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## Tariff Liberalisation, Labour Market Flexibility and Employment: Evidence from India

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**Abstract:** While it can be hypothesised that domestic labour market characteristics influence the impact of trade liberalisation, the evidence base in this context is thin. This paper examines the extent to which differences in regional labour market flexibility shaped the impact of tariff liberalisation on employment in both formal and informal manufacturing firms in India in the 1990s. Controlling for other reforms undertaken in the same period, and for a range of firm, industry and state characteristics, the analysis finds appreciable links between tariff liberalisation and firm level employment. Declines in downstream and input tariffs are found to be of particular significance relative to reductions in final goods tariffs. Ceteris paribus, following tariff liberalisation, employment in the average formal firm increased by 9 per cent in states with relatively flexible labour markets in the 1985-2004 period, but declined by up to 17 per cent in states with less flexible labour markets. In the same period, in association with the tariff declines, average informal firm level employment fell by close to 36 per cent in states with flexible labour markets, while no statistically significant corresponding change was registered in states with inflexible labour markets. The results suggest that a consideration of forward and backward linkages should be integral to any analysis of the firm level effects of trade reform.

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## **1** Introduction

In the latter half of the twentieth century, a number of developing economies initiated trade liberalisation policies, often as part of a more comprehensive economic reform agenda. 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. Over two decades later, however, gaps persist in the literature that explores the labour market impacts of this trade 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. Crucially, the existing literature in this domain fails to distinguish between registered, or formal, manufacturing firms and the unregistered or 'informal' manufacturing sector, which encompasses all manufacturing firms employing less than 10 workers<sup>2</sup>. 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 paper seeks to address this gap in the literature by analysing the impact of India's tariff liberalisation in the 1990s on employment in formal and informal manufacturing firms. I also examine the extent to which this impact depends 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, the argument in favour of accounting for formal and informal firms separately appears to stand on solid ground.

The analysis in this paper exploits firm level survey data compiled by official Indian agencies for the formal and informal sectors. It benefits from the rich cross-industry variation in India's tariff declines, driven by a twin focus on tariff reduction and harmonisation, in the 1990s. 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. 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).

<sup>&</sup>lt;sup>2</sup>This threshold rises to 20 workers in the case of firms that do not use electricity. While official accounts refer to these firms as 'enterprises', I use the term 'firm' throughout this paper for consistency.

Most studies that analyse the impacts of India's trade reforms on the domestic labour market have tended to focus on tariffs on final goods, or output tariffs. 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 output tariffs. Amiti and Konings (2007) arrive at this conclusion in a study focusing on Indonesian firms. Nataraj (2011) obtains a similar productivity effect for formal firms in India, while also establishing that output tariff cuts are a more important driver of increases in informal firm productivity. These results suggest that in considering the employment impacts of trade reforms, the case for examining both output and input tariff declines is sound. This paper is the first to examine the impact of declines in both output and input tariffs on firm level employment in India.

Given the consideration accorded to input tariff decreases as a potential driver of shifts in firm level outcomes, it could be argued that declines in the tariffs faced by industries that are 'downstream' to firms in a given industry of interest might also have non-negligible effects on employment in such firms. Recent research by Ghani *et al* (2013a) provides indicative evidence that the informal sector is responsive to changes in the degree of potentially downstream formal sector activity. In addition to considering output and input tariffs, therefore, I examine firm level employment changes associated with tariff declines in the industries to which a given industry supplies its products, as per India's official input-output matrix. I label these tariffs 'downstream tariffs'. To the best of my knowledge, this is the first study to consider these downstream tariff related effects in the Indian context.<sup>3</sup>

Hasan *et al* (2012) explore whether output tariff liberalisation has differential impacts on the unemployment rate in Indian states with relatively more flexible and less flexible labour markets. However, this analysis is conducted at a fairly high level of industry aggregation, does not assess input and downstream tariff declines, and does not consider employment in formal and informal firms separately. In comparison, I am able to achieve not only a formal-informal segregation but also a more disaggregated industry classification.

The results are suggestive of substantial employment shifts in the manufacturing sector following tariff liberalisation, with downstream and input tariffs being particularly significant explanatory variables. As regards formal firms, a one percentage point cut in output tariffs is associated with

<sup>&</sup>lt;sup>3</sup> As regards productivity shifts, downstream tariffs are arguably unimportant, given that productivity is a function of labour and material inputs and costs. However, as I focus on employment effects, which may be driven by both forward and backward linkages, I include downstream tariffs in my analysis.

average employment falling by close to 0.13 per cent in states with flexible labour markets. However, a one percentage point decline in downstream tariffs is associated with formal firm employment rising by 0.29 per cent in those states. Conversely, in states with relatively rigid labour markets, a one percentage point decline in downstream tariffs is linked with formal firm level employment declining by nearly 0.3 per cent.

The reductions in output and downstream tariffs are not associated with significant informal firm level employment changes. However, a one percentage point decline in input tariffs is associated with a fall in employment of a little over 0.5 per cent in the average informal firm in states with flexible labour markets, with no corresponding statistically significant effect visible in states with inflexible labour markets.

Given the extent to which output, input and downstream tariffs declined in India through the 1990s, these estimates suggest that *ceteris paribus*, following tariff liberalisation, employment in the average formal firm increased by 9 per cent in states with flexible labour markets and declined by up to 17 per cent in states with inflexible labour markets. In the same timeframe, following the tariff declines, average informal firm level employment fell by approximately 36 per cent in states with flexible labour markets, and registered no statistically significant change in states with less flexible labour markets.

In line with intuition, in states with flexible labour markets, the employment enhancing effect of downstream tariff reductions appears to be restricted to formal firms in basic or capital goods industries. Conversely, as regards consumer durables, formal firm employment in the same states is more responsive to output and input tariff declines. Further, my results retain statistical significance only for informal and formal firms located in urban areas.

My findings uphold the notion that, *prima facie*, the interactions between tariff rate changes and states' labour market flexibility might be expected to affect employment in formal firms rather than informal firms, as the latter rarely engage directly in international trade and are not subject to the labour market regulations with which formal firms are legally bound to comply. Nonetheless, informal firm level employment does respond somewhat to declines in input tariffs, at least in states with flexible labour markets. Complementarities may, therefore, exist between formal and informal firms on account of vertical linkages or agglomeration externalities. This is in line with recent work by Sundaram *et al* (2012), Mukim (2013) and Ghani *et al* (2013b).

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The remainder of this paper is organised as follows. Section 2 undertakes a brief review of the literature and discusses the context in which the 1991 reforms were phased in. Section 3 describes the data, while Section 4 outlines the empirical methodology. Main findings are presented in Section 5, with a wide range of robustness checks discussed in Section 6. Section 7 concludes.

## 2 Background and context

## 2.1 Literature review

#### 2.1.1 Impacts of tariff liberalisation on firm level employment

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 output 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 papers 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 (2012)). In the Indian context, given that informality is captured at the firm level rather than the worker level, the relevance of these studies is limited.

The literature has implicitly tended to assume that formal and informal firms 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. In considering employment impacts, then, declines in tariffs on intermediate goods (input tariffs), as also declines in tariffs on goods in downstream industries (downstream tariffs), are arguably as important to assess as output tariff cuts.

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

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Kis-Katos and Sparrow (2013), Paunov (2011), Sharma (2013) and Groizard et al (2014)). The only study also considering the implications of reductions in input tariffs for informal employment appears to be that of Menezes-Filho and Muendler (2011). This analysis exploits a rich worker flow dataset to establish that output tariff cuts in Brazil in the 1990 are associated with significant numbers of formal workers becoming unemployed. Conversely, declines in Brazilian input tariffs are associated with significant reductions in worker flows out of formality and into unemployment. No significance is obtained for the informal sector.

Empirical analysis otherwise appears to have sidestepped the impacts of input tariff declines on informal employment. Further, to the best of my knowledge, the literature has not considered the potential employment effects of declines in the tariffs faced by downstream industries on formal and informal firms further upstream. This paper contributes to building an evidence base in these areas.

#### 2.1.2 Does labour market flexibility matter?

The analyses of 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 tariff liberalisation. Intuitively, the notion that the impact of tariff reform on an economy's labour markets is affected by domestic institutions is appealing. In other words, the impact of tariff liberalisation on domestic labour markets is arguably likely to hinge on the interaction between tariff liberalisation and domestic institutions, in particular labour market regulation.

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 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 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 'proemployer' 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. While the purview of labour market regulation extends only to formal firms, the potential for linkages between formal and informal firms would imply that the possibility of spillover effects into the informal sector cannot be discounted.

A recent study by Hasan *et al* (2012) examines the extent to which output tariff liberalisation in India had differential impacts at the state level on the basis of state level labour market flexibility, as evaluated using the Besley-Burgess measure, the measure due to Gupta *et al* (2009) and an additional measure ('FLEX 2', described in Section 3.3). Hasan *et al* (2012) conclude that urban unemployment in states with flexible labour markets tended to be lower than that in states with less flexible labour markets. However, their analysis fails to consider input and downstream tariff declines, does not distinguish between the formal and informal sectors, and is conducted at a fairly broad, two-digit industry level, which leaves open the possibility that a more disaggregated dataset might yield greater insight. My analysis aims to help address this gap in the literature.

## 2.2 Context to the Indian Reforms of 1991-1997

Prior to the 1980s, Indian economic policy was largely geared towards government regulation and national self-sufficiency. 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. 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. The domestic license regime was partially liberalised, with roughly one in three three-digit manufacturing industries being delicensed in 1985<sup>4</sup>. 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.

In August 1991, the Indian government approached the IMF to request a Stand-By Arrangement to help it tide over this external payments crisis. The IMF agreed to provide the requisite support conditional on the government undertaking a series of macro-structural reforms, including substantive trade liberalisation measures. It was against this background that the trade reforms of 1991 were phased in. Given the circumstances, it may plausibly be argued that these reforms constituted an exogenous shock for the economy<sup>5</sup>.

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. Foreign direct investment (FDI) constraints were gradually eased<sup>6</sup> and special economic zones were set up to promote the growth of the nascent information technology industry. Further, the Indian rupee was devalued relative to the US dollar and a dual exchange rate was introduced.

<sup>&</sup>lt;sup>4</sup> Up to the 1980s, 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. This policy was extremely restrictive and discouraged industry entry and competition (Sharma, 2008). In this context, the term 'delicensing' implies that firms in a given industry or industries were no longer required to obtain such a license.

<sup>&</sup>lt;sup>5</sup> Sivadasan (2009) and Topalova and Khandelwal (2011) provide additional background detail on the 1991 reforms. <sup>6</sup> 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 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 output 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.

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. 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 Section 6.5, I undertake a number of checks and conclude that tariff endogeneity is unlikely to be a concern for the analysis in this paper.

In tandem, 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. 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).

As Nataraj (2011) documents, while many of the other domestic reforms of the 1990s were of an industry invariant nature, the delicensing and FDI liberalisation measures were phased in at different points in time for different manufacturing industries. In all my empirical specifications, I therefore include controls for these two reform measures. These controls are described in Section 3.2.

## 3 Data

## 3.1 Labour market data

I use formal and informal firm level employment data compiled by the Indian Ministry of Statistics and Programme Implementation (MOSPI) in 1989-90, 1994-95 and 2000-01. For both sets of firms, I use data on the total number of persons engaged to measure employment. 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<sup>7</sup>. All other firms are unregistered and comprise the informal manufacturing sector<sup>8</sup>.

The formal firm survey data that I use are compiled by the Annual Survey of Industries (ASI), which covers all large firms (defined as having 100 or more employees) 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.

I obtain informal firm survey data from the National Sample Survey Organisation (NSSO), which surveys approximately 1 per cent of all informal (unregistered) firms approximately every five years. The NSSO 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 firms.

I construct datasets comprising formal and informal firm data for three periods: 1989-90, 1994-95 and 2000-01. While data on formal firm employment are compiled annually, informal firms are surveyed only quinquennially, including in these three periods<sup>9</sup>. As my analysis extends to both formal and informal sector employment, I restrict my analysis to the snapshots that these three points in time offer. As such, I observe firms 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 establish the

<sup>&</sup>lt;sup>7</sup> 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.

<sup>&</sup>lt;sup>8</sup> The terms 'unregistered' and 'informal' are, in the context of Indian firms, virtually synonymous.

<sup>&</sup>lt;sup>9</sup> For convenience, I refer to these three periods as 1990, 1995 and 2001 in this paper.

channels through which observed employment changes occur, but I attempt to discuss this issue to the extent possible.

Pooled employment distributions for the informal and formal sectors are presented in Figures 1(a) and 1(b). The average informal firm employs two persons, and over 90 per cent of informal firms employ up to four people. Over a half of informal manufacturing jobs are accounted for by informal firms engaging one or two persons. Close to 80 per cent of the informal firms in my dataset are small household enterprises, labelled 'own account manufacturing enterprises' or OAMEs in the NSSO surveys<sup>10</sup>. The remaining, slightly larger informal firms in the dataset are labelled 'non-directory manufacturing establishments' or NDMEs<sup>11</sup> by the NSSO<sup>12</sup>.

While average formal firm employment amounts to 74, the distribution is highly skewed to the right, so that the median formal firm employs 20 people and over 75 per cent of formal firms employ less than 50 people. The modal employment value for formal firms is 10, the threshold below which firms may be unregistered or informal. Large formal firms employing over 100 people, however, account for a majority of formal manufacturing jobs.

## Figure 1: Firm and employment shares by firm employment size



## (a) Formal sector (Pooled data – 1990, 1995, 2001)

<sup>&</sup>lt;sup>10</sup> OAMEs are household based, informal manufacturing firms 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).

<sup>&</sup>lt;sup>11</sup> NDMEs are informal manufacturing firms that hire at least one and up to five workers (household and non-household workers) on a regular basis.

<sup>&</sup>lt;sup>12</sup> In 1990, the NSSO did not survey relatively large informal firms employing more than six workers (household and hired workers) on a regular basis (labelled 'directory manufacturing firms' or DMEs). As DMEs therefore do not feature in the only pre-reform data at my disposal and since they comprise less than 10 per cent of informal firms surveyed in 1995 and 2001, I discard them from my dataset.



## (b) Informal sector (Pooled data – 1990, 1995, 2001)

Source: ASI and NSSO 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 formal and informal firms.

The construction of the pooled formal and informal firm datasets poses a number of challenges, key among which is the fact that the National Industrial Classification (NIC) system used in the 2001 NSSO and ASI surveys (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. The dependent variable is the natural logarithm of firm level employment.

As the state specific labour market flexibility measure used applies to fifteen states, I discard firms located in other states. This does not appear to be a serious concern, as the fifteen states of interest 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 manufacturing employment in each period.

I exclude firms that are reported to have been closed from my analysis. Further, I observe that a very small fraction (less than 0.1 per cent) of informal firms in each period appear to employ more than 20 persons, the unequivocal threshold for transition to formal (registered) status. I retain these firms in my dataset, but I undertake a robustness check to confirm that omitting them from the dataset does not modify my results. Conversely, a number of formal firms report employing less than 10 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. However, I drop two formal firms that report implausibly high employment values<sup>13</sup>, having undertaken a robustness check to ensure that this has little impact on the results.

## 3.2 Data on tariff liberalisation and other reforms

I use annual data on output and input tariff rates for the 1989-2000 period, compiled by Nataraj (2011) at the three-digit National Industrial Classification (NIC) 1987 level. The output tariff data are based on the Government of India's Customs Tariff Working Schedules and the UNCTAD-TRAINS database, whereas the input tariff data are computed using sectoral output tariffs and the Indian Input-Output Transactions Table (IOTT).<sup>14</sup> Further, in a manner similar to the input tariff calculation, I construct an annual downstream tariff measure for the 1989-2000 period, also on the basis of output tariffs and the IOTT.<sup>15</sup> Summary statistics are provided in Table 1.

Output, input and downstream 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)<sup>16</sup>. These 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 2.2, output tariffs declined precipitously in 1992, which was the first year of reform implementation following the balance-of-payments crisis of 1990-91. Input tariffs and downstream tariffs also fell and converged in the post-1991 period, and display less variance relative to output tariffs. The scatterplots in Figures 2(a), 2(b) and 2(c) capture tariff levels in 1989 and the declines that occurred in the 1989-2000 period for output, input and downstream tariffs (respectively), illustrating how the highest pre-reform tariff rates were subjected to the largest

<sup>&</sup>lt;sup>13</sup> These two firms report employment figures of over 2 million and 4 million, which may be due to misreporting given that mean employment for the rest of the formal firm sample is 74, with the median being 20 and the maximum being 91,144. <sup>14</sup> 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 output tariff for leather goods plus 0.2 times the output tariff for textiles.

<sup>&</sup>lt;sup>15</sup> As an instance, to extend the example of Nataraj (2011), if the textiles industry supplies 25 per cent of its output to the footwear industry and 75 per cent of its output to the readymade garments industry, the downstream tariff on textiles equals 0.25 times the output tariff for footwear plus 0.75 times the output tariff for readymade garments.

<sup>&</sup>lt;sup>16</sup> These data were first used by Aghion *et al* (2008). As discussed in Section 2.2, 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.

cuts<sup>17</sup>. Figures 2(d) and 2(e) plot pairwise declines in output tariffs on the one hand, and input and downstream tariffs on the other, over the 1989-1994 and 1989-2000 periods. These graphs suggest that while there may be a positive association between the shifts in tariff rates<sup>18</sup>, it is not sufficiently strong for multicollinearity to pose major concerns.





(a) Output tariffs (1989) and declines in output tariffs (1989-2000)<sup>19</sup>

<sup>&</sup>lt;sup>17</sup> This was purposefully undertaken in the case of output tariffs, with input and downstream tariffs undergoing related, albeit not equivalent, declines.

<sup>&</sup>lt;sup>18</sup> The correlation coefficient for the changes in output and input tariffs over the 1989-1994 period is 0.5776, while that for the corresponding changes over the 1989-2000 period is 0.5927. Further, the correlation coefficient for the changes in output and downstream tariffs over the 1989-1994 period is 0.5733, while that for the corresponding changes over the 1989-2000 period is 0.5733, while that for the corresponding changes over the 1989-2000 period is 0.5733, while that for the corresponding changes over the 1989-2000 period is 0.5733, while that for the corresponding changes over the 1989-2000 period is 0.5733, while that for the corresponding changes over the 1989-2000 period is 0.5517.

<sup>&</sup>lt;sup>19</sup> The two outliers visible to the right of this graph are the wine manufacturing and spirit distillation, rectification and blending industries, the tariffs for which amounted to over 250 per cent in 1989, but were subjected to smaller reductions relative to other industries with very high tariff rates in 1989. A robustness check which omits these outliers from the baseline regressions (outlined in Section 4) is discussed in Section 6.5.



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

## (c) Downstream tariffs (1989) and declines in downstream tariffs (1989-2000)





### (d) Declines in output tariffs and declines in input tariffs (1989-1994 and 1989-2000)

### (e) Declines in output tariffs and declines in downstream tariffs (1989-1994 and 1989-2000)



Source: Output and input tariff data compiled by Nataraj (2011) on the basis of Government of India estimates and India's IOTT, downstream tariff data compiled by author on the basis of output tariff data provided by Nataraj (2011) and India's IOTT

As a robustness check, I also use data on effective rates of protection (ERP) in the manufacturing industries of relevance to this study. These data, available for the years 1987-88, 1992-93, 1994-95 and 1997-98, are compiled by Nouroz (2001).

#### 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 Industrial Disputes Act (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<sup>20</sup>. In total, the fifteen states made 113 amendments. Besley and Burgess 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 (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-Burgess 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)<sup>21</sup>, who construct an additional measure that they refer to as 'FLEX 2'. 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* point out that World Bank (2003) 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'<sup>22</sup>. In summary, the 'FLEX 2' index assigns scores

<sup>&</sup>lt;sup>20</sup> Besley and Burgess (2004) consider sixteen states in their analysis, but the state of Jammu and Kashmir made no amendment to the IDA in the 1958-1990 period.

<sup>&</sup>lt;sup>21</sup> The Besley-Burgess measure, with a minor correction incorporated for the state of Madhya Pradesh, is labelled 'FLEX 1' by Hasan *et al* (2012).

<sup>&</sup>lt;sup>22</sup> In their online appendix, Hasan *et al* (2012) provide additional detail in this regard. Gujarat and Maharashtra are typically considered to be prime business locations by Indian businessmen, whereas Kerala is not. The World Bank's (2003) 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 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.

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.

In this study, I use the 'FLEX 2' 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 (as noted in footnote 22). Dougherty (2008) notes that there were no major state level amendments to the IDA between 1990 and 2004.<sup>23</sup> As my analysis is focused on the 1990-2001 time period, the 'FLEX 2' indicator varies only across states and not over time.

As I interact the 'FLEX 2' measure with the output, input and downstream 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 ('proworker') 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).

## 4 Method

The analysis harnesses the substantial degree of variation in tariff declines over time and across industries to identify the impact of tariff liberalisation on employment. In the expanded baseline specification, I account for state level differences in labour market flexibility.

The preliminary regression that I employ is of the form:

$$lnemp_{ijkt} = \alpha_0 + \alpha_1 TARIFF_{jt-1} + \alpha_2 INTAR_{jt-1} + \alpha_3 DTAR_{jt-1} + \gamma_1 DEL_{jt-1} + \gamma_2 FDI_{jt-1} + \delta_t + \delta_j + \delta_k + \varepsilon_{ijkt}$$
(1)

and the full baseline specification, similar to that used by Hasan et al (2012), is of the form:

$$lnemp_{ijkt} = \alpha_0 + \alpha_1 TARIFF_{jt-1} + \beta_1 TARIFF_{jt-1}LM_k + \alpha_2 INTAR_{jt-1} + \beta_2 INTAR_{jt-1}LM_k + \alpha_3 DTAR_{jt-1} + \beta_3 DTAR_{jt-1}LM_k + \gamma_1 DEL_{jt-1} + \gamma_2 FDI_{jt-1} + \delta_t + \delta_j + \delta_k + \varepsilon_{ijkt}$$
(2)

where  $Inemp_{ijkt}$  is the natural logarithm of employment in firm *i* in industry *j* and state *k* at time *t*; TARIFF<sub>*j*t-1</sub>, INTAR<sub>*j*t-1</sub> and DTAR<sub>*j*t-1</sub> are one-year lags of output, input and downstream tariffs

<sup>&</sup>lt;sup>23</sup> Dougherty (2008) states that there have been 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.

respectively;  $DEL_{jt-1}$  and  $FDI_{jt-1}$  are time varying indicator variables capturing whether industry junderwent delicensing and FDI regime reforms in the previous period;  $\delta_t$ ,  $\delta_j$  and  $\delta_k$  are year, industry and state fixed effects; and  $LM_k$  is a time invariant indicator variable capturing the degree of labour market flexibility in state k (the 'FLEX 2' measure). As  $LM_k$  is time invariant, its level effect is subsumed within  $\delta_k$ , the state fixed effects term.

In the specification presented in equation (1), the overall impact of tariff liberalisation on employment is the sum of the coefficients  $\alpha_1$ ,  $\alpha_2$  and  $\alpha_3$ . In the expanded specification of equation (2), this impact derives from the sums  $\alpha_1 + \beta_1$  (for output tariff liberalisation),  $\alpha_2 + \beta_2$  (for input tariff liberalisation) and  $\alpha_3 + \beta_3$  (for downstream tariff liberalisation). In each instance, the first term captures the direct impact linked with tariff liberalisation, whereas the interaction term (involving  $LM_k$ ) presents a measure of the indirect effect associated with the interplay between tariff liberalisation and state level labour market flexibility. The sum of the two coefficients thus yields a measure of 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  $\beta_1$ ,  $\beta_2$  and  $\beta_3$ . 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.

## **5** Results

### 5.1 The effects of the tariff declines

To begin, I assess whether the tariff reductions are associated with statistically significant employment shifts at the firm level, irrespective of variations in regional labour market flexibility. In Column 1 of Table 3, I therefore regress the natural logarithm of formal firm level employment on output tariffs lagged by one year, controlling for the delicensing and FDI reforms and state,

year and industry dummies. In Column 5 of Table 3, I run the same regression for informal firms. In both instances, the output tariff coefficients are statistically insignificant. FDI liberalisation, however, is associated with a statistically significant increase in formal firm employment. Little changes when I add input tariffs lagged by one year to the right hand side (Table 3, Columns 2 and 6), with the input tariff coefficients being statistically significant only at a significance level of 0.10. Further, incorporating downstream tariffs lagged by one year in the primary specification (Table 3, Columns 3, 4, 7 and 8) has virtually no effect, with the downstream tariff coefficients being statistically insignificant (Columns 4 and 8 correspond to equation (1) as specified in Section 4).

In Table 4, I explore the extent to which state level differences in labour market flexibility have a bearing on the effects of tariff liberalisation, using alternative forms of the baseline specification of equation (2). I focus on the results that are statistically significant at a significance level of 0.05. As regards formal firm employment, Column 1 indicates that output tariff changes have no significant effect when input and downstream tariff changes are not controlled for. The inclusion of input tariffs in the equation (Table 4, Column 2) yields a weakly significant effect of output tariff changes, and a more visibly significant effect of input tariff changes, on formal firm employment in states with flexible labour markets. More precisely, in these states, a one percentage point reduction in input tariffs is associated with employment in the average formal firm increasing by 0.36 per cent (Column 2, 'Row 3 + Row 4').<sup>24</sup> The corresponding p-value of 0.026 indicates that this result is statistically significant at a significance level of 0.05.

Likewise, Column 3 of Table 4 reveals that when we add downstream tariffs to the specification in Column 1, output tariff cuts are associated with statistically significant declines in formal firm employment in states with flexible labour markets. However, this effect is more than outweighed by a strongly significant employment enhancing effect associated with declines in downstream tariffs. This result persists when we control for input tariffs (Table 4, Column 4). To be precise, a one percentage point cut in output tariffs is associated with average formal firm employment decreasing by 0.13 per cent in states with flexible labour markets (Column 4, 'Row 1 + Row 2'). The corresponding p-value of 0.025 indicates that this result is statistically significant at a significance level of 0.05. On the other hand, a one percentage point decline in downstream tariffs is associated with formal firm level employment rising significantly by 0.29 per cent, in states with flexible labour markets (Column 4, 'Row 5 + Row 6'). Further, in states with inflexible labour

<sup>&</sup>lt;sup>24</sup> As specified in Section 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 the coefficients yielded by the regressions as proportional changes directly (without having to multiply them by 100).

markets, a one percentage point in downstream tariffs is associated with formal firm level employment falling by 0.3 per cent (Column 4, Row 5).

At the 0.05 significance level, input tariff declines are not associated with statistically significant shifts in employment in formal firms in both groups of states. However, in the informal sector, Table 4 indicates that a one percentage point reduction in input tariffs is linked with a statistically significant employment reduction of a little over 0.5 per cent in informal firms, in states with flexible labour markets (Table 4, Column 8, 'Row 3 + Row 4'). No corresponding significance is observed for states with rigid labour markets. Moreover, output and downstream tariff declines are not found to be associated with significant changes in employment in informal firms in either group of states.

Given that the average informal firm employs only two persons and that most informal firms employ up to four persons (as outlined in Section 3.1), it could be argued that using the natural logarithm of employment as the dependent variable is problematic in this context. To address this concern and to explore whether a count model would better fit the data, I employ a Poisson regression approach.<sup>25</sup> Table 5 suggests that this strategy yields very similar results, in comparison with my baseline findings for informal firms.

To summarise the findings for formal firms, output tariff declines are associated with reductions in employment in states with flexible labour markets and downstream tariff declines are associated with employment increases in these states, with the latter outweighing the former. These results suggest that in states which have relatively more flexible labour markets, formal manufacturing firms may be better able to use their employees as an adjustment channel when they face the competitive pressures engendered by tariff liberalisation. This is likely to be more difficult in states with inflexible labour markets, which make worker hiring and firing more onerous for formal firms.

As regards informal firms, the only statistically significant result is that of reduced employment in states with flexible labour markets following declines in input tariffs. As informal firms are highly unlikely to use imported inputs<sup>26</sup>, it is not immediately clear why this result should hold. One possibility is that informal firms respond to the price reduction effects of tariff declines in the

<sup>&</sup>lt;sup>25</sup> The dependent variable in this model is actual firm level employment rather than the natural logarithm.

<sup>&</sup>lt;sup>26</sup> Less than 3 per cent of formal firms with less than 20 employees (the higher informal employment threshold) report using imported inputs in 2000-01 (the 1990 and 1995 surveys did not request this information), with input importers tending to be larger firms. While the informal firm data do not provide this information, it seems reasonable to assume that informal firms, which employ 2 persons on average, rarely use imported inputs.

industries that are input providers vis-à-vis their own industry. I analyse the robustness of this finding in Section 6.

On the whole, the findings also raise the possibility that there may be linkages within the formal and informal sectors, with smaller firms potentially supplying larger ones. I consider these size-based linkages in greater detail in Section 6.

## 5.2 Implications for the Indian labour market

The discussion in Section 5.1 implies that the changes in firm level employment that are associated with the tariff reforms of the 1990s are of a substantial magnitude. The median declines in output, input and downstream tariffs in the manufacturing industries in my dataset for this period amount to 62 percentage points, 66 percentage points and 58 percentage points. Given these numbers, the statistically significant results<sup>27</sup> discussed in Section 5.1 indicate that if other variables are held constant over this period, employment in the average formal firm increased by 9 per cent in states with flexible labour markets in association with the tariff reductions, and declined by up to 17 per cent in states with inflexible labour markets. In the same timeframe, average informal firm level employment fell by approximately 36 per cent in states with less flexible labour markets.<sup>28</sup>

Overall, the results suggest that the tariff liberalisation of the 1990-2001 period is associated with statistically significant increases in formal firm size (in terms of employment) in states with flexible labour markets. Conversely, in states with less flexible labour markets, the tariff reforms are associated with significant reductions in formal firm level employment. The same reforms are associated with employment in the average informal firm having fallen in states with flexible labour markets, with no significant shift visible for informal firms in states with inflexible labour markets.

<sup>&</sup>lt;sup>27</sup> I restrict my attention to those results that are statistically significant at a significance level of 0.05.

<sup>&</sup>lt;sup>28</sup> As an example of how these numbers are arrived at, since a one percentage point fall in input tariffs is associated with average informal firm employment decreasing by 0.54 per cent in states with flexible labour markets, the median input tariff reduction of 66 percentage points would be associated with informal firm employment declining by 36 per cent (66 multiplied by 0.54). The estimates pertaining to formal firm employment are derived in similar fashion.

## **6 Robustness checks**

## 6.1 Consumer goods and capital goods

The results discussed in Section 5 highlight that, on the whole, fluctuations in input and downstream tariff are a more prominent driver of firm level employment shifts relative to output tariffs. Nonetheless, output tariffs might be expected to have a bigger role to play in industries that are primarily final goods producers, such as consumer goods industries. On the other hand, as regards industries that tend to supply inputs or basic goods to other industries, it might be anticipated that movements in downstream tariffs are of greater relevance for employment. Further, in industries that have relatively sophisticated supply chains, input tariffs would arguably assume greater prominence relative to other industries. Moreover, Nataraj (2011) and others have pointed out that while almost all manufacturing industries in India were, to varying degrees, subjected to the tariff declines of the 1990s, non-tariff barriers were lowered much more gradually for consumer goods, as opposed to other industries.

To explore these ideas further, I classify the firms in my dataset into three 'use based' industry categories, as drawn up by Nouroz (2001): basic goods (including capital and intermediate goods), consumer durables and consumer non-durables. The baseline regression (2) is then estimated separately for these three industry categories.<sup>29</sup> Given that I obtain more striking baseline findings for formal firms relative to informal firms (see Section 5), I expect these industry type based checks to yield potentially interesting results for the formal sector in particular.

Results are presented in Table 6, and are broadly supportive of intuition. As regards formal firms in states with flexible labour markets (Table 6, Columns 1 to 3), downstream tariffs are a more prominent driver of employment shifts in basic, capital and intermediate goods industries. On the other hand, in the same states, formal firms in consumer durables industries grow following input tariff declines. Output tariff declines are associated with reduced formal firm employment in industries that produce consumer durables, irrespective of state level labour market flexibility. However, in states with inflexible labour markets, output tariff declines are associated with the same associated with increased employment in formal firms classified as consumer non-durable producers, although this effect is negated by downstream tariff declines.

<sup>&</sup>lt;sup>29</sup> As my baseline results are statistically significant in the presence of the state level labour market flexibility dummy 'FLEX 2', as discussed in Section 5, I undertake robustness checks primarily for the baseline equation (2) as opposed to equation (1).

The results for informal firms (Table 6, Columns 4 to 6) are more difficult to interpret, although this is perhaps to be expected given that an end use based industry classification is less likely to be relevant to small informal firms relative to the formal sector. The negative baseline informal firm employment effect associated with input tariff declines in states with flexible labour markets appears to be restricted to consumer non-durables industries, which account for approximately three-quarters of informal firms. Informal firms in capital goods industries appear to grow following input tariff declines, irrespective of state level labour market flexibility, which may be driven by overall price declines in the industries from which these firms procure their inputs (following the discussion in Section 5.1).

#### 6.2 Urban and rural firms

As documented by Topalova (2010), manufacturing is more prevalent in urban areas in India, relative to rural areas. Hasan et al (2012) find that trade protection has a stronger impact on the unemployment rate in urban areas, as opposed to rural areas. As information on firm location is provided in my dataset, I run the baseline equation (2) separately for firms located in urban and rural areas. The results, presented in Table 7, illustrate that my headline findings are robust only for formal and informal firms located in urban areas, and lose significance for their rural counterparts. The tariff declines, therefore, are associated with firm level employment shifts primarily in urban areas.

#### 6.3 Linkages within the formal and informal sectors

Following the discussion in Section 5.1, I explore whether the formal firm employment shifts associated with downstream tariffs are confined to smaller formal enterprises, as might be expected if vertical linkages exist within the formal sector. In other words, it is possible that smaller formal firms supply goods to larger formal firms, and that employment in the former is therefore relatively more sensitive to downstream tariff declines. In Table 8, I present evidence that is supportive of this notion. In particular, in states with flexible labour markets, the headline findings for formal firms are robust only for firms employing up to 50 workers. For the large formal firms that exceed this threshold, there appears to be no significant employment change associated with tariff liberalisation. Instead, for these large firms, the industrial delicensing being associated with a statistically significant employment increase in such firms. This is supportive of the view that as the pre-reform licensing policy applied to formal manufacturing

firms employing over 50 workers (or 100 workers if power was not used), as specified in Section 2.2, its relaxation might be expected to have affected these larger firms in particular. The employment enhancing effect of delicensing, however, is negated by what is likely to have been a 'pro-competition' impact of the output tariff cuts, as these are associated with significant employment reductions in the larger formal firms in states with inflexible labour markets.

As regards informal firms, I run the baseline regressions separately for the OAMEs (small household enterprises) and NDMEs (slightly larger enterprises) discussed in Section 3.1. I find that all significance is lost for OAMEs, although the results are robust for NDMEs (Table 8). This is intuitively appealing, in the sense that NDMEs are arguably more likely to use manufactured inputs in their production process relative to OAMEs, which constitute the most 'household specific' component of the informal sector. As specified in Section 5.1, informal firms are highly unlikely to use imported inputs. With the tariff reductions being likely to have had implications for market prices, this indicates that employment in NDMEs was more sensitive to the declines in domestic input prices in the period following tariff liberalisation, in comparison with employment in OAMEs (which is purely household based).

#### 6.4 Alternative measure of protection

As discussed in Section 3.2, I use effective rates of protection (ERP) obtained from Nouroz (2001) as an alternative to tariff rates in my baseline regressions (1) and (2) to conduct an additional robustness check. The ERP is an alternative characterisation of the rate of protection enjoyed by domestic industries *vis-à-vis* foreign competition. It is defined as the ratio of the difference between product value added at free trade prices and tariff distorted prices, to product value added at free trade prices and tariff distorted prices.

$$ERP_{j} = (VA_{j}^{*} - VA_{j}) / (VA_{j}^{*})$$
(3)

where *ERP<sub>i</sub>* is the effective rate of protection enjoyed by industry *j*, *VA<sub>j</sub>*<sup>\*</sup> is the value added of the final product *j* at free trade prices and *VA<sub>j</sub>* is the value added of the final product *j* at tariff distorted prices. The ERP data obtained from Nouroz (2001) are not perfect in the context of my analysis, as they are available only for four points in time (1987-88, 1992-93, 1994-95 and 1997-98) and at a higher level of industry aggregation than the three-digit NIC (1987) classification that I use. Nonetheless, there appears to be sufficient variation in the ERP to undertake a robustness check, with 57 unique ERP values available. I use industry group descriptions in the ERP data to match these values to firms in the 132 industries in my dataset.

The results, presented in Table 9, are broadly supportive of the key findings relating to firm level employment as discussed in Section 5, especially as regards the formal sector. In particular, a decline in ERP is associated with an increase in employment in formal firms located in states with flexible labour markets, but not in states with inflexible labour markets. Table 9 suggests that this holds for both simple and import weighted ERP. In the case of import weighted ERP, the finding that employment falls in formal firms situated in states with inflexible labour markets is also upheld (Table 9, Column 2).

## 6.5 Endogeneity of tariff liberalisation policy

As explained in Section 2.2, the tariff declines that were phased in during the initial years of reform (1991-97) were arguably an exogenous event, but tariff policy endogeneity might be an issue in the later years of relevance to my analysis (1998-2001), when the pressure to adhere to externally imposed guidelines had waned.<sup>30</sup> I explore whether endogeneity poses a concern for my results in a number of ways.

First, I regress output tariffs on lagged state-industry level employment and lagged state-industry employment shares for the informal and formal sectors in alternative specifications<sup>31</sup>, including year and industry fixed effects throughout. The time lags used vary over one to three years. I undertake the same exercise for input and downstream tariffs. In all instances, as demonstrated in Table 10, there is no evidence of any association between formal or informal industry employment levels and tariff rates in later years. I proceed to run these regressions separately for the three cross-sections (1990, 1995 and 2001), dropping the year fixed effects, and arrive at the same conclusion.

Second, I run separate regressions of the proportionate change in output, input and downstream tariffs on the lagged proportionate change in employment in formal and informal industries, including period and industry fixed effects throughout. As evidenced in Table 11, there is no significant association between proportionate formal employment changes and proportionate tariff changes in subsequent periods. While the coefficients for informal employment are statistically significant, their economic significance is close to zero. Further, when the regressions

<sup>&</sup>lt;sup>30</sup> 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.

<sup>&</sup>lt;sup>31</sup> I undertake separate checks for the informal and formal sectors, given that any evidence of endogeneity is more likely to appear in the context of the formal sector, since permanent employees of formal firms are arguably better able to unionise and lobby for protection (see for instance Saha *et al*, 2013).

are run separately for the two periods in question (1990-1995 and 1995-2001) after dropping the period fixed effects, little statistical or economic significance is obtained.

Topalova and Khandelwal (2011) report that the changes in output tariffs, input tariffs and ERP 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 12, I confirm that the period-to-period output, input and downstream tariff changes (over the 1990-1995 and 1995-2001 periods) are not correlated with pre-existing formal or informal industry employment levels<sup>32</sup>.

Next, I proceed to add industry-year interaction fixed effects to my baseline regressions, to check whether industry and time varying unobservables have a role to play in explaining my findings. These variables are collinear with the tariffs, so that the direct output, input and downstream tariff regressors have to be dropped when they are incorporated in the regressions. In terms of statistical significance, the results, presented in Table 13, are consistent with the corresponding baseline coefficients in Table 4.

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 period<sup>33</sup>. Figure 2(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 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. Table 14 reveals that the omission of these outliers leaves the baseline results for formal and informal firms virtually unchanged in terms of both magnitude and significance (the comparison is with the figures presented in Table 4, Columns 4 and 8).

## 6.6 Adding state-year interaction terms

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

<sup>&</sup>lt;sup>32</sup> When the same check is undertaken for each period separately, statistical significance is obtained in some instances for informal employment, but economic significance is missing throughout as all the coefficients obtained equal zero, even up to six decimal places.

<sup>&</sup>lt;sup>33</sup> These industries are the wine manufacturing industry and the distillation, rectification and blending of spirits industry. See Figure 2(a).

to my baseline specification. The results, presented in Table 15, indicate that the headline findings are robust for formal firms, but significance is lost for informal firms in states with flexible labour markets.<sup>34</sup> Instead, when state-year interaction fixed effects are included, input tariff declines appear to be associated with declines in informal firm level employment in states with inflexible labour markets, as opposed to states with flexible labour markets (which is the baseline case). As such, state level characteristics other than labour market flexibility may have a role to play in determining the impact of tariff liberalisation on employment in informal firms. This is in line with the fact that state level labour market regulation is binding for formal firms and not for informal firms, on account of which its influence on the impact of tariff liberalisation is also likely to be more robust in the context of formal firms.

## 6.7 Complementarities between tariff liberalisation and other reforms

I undertake additional checks to assess whether the employment effects associated with the tariff reforms are different for informal and formal firms in industries that were or were not delicensed by 1991, and in industries that were or were not FDI liberalised by 1991. The results are presented in Table 16. FDI liberalisation does not appear to matter substantially for whether downstream tariffs are associated with significant employment effects in formal firms in states with flexible labour markets. However, the downstream tariff related effects for formal firms are robust only in industries that were delicensed by 1991. By contrast, as regards informal firms, the input tariff effect is particularly strong in industries that were not delicensed by 1991 and in industries that were not FDI liberalised by 1991, relative to those that were liberalised. This evidence is indicative of complementarities between the different strands of reform.

Further, along the lines of Aghion *et al* (2008), I test whether my results are robust to controlling for interactions between the delicensing and FDI liberalisation reforms and the 'FLEX 2' labour market flexibility indicator (Table 17). This reveals that my main findings are robust to including these additional controls across a range of alternative specifications.<sup>35</sup>

In summary, these results suggest that the labour market impacts of the tariff liberalisation, delicensing and FDI reforms are not entirely independent of each other, and that the chronology

<sup>&</sup>lt;sup>34</sup> As regards formal firms, if the 'FLEX 1' or 'FLEX 3' indices of labour market flexibility (discussed in Section 3.3) are used in place of the 'FLEX 2' index, the signs on the coefficients that arise are the same as in the baseline; however, the statistical significance of the downstream tariff coefficients is attenuated.

<sup>&</sup>lt;sup>35</sup> I also follow Aghion *et al* (2008) in terms of dropping individual states from my baseline regression, to test whether this affects my findings. I find that the results yielded by these regressions are similar, in magnitude and significance, to my baseline results for informal and formal firms. This confirms that individual states do not unduly influence the overall results.

of initiation of tariff reform relative to other policy instruments matters. However, the simplistic nature of the delicensing and FDI liberalisation measures that I employ suggests that caution is warranted in this interpretation. The interactions hinted at here constitute an area for future research.

#### 6.8 Introducing additional time lags

In the baseline results discussed in Section 5, as well as in the robustness checks executed in this section, the reform measures (tariffs as well as delicensing and FDI) have been lagged by one year. I carry out an additional check to examine the effects of extending this lag to a period of two or three years. My findings are presented in Table 18. I find that the results for formal firms are robust to introducing additional time lags, whereas the informal firm related result gradually loses significance as additional lags are introduced. In line with the discussion in Section 6.6, this suggests that the effects of tariff liberalisation may have more robust and longer lasting implications for formal firms rather than informal firms.

## 7 Conclusions

This paper exploits the initiation of a quasi-exogenous round of tariff liberalisation and concurrent domestic policy reform to examine changes in employment in Indian manufacturing firms 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 to account for formal manufacturers and their small, informal counterparts separately in this context.

The results point to declines in input and downstream tariffs, hitherto virtually ignored by the literature exploring post-liberalisation employment shifts, being associated with significant employment shifts at the firm level. These shifts are restricted to firms located in urban areas. As regards formal firms, downstream tariff declines are associated with significant employment gains in states with flexible labour markets and with significant reductions in employment in states with inflexible labour markets. These effects are robust only for formal firms employing up to 50 persons, with larger formal firms appearing to have been affected to a greater extent by the delicensing reforms undertaken in tandem with the tariff cuts. This indicates that supply side or agglomeration driven linkages may exist within the formal sector, in particular in states characterised by labour market flexibility. For these states, there is also some evidence that employment in formal firms in final good producing industries is more responsive to output and input tariff reductions, and that in intermediate goods industries to downstream tariff declines.

Further, in states with flexible labour markets, employment in the average urban informal firm declines following reductions in input tariffs. This finding does not apply to the tiny household enterprises (OAMEs) that account for a large share of the informal sector, and is less robust to alternative specifications than the results obtained for the formal sector. Instead, the informal firm employment response to input tariff declines is restricted to slightly larger informal firms, which is in line with the notion that larger informal firms are arguably more likely to use manufactured inputs in their production process.

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 trade reform for firm level employment is incomplete unless input and downstream tariffs, as well as variations in regional labour market flexibility, are accounted for. In a developing country setting characterised by a substantial informal sector, my findings suggest that both formal and informal firms merit consideration. Data permitting, further research is eminently desirable, in particular on broader industry level effects and the mechanisms underlying the firm level impacts that are discussed in this study.

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## Tables

Year		OUTPU	UT TARIF	FS (%)		INPUT TARIFFS (%)				DOWNSTREAM TARIFFS (%)				%DEL	%FDI		
	Mean	Median	Max	Min	SD	Mean	Median	Max	Min	SD	Mean	Median	Max	Min	SD		
1985	88.78	92.71	203.91	0.00	33.55	95.01	95.92	129.54	62.62	11.08	83.61	86.41	145.16	31.73	20.86	35	0
1986	95.60	100.00	242.22	0.00	39.30	99.85	100.49	131.97	74.45	7.84	90.15	92.56	152.62	40.74	19.88	36	0
1987	94.92	100.00	242.22	0.00	38.92	96.07	96.87	128.47	72.87	6.80	89.30	91.50	151.44	40.74	19.61	36	0
1988	95.08	100.00	248.89	0.00	38.81	97.69	98.13	130.99	73.29	7.18	89.70	92.36	152.32	40.74	19.64	36	0
1989	95.84	100.00	281.25	0.00	41.85	97.83	98.24	130.97	73.91	7.22	90.20	92.84	171.44	40.74	20.98	37	0
1990	95.95	100.00	281.25	0.00	42.11	97.92	98.25	131.05	73.13	7.23	90.31	92.72	171.33	40.74	21.00	37	0
1991	95.95	100.00	281.25	0.00	42.11	97.92	98.25	131.05	73.13	7.23	90.31	92.72	171.33	40.74	21.00	84	38
1992	63.65	64.87	281.25	0.00	29.27	63.18	63.79	71.26	55.07	2.67	60.74	61.20	151.93	27.45	14.75	84	38
1993	64.06	64.04	340.63	22.50	32.85	61.47	61.74	70.89	49.05	3.13	61.70	61.17	165.58	39.07	15.51	86	38
1994	64.57	65.00	400.00	11.28	38.16	59.94	59.68	71.68	33.53	5.48	62.72	62.80	179.26	28.59	17.35	86	38
1995	53.71	53.44	320.75	12.08	32.55	48.88	49.12	58.91	30.14	4.80	52.08	51.17	154.51	27.05	15.57	86	38
1996	42.48	43.50	254.27	0.00	25.76	37.73	38.53	49.04	26.77	5.12	41.14	40.84	119.14	20.26	13.20	86	38
1997	34.10	33.97	176.67	0.00	19.47	30.46	30.92	37.95	21.48	3.31	32.54	32.07	99.68	15.50	11.10	89	45
1998	34.66	34.16	167.50	0.00	18.44	31.72	32.18	38.22	23.13	2.95	33.08	32.57	97.11	16.49	10.53	93	45
1999	35.70	35.71	158.33	0.00	17.26	33.36	33.70	38.54	24.83	2.56	34.19	33.57	94.61	17.62	9.91	93	45
2000	35.16	37.25	146.36	0.00	16.00	33.93	33.54	39.82	28.46	2.36	33.37	32.63	86.19	18.07	8.94	93	93

 Table 1: Summary statistics by year: Output tariffs, input tariffs, delicensing and FDI liberalisation (1985-2000)\*

Source: Output and input tariff data obtained from Nataraj (2011); downstream tariffs based on author's calculations; 132 three-digit NIC (1987) industries included

\*"% DEL" and "% FDI" refer to the proportions of industries that were delicensed and FDI liberalised (respectively) up to a given year

### Table 2: Summary of labour market / product 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

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

### Table 3: Tariff liberalisation and employment (1990-2001)

		Forma	l firms			Inform	al firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output tariffs	-0.004	0.033	0.013	0.036	-0.028	-0.111	-0.024	-0.107
	(0.026)	(0.032)	(0.028)	(0.032)	(0.046)	(0.072)	(0.048)	(0.068)
Input tariffs		-0.296*		-0.260		0.470*		0.469*
		(0.152)		(0.173)		(0.251)		(0.250)
Downstream tariffs			-0.117	-0.051			-0.032	-0.026
			(0.080)	(0.093)			(0.173)	(0.170)
Delicensing	-0.037	-0.040	-0.039	-0.040	0.038	0.034	0.038	0.035
	(0.030)	(0.030)	(0.030)	(0.030)	(0.029)	(0.029)	(0.028)	(0.028)
FDI	0.062**	0.054**	0.064**	0.056**	0.030	0.035	0.029	0.035*
	(0.026)	(0.026)	(0.026)	(0.027)	(0.021)	(0.021)	(0.020)	(0.021)
State FE	Yes	Yes						
Year FE	Yes	Yes						
Industry FE	Yes	Yes						
Observations	99219	99219	99219	99219	303505	303505	303505	303505
R-squared	0.130	0.130	0.130	0.130	0.158	0.159	0.158	0.159

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. \*\*\*: Significant at 1% \*: Significant at 5% \*: Significant at 10%

		Forma	al firms			Inform	al firms		
Rigid labour markets (direct effect only)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Output tariffs	-0.039	-0.074	-0.151**	-0.116*	-0.080	-0.151*	-0.075	-0.147*	
	(0.042)	(0.065)	(0.070)	(0.070)	(0.052)	(0.081)	(0.063)	(0.077)	
Output tariffs * FLEX 2	0.058	0.171*	0.269***	0.244**	0.119**	0.095	0.127	0.100	
	(0.058)	(0.095)	(0.104)	(0.102)	(0.047)	(0.095)	(0.089)	(0.096)	
Input tariffs		-0.150		-0.350*		0.447*		0.401	
		(0.159)		(0.188)		(0.250)		(0.267)	
Input tariffs * FLEX 2		-0.207**		0.234*		0.029		0.143	
		(0.104)		(0.132)		(0.094)		(0.204)	
Downstream tariffs			0.128	0.296**			-0.052	0.021	
			(0.113)	(0.148)			(0.182)	(0.234)	
Downstream tariffs * FLEX 2			-0.395***	-0.586***			-0.009	-0.127	
			(0.127)	(0.182)			(0.087)	(0.193)	
Delicensing	-0.037	-0.044	-0.045	-0.044	0.039	0.036	0.040	0.036	
	(0.030)	(0.030)	(0.031)	(0.030)	(0.028)	(0.028)	(0.027)	(0.027)	
FDI	0.063**	0.054**	0.061**	0.054**	0.028	0.033	0.027	0.033	
	(0.026)	(0.026)	(0.026)	(0.027)	(0.023)	(0.023)	(0.022)	(0.023)	
Flexible labour markets: Effects of	f changes in out	put tariffs							
<b>Row 1 + Row 2</b>	0.018	0.097*	0.118**	0.128**	0.039	-0.056	0.052	-0.047	
Std Error	0.036	0.053	0.055	0.057	0.046	0.083	0.064	0.082	
p-value (combined effect $= 0$ )	0.610	0.068	0.034	0.025	0.387	0.499	0.417	0.564	
Flexible labour markets: Effects of	f changes in inp	ut tariffs							
<b>Row 3 + Row 4</b>		-0.357**		-0.117		0.476*		0.544**	
Std Error		0.160		0.184		0.246		0.259	
p-value (combined effect $= 0$ )		0.026		0.526		0.053		0.036	
Flexible labour markets: Effects of	f changes in dov	vnstream tariffs							
<b>Row 5 + Row 6</b>			-0.267***	-0.290**			-0.062	-0.107	
Std Error			0.100	0.120			0.165	0.149	
p-value (combined effect $= 0$ )			0.008	0.016			0.709	0.475	
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Observations	99219	99219	99219	99219	303505	303505	303505	303505	
R-squared	0.130	0.131	0.131	0.131	0.159	0.160	0.159	0.160	

### Table 4: Tariff liberalisation, labour market flexibility and employment (1990-2001)

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. 'FE' denotes fixed effects. Standard errors, in brackets, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

		Informal firms: P	oisson regression	
Rigid labour markets (direct effect only)				
Dependent variable: firm employment	(1)	(2)	(3)	(4)
Output tariffs	-0.060	-0.141**	-0.051	-0.135**
	(0.044)	(0.070)	(0.057)	(0.067)
Output tariffs * FLEX 2	0.112**	0.080	0.113	0.086
	(0.048)	(0.096)	(0.088)	(0.096)
Input tariffs		0.528**		0.487*
		(0.244)		(0.258)
Input tariffs * FLEX 2		0.039		0.151
		(0.098)		(0.188)
Downstream tariffs			-0.066	-0.006
			(0.165)	(0.207)
Downstream tariffs * FLEX 2			-0.001	-0.126
			(0.091)	(0.177)
Delicensing	0.036	0.032	0.037	0.033
	(0.028)	(0.028)	(0.027)	(0.027)
FDI	0.024	0.031	0.023	0.031
	(0.022)	(0.022)	(0.021)	(0.022)
Flexible labour markets: Effects of changes in o	output tariffs			
<b>Row 1 + Row 2</b>	0.052	-0.060	0.062	-0.049
Std Error	0.044	0.082	0.061	0.080
p-value (combined effect = 0)	0.234	0.462	0.312	0.545
Flexible labour markets: Effects of changes in i	nput tariffs			
<b>Row 3 + Row 4</b>		0.567		0.638
Std Error		0.247		0.260
p-value (combined effect = 0)		0.022		0.014
Flexible labour markets: Effects of changes in c	lownstream tariff	Ś		
<b>Row 5 + Row 6</b>			-0.067	-0.133
Std Error			0.144	0.133
p-value (combined effect $= 0$ )			0.641	0.320
Observations	303505	303505	303505	303505

# Table 5: Tariff liberalisation, labour market flexibility and employment in informal firms (1990-2001):Results of Poisson regression

SUBSCRSUBSCRSUBSCRSUBSCRSUBSCRSUBSCRThe dependent variable is firm level employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All<br/>specifications include industry, year and state fixed effects. Standard errors, in brackets, are clustered at the state-industry level.303505303505at 1%\*\*: Significant at 5%\*: Significant at 10%

	Formal			Informal		
Rigid labour markets (direct effect only)						
Dependent variable: Inemp	Basic/ Capital/ Intermediate goods	Consumer durables	Consumer non-durables	Basic/ Capital/ Intermediate goods	Consumer durables	Consumer non-durables
Output tariffs	-0.012	0.281***	-0.291**	0.585**	0.049	-0.195**
	(0.073)	(0.094)	(0.127)	(0.235)	(0.055)	(0.087)
Output tariffs * FLEX 2	0.154*	-0.078	0.395**	-0.097	-0.047	0.151
-	(0.093)	(0.090)	(0.155)	(0.156)	(0.112)	(0.112)
Input tariffs	-0.530**	-1.162*	-0.238	-1.636***	-1.022	0.470
	(0.245)	(0.667)	(0.398)	(0.499)	(0.962)	(0.434)
Input tariffs * FLEX 2	0.173	-0.021	0.351*	0.157	0.102	0.510*
	(0.169)	(0.384)	(0.204)	(0.200)	(0.791)	(0.278)
Downstream tariffs	0.018	-0.804	0.543**	-0.079	-0.079	0.107
	(0.187)	(0.558)	(0.267)	(0.346)	(0.972)	(0.324)
Downstream tariffs * FLEX 2	-0.387*	0.313	-0.822***	-0.193	-0.187	-0.489*
	(0.218)	(0.431)	(0.259)	(0.170)	(0.876)	(0.280)
Delicensing	-0.054	0.203***	-0.064	-0.051*	0.026	0.061*
	(0.039)	(0.063)	(0.048)	(0.030)	(0.061)	(0.033)
FDI	0.001	-0.028	0.146***	0.006	-0.072	0.026
	(0.029)	(0.053)	(0.052)	(0.043)	(0.083)	(0.027)
Flexible labour markets: Effects of changes in output tariffs						
Row 1 + Row 2	0.142	0.203	0.104	0.488	0.002	-0.044
Std Error	0.071	0.079	0.089	0.209	0.118	0.102
p-value (combined effect $= 0$ )	0.045	0.010	0.242	0.020	0.988	0.665
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.358	-1.183	0.114	-1.479	-0.920	0.980
Std Error	0.259	0.595	0.384	0.513	1.008	0.315
p-value (combined effect = 0)	0.168	0.048	0.767	0.004	0.362	0.002
Flexible labour markets: Effects of changes in downstream tariffs						
Row 5 + Row 6	-0.369	-0.490	-0.279	-0.273	-0.266	-0.382
Std Error	0.202	0.542	0.194	0.307	0.786	0.163
p-value (combined effect = 0)	0.069	0.366	0.150	0.374	0.735	0.019
Observations	34524	10867	53828	46839	31144	225522
R-squared	0.088	0.080	0.153	0.259	0.107	0.152

### Table 6: Tariff liberalisation, labour market flexibility and employment - 'Use based' industry classification

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. The classification of industries into three categories is borrowed from Nouroz (2001). \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

	Formal		Informal	
Rigid labour markets (direct effect only)				
Dependent variable: <i>lnemp</i>	Urban	Rural	Urban	Rural
Output tariffs	-0.098	-0.133	-0.047	-0.150*
	(0.072)	(0.082)	(0.063)	(0.091)
Output tariffs * FLEX 2	0.247**	0.185*	-0.087	0.135
	(0.103)	(0.109)	(0.061)	(0.111)
Input tariffs	-0.345*	-0.442	0.660*	0.306
	(0.202)	(0.307)	(0.350)	(0.300)
Input tariffs * FLEX 2	0.305**	0.122	0.100	0.115
	(0.135)	(0.212)	(0.155)	(0.258)
Downstream tariffs	0.314*	0.309	0.028	-0.059
	(0.161)	(0.218)	(0.138)	(0.302)
Downstream tariffs * FLEX 2	-0.639***	-0.375	-0.010	-0.083
	(0.189)	(0.237)	(0.135)	(0.246)
Delicensing	-0.036	-0.086*	0.017	0.042
	(0.031)	(0.045)	(0.025)	(0.031)
FDI	0.022	0.128***	0.090**	0.007
	(0.028)	(0.045)	(0.042)	(0.023)
Flexible labour markets: Effects of changes in our	tput tariffs			
Row 1 + Row 2	0.148	0.052	-0.134	-0.015
Std Error	0.061	0.071	0.083	0.103
p-value (combined effect $= 0$ )	0.016	0.466	0.109	0.884
Flexible labour markets: Effects of changes in inp	out tariffs			
Row 3 + Row 4	-0.040	-0.319	0.760	0.421
Std Error	0.187	0.287	0.411	0.275
p-value (combined effect $= 0$ )	0.832	0.266	0.064	0.126
Flexible labour markets: Effects of changes in do	wnstream tariffs			
Row 5 + Row 6	-0.325	-0.067	0.018	-0.141
Std Error	0.122	0.203	0.125	0.216
p-value (combined effect $= 0$ )	0.008	0.742	0.885	0.512
Observations	65629	33545	138893	164612
R-squared	0.098	0.204	0.167	0.180

Table 7:	Tariff liberalisation.	labour market	flexibility and e	mplovment – <sup>1</sup>	Urban and rural firms

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

	Formal		Informal	
Rigid labour markets (direct effect only)				
Dependent variable: <i>lnemp</i>	Up to 50	More than 50	Smaller/OAME	Larger/NDME
	persons	persons	(household	(hire one to
	employed	employed	enterprises)	five workers)
Output tariffs	-0.125**	0.093**	-0.140	-0.097*
	(0.057)	(0.042)	(0.087)	(0.051)
Output tariffs * FLEX 2	0.197***	-0.067	0.153	0.082
	(0.074)	(0.053)	(0.115)	(0.074)
Input tariffs	-0.161	-0.103	0.296	0.463**
	(0.134)	(0.154)	(0.271)	(0.184)
Input tariffs * FLEX 2	0.144*	0.050	0.031	-0.020
	(0.083)	(0.116)	(0.229)	(0.097)
Downstream tariffs	0.256**	-0.062	-0.026	-0.020
	(0.109)	(0.113)	(0.264)	(0.102)
Downstream tariffs * FLEX 2	-0.380***	0.080	-0.069	-0.037
	(0.126)	(0.130)	(0.212)	(0.105)
Delicensing	-0.000	-0.058**	0.036	0.009
	(0.020)	(0.025)	(0.027)	(0.020)
FDI	0.023	0.005	0.029	-0.004
	(0.020)	(0.023)	(0.023)	(0.022)

Flexible labour markets: Effects of changes in output tariffs								
Row 1 + Row 2	0.072	0.026	0.013	-0.015				
Std Error	0.041	0.037	0.094	0.061				
p-value (combined effect $= 0$ )	0.077	0.483	0.894	0.807				
Flexible labour markets: Effects of changes in input tariffs								
Row 3 + Row 4	-0.018	-0.052	0.327	0.443				
Std Error	0.126	0.156	0.224	0.197				
p-value (combined effect $= 0$ )	0.887	0.736	0.144	0.024				
Flexible labour markets: Effects of changes in do	wnstream tariffs							
Row 5 + Row 6	-0.124	0.018	-0.095	-0.057				
Std Error	0.086	0.109	0.162	0.105				
p-value (combined effect $= 0$ )	0.148	0.871	0.557	0.583				
Observations	62533	36686	239734	63771				
R-squared	0.071	0.138	0.177	0.164				

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

Table 9: Decl	lines in effective r	ates of protection	(ERP) and	associated cl	hanges in e	employment

	Formal		Informal	
Rigid labour markets (direct e	ffect only)			
Dependent variable: <i>lnemp</i>	Simple ERP	Import- weighted ERP	Simple ERP	Import- weighted ERP
ERP	0.022 (0.019)	0.033** (0.014)	0.012 (0.013)	0.014 (0.009)
ERP * FLEX 2	-0.072*** (0.025)	-0.065*** (0.019)	0.004 (0.014)	-0.010 (0.010)
Delicensing	-0.031 (0.031)	-0.036 (0.032)	0.034 (0.030)	0.024 (0.032)
FDI	0.065** (0.026)	0.064** (0.026)	0.047* (0.027)	0.049* (0.026)
Flexible labour markets: Effec	ts of changes in H	ERP		
Row 1 + Row 2	-0.050	-0.033	0.016	0.004
Std Error	0.025	0.016	0.011	0.007
p-value (combined effect = $0$ )	0.043	0.045	0.174	0.559
Observations	99219	99219	303505	303505
R-squared	0.131	0.131	0.158	0.159

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

# Table 10: Tariff endogeneity check – regression of tariffs on lagged employment variables (state-industry level)

Period (dependent variable	e) t+1	t+2	t+3
D	ependent variable: Outp	ut tariffs	
Formal employment	-0.000000	0.000000	0.000000
	(0.000000)	(0.000000)	(0.000000)
Informal employment	-0.000000	-0.000000	-0.000000
	(0.000000)	(0.000000)	(0.000000)
Formal employment share	-0.367225	0.165904	0.312415
	(0.370309)	(0.139178)	(0.178037)
Informal employment share	-0.734149	-0.124697	-0.036976
	(0.411481)	(0.121209)	(0.130993)

Dependent variable: Input tariffs					
Formal employment	0.000000	0.000000	0.000000		
	(0.00000)	(0.000000)	(0.000000)		
Informal employment	-0.000000	-0.000000*	-0.000000		
	(0.000000)	(0.000000)	(0.000000)		
Formal employment share	0.113888	0.121420	0.104359		

	(0.109964)	(0.066670)	(0.072365)
Informal employment share	-0.250856	-0.099648	-0.039942
	(0.173800)	(0.079878)	(0.081805)

Dependent variable: Downstream tariffs					
Formal employment	-0.000000	0.000000	0.000000		
	(0.000000)	(0.000000)	(0.000000)		
Informal employment	-0.000000	-0.000000*	-0.000000		
	(0.000000)	(0.000000)	(0.000000)		
Formal employment share	-0.000000	0.000000	0.000000		
	(0.000000)	(0.000000)	(0.000000)		
Informal employment share	-0.043237	-0.178253	-0.135727		
	(0.096035)	(0.115757)	(0.120794)		
Observations	5940	5940	5940		
The independent variables are measured in r	period t All specifications inclu	ide year and industry fixed	effects Standard errors in		

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

# Table 11: Tariff endogeneity check – regression of proportionate changes in tariffs on lagged proportionate changes in employment (state-industry level)

-0.000344*					
(0.000167)					
-0.000015***					
(0.000003)					
-0.000110					
(0.000092)					
-0.000003***					
(0.000001)					
Dependent variable: Proportionate change in downstream tariffs					
0.000006					
(0.000119)					

 Proportionate change in informal employment
 -0.000008\*\*\*
 -0.000010\*\*\*
 -0.00006\*\*\*

 (0.00001)
 (0.00002)
 (0.00001)

 The independent variables are measured in period t. All specifications include period and industry fixed effects. Standard errors, in parentheses.

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%

# Table 12: Tariff endogeneity check – regression of proportionate changes in tariffs on lagged employment levels (state-industry level)

	Period (dependent variable)	t+1	t+2	t+3
	Dependent variable: Pro	oportionate change in	n output tariffs	
Formal employment		0.000000	0.000000	0.000000
		(0.000000)	(0.000000)	(0.000000)
Informal employment		-0.000000*	-0.000000*	-0.000000*
		(0.000000)	(0.000000)	(0.000000)
	Dependent variable: Pr	oportionate change	in input tariffs	
Formal employment		0.000000	0.000000	0.000000
1.1		(0,000000)	(0,00000)	(0,000000)

Formal employment	0.000000	0.000000	0.000000
	(0.00000)	(0.000000)	(0.000000)
Informal employment	-0.000000	-0.000000	-0.000000
	(0.000000)	(0.000000)	(0.000000)

Dependent variable: Proportionate change in downstream tariffs					
Formal employment	0.000000	0.000000	0.000000		
	(0.000000)	(0.000000)	(0.000000)		
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%

Dependent variable: <i>lnemp</i>	Formal	Informal	
Output tariffs * FLEX 2	0.267**	0.106	
	(0.104)	(0.098)	
Input tariffs * FLEX 2	0.285**	0.164	
	(0.129)	(0.179)	
Downstream tariffs * FLEX 2	-0.577***	-0.151	
	(0.183)	(0.175)	
Observations	99219	303505	
R-squared	0.143	0.173	

Table 13: Tariff endogeneity check - incorporating industry-year interaction fixed effects

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry-year interaction fixed effects and industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

Table 14: Tariff endogeneity check – ]	Dropping outlier industries	(Wine manufacturing and	the distillation,
rectification and blending of spirits)			

Rigid labour markets (direct effect only)           Output tariffs         -0.158**         -0.148*           0.079)         (0.078)           Output tariffs * FLEX 2         0.308***         0.102           0.115)         (0.099)           Input tariffs         -0.259         0.403           0.197)         (0.269)           Input tariffs * FLEX 2         0.088         0.139           0.153)         (0.210)           Downstream tariffs         0.241         0.019           0.149)         (0.236)           Downstream tariffs * FLEX 2         -0.483***         -0.125           0.0181)         (0.196)           Delicensing         -0.044         0.036           0.027)         (0.023)           FDI         0.056**         0.033           (0.027)         (0.023)           Flexible labour markets: Effects of changes in output tariffs         0.580           P-value (combined effect = 0)         0.018         0.580           p-value (combined effect = 0)         0.375         0.037           Flexible labour markets: Effects of changes in input tariffs         0.121         0.149           p-value (combined effect = 0)         0.375         0.037     <	Dependent variable: <i>lnemp</i>	Formal	Informal					
Output tariffs $-0.158^{**}$ $-0.148^{*}$ Output tariffs * FLEX 2 $0.308^{***}$ $0.102$ Output tariffs * FLEX 2 $0.308^{***}$ $0.102$ Input tariffs $-0.259$ $0.403$ Input tariffs * FLEX 2 $0.088$ $0.139$ Downstream tariffs $0.241$ $0.019$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Delicensing $(0.030)$ $(0.027)$ Delicensing $-0.044$ $0.036$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffs           Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.132$ $0.260$ $-value$ (combined effect = 0) $0.375$ $0$	Rigid labour markets (direct effect only)							
Output tariffs * FLEX 2 $(0.079)$ $(0.078)$ Output tariffs * FLEX 2 $(0.308***$ $0.102$ Input tariffs $(0.115)$ $(0.099)$ Input tariffs $(0.197)$ $(0.269)$ Input tariffs * FLEX 2 $0.088$ $0.139$ Downstream tariffs $0.241$ $0.019$ Downstream tariffs * FLEX 2 $-0.483***$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483***$ $-0.125$ Downstream tariffs * GLEX 2 $0.044$ $0.036$ Delicensing $0.0056**$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ p-value (combined effect = 0) $0.375$ $0.037$	Output tariffs	-0.158**	-0.148*					
Output tariffs * FLEX 2 $0.308^{***}$ $0.102$ Input tariffs $-0.259$ $0.403$ (0.197) $(0.269)$ Input tariffs * FLEX 2 $0.088$ $0.139$ Downstream tariffs $0.241$ $0.019$ Downstream tariffs $0.241$ $0.019$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * Glasse $(0.030)$ $(0.027)$ Delicensing $-0.044$ $0.036$ $(0.027)$ $(0.027)$ $(0.023)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ $(0.027)$ Flexible labour markets: Effects of changes in output tariffs $0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in input tariffs $Row 3 + Row 4$ $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $-y-value$ (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in inow		(0.079)	(0.078)					
Input tariffs $(0.115)$ $(0.099)$ Input tariffs $-0.259$ $0.403$ $(0.197)$ $(0.269)$ Input tariffs * FLEX 2 $0.088$ $0.139$ $(0.153)$ $(0.210)$ Downstream tariffs $0.241$ $0.019$ $(0.149)$ $(0.236)$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ $(0.181)$ $(0.196)$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of charges in output tariffsRow 1 + Row 2 $0.149$ $-0.063$ $0.084$ $p$ -value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of charges in input tariffsRow 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $p$ -value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of charges in downstream tariffsRow 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $-0.242$ $-0.106$ Std	Output tariffs * FLEX 2	0.308***	0.102					
Input tariffs       -0.259 $0.403$ Input tariffs $(0.197)$ $(0.269)$ Input tariffs * FLEX 2 $0.088$ $0.139$ Downstream tariffs $0.210$ $0.210$ Downstream tariffs $0.241$ $0.019$ $(0.153)$ $(0.210)$ Downstream tariffs $0.241$ $0.019$ $(0.149)$ $(0.236)$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ $(0.181)$ $(0.196)$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ $(0.023)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs $Row 3 + Row 4$ $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $p$ -value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs $Row 5 + Row 6$ $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $p$ -value (combi		(0.115)	(0.099)					
Input tariffs * FLEX 2 $(0.197)$ $(0.269)$ Input tariffs * FLEX 2 $0.088$ $0.139$ Downstream tariffs $0.241$ $0.019$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Downstream tariffs * Guident and the set of the	Input tariffs	-0.259	0.403					
Input tariffs * FLEX 2       0.088       0.139         Input tariffs * FLEX 2       (0.153)       (0.210)         Downstream tariffs       0.241       0.019         (0.149)       (0.236)         Downstream tariffs * FLEX 2       -0.483***       -0.125         (0.181)       (0.196)         Delicensing       -0.044       0.036         (0.030)       (0.027)         FDI       0.056**       0.033         (0.027)       (0.023)         Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2       0.149       -0.046         Std Error       0.063       0.084         p-value (combined effect = 0)       0.018       0.580         Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4       -0.171       0.542         Std Error       0.192       0.260         p-value (combined effect = 0)       0.375       0.037         Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6       -0.242       -0.106         Std Error       0.121       0.149       -y-value (combined effect = 0)       0.045       0.477         Observations       98821		(0.197)	(0.269)					
Image: constraint of the second s	Input tariffs * FLEX 2	0.088	0.139					
Downstream tariffs $0.241$ $0.019$ $(0.149)$ $(0.236)$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ $(0.181)$ $(0.196)$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs       Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $p$ -value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs         Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $p$ -value (combined effect = 0) $0.045$ $0.477$ Observations       98821 $303443$ R-squared $0.131$ $0.160$		(0.153)	(0.210)					
$(0.149)$ $(0.236)$ Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ $(0.181)$ $(0.196)$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs $Row 3 + Row 4$ $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $p$ -value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs         Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $p$ -value (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ R-squared $0.131$ $0.160$	Downstream tariffs	0.241	0.019					
Downstream tariffs * FLEX 2 $-0.483^{***}$ $-0.125$ Delicensing $-0.044$ $0.036$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs       Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ $p$ -value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $-y$ -value (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ $R$ -squared $0.131$ $0.160$		(0.149)	(0.236)					
Delicensing $(0.181)$ $(0.196)$ Delicensing $-0.044$ $0.036$ $(0.030)$ $(0.027)$ FDI $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffsRow 1 + Row 2 $0.149$ $0.063$ $0.063$ $0.063$ $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffsRow 3 + Row 4 $-0.171$ $0.542$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffsRow 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.045$ $0.0477$ $0.045$ $0.0477$ $0.045$ $0.0477$ $0.045$ $0.0477$ $0.045$ $0.0477$ $0.04$	Downstream tariffs * FLEX 2	-0.483***	-0.125					
Delicensing       -0.044       0.036         (0.030)       (0.027)         FDI       0.056**       0.033         (0.027)       (0.023)         Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2       0.149       -0.046         Std Error       0.063       0.084         p-value (combined effect = 0)       0.018       0.580         Flexible labour markets: Effects of changes in input tariffs       Row 3 + Row 4       -0.171       0.542         Std Error       0.192       0.260       0.037         p-value (combined effect = 0)       0.375       0.037         Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6       -0.242       -0.106         Std Error       0.121       0.149       0.149       -value (combined effect = 0)       0.045       0.477         Observations       98821       303443       R-squared       0.131       0.160		(0.181)	(0.196)					
FDI $(0.030)$ $(0.027)$ $0.056^{**}$ $0.033$ $(0.027)$ $(0.023)$ Flexible labour markets: Effects of changes in output tariffsRow 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffsRow 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffsRow 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ p-value (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ R-squared $0.131$ $0.160$	Delicensing	-0.044	0.036					
FDI $0.056^{**}$ $0.033$ (0.027)       (0.023)         Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs $0.632$ $0.023$ Row 3 + Row 4 $-0.071$ $0.542$ $0.260$ $0.260$ $0.922$ $0.260$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs $0.037$ $0.037$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs $0.037$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs $0.037$ Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $0.149$ p-value (combined effect = 0) $0.045$ $0.477$ $00$ Observations $98821$ $303443$ $0.160$		(0.030)	(0.027)					
(0.027) $(0.023)$ Flexible labour markets: Effects of changes in output tariffs           Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs $0.580$ Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs $0.037$ Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ p-value (combined effect = 0) $0.045$ $0.477$ Observations         98821 $303443$ R-squared $0.131$ $0.160$	FDI	0.056**	0.033					
Flexible labour markets: Effects of changes in output tariffs         Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $0.149$ $p$ -value (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ $R$ -squared $0.131$ $0.160$		(0.027)	(0.023)					
Row 1 + Row 2 $0.149$ $-0.046$ Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs         Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ p-value (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ R-squared $0.131$ $0.160$	Flexible labour markets: Effects of chan	ges in output tariffs						
Std Error $0.063$ $0.084$ p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $-value$ (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ $R$ -squared $0.131$ $0.160$	Row 1 + Row 2	0.149	-0.046					
p-value (combined effect = 0) $0.018$ $0.580$ Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4 $-0.171$ $0.542$ Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs       Row 5 + Row 6 $-0.242$ $-0.106$ Std Error $0.121$ $0.149$ $-value$ (combined effect = 0) $0.045$ $0.477$ Observations $98821$ $303443$ $R$ -squared $0.131$ $0.160$	Std Error	0.063	0.084					
Flexible labour markets: Effects of changes in input tariffs         Row 3 + Row 4       -0.171       0.542         Std Error       0.192       0.260         p-value (combined effect = 0)       0.375       0.037         Flexible labour markets: Effects of changes in downstream tariffs       -0.106         Std Error       0.121       0.149         p-value (combined effect = 0)       0.045       0.477         Observations       98821       303443         R-squared       0.131       0.160	p-value (combined effect $= 0$ )	0.018	0.580					
Row 3 + Row 4         -0.171         0.542           Std Error         0.192         0.260           p-value (combined effect = 0)         0.375         0.037           Flexible labour markets: Effects of changes in downstream tariffs         -0.106           Row 5 + Row 6         -0.242         -0.106           Std Error         0.121         0.149           p-value (combined effect = 0)         0.045         0.477           Observations         98821         303443           R-squared         0.131         0.160	Flexible labour markets: Effects of chan	ges in input tariffs						
Std Error $0.192$ $0.260$ p-value (combined effect = 0) $0.375$ $0.037$ Flexible labour markets: Effects of changes in downstream tariffs         Row 5 + Row 6       - $0.242$ - $0.106$ Std Error $0.121$ $0.149$ p-value (combined effect = 0) $0.045$ $0.477$ Observations       98821 $303443$ R-squared $0.131$ $0.160$	<b>Row 3 + Row 4</b>	-0.171	0.542					
p-value (combined effect = 0)         0.375         0.037           Flexible labour markets: Effects of changes in downstream tariffs         -0.106           Row 5 + Row 6         -0.242         -0.106           Std Error         0.121         0.149           p-value (combined effect = 0)         0.045         0.477           Observations         98821         303443           R-squared         0.131         0.160	Std Error	0.192	0.260					
Flexible labour markets: Effects of changes in downstream tariffs           Row 5 + Row 6         -0.242         -0.106           Std Error         0.121         0.149           p-value (combined effect = 0)         0.045         0.477           Observations         98821         303443           R-squared         0.131         0.160	p-value (combined effect $= 0$ )	0.375	0.037					
Row $5 + Row 6$ -0.242-0.106Std Error0.1210.149p-value (combined effect = 0)0.0450.477Observations98821303443R-squared0.1310.160	Flexible labour markets: Effects of chan	ges in downstream tariffs						
Std Error         0.121         0.149           p-value (combined effect = 0)         0.045         0.477           Observations         98821         303443           R-squared         0.131         0.160	<b>Row 5 + Row 6</b>	-0.242	-0.106					
p-value (combined effect = 0)         0.045         0.477           Observations         98821         303443           R-squared         0.131         0.160	Std Error	0.121	0.149					
Observations         98821         303443           R-squared         0.131         0.160	p-value (combined effect $= 0$ )	0.045	0.477					
R-squared 0.131 0.160	Observations	98821	303443					
	R-squared	0.131	0.160					

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

Table 1	15:	Incorporating	state-year	<i>interaction</i>	fixed	effects
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Dependent variable: <i>lnemp</i>	Formal	Informal				
Rigid labour markets (direct effect only)						
Output tariffs	-0.131*	-0.171**				
	(0.079)	(0.068)				
Output tariffs * FLEX 2	0.259**	0.203*				
	(0.118)	(0.104)				
Input tariffs	-0.195	0.761***				
	(0.280)	(0.266)				
Input tariffs * FLEX 2	0.017	-0.944**				
	(0.397)	(0.399)				
Downstream tariffs	0.305*	0.103				
	(0.160)	(0.212)				
Downstream tariffs * FLEX 2	-0.587***	-0.205				
	(0.197)	(0.192)				
Delicensing	-0.038	0.035				
	(0.030)	(0.024)				
FDI	0.048*	0.023				
	(0.027)	(0.020)				
Flexible labour markets: Effects of changes in output tariffs						
Row 1 + Row 2	0.128	0.032				
Std Error	0.059	0.080				
p-value (combined effect = 0)	0.031	0.686				
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.178	-0.182				
Std Error	0.248	0.285				
p-value (combined effect = 0)	0.472	0.523				
Flexible labour markets: Effects of changes in downstream tariffs						
Row 5 + Row 6	-0.282	-0.102				
Std Error	0.125	0.133				
p-value (combined effect = 0)	0.024	0.446				
Observations	99219	303505				
R-squared	0.132	0.165				

The dependent variable is the natural log of employment. The tariffs and delicensing and FDI liberalisation measures are lagged by one year. All specifications include state-year interaction fixed effects and state, industry and year fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

Table 1	16:	Com	plementarities	between	tariff liber	alisation	and	other	reforms

	Formal				Informal			
Rigid labour markets (direct effect only)								
Dependent variable: <i>lnemp</i>	Delicensed	Not	FDI	Not FDI	Delicensed	Not	FDI	Not FDI
	- 1991	delicensed -	liberalized -	liberalized -	- 1991	delicensed -	liberalized -	liberalized -
		1991	1991	1991		1991	1991	1991
Output tariffs	-0.139*	0.039	0.070	-0.142*	-0.144*	-0.840***	-0.146	-0.170**
	(0.083)	(0.131)	(0.064)	(0.081)	(0.084)	(0.259)	(0.106)	(0.085)
Output tariffs * FLEX 2	0.270**	-0.013	0.004	0.262**	0.156	-0.301*	0.176	0.089
	(0.118)	(0.171)	(0.084)	(0.105)	(0.095)	(0.170)	(0.141)	(0.102)
Input tariffs	-0.194	-0.642*	-0.436	-0.291	0.328	1.787***	-0.236	0.448
	(0.200)	(0.386)	(0.279)	(0.257)	(0.289)	(0.682)	(0.456)	(0.275)
Input tariffs * FLEX 2	0.248*	-0.036	0.231	0.197	0.165	-0.632	-0.279	0.225
	(0.148)	(0.381)	(0.184)	(0.165)	(0.201)	(0.556)	(0.303)	(0.210)
Downstream tariffs	0.221	0.306	-0.173	0.380**	0.238	-0.008	0.564*	-0.067
	(0.154)	(0.463)	(0.172)	(0.192)	(0.201)	(0.300)	(0.332)	(0.240)
Downstream tariffs * FLEX 2	-0.519***	-0.478	-0.201	-0.612***	-0.259	1.057*	-0.041	-0.171
	(0.198)	(0.465)	(0.228)	(0.197)	(0.191)	(0.570)	(0.331)	(0.200)
Delicensing	0.022	-0.214***	0.018	-0.088**	0.044	0.195	-0.003	0.035
	(0.030)	(0.067)	(0.044)	(0.040)	(0.034)	(0.119)	(0.039)	(0.030)
FDI	0.053**	0.132	-0.406**	0.334**	-0.008	-0.002	0.023	0.069**
	(0.022)	(0.101)	(0.172)	(0.137)	(0.023)	(0.118)	(0.237)	(0.034)
Flexible labour markets: Effects of changes in output tariffs								
Row 1 + Row 2	0.131	0.027	0.074	0.120	0.012	-1.141	0.030	-0.081
Std Error	0.063	0.154	0.061	0.064	0.083	0.261	0.129	0.090
p-value (combined effect $= 0$ )	0.038	0.862	0.229	0.059	0.888	0.000	0.817	0.369
Flexible labour markets: Effects of changes in input tariffs								
Row 3 + Row 4	0.054	-0.678	-0.205	-0.095	0.493	1.155	-0.515	0.673
Std Error	0.210	0.491	0.303	0.242	0.309	0.651	0.355	0.273
p-value (combined effect = 0)	0.797	0.169	0.498	0.696	0.110	0.077	0.147	0.014
Flexible labour markets: Effects of changes in downstream tariffs								
Row 5 + Row 6	-0.298	-0.172	-0.373	-0.233	-0.021	1.049	0.523	-0.239
Std Error	0.125	0.478	0.184	0.141	0.127	0.535	0.255	0.139
p-value (combined effect = 0)	0.017	0.719	0.043	0.099	0.866	0.051	0.041	0.086
Observations	87521	11698	39975	59244	233599	69906	35490	268015
R-squared	0.101	0.325	0.057	0.187	0.144	0.186	0.139	0.153

The dependent variable is the natural log of employment. The delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

	Formal			Informal		
Rigid labour markets (direct effect only)						
Dependent variable: <i>lnemp</i>	(1)	(2)	(3)	(4)	(5)	(6)
Output tariffs	-0.111*	-0.112	-0.105	-0.141*	-0.133*	-0.119
	(0.067)	(0.071)	(0.066)	(0.075)	(0.076)	(0.073)
Output tariffs * FLEX 2	0.238**	0.235**	0.228**	0.089	0.088	0.066
	(0.098)	(0.103)	(0.097)	(0.090)	(0.096)	(0.089)
Input tariffs	-0.343*	-0.380*	-0.377*	0.407	0.354	0.354
	(0.192)	(0.211)	(0.214)	(0.269)	(0.263)	(0.261)
Input tariffs * FLEX 2	0.215	0.297	0.286	0.122	0.216	0.196
	(0.148)	(0.212)	(0.223)	(0.207)	(0.212)	(0.210)
Downstream tariffs	0.301**	0.298**	0.304**	0.020	-0.017	-0.027
	(0.149)	(0.149)	(0.149)	(0.234)	(0.228)	(0.228)
Downstream tariffs * FLEX 2	-0.594***	-0.581***	-0.590***	-0.128	-0.066	-0.053
	(0.182)	(0.179)	(0.180)	(0.192)	(0.194)	(0.193)
Delicensing	-0.016	-0.042	-0.010	0.048	0.038	0.059**
	(0.075)	(0.030)	(0.070)	(0.031)	(0.026)	(0.030)
FDI	0.053**	0.029	0.022	0.032	0.001	-0.008
	(0.026)	(0.066)	(0.057)	(0.022)	(0.027)	(0.025)
Delicensing * FLEX 2	-0.044		-0.050	-0.030		-0.054
	(0.105)		(0.099)	(0.039)		(0.038)
FDI * FLEX 2		0.041	0.048		0.086**	0.106***
		(0.084)	(0.073)		(0.035)	(0.034)
Flexible labour markets: Effects of changes in output tariffs						
Row 1 + Row 2	0.127	0.124	0.122	-0.052	-0.045	-0.053
Std Error	0.057	0.057	0.057	0.080	0.080	0.077
p-value (combined effect = 0)	0.025	0.031	0.031	0.516	0.572	0.491
Flexible labour markets: Effects of changes in input tariffs						
Row 3 + Row 4	-0.128	-0.083	-0.090	0.530	0.570	0.550
Std Error	0.185	0.193	0.196	0.256	0.255	0.251
p-value (combined effect = 0)	0.488	0.667	0.645	0.039	0.026	0.029
Flexible labour markets: Effects of changes in downstream tariffs						
Row 5 + Row 6	-0.293	-0.284	-0.286	-0.108	-0.084	-0.080
Std Error	0.121	0.120	0.121	0.150	0.146	0.145
p-value (combined effect = 0)	0.015	0.018	0.018	0.473	0.566	0.581
Observations	99219	99219	99219	303505	303505	303505
R-squared	0.131	0.131	0.131	0.160	0.160	0.161

## Table 17: Incorporating interactions between the delicensing / FDI liberalisation reforms and labour market flexibility

The dependent variable is the natural log of employment. The delicensing and FDI liberalisation measures are lagged by one year. All specifications include industry, year and state fixed effects. Standard

errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%

### Table 18: Introducing additional time lags

	Formal		Informal					
Rigid labour markets (direct effect only)								
Dependent variable: <i>lnemp</i>	Two-year lag	Three-year lag	Two-year lag	Three-year lag				
Output tariffs	-0.096	-0.100	-0.151	-0.119				
	(0.082)	(0.082)	(0.098)	(0.108)				
Output tariffs * FLEX 2	0.259**	0.237**	0.125	0.120				
	(0.112)	(0.105)	(0.111)	(0.116)				
Input tariffs	-0.413	-0.330	0.297	0.052				
	(0.282)	(0.352)	(0.305)	(0.308)				
Input tariffs * FLEX 2	0.243	0.260	0.172	0.197				
	(0.169)	(0.193)	(0.219)	(0.214)				
Downstream tariffs	0.254	0.202	-0.104	-0.075				
	(0.189)	(0.208)	(0.308)	(0.319)				
Downstream tariffs * FLEX 2	-0.616***	-0.630**	-0.187	-0.211				
	(0.231)	(0.252)	(0.214)	(0.212)				
Delicensing	-0.040	-0.038	0.046*	0.044				
	(0.030)	(0.029)	(0.027)	(0.028)				
FDI	0.019	0.023	0.038*	0.028				
	(0.026)	(0.024)	(0.021)	(0.021)				
Flexible labour markets: Effects of changes in output tariffs								
Row 1 + Row 2	0.163	0.137	-0.026	0.000				
Std Error	0.067	0.067	0.081	0.077				
p-value (combined effect $= 0$ )	0.015	0.042	0.748	0.996				
Flexible labour markets: Effects of changes in input tariffs								
Row 3 + Row 4	-0.170	-0.070	0.468	0.249				
Std Error	0.298	0.383	0.295	0.303				
p-value (combined effect = 0)	0.569	0.855	0.113	0.412				
Flexible labour markets: Effects of changes in downstream tariffs								
Row 5 + Row 6	-0.362	-0.428	-0.291	-0.286				
Std Error	0.158	0.178	0.205	0.227				
p-value (combined effect = 0)	0.022	0.016	0.157	0.208				
Observations	99219	99219	303505	303505				
R-squared	0.131	0.131	0.160	0.160				

The dependent variable is the natural log of employment. The delicensing and FDI liberalisation measures are lagged by the same period as are the tariffs (as specified in the relevant column headings). All specifications include industry, year and state fixed effects. Standard errors, in parentheses, are clustered at the state-industry level. \*\*\*: Significant at 1% \*\*: Significant at 5% \*: Significant at 10%