond to the input tariff reductions even if, as seems realistic, informal enterprises do not use sophisticated imported inputs and only source inputs locally. Along similar lines, if informal enterprises comprise a part of the supply chain of formal firms that are recipients of FDI inflows, informal sector employment may respond to FDI regime reform even while FDI flows only into a subset of formal firms.

Further, any such policy spillovers into informality might also be expected to differ across states with more and less flexible labour markets. While informal enterprises themselves are not subject to the state level labour market regulations outlined in Section 2.3.3, the fact that the reforms often have different implications for formal firms in states with more and less flexible labour markets (following the analysis in Chapter 2) also makes labour market flexibility a point worth considering in this chapter. Further, as it has been

established that Indian states with less flexible labour markets were characterised by higher levels of informal sector output even in 1992 (Besley and Burgess, 2004), it is important to account for state level variations in labour market flexibility in the context of the current analysis. Along the lines of Chapter 2, the analysis in this chapter focuses on the net employment effects of each policy (albeit with an informal enterprise focus). With limited success, I also attempt to disentangle the mechanisms underlying the observed effects.

The literature has implicitly tended to assume that formal and informal enterprises compete for gaining market share. However, as Munro (2011) documents, a scenario in which the formal and informal sectors complement each other may constitute a more realistic description of developing economies. Complementarities could exist between and within the formal and informal sectors and might arise, for instance, through supply-chain linkages or agglomeration driven externalities. As such, forward and backward linkages may have a crucial role to play in determining the extent to which tariff liberalisation affects firm level outcomes.

As regards India's trade reforms in particular, most studies have tended to focus on tariffs on final goods, or final goods tariffs. However, as discussed in Section 2.2.1.1, an increasing body of evidence suggests that declines in tariffs on intermediate inputs (input tariffs) have a greater positive impact on firm level productivity, relative to final goods tariffs. This evidence strengthens the case for examining both final goods and input tariff declines in a study of the implications of trade liberalisation for employment. The only study that appears to have assessed the implications of reductions in input tariffs for both formal and informal employment, however, appears to be that of Menezes-Filho and Muendler (2011). This analysis exploits a rich worker flow dataset to establish that final goods and input tariff cuts in Brazil in the 1990s are not associated with significant shifts in informal employment.

Empirical analysis otherwise appears to have sidestepped the impacts of input tariff declines on informal employment.

As stated in Section 2.2.1.2, Hasan *et al* (2012) find that Indian states with flexible labour markets are more likely to register employment growth in the post-liberalisation period, particularly in net exporter industries, relative to states with less flexible labour markets. However, this analysis is conducted at a fairly high level of industry aggregation, does not assess input tariff declines, and does not consider employment in formal and informal enterprises separately. In comparison, I am able to focus on informal enterprises using a more disaggregated industry classification as well as declines in final goods and input tariffs, in addition to domestic industrial policy reforms. This chapter is therefore an original contribution to the existing evidence base.

3.3 Data and method

3.3.1 Labour market data

I use survey data on unorganised manufacturing firms compiled by the National Sample Survey Office (NSSO) in 1989-90, 1994-95 and 2000-01. The Factories Act of 1948 requires all Indian manufacturing firms that use electricity and employ 10 or more workers, as well as all manufacturing firms that do not use electricity and employ 20 or more workers, to register with the state government. The term ‘workers’ encompasses all paid and unpaid individuals, including household help where this is relevant, who are directly or indirectly associated with a firm’s operations. All other firms are unregistered and comprise the informal manufacturing sector⁴, which is the sampling frame of the NSSO surveys of

⁴ The terms ‘unorganised’ and ‘informal’ are, in the context of Indian firms, virtually synonymous. In addition to the proprietary and partnership based enterprises that constitute the informal sector, the unorganised sector also encompasses a small number of enterprises managed by cooperative societies, trusts, and private and public

unorganised manufacturing enterprises. In the baseline regressions in this chapter, employment is captured in terms of the total number of persons engaged. The baseline dependent variable is the natural logarithm of firm level employment.

The NSSO surveys approximately 1 per cent of all informal enterprises approximately every five years. It employs a stratified random sampling strategy for each survey, with the sample frame in each period updated on the basis of the sample frame used in the preceding Economic Census (EC). I use the inverse sampling probability based weights that accompany the survey data to weight observations in a manner that yields results that are applicable to the population of small informal enterprises. I observe informal enterprises in one pre-reform period (1990) and two post-reform periods (1995 and 2001). As my data do not comprise a panel, I am unable to pinpoint the channels through which observed employment changes occur, but I discuss this issue to the extent possible.

The pooled employment distribution for the population of informal manufacturers is presented in Figure 5(a). The average informal enterprise employs two individuals, a number that displayed remarkable consistency in the 1990s, both in states with flexible and states with inflexible labour markets (defined on the basis of the 'FLEX 2' measure discussed in Section 2.3.3), and only declined registered a very slight decline across the country in 2001, as seen in Figure 5(b). Further, over 95 per cent of informal enterprises employ less than five people. A little over 50 per cent of informal manufacturing jobs are accounted for by informal enterprises engaging one or two individuals.

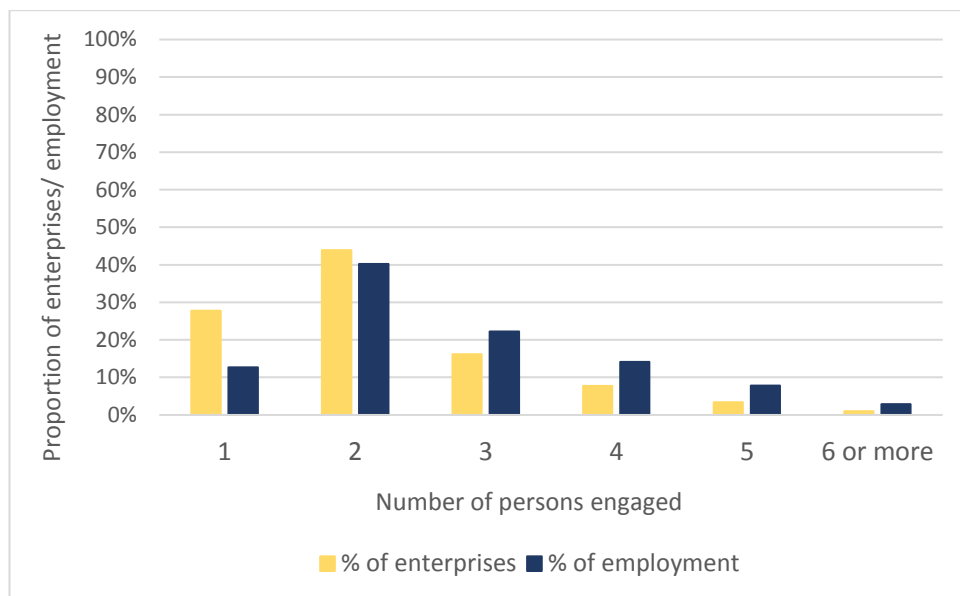
Close to 80 per cent of the informal enterprises in my dataset are small, household only enterprises, labelled 'own account manufacturing enterprises' or OAMEs in the NSSO

limited companies. As this latter category of enterprises accounts for less than 0.5 per cent of the sample of enterprises in each NSSO survey round (sample) used in the analysis for this chapter, and as it is arguably unlikely to face the same production or growth incentives as the informal sector, I exclude it from my analysis.

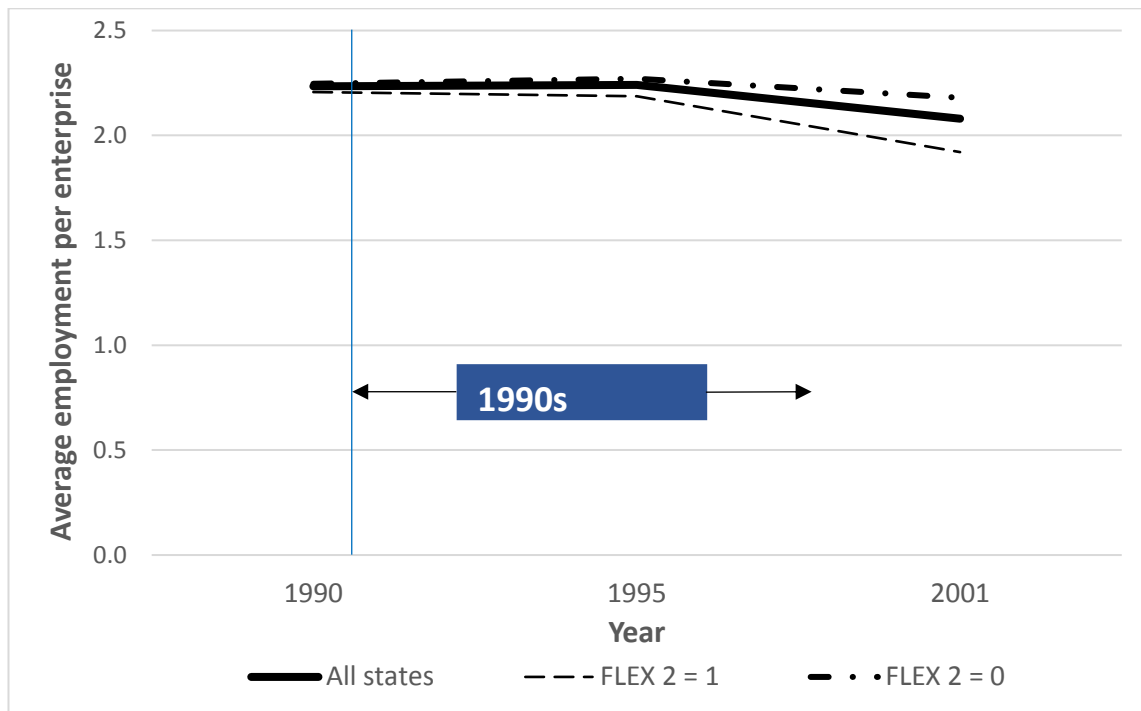
surveys. OAMEs are household based, informal manufacturing enterprises that do not hire any workers on a regular basis. In effect, OAMEs only employ unpaid members of the household(s) of their proprietor(s). The remaining, slightly larger informal enterprises in the dataset are labelled ‘non-directory manufacturing establishments’ or NDMEs by the NSSO. NDMEs are informal manufacturing enterprises that hire at least one and up to five workers (household and non-household workers) on a regular basis. In 1990, the NSSO did not survey relatively large informal enterprises employing more than six workers (household and hired workers) on a regular basis (labelled ‘directory manufacturing establishments’ or DMEs). As DMEs therefore do not feature in the only pre-reform data at my disposal and since they comprise less than ten per cent of informal enterprises surveyed in 1995 and 2001, I discard them from the dataset. However, I undertake a robustness check in which they are included in the data (for 1995 and 2001), which yields results that are similar to the baseline (Section 3.5.2).

Figure 5: Employment in informal manufacturing enterprises in India

(a) Informal enterprise and employment shares by enterprise size (1990-2001)



(b) Average number of persons engaged per informal enterprise (1990-2001)



Source: NSSO survey data (1990, 1995, 2001) As inverse sampling probability based multipliers have been used to aggregate the raw data, these distributions are representative of the population of informal enterprises. The measure of labour market flexibility used in Figure 5(b) is the 'FLEX 2' measure due to Hasan *et al* (2012) and is described in Section 2.3.3.

The construction of the pooled informal enterprise level dataset poses a number of challenges, key among which is the fact that the National Industrial Classification (NIC) system used in the 2001 survey (NIC 1998) differs from that used in the 1990 and 1995 surveys (NIC 1987). In a manner similar to that of Nataraj (2011), I assign each firm in the 2001 dataset to the three-digit NIC 1987 code corresponding to its industry of operation and subsequently map firms to tariff codes on the basis of the concordance specified by Debroy and Santhanam (1993). This yields a dataset comprising firms operating in 132 three-digit NIC 1987 industries. As the state specific labour market flexibility measure used applies to sixteen states, I discard firms located in most other states. The exception is the national capital region (Delhi), which accounts for a large number of firms relative to the states that are excluded and is assigned an inflexible labour market status in the baseline on account of a lack of relevant data. The baseline results hold if Delhi and Jammu & Kashmir (which is

classified as being a state with an inflexible labour market, following the discussion in Section 2.3.3) are, instead, assumed to be flexible labour markets (Section 3.5.2). As specified in Section 2.3.1, restricting the dataset to include only the sixteen states of interest and Delhi is not a major concern in the context of this analysis.

I exclude informal enterprises that are reported to have been closed from my analysis. Further, I observe that a very small fraction (less than 1 per cent) of enterprises in each period appear to employ ten or more persons, the threshold above which units that use electricity attain formal (registered) status. I drop these enterprises from my dataset, but I undertake a robustness check to confirm that the alternative does not affect my baseline results (Section 3.5.2). Further, along the lines of the discussion in Section 2.3.1, I do not include enterprises that report zero or missing values for raw material use and/or physical product manufacturing in the baseline analysis. This is considerably more common in the informal sector *vis-à-vis* the formal sector, which indicates that informal enterprises may be more likely to engage solely in trading activity relative to formal firms, in spite of being classified as ‘manufacturing’ entities. A robustness check suggests that including these ‘non-manufacturers’ in the analysis does not substantially affect the results (Section 3.5.2).

3.3.2 Other data

In addition to the labour market data described in Section 3.3.1, this analysis uses data on the Indian economic liberalisation programme of the 1990s and state level labour market flexibility indices. These data are discussed in Section 2.3.2 and Section 2.3.3.

Table 18 provides summary employment statistics for OAMEs and NDMEs, for the sample as a whole and separately for states with flexible and inflexible labour markets, as defined using the ‘FLEX 2’ measure. The average OAME engages two people, while three to four individuals are

engaged in the average NDME. Only minor differences appear in these numbers across the two groups of states. While both averages register declines in 2001 relative to 1990, these changes are very small and do not, *prima facie*, appear to be economically meaningful.

The final column of Table 18 also shows that, on the whole, total weighted employment in the population represented by OAMEs and NDMEs increased over the 1990-2001 period, both in states with more flexible labour markets and less flexible labour markets. More precisely, the data are indicative of a substantial increase in aggregate employment in informal enterprises in all states in the 1990-1995 period, followed by a slight decline in the 1995-2001 period. However, the 2001 figures are clearly higher than the corresponding 1990 estimates in each case, with the exception of OAMEs in states with less flexible labour markets. Considered alongside the observed declines in average informal enterprise employment in this period, these data highlight that a more aggregated, industry level analysis of the impacts of the reforms on informal enterprise numbers and employment may be of particular relevance for this chapter. Following the strategy employed in Chapter 2, I also attempt to disentangle the implications of the varying policy shifts of the 1990s for employment in the informal sector at the 'micro' (enterprise) and 'macro' (industry) levels.

Table 18: Summary statistics for employment in informal enterprises (1990-2001)

Year	OAMEs				NDMEs			
	N	Mean	St. dev.	Weighted total*	N	Mean	St. dev.	Weighted total*
Overall								
1990	29661	2.12	1.10	12409060	11428	3.55	1.15	1836999
1995	87410	2.18	1.12	15836887	19146	3.40	1.19	3554920
2001	45305	1.81	0.94	12715694	16858	3.35	1.11	3029317
Overall	162376	2.06	1.08	40961641	47432	3.42	1.15	8421235
States with flexible labour markets (FLEX 2 = 1)								
1990	10868	2.11	1.08	3475971	4406	3.68	1.13	748955
1995	35327	2.14	1.10	5136175	8744	3.55	1.20	1561064
2001	18576	1.70	0.91	4299569	6560	3.43	1.12	1311631
Overall	64771	2.01	1.06	12911715	19710	3.54	1.16	3621650
States with inflexible labour markets (FLEX 2 = 0)								
1990	18793	2.12	1.11	8933089	7022	3.46	1.15	1088044
1995	52083	2.20	1.13	10700713	10402	3.28	1.16	1993856
2001	26729	1.89	0.96	8416125	10298	3.30	1.10	1717685

Overall	97605	2.10	1.09	28049926	27722	3.33	1.14	4799585
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Source: NSSO data (1990, 1995, 2001) The data are unweighted and apply only to the sample of informal enterprises surveyed in each year. N: number of observations; St. dev.: standard deviation (the minimum and maximum numbers for each row in this table are 1 and 9 respectively) * This refers to the total number of persons engaged in the population represented by the informal enterprises in the sample dataset, derived using the survey weights provided for each enterprise surveyed in the sample dataset.

3.3.3 Method

The baseline regressions undertaken in this chapter follow the methodology outlined for formal firms in Section 2.4. As this chapter focuses on informal enterprises that are, by most measures, microenterprises, I also explore whether the results yielded by the baseline specification hold when a Poisson count model is adopted. The dependent variable for the Poisson regressions is the actual number of individuals engaged in work in a given enterprises, as opposed to the natural logarithm of that number (which is used in the baseline specification).

3.4 Results

3.4.1 Baseline regressions: Firm level

To begin, I assess whether the reforms are associated with statistically significant employment shifts at the firm level, irrespective of variations in regional labour market flexibility. In Table 19, I therefore run variations of equation (1) presented in Section 2.4. Neither output nor input tariff reductions are associated with significant employment changes in informal enterprises. However, I find that the delicensing reform is associated with a statistically significant increase in average informal enterprise level employment. This result is robust to controlling for FDI reform, which is not linked to significant informal employment changes. Specifically, controlling for final goods and input tariff declines, FDI liberalisation, and state, year and industry fixed effects, I find that delicensing is associated

with employment in the average informal enterprise rising by 7.6 per cent (Table 19, Column 5)⁵. In this last specification, input tariff reductions are associated with a decrease in informal enterprise level employment, but this result is only weakly statistically significant.

Table 19: Economic reforms and employment in informal enterprises (1990-2001): OLS estimates

	(1)	(2)	(3)	(4)	(5)
Final goods tariffs	-0.011 (0.086)	-0.082 (0.108)	-0.090 (0.102)	-0.082 (0.109)	-0.091 (0.104)
Input tariffs		0.473 (0.314)	0.550* (0.314)	0.472 (0.316)	0.558* (0.317)
Delicensing			0.068** (0.026)		0.076*** (0.028)
FDI reform				0.019 (0.026)	0.041 (0.026)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	195789	195789	195789	195789	195789
R-squared	0.160	0.161	0.162	0.161	0.162

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In Table 20, I explore the extent to which state level differences in labour market flexibility have a bearing on the effects of the reforms, using alternative forms of the expanded baseline specification of equation (2) discussed in Section 2.4. I focus on the results that are statistically significant at the significance level of 0.05. First, I confirm that final goods and input tariff reductions are not associated with significant changes in employment in all states, with the weakly significant negative effect for input tariff declines, visible in Table 19, being restricted to states with inflexible labour markets (Table 20, Row 3).

The employment enhancing effect of delicensing, visible in Table 19, is restricted to states with inflexible labour markets in Table 20. More precisely, controlling for the other reforms, in states with inflexible labour markets, delicensing is associated with average informal enterprise employment rising by 10.8 per cent (Table 20, Column 6, Row 5). This result is

⁵ As specified in Section 2.3.2, all the tariffs are entered into the dataset in fractional form (for instance, a tariff of 80 per cent is entered as 0.80). As a result, given that the dependent variable is in logarithmic form, we may interpret any coefficients attaching to the tariffs as proportional changes directly (without having to multiply them by 100). On the other hand, as the delicensing and FDI reform variables are indicator variables and cannot be rescaled in a manner similar to the tariffs, the coefficients that attach to them must be multiplied by 100 for appropriate interpretation (given the logarithmic form of the dependent variable).

statistically significant even at the 0.01 significance level. In states with flexible labour markets, however, the delicensing effect, although still positive, loses statistical significance given the p-value of 0.613 (Table 20, Column 6, 'Row 5 + Row 6').

Interestingly, Table 20 also reveals that labour market flexibility appears to matter in terms of the response of average informal enterprise level employment to FDI reform. In states with inflexible labour markets, FDI liberalisation is not associated with statistically significant changes in informal enterprise level employment, on average and *ceteris paribus* (Table 20, Column 5, Row 7). Conversely, in states with flexible labour markets, FDI liberalisation is associated with employment in informal enterprises being significantly higher *ceteris paribus*, by an average of 9.9 per cent (Table 20, Column 5, 'Row 7 + Row 8').

Table 20: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): OLS estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Final goods tariffs	-0.030 (0.092)	-0.055 (0.092)	-0.030 (0.091)	-0.138 (0.115)	-0.137 (0.118)	-0.132 (0.113)
Final goods tariffs * FLEX 2	0.056 (0.063)	0.140** (0.058)	0.076 (0.063)	0.143 (0.098)	0.147 (0.103)	0.151 (0.097)
Input tariffs				0.599* (0.328)	0.538* (0.323)	0.576* (0.327)
Input tariffs * FLEX 2				-0.202 (0.172)	-0.022 (0.166)	-0.178 (0.168)
Delicensing	0.098*** (0.029)	0.072*** (0.027)	0.100*** (0.029)	0.106*** (0.030)	0.077*** (0.027)	0.108*** (0.030)
Delicensing * FLEX 2	-0.070** (0.035)		-0.078** (0.035)	-0.083** (0.037)		-0.088** (0.037)
FDI reform	0.039 (0.026)	0.022 (0.028)	0.019 (0.028)	0.042 (0.026)	0.024 (0.028)	0.024 (0.028)
FDI reform * FLEX 2		0.069* (0.041)	0.082** (0.041)		0.065 (0.041)	0.076* (0.041)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.026	0.085	0.047	0.004	0.010	0.019
Std Error	0.069	0.067	0.068	0.079	0.083	0.078
p-value (combined effect = 0)	0.711	0.208	0.494	0.957	0.907	0.809
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4				0.397	0.516*	0.398
Std Error				0.300	0.305	0.300
p-value (combined effect = 0)				0.186	0.091	0.185
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.028		0.022	0.024		0.019
Std Error	0.038		0.038	0.038		0.038
p-value (combined effect = 0)	0.468		0.563	0.536		0.613
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8		0.090**	0.101**		0.090**	0.099**
Std Error		0.043	0.043		0.043	0.043
p-value (combined effect = 0)		0.036	0.018		0.036	0.021
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	195789	195789	195789	195789	195789	195789
R-squared	0.163	0.163	0.164	0.164	0.163	0.164

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

As discussed in Section 3.3.3, I use a Poisson count specification to explore whether the results presented in Table 19 and Table 20 are excessively reliant on the fact that I use the natural logarithm of employment to capture employment shifts in the tiny informal enterprises in my dataset. The results of this strategy, presented in Table 21 and Table 22, provide reassuring evidence that this is not the case. Indeed, the Poisson model yields findings that are very similar, in terms of direction and statistical significance, to the baseline results outlined above.

Table 21: Economic reforms and employment in informal enterprises (1990-2001): Poisson estimates

	(1)	(2)	(3)	(4)	(5)
Final goods tariffs	0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)
Input tariffs		0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)
Delicensing			0.060** (0.026)		0.067** (0.027)
FDI reform				0.016 (0.027)	0.034 (0.026)
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	195789	195789	195789	195789	195789

Dependent variable: total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table 22: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Poisson estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Final goods tariffs	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Final goods tariffs * FLEX 2	0.000 (0.001)	0.001** (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Input tariffs				0.005 (0.003)	0.004 (0.003)	0.004 (0.003)
Input tariffs * FLEX 2				-0.002 (0.002)	0.000 (0.002)	-0.001 (0.002)
Delicensing	0.087*** (0.030)	0.064** (0.027)	0.089*** (0.030)	0.093*** (0.031)	0.067** (0.027)	0.094*** (0.030)
Delicensing * FLEX 2	-0.063* (0.035)		-0.072** (0.035)	-0.073** (0.037)		-0.080** (0.037)
FDI reform	0.033 (0.026)	0.014 (0.027)	0.012 (0.027)	0.035 (0.026)	0.015 (0.027)	0.014 (0.028)
FDI reform * FLEX 2		0.077** (0.039)	0.090** (0.039)		0.077** (0.038)	0.086** (0.038)

Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.000	0.001	0.001	0.000	0.000	0.000
Std Error	0.001	0.001	0.001	0.001	0.001	0.001
p-value (combined effect = 0)	0.654	0.171	0.398	0.889	0.827	0.740
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4				0.003	0.004	0.003
Std Error				0.003	0.003	0.003
p-value (combined effect = 0)				0.269	0.144	0.251
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.024		0.017	0.019		0.014
Std Error	0.036		0.036	0.035		0.035
p-value (combined effect = 0)	0.504		0.635	0.580		0.682
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8		0.091**	0.102**		0.092**	0.100**
Std Error		0.041	0.041		0.041	0.040
p-value (combined effect = 0)		0.026	0.012		0.024	0.013
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	195789	195789	195789	195789	195789	195789

Dependent variable: total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

To summarise, my baseline results suggest that on the whole, employment in India's informal manufacturing enterprises in the 1990s responded primarily to the delicensing and FDI reforms of that period, and did not register significant changes in response to the concurrent declines in final goods and input tariffs. Delicensing is associated with significant increases (no significant change) in average informal enterprise level employment in states with inflexible (flexible) labour markets, while FDI reform is associated with significant increases (no significant change) in average informal enterprise level employment in states with flexible (inflexible) labour markets.

The distinction between small, household only enterprises (OAMEs) and slightly larger informal enterprises (NDMEs), outlined in Section 3.3.1, suggests that the baseline regressions should be separately undertaken for these two firm types. This is also relevant in light of the consideration that enterprise heterogeneity within the informal sector is likely to matter if the impact of the reforms on informal enterprises 'spills over' through the formal sector, as outlined in Section 3.1. Table 23 presents the findings of this exercise, using both the baseline OLS regression (2) and its Poisson counterpart. The employment

enhancing effect associated with delicensing in states with inflexible labour markets is robust for OAMEs, the tiny informal enterprises that dominate the informal sector, but is only weakly significant for the slightly larger NDMEs. Conversely, the baseline increase in average informal enterprise level employment linked to FDI reform holds primarily for NDMEs, with statistical significance weakening to over 11 per cent for OAMEs.

Table 23: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Results by firm size (OAME/ NDME)

	OLS estimates			Poisson estimates		
	Baseline (All enterprises)	OAME	NDME	Baseline (All enterprises)	OAME	NDME
Final goods tariffs	-0.132 (0.113)	-0.179 (0.133)	0.005 (0.046)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.000)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.223* (0.115)	-0.029 (0.059)	0.001 (0.001)	0.002* (0.001)	-0.000 (0.001)
Input tariffs	0.576* (0.327)	0.712* (0.366)	-0.162 (0.206)	0.004 (0.003)	0.007* (0.004)	-0.003 (0.002)
Input tariffs * FLEX 2	-0.178 (0.168)	-0.376** (0.191)	0.089 (0.110)	-0.001 (0.002)	-0.004* (0.002)	0.001 (0.001)
Delicensing	0.108*** (0.030)	0.115*** (0.032)	0.056* (0.029)	0.094*** (0.030)	0.106*** (0.034)	0.040 (0.027)
Delicensing * FLEX 2	-0.088** (0.037)	-0.116*** (0.037)	-0.049 (0.032)	-0.080** (0.037)	-0.115*** (0.038)	-0.031 (0.028)
FDI reform	0.024 (0.028)	0.048 (0.031)	0.036 (0.029)	0.014 (0.028)	0.038 (0.032)	0.035 (0.026)
FDI reform * FLEX 2	0.076* (0.041)	0.026 (0.046)	0.055** (0.024)	0.086** (0.038)	0.034 (0.048)	0.048** (0.023)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.019	0.044	-0.025	0.000	0.001	-0.000
Std Error	0.078	0.101	0.051	0.001	0.001	0.000
p-value (combined effect = 0)	0.809	0.667	0.626	0.740	0.539	0.583
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	0.398	0.336	-0.073	0.003	0.003	-0.002
Std Error	0.300	0.330	0.220	0.003	0.003	0.002
p-value (combined effect = 0)	0.185	0.308	0.740	0.251	0.355	0.426
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.019	-0.001	0.008	0.014	-0.009	0.009
Std Error	0.038	0.038	0.029	0.035	0.036	0.026
p-value (combined effect = 0)	0.613	0.989	0.795	0.682	0.804	0.736
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.099**	0.074	0.091***	0.100**	0.072	0.083***
Std Error	0.043	0.047	0.031	0.040	0.049	0.029
p-value (combined effect = 0)	0.021	0.114	0.004	0.013	0.143	0.004
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	195789	152178	43611	195789	152178	43611
R-squared	0.164	0.191	0.128			

Dependent variable: natural logarithm of total number of persons engaged (Columns 1, 2, 3) and total number of persons engaged (Columns 4, 5, 6) 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

3.4.2 Industry level results

As several informal enterprises employ one or two persons and the vast majority do not employ more than four individuals (Section 3.3.1), the statistically significant effects attaching to the delicensing and FDI reforms discussed in Section 3.4.1 do not appear to be of particular economic relevance. For instance, the results indicate that in states with flexible labour markets, the average informal enterprise in an FDI liberalised industry grows by approximately 10 per cent in employment terms. Assuming for convenience that the average informal enterprise in these states employs two persons, this translates to an increase of 0.2 persons; alternatively, on average and *ceteris paribus*, among every ten informal enterprises employing two persons, one is predicted to hire two additional individuals in response to FDI liberalisation. This suggests that the ‘extensive margins’ of industry level employment and enterprise numbers, analysed for the formal sector in Chapter 2, may be a more meaningful consideration for the informal sector. In this section, I discuss results yielded by industry level regressions for the informal manufacturing sector, following the strategy outlined in Section 2.4.

Baseline results of this analysis are presented in Table 24, with the first three columns focusing on industry level employment in informal enterprises as a whole and in OAMEs and NDMEs and the final three columns focusing on the number of enterprises for these three groups. As regards employment, I find that over the 1990-2001 period, delicensing is associated with a statistically significant increase of 41 per cent in average informal industry size in states with inflexible labour markets, *ceteris paribus*. This increase is entirely attributable to increased industry level employment in OAMEs (Panel C, Table 24). Furthermore, over the 1990-2001 period, FDI reform is associated with a significant average increase of approximately 55 per cent in industry level OAME employment in states with

flexible labour markets (Panel B, Table 24), *ceteris paribus*. In line with the enterprise level results discussed in Section 3.4.1, no significance attaches to the reductions in final goods and input tariffs.

When I consider the implications of the reforms for informal enterprise numbers (Columns 4 to 6, Table 24), I find that input tariff declines are associated with significant increases in the number of OAMEs in a pan-Indian context (Panel A, Table 24). Further analysis suggests that these increases are restricted to states with inflexible labour markets, with significance weakening to the 10 per cent level (Panel C, Table 24). Again, for the period in question (1990-2001), delicensing is associated with a significant increase of approximately 32 per cent in OAME numbers in states with inflexible labour markets, and FDI liberalisation precedes a significant increment of 51.5 per cent in OAME numbers in states with flexible labour markets.

Table 24: Economic reforms and informal sector employment: Industry level effects (1990-2001)

	ln (emp)	ln (emp)	ln (emp)	ln (ent)	ln (ent)	ln (ent)
		OAMEs	NDMEs		OAMEs	NDMEs
A: All states						
	(1)	(2)	(3)			
Final goods tariffs	0.079 (0.239)	0.255 (0.329)	-0.176 (0.319)	0.202 (0.255)	0.333 (0.292)	-0.197 (0.326)
Input tariffs	-2.294 (1.412)	-2.760 (1.685)	0.546 (1.276)	-3.083** (1.475)	-3.423** (1.615)	0.845 (1.401)
Delicensing	0.274** (0.121)	0.290** (0.139)	-0.018 (0.149)	0.184 (0.130)	0.188 (0.139)	-0.042 (0.168)
FDI reform	0.186 (0.122)	0.226* (0.125)	-0.088 (0.188)	0.178 (0.137)	0.199 (0.138)	-0.108 (0.218)
Observations	378	355	361	378	355	361
R-squared	0.120	0.133	0.069	0.112	0.117	0.073
B: States with flexible labour markets (FLEX 2 = 1)						
Final goods tariffs	0.329 (0.393)	0.792 (0.505)	-0.015 (0.452)	0.428 (0.416)	0.782 (0.480)	-0.145 (0.359)
Input tariffs	-2.183 (1.850)	-2.503 (2.442)	-1.828 (1.944)	-1.605 (1.893)	-1.768 (2.275)	-0.737 (1.802)
Delicensing	-0.030 (0.143)	-0.051 (0.175)	-0.072 (0.167)	-0.064 (0.147)	-0.073 (0.155)	-0.059 (0.175)
FDI reform	0.413*** (0.137)	0.553*** (0.157)	0.086 (0.188)	0.423** (0.169)	0.515*** (0.184)	0.031 (0.197)
Observations	327	302	315	327	302	315
R-squared	0.130	0.182	0.051	0.132	0.173	0.045
C: States with inflexible labour markets (FLEX 2 = 0)						
Final goods tariffs	0.102 (0.359)	0.252 (0.487)	-0.358 (0.340)	0.237 (0.351)	0.332 (0.416)	-0.292 (0.408)
Input tariffs	-2.460	-3.082	2.635*	-3.946*	-4.372*	2.418

	(2.029)	(2.469)	(1.588)	(2.038)	(2.295)	(1.881)
Delicensing	0.414***	0.440**	-0.028	0.312**	0.319**	-0.082
	(0.155)	(0.177)	(0.169)	(0.147)	(0.159)	(0.197)
FDI reform	0.150	0.179	-0.186	0.142	0.150	-0.170
	(0.125)	(0.141)	(0.205)	(0.129)	(0.139)	(0.241)
Observations	357	327	333	357	327	333
R-squared	0.137	0.159	0.043	0.147	0.156	0.039

Dependent variable: $\ln(\text{emp})$ = natural logarithm of employment or $\ln(\text{ent})$ = natural logarithm of number of enterprises
 All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1%

**: Significant at 5% *: Significant at 10%

These shifts in the number of OAMEs and industry level employment in OAMEs associated with the delicensing and FDI reforms are both statistically significant and economically meaningful. In essence, controlling for industry and time fixed effects, delicensing and FDI liberalisation go hand-in-hand with a sizeable expansion of informal manufacturing industries in the 1990s. Interestingly, no significance attaches to any reform variable in the context of NDMEs in Table 24, both in terms of industry level employment in these larger informal enterprises and in terms of their numbers. As both the delicensing and FDI reform instruments were targeted at relatively large formal firms (following the discussion in Section 1.2), it is probable that any informal sector impacts linked to these reforms arise on account of product market competition or collaborative linkages between formal firms and informal enterprises (Section 3.1). The data are better suited to an analysis of whether the observed effects are attributable to differences in the extent to which product markets are competitive. This motivates the following subsection.

3.4.3 Analysis of mechanisms

As discussed in Section 2.5.3, the reforms of the 1990s are likely to have engendered increases in product market competition in Indian manufacturing. While these shifts are of greater relevance for formal firms given the more direct effects of the reforms on the formal sector, there may have been spillovers into the informal sector. A number of hypotheses may be proposed to describe the potential implications of competition between informal

enterprises and formal firms. For instance, following the evidence presented in Section 2.5.4, employment in formal firms in industries characterised by lower levels of pre-reform competition was less responsive to the reforms. It might follow that these industries may have been less affected by the reforms in a direct sense and may therefore have witnessed fewer spillovers into the informal sector.

An alternative view might posit that less competitive formal sector industries may have registered more, rather than fewer, shifts in employment in informal enterprises, with the informal sector functioning as a 'shock absorber' in the post-reform period. This hypothesis could be in consonance with the reforms engendering Melitz (2003) type structural shifts within less competitive industries, with the least productive formal firms forced to exit their markets. Moreover, any spillovers into the informal sector may have different implications for OAMEs and NDMEs, with the latter being larger informal units and therefore arguably more likely to compete with smaller formal firms as opposed to the purely household based OAMEs.

One difficulty that arises in this context is a lack of data on competition between informal enterprises and formal firms. In 2001, the NSSO introduced a survey question regarding competition from larger firms being a problem that had been encountered by informal units, but no similar indicator is present in the survey data for 1990 and 1995. In light of this constraint, I hypothesise that competition between informal and formal market players is more likely to exist in industries characterised by a smaller gulf between informal and formal firm size. To test this hypothesis, I compute the ratio of average formal firm employment to average informal enterprise employment (the 'F-I ratio') in the pre-reform period (1990) for each three digit industry. This ratio varies considerably across industries, with a median of 19.5 and a mean of 39.3. Intuitively, industries with a lower 'F-I' ratio are perhaps more

likely to witness competition between formal and informal operators, whereas industries with a higher 'F-I' ratio might be expected to be less likely to be competitive in this sense and perhaps more likely to feature 'collaboration' between the formal and informal sectors (in terms of supply chain linkages or agglomeration externalities).

Table 25 presents results separately for informal enterprises operating in three digit industries characterised by relatively low and high pre-reform (1990) levels of this 'F-I' ratio, with Columns 2, 3 and 4 representing industries with a ratio below the first quartile, below the median and exceeding the median respectively. The results are striking: my baseline estimates are strengthened, in magnitude and significance, for industries with lower 'F-I' ratios, most visibly for industries where this ratio is below the first quartile (Column 2, Table 25). Conversely, for industries characterised by higher 'F-I' ratios, the baseline results lose significance (Column 4, Table 25). This might be viewed as evidence in favour of the reforms generating spillovers in the informal sector on account of competition between formal and informal operators.

Table 25: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Analysis based on the ratio of average formal firm employment to average informal enterprise employment ('F-I ratio') in 1990

	Baseline (All enterprises)	Industry F-I ratio below first quartile in 1990 ('most competitive')	Industry F-I ratio below median in 1990 ('more competitive')	Industry F-I ratio above median in 1990 ('less competitive')
Final goods tariffs	-0.132 (0.113)	0.014 (0.151)	-0.013 (0.076)	-0.335 (0.207)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.055 (0.192)	0.005 (0.106)	0.387** (0.167)
Input tariffs	0.576* (0.327)	0.958* (0.559)	0.524 (0.324)	0.798 (0.556)
Input tariffs * FLEX 2	-0.178 (0.168)	-0.189 (0.292)	-0.050 (0.204)	-0.359 (0.299)
Delicensing	0.108*** (0.030)	0.140*** (0.043)	0.102*** (0.030)	0.026 (0.065)
Delicensing * FLEX 2	-0.088** (0.037)	-0.114* (0.064)	-0.091** (0.046)	-0.016 (0.055)
FDI reform	0.024 (0.028)	0.005 (0.043)	0.014 (0.027)	0.044 (0.085)
FDI reform * FLEX 2	0.076* (0.041)	0.174*** (0.049)	0.099** (0.040)	0.042 (0.079)
Flexible labour markets: Effects of changes in final goods tariffs				
Row 1 + Row 2	0.019	0.069	-0.008	0.053
Std Error	0.078	0.160	0.081	0.126

p-value (combined effect = 0)	0.809	0.669	0.925	0.677
Flexible labour markets: Effects of changes in input tariffs				
Row 3 + Row 4	0.398	0.769	0.474	0.439
Std Error	0.300	0.573	0.319	0.574
p-value (combined effect = 0)	0.185	0.180	0.137	0.445
Flexible labour markets: Effects of delicensing				
Row 5 + Row 6	0.019	0.026	0.010	0.010
Std Error	0.038	0.073	0.047	0.066
p-value (combined effect = 0)	0.613	0.721	0.827	0.885
Flexible labour markets: Effects of FDI reform				
Row 7 + Row 8	0.099**	0.179***	0.113***	0.086
Std Error	0.043	0.058	0.043	0.077
p-value (combined effect = 0)	0.021	0.002	0.009	0.265
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	195789	63997	133303	62486
R-squared	0.164	0.091	0.115	0.199

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In Table 26, I present industry level findings corresponding to the industry groups analysed in Table 25. This yields a slightly more nuanced result: while the baseline results are in general more robust for more competitive industries (as characterised by lower 'F-I' ratios in 1990), the positive baseline association between FDI reform and informal enterprise numbers in states with flexible labour markets is restricted to industries with higher pre-reform 'F-I' ratios.

Table 26: Economic reforms and informal sector employment: Industry level effects for enterprise numbers (1990-2001) based on the ratio of average formal firm employment to average informal enterprise employment ('F-I ratio') in 1990

A: All states	Dependent variable: ln (number of informal enterprises in three digit industry)		
	All industries	Industries with F-I ratio below median in 1990 ('more competitive')	Industries with F-I ratio above median in 1990 ('less competitive')
Final goods tariffs	0.202 (0.255)	0.292 (0.519)	0.554 (0.349)
Input tariffs	-3.083** (1.475)	-4.730* (2.407)	0.567 (2.466)
Delicensing	0.184 (0.130)	0.253* (0.134)	0.151 (0.319)
FDI reform	0.178 (0.137)	0.128 (0.106)	0.326 (0.286)
Observations	378	195	183
R-squared	0.112	0.326	0.029
B: States with flexible labour markets (FLEX 2 = 1)			
Final goods tariffs	0.428 (0.416)	0.346 (0.516)	1.302* (0.665)
Input tariffs	-1.605 (1.893)	-2.950 (2.461)	-2.697 (3.691)
Delicensing	-0.064 (0.147)	0.053 (0.150)	-0.399 (0.440)
FDI reform	0.423**	0.097	0.849**

	(0.169)	(0.190)	(0.322)
Observations	327	168	159
R-squared	0.132	0.258	0.159
C: States with inflexible labour markets (FLEX 2 = 0)			
Final goods tariffs	0.237 (0.351)	0.880 (0.588)	0.160 (0.470)
Input tariffs	-3.946* (2.038)	-7.118*** (2.627)	2.196 (3.917)
Delicensing	0.312** (0.147)	0.279* (0.146)	0.509 (0.357)
FDI reform	0.142 (0.129)	0.201* (0.115)	-0.188 (0.443)
Observations	357	198	159
R-squared	0.147	0.323	0.057

Dependent variable: natural logarithm of number of informal enterprises at the three digit industry level. All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

The four firm concentration ratio (CR4) in each three digit industry in the formal sector, as outlined in Section 2.5.4, is an alternative prism through which to view the implications of shifts in product market competition. Providing as it does a measure of competition within the formal sector, the CR4 also serves as a barometer of industry consolidation. As the CR4 declined in most (90 per cent) of formal industries in the 1990-1995 period, it is possible that industries that had higher CR4 figures (and were therefore less competitive) prior to the reforms may have been more vulnerable to the increases in product market competition in the 1990s. As such, the informal sector may have expanded in these industries, following the exit of less productive formal firms from the market.

This hypothesis is examined in Table 27 and Table 28, which present enterprise and industry level results for informal manufacturing in industries with higher and lower formal sector CR4 in 1990. At the enterprise level (Table 27), the delicensing effect holds for both groups of industries, while the FDI effect is robust only in industries featuring a higher degree of formal sector competition in 1990 (as captured by lower CR4 estimates). Conversely, at the industry level, all the baseline results concerning informal sector expansion in response to the delicensing and FDI reforms hold only for industries with higher CR4 figures in 1990 (Table 28). This supports the view that economically meaningful structural shifts in the post-

reform informal sector may have been driven by an evolving competitive landscape in the formal sector.

Table 27: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Analysis based on formal sector four firm concentration ratio (CR4) in 1990 (the proportion of formal industry level output accounted for by the four largest formal firms in 1990)

	Baseline (All enterprises)	Enterprises in industries with formal CR4 above median in 1990 (less competitive formal sector)	Enterprises in industries with formal CR4 below median in 1990 (more competitive formal sector)
Final goods tariffs	-0.132 (0.113)	-0.200 (0.200)	-0.109 (0.073)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.165 (0.184)	0.167* (0.087)
Input tariffs	0.576* (0.327)	0.460 (0.498)	0.184 (0.409)
Input tariffs * FLEX 2	-0.178 (0.168)	-0.246 (0.298)	-0.121 (0.184)
Delicensing	0.108*** (0.030)	0.079** (0.036)	0.092** (0.043)
Delicensing * FLEX 2	-0.088** (0.037)	-0.108** (0.055)	-0.018 (0.037)
FDI reform	0.024 (0.028)	0.082 (0.140)	0.070** (0.032)
FDI reform * FLEX 2	0.076* (0.041)	-0.123 (0.144)	0.099** (0.042)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.019	-0.036	0.058
Std Error	0.078	0.148	0.070
p-value (combined effect = 0)	0.809	0.810	0.408
Flexible labour markets: Effects of changes in input tariffs			
Row 3 + Row 4	0.398	0.215	0.063
Std Error	0.300	0.439	0.428
p-value (combined effect = 0)	0.185	0.625	0.883
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	0.019	-0.029	0.074*
Std Error	0.038	0.056	0.040
p-value (combined effect = 0)	0.613	0.609	0.064
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.099**	-0.041	0.170***
Std Error	0.043	0.231	0.048
p-value (combined effect = 0)	0.021	0.859	0.000
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	195789	88512	107277
R-squared	0.164	0.122	0.206

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table 28: Economic reforms and informal sector employment: Industry level effects for enterprise numbers (1990-2001) based on formal sector four firm concentration ratio (CR4) in 1990 (the proportion of formal industry level output accounted for by the four largest formal firms in 1990)

A: All states	Dependent variable: ln (number of informal enterprises in three digit industry)		
	All industries	Industries with formal CR4 above median in 1990 (less competitive formal sector)	Industries with formal CR4 below median in 1990 (more competitive formal sector)
Final goods tariffs	0.202 (0.255)	0.244 (0.198)	0.128 (0.429)
Input tariffs	-3.083** (1.475)	-3.367*** (0.809)	0.711 (1.829)
Delicensing	0.184 (0.130)	0.405*** (0.099)	-0.201 (0.250)
FDI reform	0.178 (0.137)	0.687* (0.356)	-0.077 (0.227)
Observations	378	153	225
R-squared	0.112	0.491	0.086
B: States with flexible labour markets (FLEX 2 = 1)			
Final goods tariffs	0.428 (0.416)	1.221** (0.480)	-0.207 (0.503)
Input tariffs	-1.605 (1.893)	-5.504** (2.441)	2.090 (1.420)
Delicensing	-0.064 (0.147)	0.215* (0.121)	-0.533** (0.252)
FDI reform	0.423** (0.169)	0.284*** (0.080)	0.303 (0.293)
Observations	327	132	195
R-squared	0.132	0.463	0.119
C: States with inflexible labour markets (FLEX 2 = 0)			
Final goods tariffs	0.237 (0.351)	-0.019 (0.169)	0.521 (0.578)
Input tariffs	-3.946* (2.038)	-2.908*** (0.390)	-0.056 (2.896)
Delicensing	0.312** (0.147)	0.451*** (0.140)	0.090 (0.200)
FDI reform	0.142 (0.129)	0.433 (0.686)	-0.103 (0.191)
Observations	357	138	219
R-squared	0.147	0.482	0.121

Dependent variable: natural logarithm of number of informal enterprises at the three digit industry level. All regressions include a constant and industry and year fixed effects, and are weighted by pre-reform (1990) levels of the dependent variable. Standard errors, in brackets, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In summary, the evidence is broadly indicative of competition between formal and informal manufacturers, as also within the formal sector, being a mechanism underlying the implications of liberalisation, in particular the delicensing reform, for the informal sector. While the possibility of the results also deriving in part from collaborative linkages between informal and formal units cannot be ruled out, a rigorous examination of the same is beyond the scope of the current study and data.

3.5 Further analysis and robustness checks

3.5.1 Endogeneity of tariff liberalisation policy

As explained in Section 1.2, the tariff declines that were phased in during the initial years of reform (1991-1997) were arguably an exogenous event, although tariff policy endogeneity might be an issue in the post-1997 period, when the pressure to adhere to externally imposed guidelines had waned. Although my dataset focuses on employment shifts in the 1990-2001 period and is therefore arguably largely immune to this concern, I explore whether tariff endogeneity poses problems for my results in a number of ways, along the lines of the formal sector analysis in Section 2.6.2.

In Table 29, I regress final goods and input tariffs on lagged industry level employment (in logarithmic and absolute terms) and lagged industry employment shares for the informal sector in alternative specifications, including year and industry fixed effects throughout. The time lags used vary over one to three years. In all instances, there is no evidence of any association between informal industry employment levels and tariff rates in later years.

Table 29: Tariff endogeneity check – regression of tariffs on lagged informal industry employment

Period (dependent variable)	t+1	t+2	t+3
Dependent variable: Final goods tariffs			
ln (Informal employment)	-0.016464 (0.032074)	-0.005122 (0.006116)	0.011626 (0.013230)
Absolute informal employment	-0.000000 (0.000000)	-0.000000* (0.000000)	0.000000 (0.000000)
Share of informal employment	-1.356834* (0.619153)	-0.149030* (0.072600)	0.265656 (0.200149)
Dependent variable: Input tariffs			
ln (Informal employment)	-0.012172 (0.009350)	0.006663 (0.009607)	0.004303 (0.008805)
Absolute informal employment	-0.000000*** (0.000000)	0.000000 (0.000000)	0.000000 (0.000000)
Share of informal employment	-0.429763*** (0.079884)	0.350535* (0.148239)	0.249852 (0.133476)

The independent variables are measured in period t. All specifications include year and industry fixed effects. Standard errors, in parentheses, are robust to heteroscedasticity. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Next, I run separate regressions of the changes in final goods and input tariffs on the lagged changes in informal industry level employment, including period and industry fixed effects throughout. As evidenced in Table 30, there is no significant association between changes in informal employment and tariff changes in subsequent periods. Following Topalova and Khandelwal's (2011) formal sector analysis, I also confirm that the period-to-period final goods and input tariff changes are not correlated with pre-existing informal industry employment levels (Table 30).

Table 30: Tariff endogeneity check – regression of changes in tariffs on lagged changes in informal employment (industry level)

Period (dependent variable)	t+1	t+2	t+3
Dependent variable: Change in final goods tariffs			
Change in ln (informal employment)	-0.045614 (0.030015)	-0.017347 (0.010375)	0.002004 (0.008687)
ln (informal employment)	-0.057060 (0.048998)	-0.018306 (0.017325)	0.003901 (0.014173)
Change in absolute informal employment	-0.000000 (0.000000)	-0.000000 (0.000000)	0.000000 (0.000000)
Absolute informal employment	-0.000000 (0.000000)	-0.000000 (0.000000)	0.000000 (0.000000)
Dependent variable: Change in input tariffs			
Change in ln (informal employment)	-0.021023* (0.008914)	0.007370 (0.010543)	0.006683 (0.007722)
ln (informal employment)	-0.034354* (0.013446)	0.007437 (0.019235)	0.008454 (0.014563)
Change in absolute informal employment	-0.000000*** (0.000000)	0.000000 (0.000000)	0.000000 (0.000000)
Absolute informal employment	-0.000000*** (0.000000)	0.000000 (0.000000)	0.000000 (0.000000)

The independent variables are measured in period t. All specifications include period and industry fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Furthermore, I drop two industries that were highly protected in the pre-reform period, yet were subjected to visibly low tariff declines relative to other industries with comparably high tariff rates in the 1991-1997 period⁶. In Section 2.3.2, Figure 1(a) suggests that some endogeneity may have seeped into tariff policy as regards these two industries even in the face of the IMF backed reforms of 1991, given that the high degree of tariff protection

⁶ These industries are the wine manufacturing industry and the distillation, rectification and blending of spirits industry. See Figure 1(a).

enjoyed by these industries in the pre-reform period was relaxed to a lesser extent in the reform years relative to other industries with comparably high pre-reform tariffs. Column 2 of Table 31 reveals that the omission of these outliers leaves the baseline results (re-presented in Column 1 of Table 31 for convenience) virtually unchanged in terms of both magnitude and significance.

3.5.2 Additional checks

To assess whether my results are influenced by state level characteristics other than the flexibility of labour market regulation, I run a regression in which I add state-year interaction fixed effects to my baseline specification. The results, presented in Column 3 of Table 31, indicate that the baseline results are similar in magnitude and significance following the addition of these interactions. This suggests that the baseline statistical significance of the interplay between the reforms and labour market flexibility is retained after accounting for other state level trends. Interestingly, controlling for state-year trends, input tariff declines are associated with a significant decrease in informal enterprise level employment, on average and *ceteris paribus*, in states with inflexible labour markets. As informal enterprises rarely use imported inputs, I interpret this as being a spillover effect driven by the possible general equilibrium price shifts engineered by reduced imported input prices (following the discussion in Section 3.2). The concurrent currency devaluation means that such shifts are all but impossible to trace in contemporaneous price index data.

Table 31: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Tariff endogeneity check – Dropping outlier industries (Wine manufacturing and the distillation, rectification and blending of spirits) and adding state-year interaction fixed effects

	Baseline (All enterprises)	Dropping outlier industries	Adding state-year interactions
Final goods tariffs	-0.132 (0.113)	-0.133 (0.114)	-0.131 (0.106)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.155 (0.100)	0.152* (0.092)
Input tariffs	0.576* (0.327)	0.577* (0.328)	0.745** (0.310)

Input tariffs * FLEX 2	-0.178 (0.168)	-0.184 (0.171)	-0.908*** (0.298)
Delicensing	0.108*** (0.030)	0.108*** (0.030)	0.092*** (0.028)
Delicensing * FLEX 2	-0.088** (0.037)	-0.088** (0.037)	-0.061* (0.037)
FDI reform	0.024 (0.028)	0.023 (0.028)	0.022 (0.027)
FDI reform * FLEX 2	0.076* (0.041)	0.076* (0.041)	0.081** (0.038)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.019	0.022	0.021
Std Error	0.078	0.079	0.073
p-value (combined effect = 0)	0.809	0.785	0.770
Flexible labour markets: Effects of changes in input tariffs			
Row 3 + Row 4	0.398	0.393	-0.163
Std Error	0.300	0.301	0.328
p-value (combined effect = 0)	0.185	0.192	0.620
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	0.019	0.019	0.031
Std Error	0.038	0.038	0.036
p-value (combined effect = 0)	0.613	0.616	0.385
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.099**	0.099**	0.103**
Std Error	0.043	0.043	0.040
p-value (combined effect = 0)	0.021	0.021	0.010
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
State-Year FE	No	No	Yes
Observations	195789	195724	195789
R-squared	0.164	0.164	0.169

Dependent variable: natural logarithm of total number of persons engaged 'FE': fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Along the lines of Table 15, Column 2 of Table 32 attempts to control for the age, in terms of years of operation, of the informal enterprises in my dataset. The limitation of this attempt is that over 40 per cent of the enterprises in the dataset do not provide estimates of the duration for which they have operated. Nonetheless, for enterprises providing these estimates, the baseline figures are strengthened in magnitude and significance after controlling for enterprise age. Furthermore, the results also hold if the baseline measure of state level labour market flexibility ('FLEX 2') is replaced by either the 'FLEX 1' measure or the 'FLEX 3' measure, both outlined in Section 2.3.3 (Column 3 and Column 4, Table 32).

Table 32: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Robustness checks – Accounting for enterprise age and alternative measures of labour market flexibility

	Baseline (All enterprises)	Controlling for enterprise age (where reported)	FLEX 1 instead of FLEX 2	FLEX 3 instead of FLEX 2
Final goods tariffs	-0.132 (0.113)	-0.259*** (0.099)	-0.091 (0.117)	-0.058 (0.077)
Final goods tariffs * FLEX	0.151 (0.097)	0.186* (0.101)	0.030 (0.110)	-0.088 (0.133)
Input tariffs	0.576* (0.327)	0.985*** (0.333)	0.537 (0.328)	0.548* (0.299)
Input tariffs * FLEX	-0.178 (0.168)	-0.518** (0.251)	0.022 (0.187)	0.042 (0.206)
Delicensing	0.108*** (0.030)	0.126*** (0.041)	0.084*** (0.030)	0.088*** (0.030)
Delicensing * FLEX	-0.088** (0.037)	-0.107** (0.043)	-0.027 (0.043)	-0.029 (0.042)
FDI reform	0.024 (0.028)	0.022 (0.040)	0.026 (0.028)	0.052* (0.028)
FDI reform * FLEX	0.076* (0.041)	0.095** (0.045)	0.077* (0.041)	-0.036 (0.038)
Enterprise age		0.003*** (0.001)		
Flexible labour markets: Effects of changes in final goods tariffs				
Row 1 + Row 2	0.019	-0.074	-0.061	-0.146
Std Error	0.078	0.087	0.097	0.158
p-value (combined effect = 0)	0.809	0.397	0.529	0.357
Flexible labour markets: Effects of changes in input tariffs				
Row 3 + Row 4	0.398	0.467	0.559*	0.590
Std Error	0.300	0.349	0.316	0.364
p-value (combined effect = 0)	0.185	0.181	0.077	0.106
Flexible labour markets: Effects of delicensing				
Row 5 + Row 6	0.019	0.019	0.057	0.058
Std Error	0.038	0.046	0.043	0.041
p-value (combined effect = 0)	0.613	0.682	0.181	0.151
Flexible labour markets: Effects of FDI reform				
Row 7 + Row 8	0.099**	0.117**	0.103**	0.016
Std Error	0.043	0.047	0.041	0.039
p-value (combined effect = 0)	0.021	0.012	0.013	0.690
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	195789	115543	195789	195789
R-squared	0.164	0.160	0.163	0.163

Dependent variable: natural logarithm of total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. The measure of labour market flexibility used in Columns 1 and 2 is the 'FLEX 2' measure, while Columns 3 and 4 use alternative measures, as specified in the column headings. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

In the baseline results discussed in Section 3.5.1, as well as in the findings presented in this section, the reform measures have been lagged by two years. In Table 33, I examine the extent to which the baseline figures in Column 6 of Table 20 are affected if a one year or three year lag is used instead of a two-year lag. Table 33 suggests that these modifications yield figures that are similar in magnitude and significance to the baseline numbers. The

exception is the employment enhancing effect associated with FDI reform in states with flexible labour markets, which loses significance when a one year lag is used, although it is significant when a three year lag is used. This suggests that the effect of FDI reform is likely to be a relatively slower, longer lasting impact. Conversely, the weak baseline significance attaching to input tariff declines is strengthened if the time lag is reduced to one year, but disappears for a three year lag, which is suggestive of a less lasting effect.

Table 33: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Robustness checks – Modifying the baseline reform time lag and excluding individual post-reform cross-sections

	Baseline (All enterprises)	Time lag: 1 year	Time lag: 3 years
Final goods tariffs	-0.132 (0.113)	-0.114 (0.101)	-0.179 (0.110)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.082 (0.098)	0.151 (0.093)
Input tariffs	0.576* (0.327)	0.850*** (0.276)	0.543 (0.337)
Input tariffs * FLEX 2	-0.178 (0.168)	-0.087 (0.220)	-0.173 (0.154)
Delicensing	0.108*** (0.030)	0.091*** (0.028)	0.109*** (0.029)
Delicensing * FLEX 2	-0.088** (0.037)	-0.078** (0.038)	-0.092** (0.037)
FDI reform	0.024 (0.028)	0.035 (0.027)	0.019 (0.028)
FDI reform * FLEX 2	0.076* (0.041)	0.007 (0.040)	0.075* (0.040)
Flexible labour markets: Effects of changes in final goods tariffs			
Row 1 + Row 2	0.019	-0.032	-0.028
Std Error	0.078	0.083	0.075
p-value (combined effect = 0)	0.809	0.704	0.710
Flexible labour markets: Effects of changes in input tariffs			
Row 3 + Row 4	0.398	0.763***	0.370
Std Error	0.300	0.292	0.318
p-value (combined effect = 0)	0.185	0.009	0.244
Flexible labour markets: Effects of delicensing			
Row 5 + Row 6	0.019	0.014	0.017
Std Error	0.038	0.037	0.037
p-value (combined effect = 0)	0.613	0.715	0.657
Flexible labour markets: Effects of FDI reform			
Row 7 + Row 8	0.099**	0.042	0.094**
Std Error	0.043	0.042	0.042
p-value (combined effect = 0)	0.021	0.317	0.027
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	195789	195789	195789
R-squared	0.164	0.165	0.164

Dependent variable: natural logarithm of total number of persons engaged 'FE': fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

The results of the supplementary checks outlined in Section 3.3.1 are presented in the Appendix. Column 2 of Table A6 shows that retaining DMEs, the large informal enterprises that are excluded from the main analysis as they do not appear in the 1990 data (Section 3.3.1), has little impact on the baseline results. Column 3 of Table A6 indicates that changing the 'FLEX 2' indicator value for Delhi and Jammu & Kashmir from 0 to 1 (along the lines of Section 2.6.3) does not affect the key findings. Further, Column 4 of Table A6 highlights that the baseline findings are virtually unchanged if the small proportion of informal enterprises employing ten or more individuals, omitted in the main analysis, are retained. Column 5 of Table A6 confirms that the inclusion of informal enterprises reporting zero or missing values for raw material usage and/or physical product manufacturing has no material impact on the baseline, while Column 6 of Table A6 suggests that this also applies to the use of input tariffs deriving only from final goods tariffs for manufacturing industries. In addition, following Aghion *et al* (2008), I explore whether dropping individual states from my regressions has an impact on my results and conclude that the baseline numbers are robust to this check (Tables A7, A8 and A9).

3.6 Concluding comments

This chapter exploits the initiation of a quasi-exogenous round of tariff liberalisation and concurrent domestic policy reform to examine employment changes in small, unregistered (informal) Indian manufacturing enterprises in the 1990s. It also analyses the extent to which differences in state level labour market flexibility influence these changes. To the best of my knowledge, this is the first study that focuses on informal manufacturers in this context, which is vital given that these firms account for a lion's share of employment in Indian manufacturing.

The results point to India's delicensing and FDI reforms being associated with significant shifts in informal sector employment. On average and *ceteris paribus*, delicensing (FDI reform) is associated with a statistically significant increase (increase) in employment in informal enterprises in states with inflexible (flexible) labour markets. More importantly, at a broader industry level, delicensing (FDI) reform is also a predictor of significant and, from an economic perspective, more meaningful increases in informal enterprise numbers in states with inflexible (flexible) labour markets. Further, the swingeing import tariff reductions undertaken in India as part of the reform initiative of the 1990s rarely drive significant changes in informal sector employment, which is perhaps attributable to the fact that informal enterprises rarely engage in international trade.

Further analysis on the mechanisms driving these effects is suggestive of the implications of delicensing being considerably more prominent in industries with a higher propensity towards competing formal and informal operators, as also greater degrees of intra-formal sector competition. For FDI liberalisation, enterprise level findings also hold particularly for these two sets of 'more competitive' industries, but industry level shifts appear to be restricted to industries characterised by less competition in both instances. In light of the findings of the formal sector analysis (summarised in Section 2.7), these insights are indicative of competition more clearly being a mechanism underpinning the impact of delicensing as a driver of formal and informal sector employment shifts, visible in states with inflexible labour markets. As regards FDI reform, there is more room to speculate that, while the degree of competition within the formal sector matters, supply chain linkages or agglomeration based 'collaboration' between formal and informal players might also have a bearing on employment effects, primarily in states with flexible labour markets. This may be a fertile avenue for future research, particularly in instances where more refined data on FDI are available.

As policy makers in developing economies tend to emphasise increases in formal employment as a key goal of economic liberalisation, the findings of this chapter are of general interest. They contribute to the growing literature examining the role of interactions between the Indian reform programme and variations in domestic state level institutional characteristics in driving post-reform economic outcomes. The results highlight that an analysis of the implications of market reform for firm level employment is incomplete unless variations in regional labour market flexibility are accounted for. In a developing country setting characterised by a substantial informal sector, my findings strongly suggest that informal enterprises merit at least as much analysis as the formal sector. Data permitting, further research is eminently desirable, in particular on the linkages between the formal and informal sectors and the mechanisms underlying the impacts analysed in this study.

Chapter 4: Opening the Floodgates: India's Small Scale Dereservation Reform and Employment in Informal Manufacturing Enterprises

4.1 Introduction

Should small enterprises benefit from public sector protection and promotion, relative to larger competitors? This question has provoked much debate among development economists. The informal sector, typically characterised by small enterprises and accounting for a lion's share of economic activity in much of Asia and Africa (see for instance La Porta and Schleifer, 2008; Osei-Boateng and Ampratwum, 2011; and Heintz, 2012), merits special attention in this context. By definition, informal employment and output are outside the purview of government regulation. However, as discussed in Chapter 3, regulation targeting the formal sector often has important implications for the informal sector, as the twin forces of competition and collaboration often shape outcomes for businesses operating in both sectors. Policies targeted at promoting the growth of smaller enterprises in the formal sector could therefore affect outcomes for informal enterprises. This is of particular relevance for India, where informal enterprises have long accounted for 99 per cent of firms and 80 per cent of employment in the manufacturing sector.

India offers unique territory for an examination of the effectiveness of policy aimed at shielding small businesses from the pressures of product market competition. As described in Section 1.3, since the 1960s, the Indian government progressively reserved a number of manufactured products for production in small scale industries ('SSI reservation'). Martin *et al* (2017) note that by 1996, over 1000 products, amounting to approximately 20 per cent of the universe of manufactured goods, had been reserved for small enterprises. However, following the comprehensive economic reform programme unleashed in India following an

economic crisis in 1990 (Section 1.2), policymakers began to question the benefits of SSI reservation and whether, in a longer run likely to feature rapid modernisation and technological progress, the policy would be enforceable.

Eventually, in the late 1990s, the government decided to ‘dereserve’ the hitherto SSI reserved products. This dereservation was undertaken in phases over a fourteen year period (1997-2010), and there is no evidence that products were systematically dereserved on the basis of pre-existing industry characteristics or trends. The dereservation reform therefore serves as a natural experiment for an analysis of the implications of eliminating barriers to entry in product markets that had, for fairly long periods, been the preserve of small businesses.

The current analysis focuses on the implications of this dismantling of India’s SSI reservation policy (‘SSI dereservation’), discussed in Section 1.3, for employment in informal manufacturing enterprises in the country in the 1995-2006 period. As emphasised by Martin *et al* (2017), the Indian reforms of the early and mid-1990s, which took centre stage in Chapter 2 and Chapter 3, had largely run their course by 1997. There was no major product or industry level reform other than SSI dereservation in Indian manufacturing in the post-1997 years, which largely obviates the potentially thorny question of disentangling the effect of the dereservation policy from those of major concurrent policy shifts. To my knowledge, this is the first study focusing on the informal sector in the context of this reform. The formal sector was the primary focal point of SSI dereservation, as the definition of a ‘small business’ was set at a level that divided the formal sector into small and large businesses that were and (largely) were not permitted to produce SSI reserved products. Nonetheless, in consonance with the discussion pertaining to the reforms of the early 1990s in Section 3.1, the initiation of SSI dereservation may have led to changes in informal sector

employment, on account of changes in the product market competitive landscape or through supply chain linkages and other forms of collaboration between formal and informal operators. I discuss evidence regarding these mechanisms in Section 4.5.

Overall, at the enterprise level, there is no statistically significant shift in informal enterprise employment attaching to dereservation in the 1995-2006 period, although enterprises in ‘still reserved’ product markets are consistently significantly larger than other enterprises. However, I find that larger informal manufacturers (‘establishments’) producing dereserved products employ on average a statistically significant 7 per cent more people relative to establishments manufacturing items that were never reserved, with no corresponding significance visible for OAMEs. This result appears to be driven by competition between establishments and formal firms, and is possibly linked to some extent with backward linkages (input sourcing) in establishments (but not forward linkages, in terms of output sales).

The remainder of this chapter is organised as follows. Section 4.2 outlines the context. Section 4.3 describes the data and the empirical strategy. Section 4.4 and Section 4.5 present the results and a discussion of potential mechanisms. Section 4.6 concludes.

4.2 Context

Table 34 lists the proportions of products that were never SSI reserved in each broad industry category, along with the proportions that were reserved in 1995 and that remained reserved in 2001, 2006 and 2010. While reserved products existed in every industry group in 1995, the share of reserved products varied considerably across categories, ranging from 3 per cent of basic metal and alloy industry products to 37 per cent of leather industry products. Further, dereservation was initiated across industry groups in the 1997-1999

period and gained momentum in the post-2000 period, with no obvious pattern of industry selection even at a broad industry level (Figure 2, Section 1.3), which facilitates parameter identification in this study.

Table 34: SSI dereservation – breakdown of products by broad industry category

Industry category	Number of products	Proportions:				
		<i>Never reserved</i>	Reserved (1995)	Reserved (2001)	Reserved (2006)	Reserved (2010)
Food products	371	0.86	0.14	0.08	0.07	0.02
Beverages, tobacco and related products	39	0.95	0.05	0.00	0.00	0.00
Textiles and textile products (including wearing apparel)	459	0.85	0.15	0.06	0.01	0.00
Wood and wood products, furnitures and fixtures	116	0.83	0.17	0.17	0.11	0.06
Paper and paper products and printing, publishing and allied industries	160	0.82	0.18	0.17	0.13	0.02
Leather and products of leather, fur substitutes of leather	131	0.63	0.37	0.12	0.00	0.00
Basic chemicals and chemical products (except products of petroleum and coal)	1,250	0.92	0.08	0.08	0.04	0.01
Rubber, plastic, petroleum and coal products; processing of nuclear fuels	387	0.82	0.18	0.16	0.10	0.00
Non-metallic mineral products	191	0.83	0.17	0.17	0.16	0.01
Basic metal and alloy industries	297	0.97	0.03	0.03	0.02	0.00
Metal products and parts, except machinery and equipment	265	0.80	0.20	0.20	0.12	0.04
Machinery and equipment other than transport equipment	952	0.94	0.06	0.05	0.02	0.00
Transport equipment and parts	216	0.88	0.12	0.07	0.04	0.00
Other manufacturing industries	366	0.87	0.13	0.12	0.10	0.00
TOTAL	5,200	0.88	0.12	0.09	0.06	0.01

Source: Author's calculations based on Government of India data on SSI dereservation (available at <http://www.dcmsme.gov.in/>)

Martin *et al* (2017) explore the impact of the dereservation reform on formal manufacturing enterprises. They conclude that while the reform led to reduced employment in smaller enterprises that had previously benefited from being in reserved product markets, this effect was outweighed by increased employment in larger enterprises that were able to enter the dereserved product spaces, with a positive net productivity effect. Their findings also suggest that the reservation policy had imposed growth constraints on a subset of formal firms. This is in line with the results of a simulation exercise undertaken by Garcia-Santana and Pijoan-Mas (2014), which suggests that the removal of the reservation policy would yield output and productivity increases in the manufacturing sector. Further, Tewari and Wilde (2014) find that the dereservation reform is associated with increased product scope and productivity in the formal sector, particularly for multi-product firms.

The current study, which focuses on informal enterprises, complements this body of existing research on the dereservation reform and formal firms. Its analysis is founded upon data compiled by India's Ministry of Statistics and Programme Implementation in its periodic surveys of unorganised enterprises in India, almost all of which can be categorised as 'informal' enterprises (Section 3.3.1). This chapter aims to identify whether outcomes for informal enterprises in product spaces that had been dereserved by a given point in time differ relative to those for informal enterprises in product spaces that were never reserved, as well as relative to those for informal enterprises manufacturing products that were reserved (or, in other words, were yet to be dereserved) at the same point in time.

As specified in Section 1.3, the threshold for a 'small business' in 1996 was defined in terms of fixed assets (plant and machinery) not exceeding a level of Rs. 10 million. It is worth emphasising that given this definition, practically all informal enterprises in India, defined as proprietary or partnership enterprises that employ less than ten workers (or less than

twenty workers without using electricity), qualify as ‘small’ enterprises. Summary information on plant and machinery for the enterprises in my dataset is discussed in Section 4.3.1.

This chapter explores the implications of the removal of SSI reservation for a segment of the economy that comprises entirely of ‘small’ enterprises. Any effects that I observe may operate through the channels of increased competition (with larger enterprises entering hitherto reserved product markets after dereservation) or linkages between informal enterprises and the formal sector (by way of supply side linkages or agglomeration effects, as proposed by Munro, 2011). As emphasised above, endogeneity is unlikely to pose a threat to my results, more so given that the timing of dereservation is very unlikely to have been based on trends in informal sector outcomes, as opposed to shifts in formal industries, for which data are compiled on a more regular (annual) basis. I present some summary statistics in support of this view in Section 4.3.1.

4.3 Data and Method

4.3.1 Data

I use enterprise level data primarily for the 1995-2006 period, compiled by India’s National Sample Survey Office (NSSO) in its periodic surveys of unorganised enterprises. The surveys were undertaken in the financial years 1994-1995, 2000-2001 and 2005-06 and cover all the states of India.⁷ In robustness analysis, I also use enterprise level survey data for 1989-1990 (Section 4.6). I do not use the 1989-1990 data in my baseline analysis as they do not provide district identifiers, which form an important component of my baseline identification

⁷ Unlike the analyses in Chapter 2 and Chapter 3, this study does not revolve around variations in state level labour market flexibility, so I do not exclude observations on this basis.

strategy. Further, as the SSI dereservation policy was product specific, I exclude informal enterprises that do not report product codes, or report zero production values. As discussed in Section 3.3.1, these enterprises are likely to be engaged only in trading activity, as opposed to actual manufacturing. The analysis presented in this chapter, therefore, applies only to informal enterprises that manufacture physical products.

For simplicity, I will refer to each survey using only the second year in question (for instance, I will refer to the 1994-1995 survey as the '1995' survey). The surveys cover all manufacturing enterprises that employ less than ten workers (or less than twenty workers without using electricity). Each survey employs a stratified sampling design, with the primary sampling units ('first stage units') being villages or urban blocks and the final stage units being enterprises. The 2006 survey departed somewhat from the usual procedure by introducing a 'list frame', through which all relatively large urban enterprises were surveyed, with a separate 'area frame' focusing on the usual sampling for smaller urban enterprises and for all rural enterprises. While the enterprises surveyed in each period account for a small fraction (approximately 1 to 5 per cent) of the population (with the exception of the list frame in 2006), each survey provides economic census based weights that facilitate aggregation and analysis applicable to the population of informal manufacturers.

Following the analysis in Section 3.3.1, I exclude a small number of enterprises that report having ten or more employees. This is particularly relevant in the context of this chapter, as the 'list frame' adopted in the 2006 survey oversamples larger informal enterprises in urban areas and could therefore induce artificial rightward skewness in the employment distribution for 2006, relative to the 1995 and 2001 distributions, if this adjustment is not made. On the whole, the employment distribution of informal enterprises employing less than ten persons in the 1990-2006 period is remarkably stable over time (Figure 6), with a

majority of informal enterprises engaging only one or two people, in line with the discussion in Section 3.3.1. However, towards the right tail of the distribution, a steady increase is visible in terms of the proportion of informal enterprises employing six to nine persons, as well as overall employment in this category.

Figure 6: Informal sector employment distribution (1990-2006)



Source: NSSO data (1990, 1995, 2001, 2006) As inverse sampling probability based multipliers have been used to aggregate the raw data, these distributions are representative of the population of informal enterprises.

As specified in Section 4.2, all of the informal enterprises in the dataset qualify as ‘small’ businesses from the context of SSI dereservation, given the definition of the fixed assets of a small business not exceeding Rs. 10 million in 1996. While only a third of the enterprises surveyed in the 1995-2006 period provide data on plant and machinery, these data reveal that the average informal enterprise owned plant and machinery worth approximately Rs. 58,000, with the median amounting to 6,500 and the third quartile falling at Rs. 32,000. Only five informal manufacturers (out of a total of over 140,000 in the dataset) report this figure to be in excess of Rs. 10 million and all of these (five) enterprises were surveyed in 2006, so that the effective threshold would have increased in line with inflation in any case. This suggests that informal enterprises producing hitherto reserved products were not

constrained from increasing investment in capital while the reservation policy was in place, a concern which is relevant for analyses focused on the formal sector.

At the enterprise level, while I do not have panel data, I benefit from having repeated cross-sections that represent the universe of informal and formal manufacturers. I use the weights provided in my regressions to obtain results that apply to the population of manufacturers. At the district level, I use these weights to construct a panel dataset. To explore potential linkages between the informal and formal sectors, I also use data from the Annual Survey of Industries (ASI), which records outcomes for formal firms and provides weights that are similar to the informal enterprise survey weights provided by the NSSO.

As discussed in Section 3.3.1, the NSSO distinguishes between ‘own account manufacturing enterprises’ (OAMEs), which are run purely by household labour, and ‘establishments’, which employ at least one hired worker on a ‘fairly regular basis’. Establishments are classified as being ‘non-directory’ (NDMEs) or ‘directory’ (DMEs), with the former employing less than six workers and the latter employing six or more workers. While DMEs were excluded from the baseline analysis in Chapter 3, on account of their not having been covered in the 1990 informal enterprise survey, they are not excluded from the baseline analysis in this chapter, as DMEs were surveyed in the 1995, 2001 and 2006 NSSO surveys.

Over 80 per cent of informal manufacturing enterprises are OAMEs. OAMEs account for higher proportions of the rural informal manufacturing sector relative to establishments. On average, an informal manufacturing enterprise employs two to three workers. The average OAME employs 2.1 workers, whereas the average establishment employs 4.4 workers. As illustrated in Table 35, approximately 82 per cent of informal enterprises are classified as operating in ‘never reserved’ product markets. Establishments are somewhat more likely to report producing hitherto reserved products relative to OAMEs. Average OAME

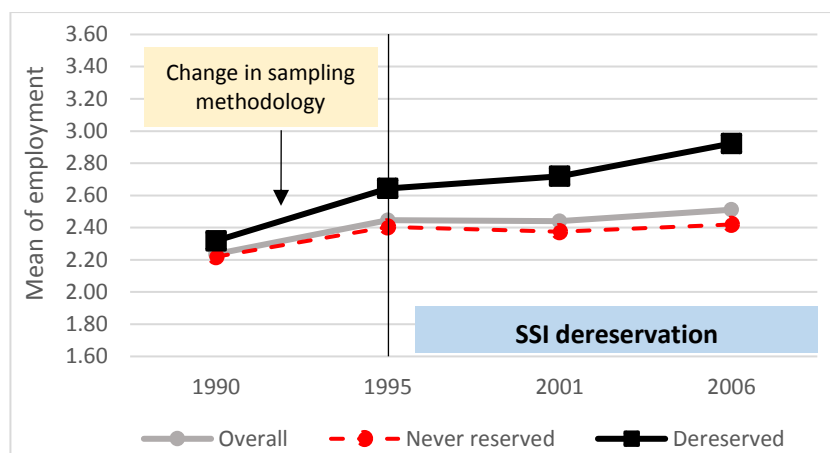
employment in the 1995-2006 period appears to have declined slightly. On the other hand, employment in the average establishment increased in the same period, in particular in dereserved and still reserved product markets. This trend is visible in Figure 7, which plots the change in average employment (1990-2006) for all informal enterprises as a whole and separately for informal enterprises producing products that were never reserved and those producing the hitherto reserved products (that were dereserved in the post-1996 period). The 1990-1995 change in average employment is roughly parallel for all three categories, which suggests that endogeneity is unlikely to be a concern for the current analysis. The slight increase visible across categories in this period is attributable to a slight change in survey sampling methods adopted by the NSSO, on account of which directory establishments, the largest informal enterprise type, were surveyed from 1995 onwards, after having been omitted from the 1990 survey.

Table 35: Summary statistics by SSI reservation status: population of informal enterprises (1995, 2001, 2006)

	Proportion of enterprises			Number of enterprises	Average employment			
	1995	2001	2006	Total	1995	2001	2006	Overall
All enterprises:								
Never reserved	0.83	0.81	0.82	12,034,059	2.40	2.38	2.42	2.40
Dereserved		0.07	0.08	690,594		2.38	2.33	2.36
Reserved	0.17	0.12	0.10	1,952,868	2.64	2.91	3.45	2.89
Overall				14,677,521	2.45	2.44	2.51	2.46
OAMEs:								
Never reserved	0.85	0.83	0.86	10,410,441	2.21	2.04	2.00	2.10
Dereserved		0.08	0.09	613,827		2.25	1.96	2.11
Reserved	0.15	0.09	0.06	1,295,288	2.15	1.94	2.04	2.07
Overall				12,319,556	2.21	2.05	2.00	2.10
Establishments:								
Never reserved	0.65	0.71	0.69	1,623,620	4.21	4.37	4.38	4.33
Dereserved		0.03	0.06	76,767		4.01	4.44	4.29
Reserved	0.35	0.25	0.25	657,580	4.20	4.70	4.65	4.29
Overall				2,357,967	4.21	4.44	4.45	4.38

Source: Author's calculations based on NSSO survey data for 1995, 2001 and 2006 (CPN and ASIC product codes used to determine SSI reservation status; as inverse sampling probability based multipliers have been used to aggregate the raw data, these distributions are representative of the population of informal enterprises)

Figure 7: Average employment in informal enterprises (1990-2006): Overall and by SSI dereservation status



Source: NSSO data (1990, 1995, 2001, 2006) As inverse sampling probability based multipliers have been used to aggregate the raw data, these distributions are representative of the population of informal enterprises.

On the whole, OAMEs appear to be less likely to expand relative to establishments. The 2006 survey reveals that over 70 per cent of manufacturing OAMEs experienced stagnation or decline over the preceding three years, while only 18 per cent expanded. On the other hand, 55-60 per cent of establishments reported perceptions of stagnation or decline over the same period, while over 23 per cent expanded. The share of establishments that report being relatively young (12 per cent report having operated for less than three years) exceeds that of OAMEs (6 per cent).

4.3.2 Methodology

4.3.2.1 Enterprise level analysis

The 1995, 2001 and 2006 surveys provide product level data on informal manufacturers. The 1995 survey uses the Common Product Nomenclature (CPN) of 1988, while the 2001 and 2006 surveys provide Annual Survey of Industries (ASI) Commodity Codes, or ASICC codes. The product codes used by the Government of India in its notifications on dereservation are distinct from both the CPN and the ASICC codes. I therefore set up a

concordance between the CPN codes and the dereservation codes. To the best of my knowledge, this is the first study to undertake this exercise, and consequently this concordance is a contribution to the literature.

In addition, I match the ASICC codes and the dereservation codes based on product and industry descriptions, comparing my matches with the concordance set up by Martin *et al* (2017) to ensure consistency. As discussed in Section 1.3, the list of reserved products accounted for approximately 20 per cent of all manufacturing products in 1996 if the dereservation product codes are used. Using the ASICC codes, which are slightly more aggregated than the dereservation codes (a total of 5,200 ASICC codes may be mapped to 6,475 dereservation codes), this figure declines to 12 per cent, as shown in Table 34 (Section 4.2). In this manner, I obtain a firm level dataset with information on reservation status for each product produced by every firm in 1995, 2001 and 2006. This facilitates an enterprise level baseline analysis, with the estimated equation being

$$\ln emp_{ijkmt} = \alpha_0 + \alpha_1 DERES_{jkt-1} + \delta_t + \delta_k + \delta_m + \varepsilon_{ijkmt} \quad (3)$$

where $\ln emp_{ijkmt}$ is the natural logarithm of the total number of persons engaged in enterprise i producing product j in three digit industry k and district m at time t ; $DERES_{jkt-1}$ is a categorical variable capturing whether enterprise i operates in a reserved, dereserved or never reserved product space (for product j in industry k at the point $t-1$); and δ_t , δ_k and δ_m are year, industry and district fixed effects. Standard errors are clustered at the district-industry level. The reference category for $DERES_{jkt-1}$ is that of enterprises manufacturing products that were never SSI reserved. The other categories are defined by whether enterprises reporting manufacturing products that were reserved or dereserved at the time of survey. Alternative specifications introduce separate categories demarcating whether the dereservation had occurred in the 1997-1999 period or in the 2001-2005 period. In total,

the $DERES_{jkt-1}$ variable comprises up to three categories from the following set: dereserved, still reserved, dereserved in the 1997-1999 period, and dereserved in the 2001-2005 period. As the employment data fit a Poisson distribution well, I also use a count dependent variable (the total number of persons engaged) in an alternative specification that uses a Poisson (count) regression.

Over two-thirds of the enterprises in my dataset produce only one product. For the remainder, which are multi-product enterprises, I assign every enterprise to the relevant (de)reservation category if it reports manufacturing at least one (de)reserved product and to the relevant ‘never reserved’ category otherwise. Further, I follow Tewari and Wilde (2014) in considering an enterprise to operate in a ‘never reserved’ space if it reports having operated for less than three years and being a manufacturer of a product that was dereserved at least three years prior to the survey period. The justification for this is that from the perspective of such an enterprise, the product in question would effectively never have been reserved.

4.3.2.2 District level analysis

As discussed in Section 4.3.1, I construct a district level panel dataset using the district codes and survey weights attached to enterprise level observations in the 1995, 2001 and 2006 surveys. To explore the implications of dereservation for informal sector employment at the district level, I employ the strategy adopted by Martin *et al* (2017). This approach involves the use of long differencing, with exposure to dereservation captured by a variable termed ‘FrDeres’:

$$FrDeres_{dt} = \frac{\sum_p (Employment_{1995_{dp}} * Deres_{pt})}{Overall\ employment_{1995_d}} \quad (4)$$

In other words, exposure to dereservation in district d at time t is measured by aggregating, over all products, employment associated with every product p manufactured in a given district in 1995, multiplied by a dummy variable equalling one if product p had been dereserved by time t ($'Deres_{pt}'$), divided by total employment in district d in 1995. For this analysis, a small number of districts not featuring at least ten observations in each cross-section (after weighting the data) are omitted. The regressions of interest employ a panel fixed effects approach:

$$\Delta \ln y_{dt} = \alpha + \beta \Delta FrDeres_{dt} + \gamma \Delta FrDeresNei_{dt} + \delta X_{d2001} + \lambda_d + \pi_t + \varepsilon_{dt} \quad (5)$$

where $\ln(y_{dt})$ is the natural logarithm of district level employment or enterprise numbers, $FrDeres_{dt}$ is district d 's dereservation exposure estimate for time t , $FrDeresNei_{dt}$ is the corresponding estimate for the districts neighbouring district d , λ_d and π_t are district and period fixed effects; and X_{d2001} denotes a set of district level control variables for 2001, obtained from the 2001 census and, as regards state level labour market flexibility, the 'FLEX 2' variable described in Section 2.3.3. Controlling for dereservation exposure in neighbouring districts helps to address the possibility of spatial spillover effects. The census based control variables include district level literacy rates, the share of Scheduled Castes and Scheduled Tribes in each district's population (a demographic control variable) and the proportions of each district's working age population (15-64) engaged in major alternative economic activities (agriculture, mining, manufacturing, transport, trade and services, with construction being the base group). This closely follows the district level analysis of Martin *et al* (2017), along the lines of which I also use district level employment in 1995 to weight these regressions. This ensures that the analysis yields estimates that account for differences in initial district size.

The identification strategy is underpinned by the argument that, notwithstanding the apparent randomness in the timing of dereservation across product lines, cross-district variation in the exposure to dereservation in the pre-reform period (1995) is likely to circumvent endogeneity concerns. In addition, as Martin *et al* (2017) suggest, the dereservation reform may be thought of as having been an exogenous shift at the district level, which provides further protection from endogeneity issues.

4.4 Results

4.4.1 Enterprise level findings

At the enterprise level, results corresponding to the simplest specification corresponding to equation (3) are reported in Table 36. For the 1995-2006 period, relative to informal manufacturers of products that were never reserved, dereservation is not associated with statistically significant changes in average employment. However, enterprises operating in product spaces that are ‘still reserved’ (in other words, product spaces that had yet to be dereserved at the time of surveying) are significantly larger than their ‘never reserved’ counterparts, with the differential amounting to almost 12 per cent after the inclusion of year, district and industry fixed effects (Table 36, Column 4). These findings are virtually unchanged in magnitude and significance when I run an alternative Poisson (count) regression (Table 36, Column 5).

Table 36: SSI dereservation and employment in informal enterprises (1995-2006): I

	OLS	OLS	OLS	OLS	Poisson
Still reserved	0.141*** (0.016)	0.104*** (0.020)	0.121*** (0.018)	0.116*** (0.018)	0.131*** (0.019)
Dereserved	0.015 (0.034)	0.043 (0.045)	0.059 (0.041)	0.065 (0.042)	0.053 (0.045)
Observations	140059	140059	140059	140059	140059
R-squared	0.132	0.143	0.229	0.230	
Year FE	Yes	Yes	No	Yes	Yes
District FE	Yes	No	Yes	Yes	Yes
Industry FE	No	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged (total number of persons engaged) for OLS

(Poisson) regression 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the district-industry level.
***: Significant at 1% **: Significant at 5% *: Significant at 10%

Further, in Table 37, I examine whether the timing of dereservation might matter for informal enterprise employment. Specifically, I introduce two dereservation categories to distinguish between products that were dereserved up to 1999 ('Dereserved 1997-1999') and products that were dereserved in the 2001-2005 period ('Dereserved 2001-2005'). The results are largely unchanged relative to Table 36, although weak significance attaches to the positive coefficient corresponding to the early period dereservation category (Table 37, Column 4, 'Dereserved 1997-1999').

Table 37: SSI dereservation and employment in informal enterprises (1995-2006): II

	OLS	OLS	OLS	OLS	Poisson
Still reserved	0.141*** (0.016)	0.102*** (0.020)	0.120*** (0.018)	0.115*** (0.018)	0.130*** (0.019)
Dereserved 1997-1999	0.051 (0.037)	0.061 (0.052)	0.084* (0.048)	0.091* (0.048)	0.073 (0.052)
Dereserved 2001-2005	-0.156*** (0.047)	-0.039 (0.055)	-0.048 (0.046)	-0.047 (0.047)	-0.031 (0.052)
Observations	140059	140059	140059	140059	140059
R-squared	0.133	0.143	0.230	0.230	
Year FE	Yes	Yes	No	Yes	Yes
District FE	Yes	No	Yes	Yes	Yes
Industry FE	No	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged (total number of persons engaged) for OLS (Poisson) regression 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the district-industry level.
***: Significant at 1% **: Significant at 5% *: Significant at 10%

I proceed to explore the extent to which these broad enterprise level findings differ for OAMEs and establishments (Table 38 and Table 39). Interestingly, this analysis highlights that dereservation is associated with a significant rise in employment in establishments, but not in OAMEs. In precise terms, for the 1995-2006 period, establishments producing recently dereserved products are approximately 7 per cent larger, in employment terms, in comparison with establishments producing products that were never reserved (Table 38, Column 3). This result appears to be driven by the early period dereservation category rather than establishments operating in product spaces dereserved in 2001-2005 (Table 39,

Column 3). Moreover, the significance of the positive coefficient attaching to the 'still reserved' indicator in Table 36 and Table 37 is robust only for establishments.

Table 38: SSI dereservation and employment in informal enterprises (1995-2006, enterprise type): I

	OLS			Poisson		
	All	OAMEs	Establishments	All	OAMEs	Establishments
Still reserved	0.116*** (0.018)	0.033 (0.023)	0.106*** (0.014)	0.131*** (0.019)	0.019 (0.028)	0.100*** (0.014)
Dereserved	0.065 (0.042)	0.052 (0.047)	0.069** (0.032)	0.053 (0.045)	0.029 (0.059)	0.061** (0.030)
Observations	140059	97849	42210	140059	97849	42210
R-squared	0.230	0.201	0.274			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged (total number of persons engaged) for OLS (Poisson) regression 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table 39: SSI dereservation and employment in informal enterprises 1995-2006, enterprise type): II

	OLS			Poisson		
	All	OAMEs	Establishments	All	OAMEs	Establishments
Still reserved	0.115*** (0.018)	0.032 (0.023)	0.106*** (0.014)	0.130*** (0.019)	0.019 (0.028)	0.100*** (0.014)
Dereserved 1997-1999	0.091* (0.048)	0.077 (0.054)	0.074** (0.037)	0.073 (0.052)	0.052 (0.066)	0.063* (0.037)
Dereserved 2001-2005	-0.047 (0.047)	-0.078* (0.043)	0.060 (0.056)	-0.031 (0.052)	-0.120** (0.047)	0.059 (0.050)
Observations	140059	97849	42210	140059	97849	42210
R-squared	0.230	0.201	0.274			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged (total number of persons engaged) for OLS (Poisson) regression 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

The economic significance of the result for establishments is limited, as the average establishment employs between 4 and 5 persons (Section 4.3.1). Effectively, an employment differential of 7 per cent therefore translates roughly to 0.3 persons. In other words, on average and *ceteris paribus*, in response to the dereservation reform over the 1995-2006 period, one in three establishments producing at least one recently dereserved product employed one additional person, in comparison with establishments manufacturing only items that were never reserved. Nonetheless, the statistical significance is noteworthy and indicates that this differential may have increased by 2011, when dereservation had been

extended to all but a small number of products. Although the NSSO surveyed manufacturing enterprises in 2011, product code data were not compiled in this exercise, on account of which I am unable to include the 2011 survey round in my analysis.

4.4.2 District level findings

Table 40 presents the results yielded by estimating equation (5). Controlling for district and year fixed effects and the additional variables outlined in Section 4.3.2.2, I find that increased exposure to dereservation (captured by the '*FrDeres*' variable) is not associated with statistically significant changes in employment in, and the number of, informal enterprises at the district level. This applies to OAMEs as well as establishments. Throughout, I obtain coefficients that are positive but statistically insignificant. This also holds for exposure to dereservation in neighbouring districts, which is indicative of the absence of significant spatial or migration driven effects in response to dereservation, at least up to 2006. Any effect that dereservation may have had on informal manufacturers therefore appears to have been fairly localised.

Table 40: SSI dereservation and district level outcomes in the informal sector: panel fixed effects (1995-2006)

	All enterprises		OAMEs		Establishments	
	$\Delta \ln (\text{emp})$	$\Delta \ln (\text{ent})$	$\Delta \ln (\text{emp})$	$\Delta \ln (\text{ent})$	$\Delta \ln (\text{emp})$	$\Delta \ln (\text{ent})$
$\Delta \text{FrDeres (own district)}$	1.828 (2.000)	1.463 (1.741)	2.471 (2.539)	1.655 (1.992)	0.073 (1.024)	0.376 (1.007)
$\Delta \text{FrDeres (neighbours)}$	-2.458 (3.300)	-2.135 (2.949)	-2.982 (3.976)	-2.262 (3.312)	-0.167 (1.498)	-0.616 (1.439)
FLEX 2	-0.805 (1.282)	-0.980 (0.939)	-1.654 (1.581)	-1.573 (1.267)	0.712 (1.425)	0.744 (1.084)
Literacy rate (2001)	-10.906 (9.809)	-7.387 (7.907)	-8.152 (12.334)	-6.167 (9.582)	-9.885 (11.897)	-7.615 (9.277)
SC/ST % (2001)	1.125 (4.609)	-1.407 (3.209)	-3.934 (5.216)	-4.562 (4.387)	8.292 (6.098)	7.092 (4.310)
2001 census: proportion of working age population engaged in ² :						
Agriculture	-186.854 (116.586)	-171.594* (89.462)	-201.604 (136.621)	-185.214 (117.096)	-92.486 (182.983)	-77.045 (148.720)
Mining	-232.929 (150.831)	-215.778* (115.854)	-250.237 (179.616)	-235.105 (151.993)	-101.967 (229.266)	-84.063 (186.064)
Manufacturing	-179.110 (132.359)	-157.540 (103.629)	-198.004 (159.775)	-171.750 (130.533)	-77.842 (177.696)	-60.811 (143.614)
Trade	-283.299 (193.770)	-281.294* (147.999)	-357.333 (226.604)	-339.024* (192.524)	-91.501 (287.335)	-78.584 (233.593)

Transport	-6.850 (93.156)	8.843 (61.784)	19.542 (121.503)	42.896 (95.095)	-91.048 (86.226)	-85.398 (65.735)
Services	-236.451 (146.429)	-217.344* (111.817)	-227.066 (172.333)	-221.382 (150.085)	-129.829 (245.304)	-107.610 (200.458)
Observations	834	834	831	831	767	767
R-squared	0.228	0.222	0.249	0.232	0.281	0.280

Dependent variable: $\Delta \ln(\text{emp})$ = change in natural logarithm of employment or $\Delta \ln(\text{ent})$ = change in natural logarithm of number of enterprises. Standard errors, in brackets, are robust to heteroscedasticity. All regressions include a constant and district and year fixed effects. 'SC/ST %' denotes the share of Scheduled Castes and Scheduled Tribes in a given district's population in 2001. ^z The base category is construction. ***: Significant at 1%
**: Significant at 5% *: Significant at 10%

To ensure that the findings presented in Table 40 are not unduly skewed by the fact that the 'FrDeres' measure equals zero for all districts in 1995 (the pre-reform year), I rerun the specification having excluded the data for 1995. These results are presented in Table 41 and are not materially different, in terms of the findings relating to dereservation exposure, from those in Table 40.

Table 41: SSI dereservation and district level outcomes in the informal sector: panel fixed effects (2001-2006)

	All enterprises		OAMEs		Establishments	
	$\Delta \ln(\text{emp})$	$\Delta \ln(\text{ent})$	$\Delta \ln(\text{emp})$	$\Delta \ln(\text{ent})$	$\Delta \ln(\text{emp})$	$\Delta \ln(\text{ent})$
$\Delta \text{FrDeres}$ (own district)	-0.714 (0.744)	-0.912 (0.836)	-0.604 (0.885)	-0.953 (0.909)	-0.478 (0.662)	-0.153 (0.632)
$\Delta \text{FrDeres}$ (neighbours)	-0.869 (1.168)	-0.320 (1.144)	-0.358 (1.286)	-0.180 (1.224)	-0.869 (1.783)	-1.091 (1.611)
FLEX 2	-0.093 (0.156)	-0.275* (0.144)	-0.427** (0.184)	-0.456*** (0.165)	0.218 (0.272)	0.217 (0.246)
Literacy rate (2001)	-1.275 (0.803)	-1.364* (0.780)	-1.898** (0.871)	-1.745** (0.841)	0.290 (1.420)	-0.113 (1.224)
SC/ST % (2001)	2.233* (1.168)	1.925** (0.969)	2.148* (1.146)	1.841* (0.954)	0.933 (0.889)	1.082 (0.794)
2001 census: proportion of working age population engaged in ^z :						
Agriculture	-3.390 (4.430)	0.629 (4.942)	-6.255 (6.458)	1.087 (6.111)	-1.721 (6.679)	-2.013 (5.625)
Mining	-2.919 (9.597)	1.203 (9.509)	-7.214 (11.185)	1.036 (10.384)	1.014 (10.354)	-0.910 (8.242)
Manufacturing	-0.910 (4.357)	3.773 (4.876)	-2.090 (6.602)	5.576 (6.184)	-2.644 (6.869)	-3.318 (5.726)
Trade	-11.111 (7.640)	-10.265 (7.666)	-21.190** (9.949)	-15.033* (9.034)	3.613 (6.444)	3.034 (5.694)
Transport	1.667 (7.786)	11.140 (8.716)	-0.584 (11.603)	14.305 (10.970)	3.281 (13.154)	4.558 (11.782)
Services	-0.078 (4.667)	4.238 (5.167)	-1.355 (6.860)	5.547 (6.479)	-3.827 (8.204)	-4.186 (6.801)
Observations	417	417	415	415	381	381
R-squared	0.187	0.205	0.254	0.241	0.036	0.034

Dependent variable: $\Delta \ln(\text{emp})$ = change in natural logarithm of employment or $\Delta \ln(\text{ent})$ = change in natural logarithm of number of enterprises. Standard errors, in brackets, are robust to heteroscedasticity. All regressions include a constant and district and year fixed effects. 'SC/ST %' denotes the share of Scheduled Castes and Scheduled Tribes in a given district's population in 2001. ^z The base category is construction. ***: Significant at 1%
**: Significant at 5% *: Significant at 10%

4.5 Potential mechanisms

The definition of ‘small scale industry’ (SSI) discussed in Section 1.3 covers the entirety of the informal manufacturing sector. On the other hand, formal (registered) manufacturing firms may be classified as having or having not been ‘small’ from the perspective of the initiation of dereservation. As such, it is vital to observe that any changes in informal enterprise outcomes associated with dereservation are likely to have arisen through linkages between the formal and informal sectors. Perhaps most evidently, these linkages may take the form of competition between formal and informal operators in hitherto reserved product markets, and changes therein following the initiation of dereservation. Moreover, as outlined in Section 3.4.3, an evolving competitive landscape within the formal sector may also have implications for informality. An alternative argument, following Munro (2011), favours the existence of collaboration between the two sectors, owing to supply side linkages or agglomeration externalities. I proceed to analyse the extent to which the data support either or both of these channels.

4.5.1 The competition channel

Over time, the dereservation policy promoted an increase in the presence of larger formal firms in product spaces that were hitherto reserved for smaller players (both formal and informal). As a first test of whether the enterprise level effects might differ in this regard, I run equation (3) separately for two sets of enterprises, defined by whether the pre-reform (1995) four firm concentration ratio (CR4) in each three digit industry exceeded (did not exceed) the median, implying a lower (higher) degree of pre-reform competition in the formal sector. This follows the analysis undertaken for the effects of the earlier 1990s reforms in Section 3.4.3, which benefited from the fact that the data on the 1990s reforms

is industry and time variant. The ‘treatment’ of the SSI dereservation policy fell at the product level rather than the industry level, which renders industry level categories less precise in this context, as there are numerous products within each three digit industry. As a result, I cannot undertake industry level analysis in this context, but pre-reform cross-industry variations in the degree of product market competition may still be employed for the enterprise level regressions.

The results of the exercise founded upon CR4 ratios are presented in Table 42. The baseline result linking dereservation to increased employment in the average establishment is robust, and indeed strengthened, for industries that were more competitive (with CR4 ratios below the median) in 1995 (Table 42, Column 6). Significance is lost for less competitive industries (with CR4 ratios exceeding the median in 1995: Table 42, Column 5). On the other hand, employment in OAMEs producing at least one dereserved product registers is significantly smaller in less competitive industries, but is not significantly different in more competitive industries.

Table 42: SSI dereservation and employment in informal enterprises (1995-2006): Analysis based on formal sector four firm concentration ratio (CR4) in 1995 (the proportion of formal industry level output accounted for by the four largest formal firms in 1995)

	OAMEs			Establishments		
	All	Industry level CR4 above median in 1995 (less competitive formal sector)	Industry level CR4 below median in 1995 (more competitive formal sector)	All	Industry level CR4 above median in 1995 (less competitive formal sector)	Industry level CR4 below median in 1995 (more competitive formal sector)
Still reserved	0.033 (0.023)	-0.031 (0.022)	0.062* (0.034)	0.106*** (0.014)	0.054** (0.022)	0.121*** (0.017)
Dereserved	0.052 (0.047)	-0.130** (0.064)	0.079 (0.062)	0.069** (0.032)	0.012 (0.054)	0.096** (0.038)
Observations	97849	64432	33417	42210	14478	27732
R-squared	0.201	0.223	0.257	0.274	0.331	0.295
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

This may relate to the findings of Martin *et al* (2017), who conclude that dereservation led to a decrease in the number of small formal firms following increased competition due to the entry of larger operators. Viewed from this perspective, the estimates in Table 42 suggest that there may have been a rise in average employment in larger informal enterprises (establishments) in industries which had lower CR4 ratios and were, consequently, relatively more competitive in 1995. In less competitive industries where higher market shares were already accounted for by large formal firms prior to dereservation, this effect is perhaps more likely to have been muted.

Further following the analysis in Section 3.4.3, I consider whether the baseline finding for establishments differs across industries characterised by the ratio of pre-reform (1995) average formal firm employment to average informal enterprise employment (the ‘F-I ratio’) exceeding and not exceeding the median (Table 43). Again, the intuitive case for this bifurcation of the dataset is that competition between formal and informal operators is arguably more likely to arise in industries with a lower average differential between formal and informal business size. The ‘F-I ratio’ serves as a proxy for this differential. In line with the results presented in Table 42, the positive and significant baseline coefficient attaching to employment in establishments in dereserved markets is restricted to more competitive industries in Table 43 (characterised as having lower ‘F-I ratios’ in 1995).

Table 43: SSI dereservation and employment in informal enterprises (1995-2006): Analysis based on the ratio of average formal firm employment to average informal enterprise employment (‘F-I ratio’) in 1995

	OAMEs			Establishments		
	All	Industry level F-I ratio above median in 1995 (less competitive)	Industry level F-I ratio below median in 1995 (more competitive)	All	Industry level F-I ratio above median in 1995 (less competitive)	Industry level F-I ratio below median in 1995 (more competitive)
Still reserved	0.033 (0.023)	-0.005 (0.030)	0.044 (0.027)	0.106*** (0.014)	0.096*** (0.030)	0.106*** (0.015)
Dereserved	0.052 (0.047)	-0.052 (0.046)	0.094 (0.059)	0.069** (0.032)	0.053 (0.057)	0.082** (0.038)
Observations	97849	25827	72022	42210	15353	26857

R-squared	0.201	0.298	0.202	0.274	0.356	0.274
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

A measure of competition deriving from firm specific perceptions of competitiveness might shed additional light in this context. In terms of the NSSO surveys used in the current study, the only evidence on competition effects is rooted in a question appearing in the 2001 and 2006 NSSO surveys, which queries whether 'competition from larger units' was a problem encountered by informal enterprises surveyed in the preceding year. On the whole, 16 per cent of informal enterprises cited this as having been an issue from their perspective. The proportion of firms reporting this issue increased from 13 per cent in 2001 to over 20 per cent in 2006. While establishments were somewhat more likely to report the issue relative to OAMEs, the proportions of both types of informal enterprise raising the issue had increased in 2006, relative to 2001.

Having rerun my enterprise level regressions separately for enterprises that do not cite competition from larger firms as having been a problem and for those that do, I obtain the results compiled in Table 44. This reveals that the positive and significant baseline dereservation effect for establishments is driven by establishments that cite competition with larger operators as being a problem, which is in line with the findings discussed above. In summary, there is some evidence in favour of product market competition having been a mechanism through which dereservation may have affected informal sector employment. However, in the absence of enterprise level panel data on informal manufacturers, I interpret these results with some caution.

Table 44: SSI dereservation and employment in informal enterprises – competition with larger firms as a problem

	All enterprises (1995-2006)	'Competition from larger units' was not cited as being a problem (2001, 2006)	'Competition from larger units' was cited as being a problem (2001, 2006)
ALL INFORMAL ENTERPRISES			
Still reserved	0.116*** (0.018)	0.130*** (0.021)	0.217*** (0.034)
Dereserved	0.065 (0.042)	0.067 (0.054)	0.036 (0.037)
Observations	140059	64011	12267
R-squared	0.230	0.277	0.392
OAMEs			
Still reserved	0.033 (0.023)	0.009 (0.026)	0.098*** (0.034)
Dereserved	0.052 (0.047)	0.066 (0.061)	-0.005 (0.043)
Observations	97849	40413	6214
R-squared	0.201	0.232	0.413
ESTABLISHMENTS			
Still reserved	0.106*** (0.014)	0.134*** (0.017)	0.115*** (0.028)
Dereserved	0.069*** (0.032)	0.047 (0.036)	0.164*** (0.055)
Observations	42210	23598	6053
R-squared	0.274	0.311	0.417
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

4.5.2 Other linkages between informal enterprises and the wider economy

To examine the existence of supply chain linkages between formal and informal market players and their implications for my results, I further examine the descriptive statistics of the NSSO surveys. The 2001 and 2006 surveys included questions on whether enterprises undertook any work on a contract basis and whether they bought at least part of their input from, and sold at least part of their output to, another enterprise or a contractor. As only a little over 8 per cent of the enterprises in my dataset report working on a contract basis, there is insufficient power for a regression to tease out differential effects linked to the dereservation reform for this variable. However, 25 per cent of enterprises state that they purchased at least part of their input from another enterprise or a contractor and 43 per

cent of enterprises report that at least part of their produce was sold to another enterprise or a contractor. While it is not clear that the counterparty in each case is a formal business, given that informal enterprises are unlikely to be part of sophisticated supply chains, the probability of the counterparty being formal is arguably high, particularly where enterprises report selling output to another enterprise or a contractor.

In Table 45, I present the estimates yielded by regressions underpinned by these linkage centric survey questions. As regards establishments, the baseline positive employment effect associated with dereservation is robust for the subsample that does not report selling any produce to another enterprise or a contractor, but loses significance for the subsample that does report doing so. Conversely, significance is retained for establishments that report procuring at least part of their input from another enterprise or a contractor, but is lost for other establishments. In the context of the dereservation reform, this suggests that backward linkages might matter more in terms of the response of employment in establishments, rather than forward linkages. Interestingly, a strongly (weakly) significant positive coefficient attaches to the dereservation indicator for OAMEs that report not buying any input from (not selling any output to) another enterprise or a contractor, which is indicative of these tiny, household only informal manufacturers being less linked with the wider economy relative to establishments.

Table 45: SSI dereservation and employment in informal enterprises – linkages with other enterprises

	All enterprises (1995-2006)	No input purchased from another enterprise/ contractor (2001, 2006)	At least some input purchased from another enterprise/ contractor (2001, 2006)	No output sold to another enterprise/ contractor (2001, 2006)	At least some output sold to another enterprise/ contractor (2001, 2006)
ALL INFORMAL ENTERPRISES					
Still reserved	0.116*** (0.018)	0.151*** (0.035)	0.150*** (0.022)	0.118*** (0.023)	0.163*** (0.027)
Dereserved	0.065 (0.042)	0.170*** (0.055)	0.050 (0.043)	0.082* (0.042)	0.033 (0.072)
Observations	140059	18810	57468	42899	33379
R-squared	0.230	0.376	0.284	0.251	0.382

OAMEs					
Still reserved	0.033 (0.023)	0.103*** (0.037)	-0.009 (0.030)	0.023 (0.024)	0.017 (0.048)
Dereserved	0.052 (0.047)	0.156** (0.063)	0.037 (0.051)	0.081* (0.046)	0.010 (0.094)
Observations	97849	14903	31724	30162	16465
R-squared	0.201	0.335	0.243	0.260	0.321
ESTABLISHMENT S					
Still reserved	0.106*** (0.014)	0.059 (0.041)	0.133*** (0.016)	0.124*** (0.024)	0.111*** (0.019)
Dereserved	0.069** (0.032)	0.030 (0.063)	0.083** (0.034)	0.074** (0.034)	0.066 (0.045)
Observations	42210	3907	25744	12737	16914
R-squared	0.274	0.590	0.283	0.340	0.292
Year FE	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

4.6 Robustness

Figure 7 suggests that there was no significant difference in the trend in pre-reform (1990-1995) employment in informal enterprises producing products that were never reserved, *vis-à-vis* those producing reserved products. Nonetheless, to account for any variation in this trend across product or industry categories, I incorporate data from the 1990 NSSO survey (Table 46). As discussed in Section 4.3.1, the 1990 survey data do not provide district codes, so I use state fixed effects instead of district fixed effects to undertake this check. The coefficients attaching to dereservation for establishments are similar in magnitude to my baseline estimates for both the OLS and the Poisson count regressions, although statistical significance is undermined to some extent. This may be on account of the estimates being less precise relative to the baseline, with state fixed effects replacing the district fixed effects used in the baseline.

Table 46: SSI dereservation and employment in informal enterprises (1990-2006, state fixed effects)

	OLS			Poisson		
	All	OAMEs	Establishments	All	OAMEs	Establishments
Still reserved	0.105*** (0.022)	0.041 (0.031)	0.101*** (0.016)	0.119*** (0.018)	0.031 (0.025)	0.095*** (0.015)
Dereserved	0.028 (0.041)	0.023 (0.050)	0.057* (0.034)	0.017 (0.028)	0.003 (0.037)	0.051 (0.032)
Observations	181696	128375	53321	181696	128375	53321

R-squared	0.167	0.135	0.207			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

As discussed in Section 4.2, Tewari and Wilde (2014) document that dereservation resulted in productivity increments in the formal sector, with relatively large multi-product firms benefiting in particular from the dismantling of the constraint on their product scope. In this context, it is possible that the baseline employment effects that I observe for establishments in the informal sector is accentuated for establishments producing more than one product, which account for approximately one-third of the establishments in the dataset. Table 47 is supportive of this hypothesis, with the baseline result being strengthened in magnitude and significance for multi-product establishments, and losing significance (although it continues to be positive) for single product establishments.

Table 47: SSI dereservation and employment in informal enterprises (1995-2006) – single product and multi-product enterprises

	All enterprises	Single product enterprises	Multi-product enterprises
ALL INFORMAL ENTERPRISES			
Still reserved	0.116*** (0.018)	0.130*** (0.021)	0.066*** (0.022)
Dereserved	0.065 (0.042)	0.036 (0.052)	0.073* (0.038)
Observations	140059	101334	38725
R-squared	0.230	0.250	0.305
OAMEs			
Still reserved	0.033 (0.023)	0.019 (0.023)	0.019 (0.030)
Dereserved	0.052 (0.047)	0.028 (0.058)	0.064 (0.044)
Observations	97849	73349	24500
R-squared	0.201	0.219	0.288
ESTABLISHMENTS			
Still reserved	0.106*** (0.014)	0.103*** (0.019)	0.073*** (0.020)
Dereserved	0.069** (0.032)	0.024 (0.038)	0.123*** (0.041)
Observations	42210	27985	14225
R-squared	0.274	0.280	0.377
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Dependent variable: natural logarithm of total number of persons engaged; 'FE': fixed effects. Standard errors, in brackets, are clustered at the district-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Along the lines of the district level analysis discussed in Section 4.4.2, I also undertake a robustness check at the industry level. As discussed in Martin *et al* (2017), industries are imperfect units for analysis of the impacts of SSI dereservation, as most three digit industries comprise a number of products, only some of which were SSI reserved and, for this subset, dereservation was often implemented at different points in time in the post-1997 period. In addition, an industry level specification cannot control for the district level variables obtained from the census, as outlined in Section 4.3.2.2. Nonetheless, as Table A10 in the Appendix shows, the industry level results (which use levels rather than changes of the left hand side and right hand side variables, to maximise the sample size) are in line with the district level findings. In other words, pre-reform exposure to dereservation is not associated with significant changes in informal employment or enterprise numbers at the industry level (the industry level 'FrDeres' variable is constructed in a manner corresponding exactly to that outlined for the district level 'FrDeres' measure in Section 4.3.2.2).

4.7 Concluding comments

This study assesses the implications of India's SSI dereservation reform of the 1997-2010 period on informal manufacturing enterprises. While the literature has made major strides in understanding the impact of this reform on formal firms, this is likely to be the first attempt that is focused on informal enterprises, which account for a great majority of businesses and a smaller but still sizeable majority of employment in Indian manufacturing.

Overall, at the enterprise level, there is no statistically significant shift in informal enterprise employment attaching to dereservation in the 1995-2006 period, although enterprises in 'still reserved' product markets are consistently significantly larger than other enterprises. However, I find that establishments producing dereserved products are approximately 7 per

cent larger, in employment terms, relative to establishments manufacturing items that were never reserved, with no corresponding significance visible for OAMEs. A supplementary analysis at the district level indicates that a higher, pre-reform (1995) district level exposure to dereservation is not linked to significant shifts in informal employment and informal enterprise numbers in the 1995-2006 period.

Further examination of the mechanisms underlying the baseline result for establishments indicates that this result is restricted to industries that are more likely to be characterised by greater competition between establishments and formal firms. It may be argued that these industries may have been more vulnerable to Melitz (2003) type shifts, such that the competitive pressures unleashed by dereservation may have led to the least unproductive formal firms exiting the market, followed by greater employment in informal enterprises. In line with intuition, these pressures appear to have played a lesser role in industries characterised by large formal incumbents accounting for substantial market shares in the pre-dereservation period. As regards supply chain effects, the limited evidence that is obtained indicates that backward linkages (input sourcing from other businesses) may be more relevant in comparison with forward linkages (output sales to other businesses) in the context of establishments. However, this latter channel may be fruitful ground for future research.

The findings of this study have a number of policy implications. They are complementary to the findings of Martin *et al* (2017), which highlight the positive employment effects of the dereservation reform for the formal sector. They highlight the persistence of the duality inherent in the Indian economy, with informal activity flourishing in tandem with strides made in terms of formal sector growth. Further assessment of the constraints faced by

informal manufacturers and the extent to which they may be accentuated or alleviated by policies targeted at SSI promotion remains a priority.

Chapter 5: Conclusion

This thesis examines the implications of a major series of economic reforms, undertaken in India in the 1990-2006 period, on employment in the manufacturing sector. Unlike most existing studies in the area, it undertakes separate analyses for formal firms and informal enterprises in manufacturing industries. In light of the fact that this duality is a trait that is inherent in, and pervades all major manufacturing industry groups across, the Indian economy, this is a distinguishing feature of this analysis and a contribution to the literature. To the best of my knowledge, this thesis also comprises the first comprehensive study of the firm or enterprise level employment effects of the Indian reforms. In this sense, it complements a rich body of existing work that analyses other firm level outcomes, primarily productivity shifts, in the post-reform era.

The results of this exercise are striking in many ways. Perhaps most prominently, I find that the swingeing reductions in final goods tariffs that the Indian government undertook in the 1990s are not associated with comprehensive, statistically significant changes in employment, both at a 'micro' (firm or enterprise) level and a 'macro' (industry) level. Rather, changes in average employment are driven by declines in tariffs on imported inputs, which may have made inputs cheaper more widely through general equilibrium effects in the post-reform period, and industrial policy reform in the guise of delicensing and FDI liberalisation.

The effects associated with lower input tariffs are restricted to the formal sector. As informal enterprises rarely engage directly in international trade, this is perhaps unsurprising. Also in line with intuition, declining input tariffs go hand-in-hand with increases in formal firm employment, on average and *ceteris paribus*, in all states. This applies to directly hired employees, as opposed to casual or 'contract' workers. At a broader, industry level,

declining input tariffs are not associated with significant shifts in employment and firm numbers. This suggests that lower input tariffs are unlikely to have led to significant levels of market entry and exit in India's formal sector in the 1990s, although this cannot be rigorously established given the unavailability of firm level panel data for this period.

The delicensing reform, initiated in 1986 for a minority of industries and in 1991 for much of the remainder of the manufacturing sector, is associated with significant employment shifts not only in the formal sector but also in the informal sector. As opposed to input tariff declines, delicensing has more substantial implications for industry level outcomes, as opposed to firm or enterprise level employment. In the formal sector, delicensing is associated with significantly increased formal firm numbers and no significant informal sector expansion in states with flexible labour markets. On the other hand, in states with inflexible labour markets, delicensing is associated with an expansion of the informal sector, on account of a significant increase in the number of informal enterprises, with no corresponding significant increase in formal firm numbers. As these effects tend to be restricted to industries characterised as being more competitive, it is possible that they are underpinned by Melitz (2003) type structural shifts in the formal sector in the post-reform period, which 'spill over' into informal sector expansion in states with inflexible labour markets.

As regards FDI liberalisation, my findings are more nuanced. At the 'micro' level, in states with flexible (inflexible) labour markets, FDI reform is followed by increases (reductions) in employment in formal firms. Importantly, the increase visible in states with flexible labour markets applies to both directly hired (more permanent) employees as well as casual or 'contract' labour, whereas the decrease recorded in states with inflexible labour markets is confined to directly hired employees. At the same time, in states with flexible labour

markets, FDI reform is linked to a significant, albeit economically trivial, rise in employment at the informal enterprise level. At the industry level, FDI reform is associated with a significant and economically relevant increase (no significant change) in the number of informal enterprises in states with flexible (inflexible) labour markets. Together, these findings indicate that while regions with flexible labour markets are more likely to benefit from increased employment in the wake of liberalising FDI regulation (as opposed to regions with less flexible labour markets), this increase could be reflected in an expansion of formal as well as informal employment. Secondary analysis is suggestive of the effects associating with FDI liberalisation being driven by a combination of product market competition within the formal sector and collaborative or value chain based linkages between formal and informal businesses. This continues to be an avenue for future investigation, particularly in contexts where data pertaining to FDI magnitudes and supply chain linkages are considerably richer.

In the post-1997 period, the reforms initiated in 1991 lost traction, with the economy having recovered somewhat from the balance-of-payments crisis of 1990 and the sense of urgency for reform that was visible in the early 1990s having abated. In this period, attention shifted to the policy of SSI reservation, which for long had seen a selection of manufactured products largely reserved for production by small businesses. This policy was dismantled progressively in the post-1997 period, with the momentum of the 'SSI dereservation' increasing in 2001 and thereafter. Recent work by Martin *et al* (2017) and others has linked SSI dereservation to increased net productivity and employment in the formal sector. I explore the implications of dereservation for employment in informal enterprises in the 1995-2006 period.

On the whole, the results of this analysis suggest that dereservation had no appreciable or statistically significant effect on employment in informal enterprises, on average and *ceteris paribus*. The only effect of significance is restricted to establishments, which are a little larger than the OAMEs (solely household based units typically comprising just two workers) that dominate the informal sector. On average, employment in an establishment producing recently dereserved products exceeds that in an establishment producing only products that were never reserved by a statistically significant 7 per cent. This finding is not accompanied by variation in dereservation intensity being linked to statistically significant changes in informal employment or enterprise numbers at a more aggregated district level. In other words, there is little evidence that the ‘extensive margin’ of informality underwent major shifts in response to dereservation, at least up to 2006.

This baseline result is restricted to establishments, in particular multi-product establishments, operating in industries that are more likely to be characterised by greater competition between establishments and formal firms, which may have led to changes in product market structure in the medium term. Industries characterised by large formal incumbents accounting for more substantial market shares in the pre-dereservation period appear to have been somewhat more insulated from these changes. Other regressions suggest that the baseline finding is more likely to be driven by backward linkages (input sourcing) as opposed to forward linkages (output sales) for establishments. However, this remains a hypothesis that merits greater attention in future research.

Table 48 offers a synopsis of the key findings of Chapter 2, Chapter 3 and Chapter 4.

Table 48: Summary of results

Policy/ Reform	Impact* on firm/ enterprise level employment	Impact* on industry/ district level number of firms/ enterprises
Reductions in final goods tariffs (1991-1997)	Formal: No significant impact Informal: No significant impact	Formal: No significant impact Informal: No significant impact
Declines in input tariffs** (1991-1997)	Formal: + (<i>flex</i>), + (<i>inflex</i>) Informal: No significant impact	Formal: No significant impact Informal: No significant impact
Delicensing (1985, 1991-1997)	Formal: No significant impact Informal: no significant impact (<i>flex</i>), + (<i>inflex</i>)	Formal: + (<i>flex</i>), no significant impact (<i>inflex</i>) Informal: no significant impact (<i>flex</i>), + (<i>inflex</i>)
FDI liberalization (1991-1997)	Formal: + (<i>flex</i>), - (<i>inflex</i>) Informal: + (<i>flex</i>), no significant impact (<i>inflex</i>)	Formal: No significant impact Informal: + (<i>flex</i>), no significant impact (<i>inflex</i>)
SSI dereservation*** (1997-2006)	Informal: + (only for establishments)	Informal: No significant impact

Source: Author's conclusions in this thesis. "+" represents an increase and "-" represents a decrease. "*flex*" denotes states with flexible labour markets and "*inflex*" denotes states with inflexible labour markets (defined using the 'FLEX 2' indicator of state level labour market flexibility). * On average and *ceteris paribus*. ** The input tariff declines were an implicit result of the reductions in final goods tariffs that were undertaken by the Indian government in the 1990s, as opposed to being a policy instrument *per se*. *** In this thesis, the implications of SSI dereservation for employment have been analysed only for the informal sector.

The findings of this thesis have a number of policy implications. They add a drop to the burgeoning sea of studies emphasising the relevance of variations in domestic institutional frameworks to evaluations of the implications of economic liberalisation, in particular in large developing economies. They also underline the relevance of separate analyses of public policy implications for formal firms and informal enterprises. While the Indian government has a strong tradition in the compilation of microdata on a regular basis, this thesis also highlight several limitations in data quality and availability, in particular for informal enterprises. Perhaps the most prominent of these limitations relates to the absence of panel data for informal enterprises in India. The initiation of panel data compilation in this regard appears to be highly desirable on a fairly regular basis, if not on an annual basis along the lines of the ASI for formal firms. In the interim, there is a strong argument for a greater weight to be placed on the collection of data that would facilitate

rigorous analysis of competition and collaboration within and between businesses operating in the formal and informal sectors.

More broadly, for both academics and policymakers, better understanding the factors that motivate enterprises to operate informally in widely varying contexts, in addition to the drivers of transition from informality to the formal sector, continues to be a vital concern in today's rapidly growing and evolving developing economies.

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List of Abbreviations

Abbreviation	Expanded version
ASI	Annual Survey of Industries
ASICC	Annual Survey of Industries Commodity Codes
CPN	Common Product Nomenclature
CR4	Four firm concentration ratio
CSO	Central Statistics Office
DME	Directory manufacturing establishment
EC	Economic Census
FE	Fixed effects
FDI	Foreign direct investment
IDA	Industrial Disputes Act
IMF	International Monetary Fund
IOTT	Input-Output Transactions Table
NDME	Non-directory manufacturing establishment
NIC	National Industrial Classification
NSSO	National Sample Survey Organisation
OAME	Own account manufacturing enterprise
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
SSI	Small scale industry
UNCTAD-TRAINS	United Nations Conference on Trade and Development – Trade Analysis Information System

Appendix

Table A1: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Additional robustness checks – I

	Baseline	Change in 'FLEX 2' value for Delhi and Jammu & Kashmir (0 to 1)	Excluding firms with fewer than ten paid employees	Including firms reporting zero or no value for raw material use/ physical products	Using input tariffs based on final goods tariffs for manufacturing industries only
Final goods tariffs	-0.020 (0.075)	-0.018 (0.081)	0.059 (0.054)	-0.007 (0.075)	-0.130* (0.076)
Final goods tariffs * FLEX 2	0.132 (0.115)	0.122 (0.119)	0.039 (0.084)	0.118 (0.114)	0.199* (0.115)
Input tariffs	-0.680*** (0.211)	-0.703*** (0.218)	-0.656*** (0.191)	-0.720*** (0.215)	-0.059 (0.187)
Input tariffs * FLEX 2	0.021 (0.216)	0.056 (0.222)	0.189 (0.193)	0.028 (0.216)	-0.162 (0.149)
Delicensing	0.084 (0.061)	0.089 (0.066)	0.072 (0.048)	0.081 (0.061)	0.073 (0.063)
Delicensing * FLEX 2	-0.098 (0.083)	-0.099 (0.085)	-0.048 (0.067)	-0.086 (0.085)	-0.119 (0.087)
FDI reform	-0.115** (0.045)	-0.103** (0.048)	-0.080** (0.035)	-0.107** (0.046)	-0.090* (0.047)
FDI reform * FLEX 2	0.208*** (0.067)	0.178*** (0.069)	0.140*** (0.051)	0.206*** (0.067)	0.192*** (0.068)
Flexible labour markets: Effects of changes in final goods tariffs					
Row 1 + Row 2	0.111*	0.104*	0.098**	0.111*	0.069
Std Error	0.063	0.061	0.046	0.062	0.062
p-value (combined effect = 0)	0.078	0.088	0.035	0.075	0.268
Flexible labour markets: Effects of changes in input tariffs					
Row 3 + Row 4	-0.659***	-0.646***	-0.468***	-0.692***	-0.221
Std Error	0.199	0.195	0.181	0.202	0.176
p-value (combined effect = 0)	0.001	0.001	0.010	0.001	0.209
Flexible labour markets: Effects of delicensing					
Row 5 + Row 6	-0.013	-0.010	0.025	-0.005	-0.046
Std Error	0.036	0.034	0.029	0.038	0.039
p-value (combined effect = 0)	0.707	0.781	0.400	0.896	0.238
Flexible labour markets: Effects of FDI reform					
Row 7 + Row 8	0.093**	0.075**	0.060**	0.099**	0.102***
Std Error	0.039	0.038	0.027	0.039	0.039
p-value (combined effect = 0)	0.017	0.047	0.027	0.011	0.010
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	160883	160883	131147	163921	160883
R-squared	0.205	0.205	0.201	0.203	0.205

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A2: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Additional robustness checks – II

	Baseline (All firms)	Consumer goods industries	Basic/ Capital/ Intermediate goods industries	Single product firms	Multi- product firms	Fully private	Not fully private
Final goods tariffs	-0.020 (0.075)	0.031 (0.083)	-0.010 (0.080)	0.042 (0.057)	0.035 (0.089)	-0.070 (0.077)	0.078 (0.126)
Final goods tariffs * FLEX 2	0.132 (0.115)	0.073 (0.119)	0.198 (0.136)	-0.033 (0.076)	0.140 (0.142)	0.178 (0.121)	0.037 (0.143)
Input tariffs	-0.680*** (0.211)	-0.667** (0.295)	-0.623** (0.265)	-0.407 (0.248)	-1.317*** (0.265)	-0.537*** (0.206)	-0.554 (0.472)
Input tariffs * FLEX 2	0.021 (0.216)	-0.022 (0.298)	-0.460* (0.244)	-0.141 (0.233)	0.417 (0.272)	-0.070 (0.211)	-0.080 (0.348)
Delicensing	0.084 (0.061)	0.183* (0.096)	-0.095* (0.051)	0.148 (0.095)	0.011 (0.051)	0.100 (0.066)	-0.063 (0.076)
Delicensing * FLEX 2	-0.098 (0.083)	-0.189 (0.128)	0.068 (0.067)	-0.253* (0.140)	-0.004 (0.059)	-0.099 (0.089)	0.011 (0.081)
FDI reform	-0.115** (0.045)	-0.136** (0.067)	0.015 (0.046)	-0.049 (0.050)	-0.092* (0.048)	-0.108** (0.046)	0.185** (0.093)
FDI reform * FLEX 2	0.208*** (0.067)	0.338*** (0.097)	-0.043 (0.046)	0.006 (0.056)	0.281*** (0.075)	0.218*** (0.068)	-0.278** (0.127)
Flexible labour markets: Effects of changes in final goods tariffs							
Row 1 + Row 2	0.111	0.104	0.188*	0.010	0.174**	0.108	0.115
Std Error	0.063	0.070	0.098	0.060	0.083	0.067	0.106
p-value (combined effect = 0)	0.078	0.139	0.056	0.874	0.035	0.106	0.279
Flexible labour markets: Effects of changes in input tariffs							
Row 3 + Row 4	-0.659***	-0.689**	-1.083***	-0.548**	-0.900***	-0.606***	-0.634
Std Error	0.199	0.279	0.305	0.249	0.236	0.201	0.496
p-value (combined effect = 0)	0.001	0.014	0.000	0.028	0.000	0.003	0.202
Flexible labour markets: Effects of delicensing							
Row 5 + Row 6	-0.013	-0.006	-0.027	-0.105*	0.007	0.001	-0.052
Std Error	0.036	0.050	0.041	0.061	0.040	0.038	0.081
p-value (combined effect = 0)	0.707	0.901	0.503	0.087	0.854	0.981	0.523
Flexible labour markets: Effects of FDI reform							
Row 7 + Row 8	0.093**	0.202***	-0.028	-0.042	0.189***	0.110***	-0.093
Std Error	0.039	0.058	0.041	0.042	0.048	0.040	0.095
p-value (combined effect = 0)	0.017	0.000	0.497	0.310	0.000	0.006	0.328
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160883	96947	63936	59164	83640	150347	10536
R-squared	0.205	0.236	0.146	0.198	0.243	0.189	0.400

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A3: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Excluding individual states (I)

<i>Excluding:</i>	Jammu & Kashmir	Punjab	Haryana	Delhi	Rajasthan	Uttar Pradesh
Final goods tariffs	-0.020 (0.076)	0.043 (0.066)	0.007 (0.079)	-0.028 (0.079)	-0.034 (0.075)	-0.042 (0.090)
Final goods tariffs * FLEX 2	0.131 (0.116)	0.029 (0.093)	0.083 (0.117)	0.135 (0.119)	0.147 (0.117)	0.153 (0.130)
Input tariffs	-0.676*** (0.212)	-0.685*** (0.211)	-0.717*** (0.217)	-0.714*** (0.218)	-0.605*** (0.212)	-0.620*** (0.239)
Input tariffs * FLEX 2	0.017 (0.218)	0.045 (0.206)	0.102 (0.218)	0.047 (0.223)	-0.042 (0.221)	-0.062 (0.238)
Delicensing	0.084 (0.062)	0.070 (0.064)	0.084 (0.065)	0.094 (0.065)	0.082 (0.061)	0.114* (0.068)
Delicensing * FLEX 2	-0.097 (0.083)	-0.084 (0.086)	-0.092 (0.086)	-0.102 (0.086)	-0.104 (0.085)	-0.116 (0.084)
FDI reform	-0.115** (0.046)	-0.095* (0.049)	-0.129*** (0.048)	-0.109** (0.048)	-0.109** (0.045)	-0.121** (0.057)
FDI reform * FLEX 2	0.206*** (0.067)	0.153** (0.062)	0.221*** (0.070)	0.202*** (0.069)	0.198*** (0.068)	0.216*** (0.079)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.111*	0.072	0.091	0.107*	0.113*	0.110*
Std Error	0.063	0.055	0.062	0.063	0.066	0.065
p-value (combined effect = 0)	0.081	0.188	0.145	0.090	0.085	0.087
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.658***	-0.641***	-0.615***	-0.666***	-0.646***	-0.682***
Std Error	0.200	0.201	0.201	0.201	0.207	0.207
p-value (combined effect = 0)	0.001	0.001	0.002	0.001	0.002	0.001
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	-0.014	-0.013	-0.008	-0.008	-0.022	-0.002
Std Error	0.036	0.036	0.036	0.035	0.038	0.033
p-value (combined effect = 0)	0.702	0.711	0.831	0.818	0.557	0.961
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.091**	0.058*	0.092**	0.092**	0.089**	0.094**
Std Error	0.039	0.034	0.039	0.039	0.040	0.039
p-value (combined effect = 0)	0.019	0.083	0.018	0.018	0.027	0.016
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	160075	151784	154624	155381	154261	144998
R-squared	0.206	0.212	0.208	0.208	0.207	0.198

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A4: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Excluding individual states (II)

<i>Excluding:</i>	Bihar	Assam	West Bengal	Orissa	Madhya Pradesh	Gujarat
Final goods tariffs	-0.016 (0.080)	-0.033 (0.076)	-0.064 (0.087)	-0.027 (0.079)	-0.036 (0.081)	-0.038 (0.072)
Final goods tariffs * FLEX 2	0.147 (0.119)	0.154 (0.115)	0.182 (0.127)	0.137 (0.118)	0.149 (0.121)	0.117 (0.119)
Input tariffs	-0.754*** (0.216)	-0.685*** (0.213)	-0.690*** (0.225)	-0.653*** (0.216)	-0.643*** (0.223)	-0.591*** (0.214)
Input tariffs * FLEX 2	0.018 (0.221)	-0.016 (0.215)	-0.005 (0.228)	0.016 (0.219)	0.038 (0.223)	0.125 (0.224)
Delicensing	0.091 (0.063)	0.098 (0.064)	0.090 (0.067)	0.077 (0.063)	0.095 (0.065)	0.084 (0.061)
Delicensing * FLEX 2	-0.091 (0.083)	-0.117 (0.084)	-0.098 (0.087)	-0.088 (0.084)	-0.110 (0.087)	-0.107 (0.088)
FDI reform	-0.133*** (0.047)	-0.125*** (0.046)	-0.124** (0.051)	-0.126*** (0.046)	-0.133*** (0.049)	-0.128*** (0.043)

FDI reform * FLEX 2	0.239*** (0.068)	0.216*** (0.067)	0.215*** (0.073)	0.219*** (0.068)	0.237*** (0.071)	0.252*** (0.070)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.130**	0.121*	0.118*	0.110*	0.113*	0.079
Std Error	0.064	0.063	0.064	0.063	0.065	0.071
p-value (combined effect = 0)	0.040	0.057	0.066	0.081	0.081	0.263
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.736***	-0.701***	-0.695***	-0.637***	-0.606***	-0.467**
Std Error	0.201	0.201	0.204	0.201	0.205	0.204
p-value (combined effect = 0)	0.000	0.000	0.001	0.002	0.003	0.023
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	-0.000	-0.018	-0.008	-0.011	-0.015	-0.023
Std Error	0.035	0.036	0.036	0.036	0.036	0.041
p-value (combined effect = 0)	0.997	0.605	0.827	0.752	0.674	0.575
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.106***	0.091**	0.091**	0.094**	0.104***	0.125***
Std Error	0.038	0.039	0.039	0.039	0.039	0.044
p-value (combined effect = 0)	0.006	0.019	0.020	0.017	0.008	0.004
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	156478	157852	153119	157954	154757	144400
R-squared	0.206	0.198	0.207	0.203	0.207	0.207

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A5: Economic reforms, labour market flexibility and employment in formal firms (1990-1997): Excluding individual states (III)

<i>Excluding:</i>	Maharashtra	Andhra Pradesh	Karnataka	Kerala	Tamil Nadu
Final goods tariffs	-0.013 (0.072)	-0.011 (0.071)	-0.016 (0.075)	-0.033 (0.078)	-0.004 (0.066)
Final goods tariffs * FLEX 2	0.133 (0.124)	0.161 (0.118)	0.133 (0.119)	0.143 (0.117)	0.128 (0.104)
Input tariffs	-0.713*** (0.216)	-0.751*** (0.213)	-0.716*** (0.214)	-0.609*** (0.212)	-0.569*** (0.195)
Input tariffs * FLEX 2	0.126 (0.237)	0.023 (0.220)	0.037 (0.225)	-0.004 (0.215)	-0.250 (0.215)
Delicensing	0.077 (0.066)	0.013 (0.050)	0.098 (0.063)	0.096 (0.062)	0.084 (0.062)
Delicensing * FLEX 2	-0.101 (0.098)	-0.026 (0.071)	-0.107 (0.087)	-0.123 (0.080)	-0.115 (0.091)
FDI reform	-0.089** (0.043)	-0.113*** (0.042)	-0.110** (0.044)	-0.084** (0.042)	-0.096** (0.044)
FDI reform * FLEX 2	0.218*** (0.072)	0.185*** (0.067)	0.204*** (0.068)	0.161** (0.064)	0.162** (0.067)
Flexible labour markets: Effects of changes in final goods tariffs					
Row 1 + Row 2	0.120	0.149**	0.117*	0.110*	0.124*
Std Error	0.077	0.068	0.068	0.063	0.067
p-value (combined effect = 0)	0.119	0.028	0.085	0.081	0.065
Flexible labour markets: Effects of changes in input tariffs					
Row 3 + Row 4	-0.587***	-0.728***	-0.679***	-0.613***	-0.819***
Std Error	0.221	0.208	0.209	0.192	0.227
p-value (combined effect = 0)	0.008	0.000	0.001	0.001	0.000
Flexible labour markets: Effects of delicensing					
Row 5 + Row 6	-0.025	-0.012	-0.010	-0.028	-0.031
Std Error	0.045	0.036	0.038	0.034	0.045
p-value (combined effect = 0)	0.583	0.730	0.803	0.423	0.494
Flexible labour markets: Effects of FDI reform					
Row 7 + Row 8	0.129***	0.072*	0.095**	0.077**	0.066

Std Error	0.047	0.041	0.040	0.039	0.045
p-value (combined effect = 0)	0.006	0.082	0.020	0.048	0.142
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	138989	146228	151390	153984	137854
R-squared	0.213	0.210	0.206	0.204	0.209

Dependent variable: natural logarithm of number of paid employees 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A6: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Additional robustness checks

	Baseline	With DMEs for 1995 and 2001	Change in 'FLEX 2' value for Delhi and Jammu & Kashmir (0 to 1)	Including enterprises with ten or more persons engaged	Including enterprises reporting zero or no value for raw material use/ physical products	Using input tariffs based on final goods tariffs for manufacturing industries only
Final goods tariffs	-0.132 (0.113)	-0.128 (0.106)	-0.137 (0.115)	-0.124 (0.112)	-0.172* (0.090)	-0.119 (0.126)
Final goods tariffs * FLEX 2	0.151 (0.097)	0.174* (0.104)	0.156 (0.098)	0.151 (0.097)	0.158 (0.098)	0.111 (0.109)
Input tariffs	0.576* (0.327)	0.185 (0.349)	0.583* (0.327)	0.558* (0.329)	0.517* (0.278)	0.444 (0.339)
Input tariffs * FLEX 2	-0.178 (0.168)	-0.222 (0.195)	-0.179 (0.165)	-0.161 (0.168)	-0.139 (0.172)	-0.051 (0.119)
Delicensing	0.108*** (0.030)	0.113*** (0.031)	0.105*** (0.030)	0.108*** (0.030)	0.057** (0.027)	0.095*** (0.028)
Delicensing * FLEX 2	-0.088** (0.037)	-0.061 (0.042)	-0.079** (0.037)	-0.081** (0.038)	-0.047 (0.037)	-0.081** (0.038)
FDI reform	0.024 (0.028)	0.053* (0.029)	0.022 (0.028)	0.025 (0.028)	-0.000 (0.022)	0.029 (0.029)
FDI reform * FLEX 2	0.076* (0.041)	0.160*** (0.048)	0.079** (0.040)	0.074* (0.041)	0.070** (0.034)	0.077* (0.041)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.019	0.046	0.018	0.028	-0.014	-0.008
Std Error	0.078	0.085	0.077	0.078	0.075	0.084
p-value (combined effect = 0)	0.809	0.589	0.810	0.721	0.853	0.924
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	0.398	-0.037	0.404	0.397	0.378	0.393
Std Error	0.300	0.338	0.297	0.304	0.249	0.299
p-value (combined effect = 0)	0.185	0.914	0.173	0.191	0.128	0.188
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.019	0.052	0.026	0.027	0.010	0.014
Std Error	0.038	0.041	0.037	0.038	0.035	0.039
p-value (combined effect = 0)	0.613	0.207	0.487	0.480	0.773	0.709
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.099**	0.213***	0.101**	0.099**	0.070**	0.106
Std Error	0.043	0.051	0.042	0.043	0.030	0.043
p-value (combined effect = 0)	0.021	0.000	0.016	0.022	0.018	0.014
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	195789	216456	195789	196001	316755	195789
R-squared	0.164	0.189	0.164	0.163	0.174	0.164

Dependent variable: natural logarithm of total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A7: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Excluding individual states (I)

<i>Excluding:</i>	Andhra Pradesh	Assam	Bihar	Gujarat	Haryana	Karnataka
Final goods tariffs	-0.148 (0.116)	-0.128 (0.116)	-0.156 (0.125)	-0.122 (0.116)	-0.136 (0.114)	-0.127 (0.116)
Final goods tariffs * FLEX 2	0.201** (0.101)	0.134 (0.098)	0.167 (0.105)	0.117 (0.100)	0.159 (0.098)	0.169* (0.098)
Input tariffs	0.652* (0.338)	0.559* (0.337)	0.589* (0.350)	0.557* (0.336)	0.578* (0.330)	0.473 (0.328)
Input tariffs * FLEX 2	-0.182 (0.185)	-0.143 (0.170)	-0.247 (0.174)	-0.121 (0.173)	-0.187 (0.168)	-0.209 (0.174)
Delicensing	0.099*** (0.030)	0.106*** (0.030)	0.109*** (0.031)	0.105*** (0.030)	0.107*** (0.030)	0.109*** (0.030)
Delicensing * FLEX 2	-0.059 (0.036)	-0.086** (0.038)	-0.098** (0.038)	-0.086** (0.039)	-0.088** (0.038)	-0.105*** (0.037)
FDI reform	0.012 (0.029)	0.027 (0.028)	0.033 (0.030)	0.024 (0.028)	0.025 (0.028)	0.028 (0.028)
FDI reform * FLEX 2	0.062 (0.045)	0.068* (0.041)	0.070* (0.042)	0.063 (0.043)	0.074* (0.041)	0.071* (0.043)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.054	0.006	0.011	-0.005	0.023	0.042
Std Error	0.084	0.079	0.079	0.082	0.079	0.079
p-value (combined effect = 0)	0.524	0.943	0.889	0.954	0.769	0.598
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	0.470	0.416	0.342	0.436	0.391	0.264
Std Error	0.303	0.306	0.313	0.310	0.302	0.306
p-value (combined effect = 0)	0.122	0.174	0.275	0.161	0.196	0.390
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.040	0.020	0.010	0.019	0.020	0.004
Std Error	0.040	0.038	0.038	0.040	0.038	0.037
p-value (combined effect = 0)	0.314	0.600	0.790	0.635	0.604	0.921
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.074	0.095**	0.103**	0.088*	0.099**	0.099**
Std Error	0.048	0.043	0.044	0.045	0.043	0.045
p-value (combined effect = 0)	0.120	0.027	0.018	0.054	0.022	0.026
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	175093	190029	177854	188617	192790	188039
R-squared	0.165	0.167	0.163	0.160	0.164	0.161

Dependent variable: natural logarithm of total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A8: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Excluding individual states (II)

<i>Excluding:</i>	Kerala	Madhya Pradesh	Maharashtra	Orissa	Punjab	Rajasthan
Final goods tariffs	-0.140 (0.118)	-0.151 (0.115)	-0.119 (0.117)	-0.132 (0.119)	-0.135 (0.117)	-0.120 (0.116)
Final goods tariffs * FLEX 2	0.162 (0.100)	0.177* (0.098)	0.114 (0.107)	0.156 (0.099)	0.155 (0.099)	0.150 (0.100)
Input tariffs	0.541 (0.336)	0.556* (0.330)	0.611* (0.341)	0.438 (0.344)	0.569* (0.334)	0.565* (0.334)
Input tariffs * FLEX 2	-0.164 (0.172)	-0.229 (0.167)	-0.158 (0.183)	-0.152 (0.177)	-0.180 (0.170)	-0.165 (0.172)
Delicensing	0.108*** (0.030)	0.113*** (0.030)	0.106*** (0.030)	0.114*** (0.034)	0.107*** (0.030)	0.106*** (0.030)
Delicensing * FLEX 2	-0.081** (0.038)	-0.093** (0.038)	-0.083** (0.042)	-0.082** (0.039)	-0.088** (0.038)	-0.080** (0.040)
FDI reform	0.023 (0.029)	0.022 (0.030)	0.024 (0.028)	0.032 (0.030)	0.023 (0.029)	0.022 (0.029)
FDI reform * FLEX 2	0.086**	0.080*	0.102***	0.087**	0.078*	0.081*

	(0.041)	(0.041)	(0.039)	(0.040)	(0.041)	(0.043)
Flexible labour markets: Effects of changes in final goods tariffs						
Row 1 + Row 2	0.022	0.026	-0.005	0.024	0.020	0.030
Std Error	0.079	0.079	0.095	0.080	0.079	0.081
p-value (combined effect = 0)	0.779	0.744	0.954	0.769	0.801	0.717
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	0.377	0.327	0.453	0.286	0.388	0.400
Std Error	0.305	0.305	0.322	0.316	0.304	0.308
p-value (combined effect = 0)	0.217	0.283	0.160	0.366	0.202	0.194
Flexible labour markets: Effects of delicensing						
Row 5 + Row 6	0.027	0.020	0.024	0.032	0.020	0.026
Std Error	0.038	0.039	0.043	0.039	0.038	0.041
p-value (combined effect = 0)	0.487	0.612	0.586	0.411	0.608	0.528
Flexible labour markets: Effects of FDI reform						
Row 7 + Row 8	0.109**	0.102**	0.126***	0.119***	0.100**	0.103**
Std Error	0.043	0.043	0.041	0.043	0.043	0.046
p-value (combined effect = 0)	0.012	0.017	0.002	0.006	0.020	0.024
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	187903	184167	181312	184632	189682	187722
R-squared	0.159	0.166	0.164	0.167	0.163	0.165

Dependent variable: natural logarithm of total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A9: Economic reforms, labour market flexibility and employment in informal enterprises (1990-2001): Excluding individual states (III)

<i>Excluding:</i>	Tamil Nadu	Uttar Pradesh	West Bengal	Jammu & Kashmir	Delhi
Final goods tariffs	-0.141 (0.113)	-0.025 (0.071)	-0.152 (0.131)	-0.135 (0.115)	-0.134 (0.114)
Final goods tariffs * FLEX 2	0.140 (0.098)	0.106 (0.087)	0.106 (0.108)	0.157 (0.098)	0.150 (0.098)
Input tariffs	0.838** (0.327)	0.331 (0.304)	0.654* (0.362)	0.588* (0.328)	0.572* (0.330)
Input tariffs * FLEX 2	-0.220 (0.164)	-0.135 (0.169)	-0.117 (0.180)	-0.194 (0.168)	-0.171 (0.169)
Delicensing	0.109*** (0.030)	0.098*** (0.031)	0.123*** (0.029)	0.104*** (0.030)	0.107*** (0.030)
Delicensing * FLEX 2	-0.121*** (0.040)	-0.079** (0.038)	-0.100*** (0.038)	-0.086** (0.038)	-0.087** (0.037)
FDI reform	0.020 (0.029)	0.034 (0.029)	-0.022 (0.032)	0.021 (0.028)	0.024 (0.028)
FDI reform * FLEX 2	0.092** (0.045)	0.050 (0.041)	0.088** (0.041)	0.084** (0.041)	0.076* (0.041)
Flexible labour markets: Effects of changes in final goods tariffs					
Row 1 + Row 2	-0.001	0.081	-0.045	0.022	0.016
Std Error	0.085	0.069	0.079	0.079	0.079
p-value (combined effect = 0)	0.990	0.245	0.568	0.779	0.836
Flexible labour markets: Effects of changes in input tariffs					
Row 3 + Row 4	0.618**	0.196	0.536	0.394	0.401
Std Error	0.316	0.291	0.329	0.301	0.302
p-value (combined effect = 0)	0.050	0.500	0.103	0.190	0.185
Flexible labour markets: Effects of delicensing					
Row 5 + Row 6	-0.013	0.019	0.023	0.017	0.020
Std Error	0.038	0.038	0.039	0.038	0.038
p-value (combined effect = 0)	0.733	0.621	0.558	0.648	0.598
Flexible labour markets: Effects of FDI reform					
Row 7 + Row 8	0.112**	0.084*	0.066	0.106**	0.100**
Std Error	0.048	0.043	0.042	0.043	0.043
p-value (combined effect = 0)	0.019	0.051	0.110	0.015	0.020
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Observations	173377	173033	171913	192443	194018
R-squared	0.163	0.168	0.181	0.165	0.164

Dependent variable: natural logarithm of total number of persons engaged 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. ***: Significant at 1% **: Significant at 5% *: Significant at 10%

Table A10: SSI dereservation and industry level outcomes in the informal sector: panel fixed effects

	All enterprises		OAMEs		Establishments	
1995-2006:	ln (emp)	ln (ent)	ln (emp)	ln (ent)	ln (emp)	ln (ent)
FrDeres (industry level)	0.669*	0.652	0.859*	0.729	0.177	0.271
	(0.355)	(0.405)	(0.459)	(0.464)	(0.243)	(0.305)
Observations	420	420	375	375	401	401
R-squared	0.302	0.310	0.424	0.368	0.015	0.023
2001-2006:						
FrDeres (industry level)	0.113	0.047	0.049	-0.006	0.087	0.109
	(0.180)	(0.226)	(0.298)	(0.283)	(0.181)	(0.194)
Observations	280	280	244	244	267	267
R-squared	0.276	0.299	0.370	0.340	0.023	0.039

Dependent variable: ln (emp) = natural logarithm of employment or ln (ent) = natural logarithm of number of enterprises Standard errors, in brackets, are robust to heteroscedasticity. All regressions include a constant and industry and year fixed effects. ***: Significant at 1% **: Significant at 5% *: Significant at 10%