

Entry Regulation, Labor Laws and Informality*

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April 2009

Abstract

Using state and industry level panel data on informal enterprises in India, I present microeconomic evidence linking informality to industrial entry and labor regulation. A major policy reform in 1991 removed license requirements on the setup and expansion of factories in nearly half of all Indian industries. I examine the impact of this entry deregulation on the informal manufacturing sector, comparing it across states that differ in the rigidity of their labor laws. My main finding is that the informal sector contracted after this lowering of entry barriers, and to a significantly greater extent in states with more pro-employer labor laws. Furthermore, value added per informal worker increased, and more so in pro-employer states. The estimates indicate that after deregulation, compared to states with less flexible labor laws, states with pro-employer labor laws saw a 25% larger decline in the number of informal establishments, and 36% larger increase in value added per worker in the informal sector. Thus, entry deregulation can lead to a productivity-enhancing labor reallocation from the informal sector, but the extent of this reallocation depends on the flexibility of labor laws.

*I am grateful to Amalavoyal V. Chari, Chris Ksoll, Rohini Pande, Mark Rosenzweig and Christopher Udry for helpful comments, and to Petia Topalova and the National Sample Survey Organization of India for allowing me use of their data. The views expressed in this paper are mine and should not be attributed to the World Bank Group.

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1 Introduction

Informality is endemic to firms in developing countries. It is estimated, for example, that 50-60% of the Columbian labor force is employed in the informal sector (Goldberg and Pavcnik (2003)), and that more than 80% of industrial employment in India is in unregistered establishments. This informality is associated with markedly lower productivity: for instance, value added per worker in India's informal manufacturing sector is on average about one tenth that in the formal sector.¹ It is often asserted that despite these large productivity gaps, firms choose to stay informal in order to avoid the burden of regulation.² Consistent with this view, cross-country investigation reveals that informality is more prevalent in economies with greater entry regulation and rigid labor laws (Djankov et al. (2002), Djankov and Ramalho (2008)).

In this paper, I use data from three nationally-representative, establishment-level surveys of India's informal manufacturing sector to present new microeconomic evidence linking informality to entry barriers and labor regulation. A wave of industrial deregulation in 1991 exempted nearly half of all industries in India from onerous licensing requirements on the setup and expansion of registered factories. I examine the impact of this entry deregulation on India's informal manufacturing sector, comparing it across states that differ in the rigidity of their labor laws.

My main finding is that the informal sector contracted significantly after this removal of entry barriers, across all industries, but to a greater degree in states with more flexible, or “pro-employer” labor laws. The estimates indicate that after deregulation, the decline in the number of informal enterprise was 25% greater in states with pro-employer labor laws, compared to states with “neutral” labor laws. This finding suggests that entry barriers encourage informality, and to a greater extent when labor regulations applying to formal firms are more rigid.

The second main finding in this paper relates to the productivity consequences of widespread informality. Informal firms have to remain small in order to avoid the regulatory radar, and staying small means giving up potential economies of scale, and having poorer access to input, product and credit markets. This reasoning suggests that labor reallocation from the informal to the formal sector will be associated with increases in labor productivity.

¹Estimates based on NSSO (2001) and CSO (2001).

²Johnson et al. (1998), Kocherlakota et al. (2006))

In contrast, if there are strong complementarities between these sectors, entry in the formal sector can expand both employment and average returns in the informal sector. For example, it is possible that the two sectors produce complements, with vertical contracting enabling informal enterprises to access a larger market. Another possibility is that when faced with greater competition, large firms try to escape labor regulations by contracting out work to the informal sector (Ramaswamy (1999)). Goldberg and Pavcnik (2003) argue that such an expansion of the informal sector occurred in Columbia when following trade liberalization, domestic industry was subjected to greater external competition.

I find that value added per worker in the informal sector *increased* following the contraction of this sector, and that this increase was significantly larger in states with more pro-employer labor regulation. In particular, value added per worker increased by 36 percentage points in states with pro-employer labor laws, relative to neutral labor regulation states. This result indicates that informality caused by entry barriers has negative productivity consequences. Deregulation can raise productivity in the informal sector by reallocating workers to the formal sector, but the degree to which this productivity increase occurs depends on the flexibility of labor laws.³

My findings also relate to the nature of labor and product market linkages between the formal and informal sector. Within states, the post-1991 exit from the informal sector did not vary significantly across industries which were delicensed, and those that remained under licensing regime, suggesting sizable cross-industry labor mobility between the formal and informal sectors. This result also contradicts the hypothesis of positive within-industry (vertical) linkages between the formal and informal sector. The data also reveal that post-delicensing, even though states with pro-employer labor laws experienced a contraction in total informal employment relative to other states, these states did *not* see a matching contraction in total revenue earned in the informal sector. This suggests that informal manufacturers in India sell in local markets, where the demand is inelastic. Informality forces producers to remain so small that it is not profitable to incur the fixed costs of accessing broader markets.

Current evidence linking regulation and informality is based largely on cross-sectional inference (Djankov and Ramalho (2008), Botero et al. (2004)), and is therefore subject to concerns of endogeneity caused by correlations between regulation and unobserved determi-

³This finding- that productivity in the informal sector is sensitive to total employment in that sector- also tallies with traditional notions of the informal sector as an elastic sink for “surplus” labor (Liedholm and Mead (1987), Biggs (2003)).

nants of informality. To give an example, both informality and heavy industrial regulation could be linked to some third institutional feature of underdevelopment. I control for such time-invariant, unobserved correlates by focussing on identifying the *changes* in informality, in response to a change in regulation. My strategy of comparing this change across states also ensures that the results do not reflect other macroeconomic shocks to the informal sector. To my knowledge, this empirical strategy is a first in the research on informality.

Besides contributing to the literature on informality, this paper adds to the growing body of microeconomic evidence on the effects of lowering entry barriers to firms in developing countries. Recent studies have shown that such entry barriers hurt growth through their effect on the size and composition of investment. Looking at the impact of India's industrial delicensing on the formal manufacturing sector, Chari (2008) finds that the growth caused by this deregulation was due, in equal parts, to an immediate expansion in existing factories, and to the registration of new factories in the longer run. In similar work on Mexico, Kaplan et al. (2007) and Bruhn (2008) take advantage of the phased roll-out of a business registry simplification program (*SARE*) to identify sizable positive effects of the reform on job and firm creation.

A point to note is that these studies are ambivalent about how much of the recorded "entry" into manufacturing is a reallocation from informal to formal manufacturing. Kaplan et al. (2007) find that the new firms being registered are larger, suggesting perhaps that these firms may have been operating informally, and that the effect of the new reform was simply to change their incentive to formalize. In contrast, Bruhn (2008) argues that the increase in the number of new businesses came primarily from former wage earners. The evidence presented in this paper- that deregulation leads to exits from the informal sector- can help interpret these previous findings. It also suggests that focussing on "entry" in the formal sector could give a biased estimate of the net effect of entry deregulation.

This paper is also related to recent work on the effect of labor regulations on growth. In a prominent study, Besley and Burgess (2004) exploit the fact that amendments to India's industrial labor law have differed significantly across Indian states, and find that pro-rigidity amendments to labor law are associated with lowered growth in registered manufacturing. Aghion et al. (2008) use data on India's registered factories to show that compared to states with neutral labor laws, industrial delicensing had a positive effect on delicensed formal industries in pro-employer states. My results complement these findings, showing that exit from

informality was a significant source of the relative growth in the formal sector of pro-employer states.

Since it shows that in combination with regional variation in labor laws, deregulation caused an increase in regional inequality in informal labor productivity, this study is also relevant to understanding rising spatial inequality in large developing countries (Sachs et al. (2002), Cashin and Sahay (1996), Dasgupta et al. (2000), Demurger (2004)). It belongs, in particular, to that strand of this literature which studies how factor immobility and institutional differences lead to regionally heterogenous impacts of policy reforms (Topalova (2004b), Sharma (2009), Aghion et al. (2005)).

It is possible that the cross-state pattern in the informal sector's growth between 1988 and 1994 reflects some regionally varying trend, or a shock other than the differential impact of deregulation and labor laws. Here, the finding in Aghion et al. (2008) that pro-employer states saw measurably higher entry of formal factories in delicensed industries supports my interpretation, since it gives clear evidence of a labor market shock originating in deregulation and labor laws. Moreover, several studies have shown that labor is spatially immobile in India,⁴ which implies that shocks originating in the formal sector would affect the informal labor market *in the same state*. My finding that employment and value added per worker moved in opposite directions also suggests that there was a negative labor supply shock to the informal sector, and not some productivity or demand shock. As further evidence against my results being driven by underlying state-level trends, I show that these differential patterns did not last for long beyond 1994. Finally, I show that my results are robust to controlling for changing import tariffs, industry specific trends, and to allowing for differential post-1991 growth across states at different levels of development.

The rest of this paper is organized as follows. Section 2 gives a brief description of India's entry regulation, or "licensing" system, and labor regulation across Indian states. Section 3 contains a simple model which illustrates the mechanisms through which large-scale delicensing is expected to affect the unorganized manufacturing sector. Next, I describe my data sources in Section 4, and spell out the empirical specification in Section 5. Section 6 presents the empirical results, and Section 7 concludes.

⁴Such as Munshi and Rosenzweig (2005) and Jayachandran (2004).

2 Institutional Background

2.1 The Industrial Licensing Regime in India

The industrial licensing system, introduced in the 1951 Industries Act, was the principal tool used by the Indian government to control the pace and pattern of industrial development across India (N.C.A.E.R (2001)). An industrial license was necessary to (i) establish a new factory, (ii) carry on business in an existing unlicensed factory (iii) significantly expand an existing factory's capacity, (iv) start a new product line and (iv) change location. All manufacturing units in the “organized” sector⁵ were subject to these licensing requirements. As described in Aghion et al. (2008), these licensing requirements

“...imposed a substantial administrative burden on firms. There was also considerable uncertainty as to whether license applications would be approved and within what time frame... Delays in the approval process were common and of indeterminate length. No explicit criteria for the award of industrial licenses were provided to applicants.”

The Rajeev Gandhi-led government which came to power in 1985 de-licensed about one-thirds of all three-digit industries. This reform was part of its generally pro-business attitude to governance (Rodrik and Subramanianand (2004)). An even bigger round of delicensing took in 1991, when industrial licensing was abolished for about half of all three-digit industries. This deregulation was part of a program of structural adjustment and liberalization, in response to the macro-economic crisis of the early 1990s.

How were the industries to be delicensed selected? If, for example, industries expected to grow faster were more likely to be delicensed, then delicensing was endogenous to an industry's growth. But Aghion et al. (2008) find no evidence of a relationship between when an industry is delicensed and its pre-reform output growth. Furthermore, the 1991 wave of delicensing was a response to a macro-economic crisis, and licensing was abolished for nearly *all* products, except for a small number of industries where licensing was retained “for reasons related to security and strategic concerns, social reasons, problems related to safety and overriding environmental issues, manufacture of products of hazardous nature and articles of elitist consumption” (G.O.I (1991)).

⁵By definition, all manufacturing units using electrical power that employ more than 10 regular workers, or those that use no power and employ more than 20.

2.2 Labor Regulation

The basis of industrial labor regulation in India is the Industrial Disputes Act of 1947, which sets out the conciliation, arbitration and adjudication procedures to be followed in the case of an industrial dispute. The Act was passed by the central government, and applied equally to all states. But since India is a federal democracy, with both the central and state governments having jurisdiction over labor legislation, the act has since been extensively amended by state governments. These amendments have caused the states to differ markedly in their labor regulation.

Besley and Burgess (2004) read all state level amendments made to the Industrial Disputes Act during 1958-1992 in 16 major Indian states (from Malik (1997)). Each amendment was coded as being either neutral, pro-worker or pro-employer.⁶ The state labor regulation regime in 1992 was then obtained as the sum of these scores over all preceding years. Based on this cumulative score, Besley and Burgess (2004) found that four states- Gujarat, Maharashtra, Orissa and West Bengal- were “pro-worker states”. Six states- Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Rajasthan and Tamil Nadu- were categorized as “pro-employer”, leaving six states- Assam, Bihar, Haryana, Jammu and Kashmir, Punjab and Uttar Pradesh- to be classified as “neutral” with respect to labor laws.⁷

3 Theory

In this section I present a simple model to illustrate the channels through which delicensing -a lowering of entry barriers to formal industry- is expected to affect the informal manufacturing sector. The first is a product market channel, which depends on whether informal sector goods are substitutes or complements to the goods produced in the formal sector. The second, a labor market effect, is caused by shifts in labor demand which results from large-scale entry/exit in formal manufacturing.

This model incorporates two mechanisms which embody the notion of inefficiency, or “overcrowding” in the informal sector. Firstly, the informal sector is by nature constrained in

⁶A sample “pro-worker” reform is from West Bengal in 1980: The rules for lay-off, retrenchment and closure may according to the discretion of the state government be applied to industrial establishments which employ more than 50 workers. Under the central act, these rules only apply to establishments which employ more than 300 workers.

⁷Because very few amendments were carried out in the post-1990 period, this 1992 categorization remains valid throughout the period of my study.

its access to managerial skills, input, output and credit markets. For unskilled workers, who are of homogenous quality to the formal sector, productivity in the informal sector can vary, depending on such factors as social networks (Banerjee (2004), Shah and Biggs (2006)). Thus, as people crowd into informality because of low formal wages, the marginal informal enterprise is increasingly less productive. The second notion of overcrowding is related to the fixed costs of accessing broader markets: small informal firms are constrained to serve localized markets, where demand is likely to be limited and inelastic.

Consider a state economy with one industry and two sectors, the formal and the informal, each employing unskilled workers to produce a distinct final product. A key determinant of the differential effect of deregulation across states would be the extent of labor mobility across states and sectors. Labor market shocks originating in organized industry will matter more to the informal sector in the same state when labor is mobile across sectors, but not across states.

There is strong evidence that spatial labor mobility is markedly low in India, with multiple studies showing that labor markets are local to districts, which are subunit of Indian states. So, the model assumes that labor does not move across states, and that the state labor market is closed. Moreover, given the focus on unskilled workers, I simplify the model by assuming perfect mobility across sectors, within states. Next, as in Aghion et al. (2008), I assume that goods manufactured in the formal sector are traded across states, at no cost. This implies a common formal commodity price across states.

Let w be the wage in the formal sector, the alternative to which is “self-employment” in the informal sector. Let p_u be the price of the output and c the unit cost of input in the informal sector.⁸ I assume that there is no fixed cost to production in the informal sector, and that any individual i can produce θ_i units of output per unit of input. θ_i varies across individuals, and is drawn from a uniform density function: $\theta \in [\theta_l, \theta_h]$. Let $k = \theta_h - \theta_l$.

Given the alternative of employment in the formal sector at wage w , an individual will stay self-employed if and only if

$$p_u\theta_i - c \geq w \tag{1}$$

or if

$$\theta_i \geq \theta_c = \frac{c + w}{p_u} \tag{2}$$

⁸The subscript u denotes “unorganized”, the official Indian term for the informal sector. Similarly, the subscript o denotes “organized”, or formal.

For a mass N of workers, this implies that the number seeking self-employment in industry i is $\frac{N}{k}(\theta_h - \theta_c)$. The total supply of goods produced in the informal sector is

$$S(w, c, p_u) = \frac{N}{2k}(\theta_h^2 - \theta_c^2) \quad (3)$$

Let $D^u(p_u, p_o, W)$ denote the demand for goods manufactured in the informal sector, which depends on a vector of exogenous state-level characteristics W , and the price p_o of the formal sector product. To highlight how the impact of a product demand shock in the informal sector may differ from a labor market shock when demand for the informal commodity is local, I assume that demand for the informal commodity is perfectly inelastic in its own price:

$$D^u(p_u, p_o) = g(p_o, W)D \quad (4)$$

The equilibrium price p_u^* in the state is determined by the informal product market clearing condition:

$$S(w, c, p_u) = g(p_o, W)D \quad (5)$$

Thus,

$$p_u^* = \frac{(w^* + c_i)}{Z} \quad (6)$$

where w^* is the equilibrium wage, and Z a function of the model's parameters.

$$Z = \left(\frac{N}{N\theta_h^2 - 2kg(p_o, W)D} \right)^{\frac{1}{2}} \quad (7)$$

Note that this condition implies that the informal sector productivity cutoff θ_c is fixed at Z : with perfectly inelastic demand, equilibrium in the goods markets requires a constant level of employment in the informal sector.

Let $A - bw$ be the labor demand in the formal sector. Then, given labor mobility across sectors, the state labor market clearing condition is

$$(A - bw) + \frac{N}{k}(\theta_h - Z) = N \quad (8)$$

This determines the equilibrium wage,

$$w^* = \frac{1}{b} \left(A - N + \frac{N}{k} (\theta_h - Z) \right) \quad (9)$$

The Product Market Effect of Delicensing

Suppose entry into formal manufacturing causes a decline in p^o , the national price of the formal commodity. The effect of this price shock on the informal sector will depend on whether the informal sector produces substitutes or complements to the item produced in the formal sector. Suppose it is the former: that is, $\frac{\partial D^u(\cdot)}{\partial p_o} > 0$. Then, Equation 6 implies that $\frac{\partial p_u^*}{\partial p_o} > 0$: the informal price p_u^* falls when the formal sector's product becomes cheaper. Equation 2 then implies that the productivity cutoff θ_c rises, which means that total output, employment and revenue in the informal sector decline. Value added by each informal worker ($p_u \theta_i$) falls, but since some of the least productive workers have left the informal sector, it can be shown that *average* value added per worker in the informal sector rises.

These predictions would be reversed if the informal sector produces goods which are complements to those made in the formal sector of the same industry. Also, note that since p_o is common to all states, the product market effect is the same in every state.

The Differential Labor Market Effect of Delicensing

Suppose labor demand in the formal sector expands due to entry deregulation. This can be modeled as an increase in the parameter A . The equilibrium wage expression in Equation 9 implies that this will increase the wage in the state. Moreover, the informal product market clearing condition (Equation 6) then indicates an increase in the informal commodity's price. In fact, given perfectly inelastic demand, p_u must increase exactly in proportion to the wage, to the point where the effect of this wage increase on the productivity cutoff θ_c is nullified.

Thus, in this polar case of perfectly inelastic demand, a labor market shock originating in the formal sector does not cause labor exit or output loss in the informal sector, but the consequent price rise *increases* total informal sector revenue. Moreover, since the productivity cutoff θ_c is the same as before, value added per worker ($p_u \theta_i$) has increased. The intuition behind this is that with inelastic demand, any outside pull on informal workers must be countered by an increase in average returns in the informal sector. Conversely, any pressure towards entry (or *overcrowding*) must lower average returns.

Now, consider the more general case of less than perfectly elastic demand in the infor-

mal market. Formal labor demand expansion will put an upward pressure on the wage, and hence raise p_u . But in this case, the informal price increase will be less than proportional, and consequently, the informal sector productivity cutoff θ_c will rise. Thus, there will be exit from the informal sector, and total employment and output will fall. Value added per worker will increase, not just because p_u has risen, but also because of a reallocation effect: the average worker remaining in the informal sector now has higher productivity. Lastly, the direction of change in total revenue will depend on the extent of demand inelasticity. If demand is inelastic enough, the price increase will outweigh the employment decrease, and total revenue will rise.

Given these goods and labor market channels, we can now consider the possible consequence of entry deregulation for the informal sector. Suppose the goods market effect operates mainly *within-industry*. Then, if formal and informal goods in the same industry are substitutes, an expansion in the formal sector would have depressed employment and revenue in the informal sector by shifting demand towards the formal product. The reverse would have occurred if there are positive goods market linkages between the formal and informal sector in the same industry. Furthermore, since the formal commodity is traded across states, this demand shock would have been common to all states.

The labor market channel operates within states, but across industries. So, formal sector entry causes exit from the informal sector in every industry, but to a degree which depends on the overall formal sector entry in the state. According to the estimates in Aghion et al. (2008), delicensing caused a significantly greater entry of formal firms in states with more pro-employer labor market regulation. This suggests that there would have been greater reductions in informality in pro-employer states. Moreover, these states would have seen a larger increase in average value added per worker in the informal sector. To the extent that unskilled labor can move across industries, these impacts would not have varied across delicensed and non-delicensed industries within each state.

4 The Data

4.1 The Informal Manufacturing Sector

My primary data sources are surveys of India’s *unorganized*, or informal manufacturing establishments. In India, manufacturing establishments that employ ten or more workers⁹ are in the *registered*, or *organized* manufacturing sector. Being subject to industrial regulation, these registered firms constitute the formal sector. By definition, all other establishments, including household enterprises, belong to the *unorganized* sector, which is not subject to licensing or labor laws.

The National Sample Survey Organization (NSSO) of India conducted surveys of manufacturers in the unorganized sector in 1988, 1994-95 and 1999-2000. These were large nationwide enterprise-level surveys that were stratified at the district level.¹⁰ I used 3-digit industry identifiers¹¹ to aggregate each survey’s data to the industry-state level. In doing so, to ensure representativeness at the state and industry level, I weighted the establishment-level figures by the inverse of the sampling probabilities. This resulted in estimates of employment, output and value added in the informal manufacturing sector for 16 major states and about 130 3-digit industries, for 1988, 1994 and 2000. Given that these states account for around 95% of the Indian population, this is a nationally-representative data set on the informal sector.

Since the survey did not stratify by 3-digit industry, there are many “empty” state-industry-year cells, meaning state-industry pairs to which not a single sampled establishment belonged in some survey round. Assuming that there was zero employment in these empty cells would be an underestimation of the extent of informality in them. Moreover, it is not possible to measure *average* attributes of these cells, such as value added per worker. Assuming that there was no systematic difference in the post-1991 rate of change in those cells which “exit” the data after 1988, treating these cells as missing data should not bias the results. Thus, my main data set on the informal sector is an unbalanced panel of 6217 observations on 130 three-digit industries, *on average*, in 16 states and three years. I also show results on a “balanced” panel, which consists of only those state-industries that are present in all three years of the data. This balanced panel has 4296 observations, containing 89 three-digit industries on average. Finally, assuming that the missing state-industry-year cells had zero

⁹Twenty workers, in case the plant does not use electric power.

¹⁰The 16 largest states each contain about 20 districts on average.

¹¹The codes used are the 1987 National Industrial Classification codes.

employment, I construct a “full” data set of 170 3-digit industries, 16 states and 3 years, and show that my results are robust to this inclusion.

Unorganized sector manufacturing establishments in India which employ more than six workers are classified as “Directory Manufacturing Establishments” (DME). Those employing six and fewer workers are classified as non-DME (NDME), while those that do not use hired labor at all are called Own Account Manufacturing Enterprises (OAME). Each category was covered in the NSSO surveys as a separate sub-strata in every district, but the 1988 survey did not cover DMEs.¹² Hence, the data used in this paper are representative of those unorganized manufacturing establishments which employ only household members, or at most six hired workers. This segment of the unorganized sector accounted for nearly 85% of all unorganized manufacturing employment in 2000 (NSSO (2001)).

The NSS surveys report revenue, not output, and I deflated all revenue and value added figured to 1988 prices using all-India three-digit industry deflators. Since available price-deflators are an average of industry prices across states, the data do not permit the decomposition of changes in the value of output into price and quantity changes.

Table 1 presents summary statistics of key characteristics of the unorganized sector (all NDMEs and OAEs). These are averages (and standard deviations) across state-industry cells, and they correspond to the balanced panel. Overall, these statistics show that there was a contraction in the informal sector between 1988 and 1994, and that this contraction slowed down or even reversed between 1994 and 2000. For example, the average number of informal establishments in a three-digit industry in a major state declined noticeably, from 7500 to 6700, between 1988 and 1994, and thereafter declined minimally to 6600 in 2000. Mean revenue in a state-industry cell declined by 11% during the same period, but rose by 18% between 1994 and 2000. Similarly, total value added in the average state-industry cell fell during 1988-94, and then rose. In contrast, value added *per worker* increased throughout.

4.2 Delicensing, Labor Laws and Tariffs

My data on the date of “delicensing” of three-digit industries is from Aghion et al. (2008). The authors first assigned three-digit codes to all the industries licensed under the 1951 Industries Act (and subsequent amendments to that act). Then, they used statements on

¹²The DMEs were covered in a 1989 survey undertaken by a different government agency, and not made publicly available.

industrial policy, press notes and notifications issued by the Government of India to construct a delicensing dummy variable which is equal to one if all or part of a three-digit manufacturing industry is delicensed in a particular year, and stays equal to one in subsequent years.

The measure of flexibility in a state's labor law in 1990 is based on the cumulative Besley-Burgess coding of state-level amendments to the Industrial Disputes Act (Besley and Burgess (2004)), which was described in Section 2.2. This information is coded in two time-invariant state-level dummies, *Pro-employer* and *Pro-worker*. A state which is neither pro-employer nor pro-worker in its labor regulation is a *neutral* state. Pro-employer states have the most flexible labor laws.

To control for the effects of contemporaneous trade liberalization, I use annual data on tariff rates disaggregated by three-digit industry. These rates were compiled from annual tariff data at the six-digit level of the Indian Trade Classification Harmonized System Code (Topalova (2004a)). The decline in these tariffs measures the industry-specific decline in trade protection.

The first panel of Figure 1 plots the proportion of three-digit industries delicensed by year. Most of the delicensing occurred in just two years, 1985 and 1991. About a third of all industries were delicensed in the first wave; in my data these industries enter the panel in 1988 with their delicensing dummy variable already set equal to one. A further half of all three digit industries were delicensed in 1991, and for these industries the delicensing indicator switches on in 1994. There was some minor delicensing between 1994 and 2000, and about a tenth of industries were still under the industrial licensing regime in 2000.

The second panel of Figure 1 shows that average tariff rates fell continuously during the 1990-2000 period. Since all the delicensing in the study period happened in 1991, while average tariff rates fell throughout the 1990s, it is possible to identify the effect of delicensing by comparing the 1988-1994 period to the 1994-2000 period.

5 Empirical Specification

The regressions in this paper use data disaggregated by state and industry to compare various informal sector characteristics before and after 1991, the year in which a majority of industries were delicensed. I measure how this change varied across states with different labor laws, and whether it also varied by the licensing status of the industry. The base specification uses data

on two years, 1988 and 1994:

$$y_{ist} = \theta_{is} + \alpha Post_t + \beta Post_t * Labor_s + \gamma Delicensed_{it} + \delta Delicensed_{it} * Labor_s + e_{ist} \quad (10)$$

y_{ist} is some characteristic of the informal manufacturing sector in industry i , state s and year t , and θ_{is} is a state-industry fixed effect. $Post_t$ is a dummy indicating the post-delicensing year, 1994. $Delicensed_{it}$ is an industry-time specific dummy which becomes equal to one after an industry is delicensed, and stays one thereafter.¹³ $Post_t * Labor_s$ is an interaction of the post-1991 dummy with $Labor_s$, a measure of the labor law in state s , while $Delicensed_{it} * Labor_s$ is the interaction of the delicensing dummy with the labor law.

The coefficient on $Post_t * Labor_s$ measures how the post-1991 change in the informal sector varied across states with different labor laws. Note that this is the average change in *all* industries. Assuming that any trends (or post-1991 shocks) in the informal sector did not vary systematically across states with different labor laws, this coefficient measures how the effect of mass deregulation on an *average* industry in the informal sector varied by state labor laws. To the extent that the labor market effect of entry deregulation in the formal sector varies by state, but not across industries, this coefficient reflects this labor market channel.

Since $Delicensed_{it}$ is equal to the $Post_t$ dummy for all the industries that were delicensed in 1991, the coefficient on $Delicensed_{it} * Labor_s$ measures how the post-1991 differential change by labor law varied across delicensed and non-delicensed industries. This interactions term reflects all possible within-industry effects of entry deregulation and labor laws. For example, if the product demand shock from expansion in the formal sector varies by state, and operates *within* delicensed industries, this coefficient reflects how the intra-industry product market linkage depends on labor laws.

Note that the coefficient on $Delicensed_{it}$ identifies the average national effect of entry deregulation on the informal sector *in deregulated industries*. If the product market channel does not vary across states, then this $Delicensed_{it}$ dummy picks up the entire intra-industry product market linkages between formal and informal manufacturing.

The key identifying assumption behind the interpretation that $Post_t * Labor_s$ is the joint effect of delicensing and labor laws is that trends in the informal sector did not vary

¹³The $Delicensed_{it}$ dummy switches on in 1994 for about half of all 3-digit industries.

systematically across states with different labor laws. Since delicensing occurred in a single wave on 1991, I am able to test against a differential trend by exploiting the 2000 data:

$$\begin{aligned} y_{ist} = & \theta_{is} + \alpha Post_t + \beta Post_t * Labor_s + \alpha_2 Post2_t + \beta_2 Post2_t * Labor_s \\ & + \gamma Delicensed_{it} + \delta Delicensed_{it} * Labor_s + e_{ist} \end{aligned} \quad (11)$$

Now, $t = \{1088, 1994, 2000\}$. The $Post$ dummy is equal to one in both 1994 and 2000, while the $Post2$ dummy switches on in 2000. If the cross-state differential in the post-delicensing years reflects some underlying trend that has varied systematically across states with different labor laws, then the coefficient on $Post2_t * Labor_s$ should be statistically significant, *and* of the same sign as that on $Post_t * Labor_s$. If not, then it suggests that $Post_t * Labor_s$ does indeed reflect the differential impact of the 1991 deregulation.

As in Aghion et al. (2008), instead of a monotonic labor law measure $Labor_s$, I use two labor regulation dummies: a dummy indicating if a state has *pro-employer* labor laws, and another indicating a *pro-worker* labor law regime. A state in which both these dummies are equal to zero is a *neutral* labor regulation state. If entry deregulation caused greater exit from informality in states with more pro-employer labor laws, then the coefficient on $Post * Pro-employer$, which measures change relative to *Neutral* states, should be negative. Furthermore, if pro-worker labor laws hindered exit from informality, then the $Post * Pro-worker$ effect should be positive.

6 Empirical Results

6.1 Overall Trends

Figures 2 and 3 give a graphical preview of the main regression results. First, Figure 2 shows that as measured by the total number of establishments, or total employment, India's informal manufacturing sector contracted between 1988 and 1994, a period spanning two years before and after the delicensing of 1991. But relative to these aggregates, value added per worker in the informal sector did not decline.

Next, like the base regressions in this study, Figure 3 compares trends in informality across states with neutral and pro-employer labor regulation. Panels A and B show that the number of establishments and employment in the informal manufacturing sector fell in pro-

employer states, between 1988 and 1994. In contrast, the size of the informal sector increased in neutral states. Thus, right after the broad-based entry deregulation in 1991, there was large-scale exit from the informal sector in states with flexible labor laws, in absolute terms, and also relative to states with less flexible labor laws. Furthermore, this differential did not last much beyond 1991, since during 1994-2000 the informal sector expanded in both groups of states.

Finally, Panel C in Figure 3 shows that in contrast to employment, between 1988 and 1994, value added per informal worker *increased* in pro-employer states, and fell in neutral states. And, this relative trend too reversed after 1994. Thus, these broad trends are consistent with the expected labor market effects of entry deregulation: greater exit from informality, and a consequent relative increase in informal sector productivity in states with flexible labor laws.

6.2 Results: Changes in the Size of the Informal Sector

Table 2 presents results from OLS estimations of the basic regression specification, Equation 10, which uses data from before and after 1991. The outcome variables are the logarithms of the number of establishments (Columns 1-2) and total employment (Columns 3-4) in the unorganized sector in a state-industry-year cell.

In Column (1), which does not include interactions with the labor law dummies, the coefficient on *Post* is -0.178, significant at the 1% level. This means that on average, across all industries and states, the number of informal enterprises declined by nearly 18% between 1988 and 1994. The coefficient on the dummy which indicates whether an industry was delicensed is statistically not significant from zero, which indicates that this contraction in the informal sector was common to all industries, irrespective of delicensing. Column (3), which looks at employment, reveals the same pattern.

Columns (2) and (4) interact the *Post* and the *Delicensed* dummies with the state labor regulation dummies. In Columns (2), the *Post*Pro-employer* dummy has a coefficient estimate of -.253, significant at the 5% level, which indicates that relative to neutral states, the post-1991 decline in the number of informal enterprises was 25 percentage points greater in states with pro-employer labor laws. The coefficient on the *Post*Pro-worker* dummy is negative but not significant, implying that post-1991 changes in states with pro-worker labor laws were not significantly different from those in neutral states. Again, the coefficients on

*Delicensed*Pro-employer* and *Delicensed*Pro-worker* are statistically not significant, which implies that the cross-state differential in the growth of the informal sector did not vary across delicensed and non-delicensed industries. Like the result in Column (1), this too suggests that the effect of entry deregulation on the informal sector cut across deregulated and non-deregulated industries.

In Column (4), which looks at employment, the results are similar to those in Column (2), but weaker. In particular, the coefficient on the *Post*Pro-employer* is not statistically significant. In later regression results, which add the 2000 data to the estimations, and control for tariffs, I will show that the *Post*Pro-employer* coefficient is statistically significant for employment too.

In summary, Table 2 shows that after the big wave of deregulation in 1991, the number of informal enterprises declined significantly more in states with flexible labor laws, and that this decline was common to all industries. One concern with this result is that it could be picking up some underlying state-specific trend in informality, which is also correlated with a state's labor regulation regime. To allay this concern by testing against a continuing differential trend, Table 3 presents results from estimating Equation 11, using data from three periods- 1988, 1994 and 2000. In these regressions, the *Post* dummy is equal to one in both 1994 and 2000, while the *Post2* dummy switches in the year 2000.

Column (1), which looks at the number of informal enterprises, reinforces the main result in Table 2. The *Post*Pro-employer* dummy has a coefficient estimate of -.36, which is statistically significant at the 5% level, indicating that relative to neutral states, and between 1988 and 1994-2000, the decline in the number of informal enterprises was 36 percentage points larger in states with pro-employer labor laws. Moreover, the *Post2*Pro-employer* coefficient is significantly *positive*, at a value of 0.31. This implies that the differential rate of decline in informality did not continue into 2000, which is evidence against a differential state-specific trend driving the main results.

In fact, like Figure 3, the *Post2*Pro-employer* estimate suggests that the differential in informality levels was nearly, but not fully reversed in 2000. This suggests that it could not be the outcome of trade and FDI reforms, which continued well past 1991.

As in Table 2, the coefficients on the delicensing dummy and its interactions with labor regimes are not significant, implying that the relative contraction in informality operated across all industries. Next, Column (2) presents results on the balanced panel, and these are

essentially the same as those in Column (1). Thus, the results are robust to keeping only those state-industry cells which had at least one sampled establishment in all three survey rounds.¹⁴

Column (3) and (4) presents the corresponding results for total employment in informal enterprises. Here, the results are weaker than those for the number of establishments. In the unbalanced panel (Column (3)), the coefficient on *Post*Pro-employer* is negative and significant, which says the relative to other states, informal employment declined in states with pro-employer labor laws. However, the *Post*Pro-worker* coefficient too is negative and statistically significant, suggesting that even pro-worker states saw a relatively larger contraction in informality. This is contrary to the expected effect of inflexible labor laws, and inconsistent with other results, but there is evidence that this estimate is not robust. Firstly, other coefficients in Column (3) suggest that it could be reflecting some underlying trend in a few pro-worker states: unlike the *Post2*Pro-employer* interaction, the *Post2 * Pro – worker* interaction does not show any reversal in 2000. Secondly, as shown below in Table 4, unlike the *Post*Pro-employer* interaction term, and unlike the results for the number of establishments, the statistical significance of the *Post*Pro-worker* term in the employment regression does not survive the addition of tariffs and other controls. Thus, overall, the robust result in Table 3 is that after 1991, the informal sector contracted relatively more in states with pro-employer labor laws, and to the same extent in all industries.

Table 4 presents two robustness checks on these results.¹⁵ Column (1) presents OLS estimates of Equation 11, with (three-digit) industry-specific time trends as controls. This is on account of two possibilities: one, that delicensed industries may have had different underlying trends from other industries, and two, that industries more prevalent in pro-employer or pro-worker states may have had different trends from industries more prevalent in neutral states. The key result- the negative and significant coefficient on *Post*Pro-employer*- survives this addition, with the point estimate of the differential contraction of informality in pro-employer

¹⁴Given that every regression includes state-industry fixed effects, the coefficients of interest are identified off those state-industry cells which are observed in at least one of the two *Post* years. The “balanced” panel keeps only those state-industry cells which appeared in 1988, 1994 and 2000. So, as far as the *Post* dummy and its interaction effects are concerned, only those state-industry cells which appeared in *just one* of the two *Post* years would drive any difference in the results from the unbalanced and balanced panels. Unless the rate of change in such cells was systematically different, and in a manner correlated with labor laws, the results based on the two panels are not expected to differ. Using the unbalanced panel is more efficient, as it does not ignore the information in such cells. But to show that the key results are robust, I present those using both data sets.

¹⁵Results on the balanced panel, not shown, are similar.

states still close to 35%.

In Column (1), the estimated coefficient on the *Delicensed* dummy is negative and statistically significant. This indicates that conditional on the assumption of linear industry-specific time trends, delicensed industries saw a 26% percent decline in the number of informal enterprises after delicensing. Moreover, given that the interactions of *Delicensed* with the state labor law dummies are estimated to be insignificant, this effect of delicensing did not vary across states. As shown in the model, interstate trade in the formal commodity means that the product market effect of expansion in the formal sector should be common to all states. This finding thus hints at a product market effect, suggesting that the informal commodity is a substitute for the formal commodity produced in the same industry.

Column (2) controls for time-varying import tariffs in every industry group. Recall that tariffs fell continuously throughout the 1990s, but to varying degrees in different industries. Increased openness to trade could have affected the competitiveness of both formal and informal manufacturers in the same industry. However, the main result- that there was relatively greater contraction in informality in the states with the most flexible labor laws- remains unchanged.

Columns (3) and (4) present the corresponding results for employment. These results are substantively similar to those for the number of informal establishments: in Column (3), the negative and statistically significant coefficient estimate of *Post*Pro-employer* indicates a 27% percent points greater decline, after 1991, in informal employment in pro-employer labor law states. The coefficient on *Post*Pro-worker*, on the other hand, is no longer statistically significant, which is also consistent with the result for the number of establishments. Lastly, the positive and significant estimate of *Post2*Pro-employer* suggests that this differential lasted only for the period following the delicensing wave. As in previous estimations, the results on employment are weaker, and somewhat sensitive to tariff controls. This could be because compared to just enumerating informal units, there is likely to be greater measurement error in estimating employment in unregulated enterprises.

6.3 Results: Changes in Value Added Per Worker in the Informal Sector

Section 3 explained how entry deregulation is expected to affect labor productivity in the informal sector. First, the labor market shock- an increase in formal sector wages- is expected to pull the least productive workers out of informality, thereby increasing average informal sector productivity. Moreover, this effect is larger if the demand for the informal commodity is inelastic. If unskilled labor can move across industries but not across states, this labor market channel will be common to all industries, but vary across states, and the increase in productivity will be larger in states where the labor market shock is larger- namely, states with flexible labor laws. Second, there is an intra-industry product market effect, which runs in the opposite direction: an expansion in the output of the substitute commodity produced in large factories will shrink demand for the informal commodity, and *lower* value added per worker in the informal sector.

Table 5 presents OLS estimations of Equation 11, with value added per worker in the informal sector as the outcome variable. Column (1)-(3) correspond to the unbalanced panel, and (4)-(5) to the balanced panel. Columns (2) and (5) add industry-specific time trends as controls, while (3) and (6) control for the effect of tariff deregulation. The results are substantively similar across all specifications. The coefficient on *Post*Pro-employer* is positive and statistically significant, with the estimates suggesting that post-1991, relative to neutral states, value added per informal sector worker increased by 36-25% points in states with pro-employer labor regulation. The coefficient on *Post*Pro-worker* is significantly negative, indicating that relative to neutral states, informal labor productivity fell in pro-worker states.

Both estimates are consistent with the expected labor market shock effect of deregulation: as workers are pulled into the formal sector after entry barriers are lowered, those remaining in the informal sector are on average more productive than before.

In Table 5, the coefficient on *Delicensed* is significantly negative, which suggests that there is also a product market impact of deregulation. This effect too appears to vary across states: the coefficient on *Delicensed*Pro-worker* is significantly positive, indicating that relative to neutral states, the negative intra-industry demand shock to the informal sector was weaker in states that saw relatively little formal sector entry after delicensing. Thus, product markets could be local to states.

An expansion in informality can lower total informal sector revenue if the demand for the informal commodity is sufficiently inelastic. This “market saturation” is possible when informality precludes access to broader markets. Conversely, when the informal commodity market is saturated, an exit of informal workers need not lower total revenue in the informal sector. The results in Table 6, which look at total revenue in informal state-industry cells, support this localized market hypothesis. Firstly, with or without controls, and in both balanced and unbalanced panels, the *Post*Pro-employer* interaction is statistically insignificant. Thus, even though pro-employer states saw relatively greater contraction in the number of informal units, they did not experience a significant relative contraction in total revenue, suggesting that informal producers face an inelastic demand curve. The market saturation hypothesis is also supported by the significantly negative coefficient on *Post*Pro-worker*, since it indicates that in relative terms, states experiencing an *entry* into informality saw a decline in total informal sector revenue.

6.4 Robustness Checks

States with different labor regulation might differ systematically along other dimensions relevant to industrial investment. In that case, the differential impact of delicensing could be reflecting something other than the causal effect of labor regulation.

In Table 7, I modify the main specification by controlling for the *differential* impact of a state’s overall level of development, interacting *Post* and *Post2* with average annual state domestic product in 1985-89. This is to show that the differential with respect to labor laws is robust to comparing states which have different labor regimes, but are at the same general level of development. The results are identical to previous regressions. For example, in Column (1), the estimate of the *Post*Pro-employer* effect indicates that after 1991, the number of informal establishment in pro-employer states fell by 37% points relative to neutral states.¹⁶ And consistent with previous results, the *Post*Pro-employer* term is estimated to be significantly positive in Columns (3) and (4), indicating that after delicensing, value added per worker in the informal sector of pro-employer states increased relative to neutral states.

Finally, Table 8 addresses with the concern that ignoring “missing” observations- that is, those industry-state pairs to which no sampled establishment belonged in a survey round-

¹⁶The coefficient on *Post*Pro-worker* too is significantly negative, but as in Tables 3, this contrary result is not robust to addition of tariff controls.

could bias the result. A missing observation is likely to be an industry-state with an informal sector so small as to be missed entirely in the survey. If so, then ignoring these cells would underestimate the decline in informality after 1991. Moreover, if this “exit” was correlated with a state’s labor law regime, ignoring it would bias estimates of the differential impact of deregulation.

In Table 8, Columns (2) and (4), I re-estimate Equation 11 on a data set in which employment and the number of enterprises in non-sampled cells are assumed to be zero. The outcome variables are in levels instead of logarithms, a modification necessitated by the fact that the log of zero is not defined. To enable comparison with earlier results, I also re-estimated Equation 11 on the unbalanced panel, as before, but with the outcomes specified in levels. These modified re-estimations of regressions presented earlier in Table 3 are shown in Columns (1) and (3), Table 8.

Even after the missing cells are taken into account by assuming zero informality in them, the coefficient on *Post*Pro-employer* is estimated to be negative and statistically significant. The patterns are same for both outcomes, the number of units and their employment. For instance, ignoring the missing cells (Column (1)), we get the result that relative to neutral states, the number of informal enterprises in pro-employer states fell by nearly 2,500 after 1991. This result is the non-logarithmic counterpart to that presented in Table 3, Column (1). Next, filling in the data by assuming that missing cells are those which saw a complete disappearance of informality, we see in Column (2) that the relative decline in pro-employer states was to the tune of 1,500. While this is a lower estimate than that from the unbalanced panel, it happens to be based on an extreme assumption on the extent of informality in missing cells. Hence, the main message of these estimations should be that the sign of the *Post*Pro-employer* coefficient is insensitive to ignoring state-industries with no establishment sampled in some year.

7 Conclusion

Most developing countries have vast numbers working in small, informal establishments, or in self-employment. Given the extremely low productivity levels observed in the informal sector, there is a great deal of interest in understanding informality, and in formulating policies which encourage a reallocation from informal to formal enterprises. It is, in particular, important to

understand if informality is largely a response to inflexible regulations.

The findings in this paper suggest that removing regulatory barriers to industrial entry can be successful in reducing informality. This happens mainly because rising labor demand in the formal sector induces workers to leave low-paying informal jobs. But since the effect of entry deregulation on labor demand in formal enterprises depends on labor laws, this exit from informality is markedly higher when labor laws give more flexibility to employers in the regulated sector.

There are, moreover, substantial productivity benefits associated with the exit from informality which is induced by regulatory reform: while other studies have shown that entry reform raises productivity in the formal sector, this paper shows that it also increases average earnings in the informal sector. Once again, this productivity increase depends on the degree of flexibility of labor laws.

Of course, another benefit of formalizing firms is that it offers workers some degree of formal protection. To that extent, more pro-worker labor laws are beneficial. But my findings show that making labor laws “too” pro-worker may inadvertently hurt worker protection by reducing labor demand in the formal sector, and encouraging informality. There is no worker protection in the informal sector. This tradeoff must be kept in consideration when thinking about labor regulation.

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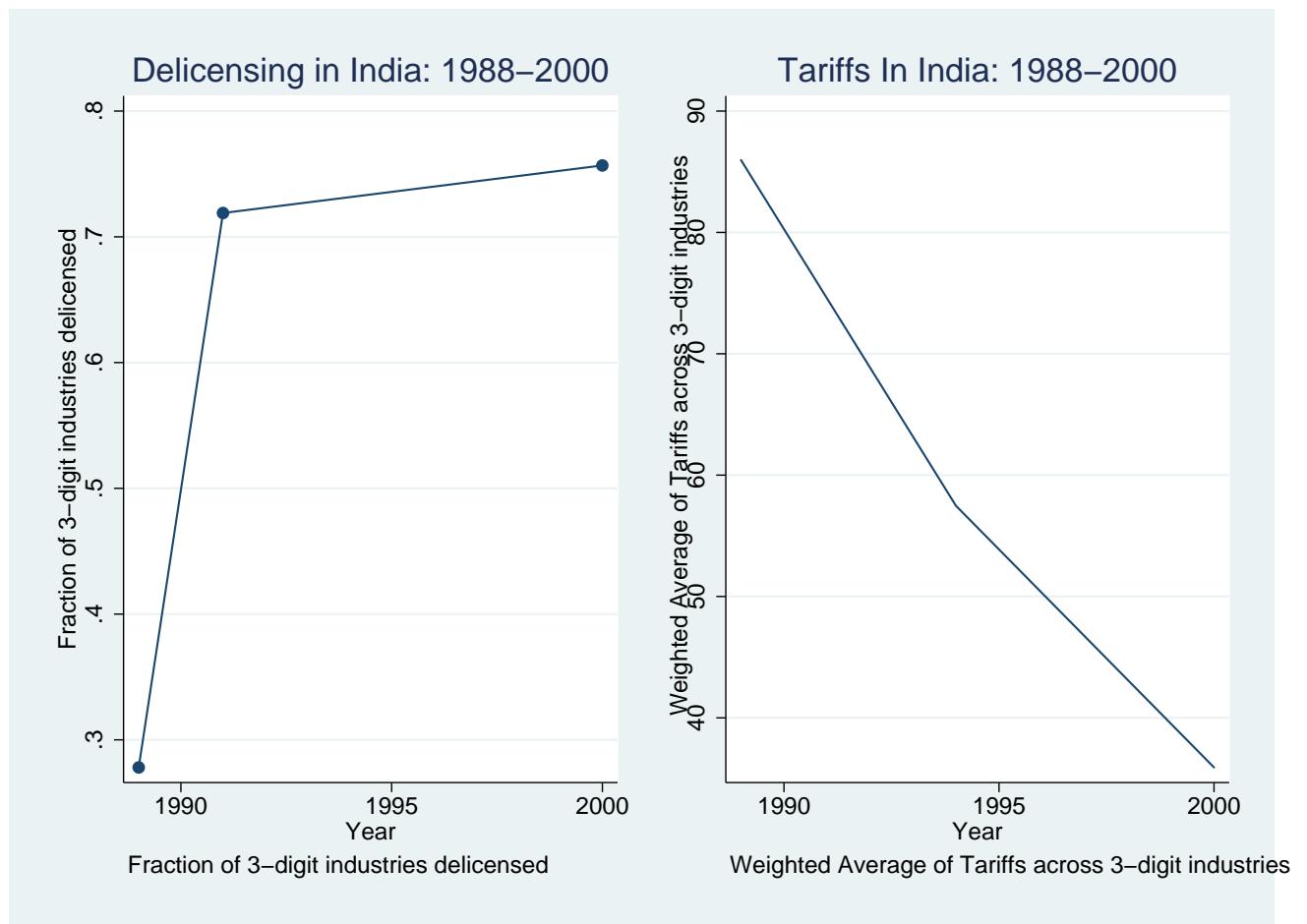


Figure 1: Delicensing and Import Tariffs

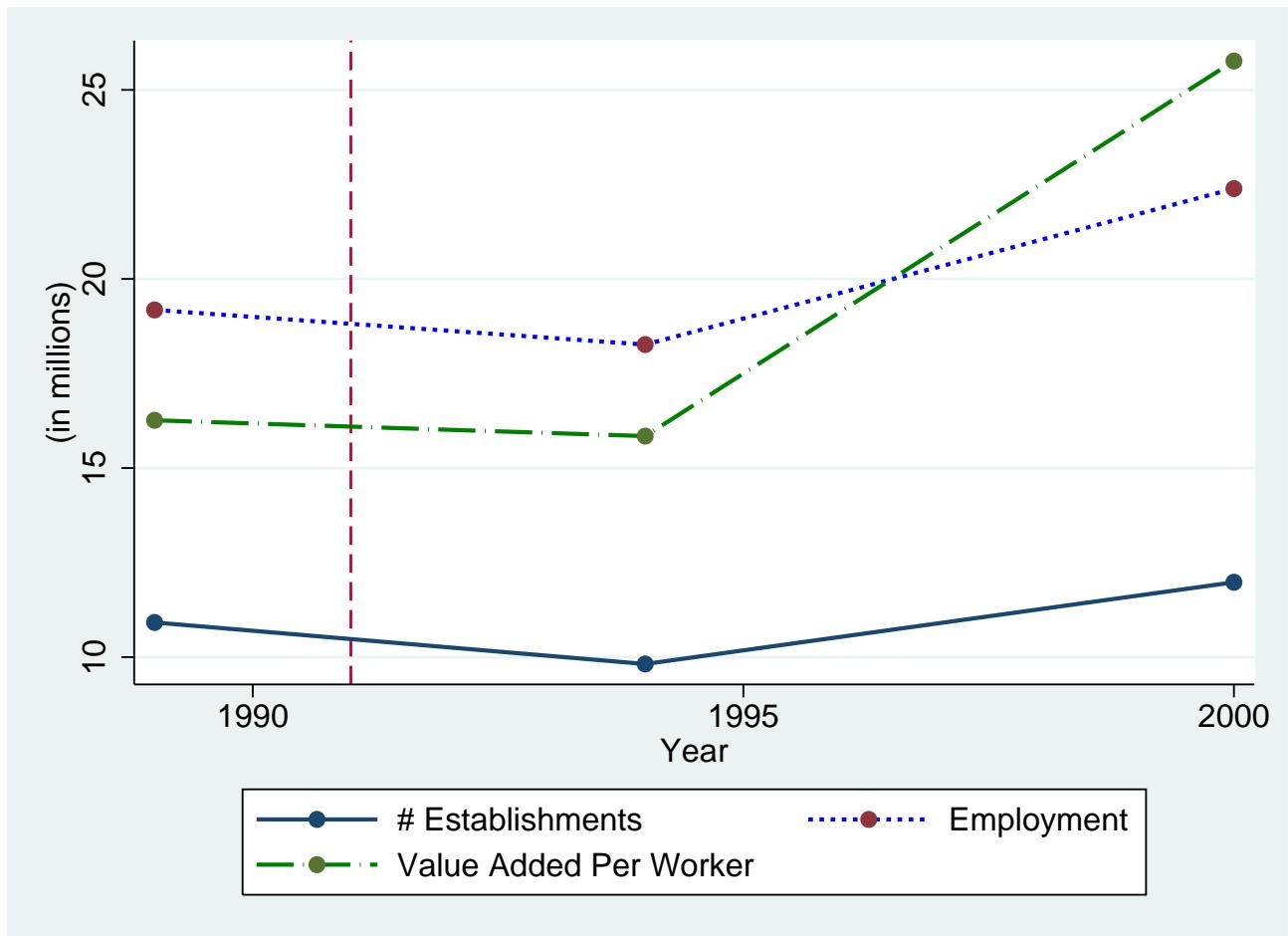


Figure 2: Trends in India's Informal Manufacturing Sector

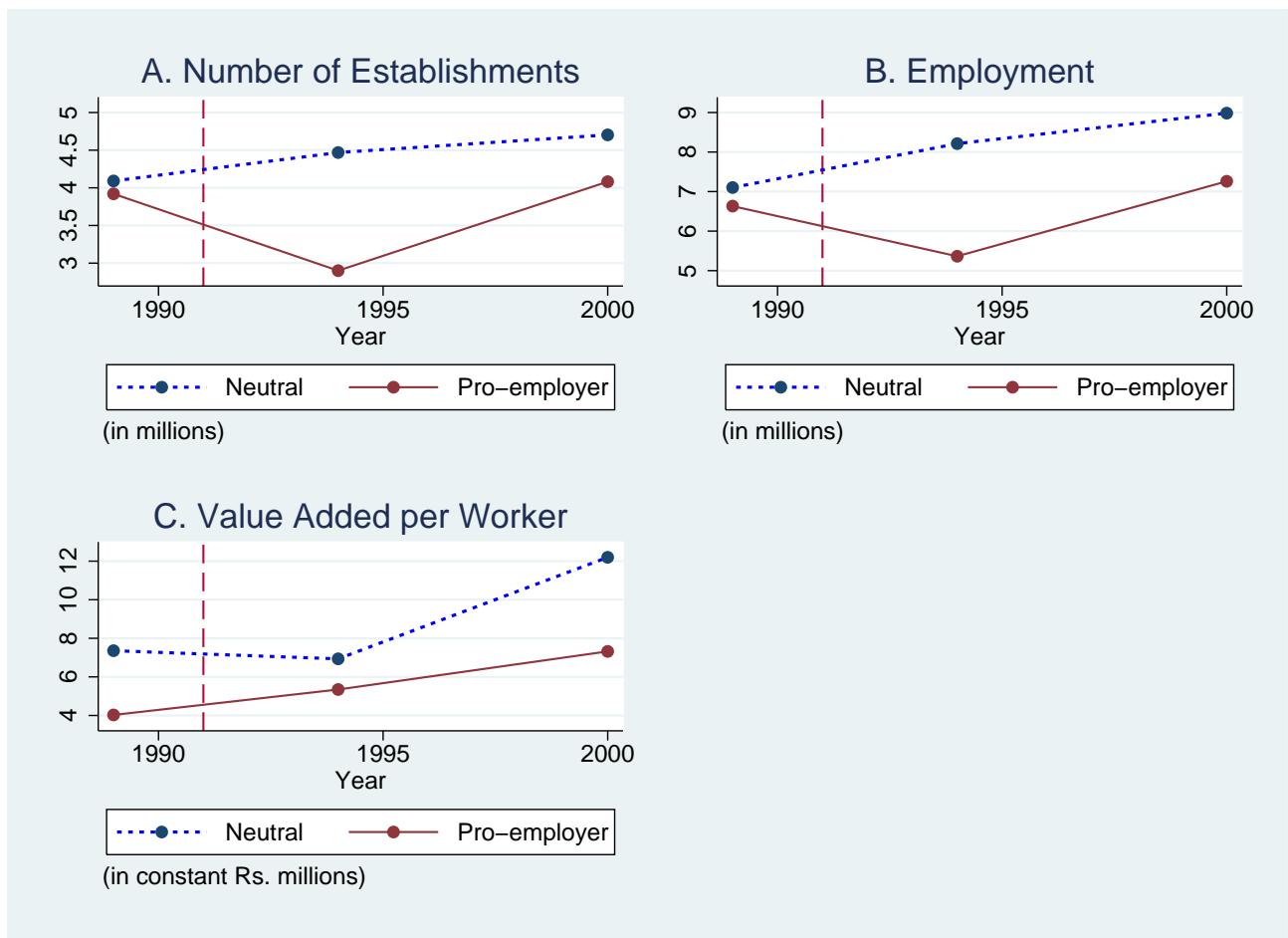


Figure 3: Trends in India's Informal Manufacturing Sector: Comparing States with Pro-employer and Neutral Labor Laws

Table 1: Descriptive Statistics

	Year		
	1988	1994	2000
Unorganized Manufacturing Sector (OAEs + NDMEs)			
Number of establishments (in 1000s)	7.5 (22.2)	6.7 (20.3)	6.6 (17.8)
Employment (in 1000s)	13.1 (38.1)	12.4 (36.5)	12.3 (32.8)
Revenue (in millions)	145.3 (507.7)	129.0 (424.1)	160.2 (469.1)
Gross value added (in millions)	64.9 (205.8)	58.3 (154.3)	68.4 (143.9)
Gross value added per worker (in 1000s)	7.9 (11.3)	8.6 (17.6)	10.2 (10.4)
Cumulative number of industries delicensed	43	96	102
Mean import tariff rate	89.3 (26.7)	58.6 (13.3)	33.3 (10.6)
Observations	1432	1432	1432

The unorganized manufacturing sector statistics are averages across industry-states, with standard deviations in parentheses. The unorganized sector is defined as all manufacturing establishments that either hire one to six workers (NDMEs) or employ only non-hired (family) labor (OAEs). All values are in Indian rupees, and output and gross value added have been deflated to 1988 prices using all-India three-digit industry deflators. These statistics are for a balanced panel, which consists of those industry-state cells which are sampled in all three rounds of the survey.

Table 2: The 1991 Delicensing, Labor Regulation and Contraction
in the Informal Manufacturing Sector

	Number of Establishments		Employment	
			(in logs)	
	(1)	(2)	(3)	(4)
Post	-.178 (.052)***	-.070 (.078)	-.180 (.059)***	-.071 (.089)
Post*Pro-employer		-.253 (.120)**		-.198 (.137)
Post*Pro-worker		-.108 (.132)		-.190 (.151)
Delicensed	-.008 (.077)	.059 (.116)	.057 (.088)	.083 (.132)
Delicensed*Pro-employer		-.104 (.178)		-.053 (.203)
Delicensed*Pro-worker		-.147 (.198)		-.045 (.226)
Obs.	3744	3744	3744	3744
State-Industry FEs	Y	Y	Y	Y

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. An observation is a state*industry*year cell, with 16 states and two year- 1988 and 1994. *Delicensed* is an industry-level dummy variable which is one in the year the three-digit industry is delicensed (1991) and stays one thereafter. *Post* is a dummy equal to 1 for 1994 and 0 for 1988. *Pro-employer* and *Pro-worker* is the Besley-Burgess characterization of a state's labor regulation as "pro-employer" or "pro-worker". The default labor regulation category is "neutral".

Table 3: Delicensing, Labor Regulation and the Informal Manufacturing Sector during 1988-2000

	Number of Establishments				Employment (in logs)	
	(1)		(2)			
			(3)	(4)		
Post*Pro-employer	-.362 (.147)**	-.318 (.152)**	-.277 (.154)*	-.224 (.158)		
Post*Pro-worker	-.256 (.165)	-.141 (.166)	-.317 (.172)*	-.234 (.172)		
Post2*Pro-employer	.309 (.116)***	.121 (.120)	.231 (.121)*	.016 (.125)		
Post2*Pro-worker	.073 (.131)	.074 (.133)	-.027 (.137)	-.016 (.138)		
Delicensed	.070 (.124)	.077 (.130)	.096 (.130)	.099 (.135)		
Delicensed*Pro-employer	-.094 (.194)	-.009 (.198)	-.093 (.202)	-.024 (.206)		
Delicensed*Pro-worker	.139 (.218)	-.028 (.220)	.190 (.228)	.076 (.229)		
Obs.	6217	4296	6217	4296		
Year Dummies	Y	Y	Y	Y		
State-Industry FEs	Y	Y	Y	Y		
Balanced Panel	N	Y	N	Y		

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. An observation is a state*industry*year cell. The unbalanced panel includes an average of 130 three-digit industries in the 16 states, in the years 1988, 1994 and 2000. The balanced panel consists of state-industries that are present in all three rounds of the data- including 89 three-digit industries in the 16 states. *Delicensed* is an industry-level dummy variable which is one in the year the three-digit industry is delicensed (1991 or later) and stays one thereafter. *Post* is a dummy equal to 1 for 1994-2000, and 0 for 1988. *Post2* is a dummy equal to 1 for 2000 and 0 for 1988-94. *Pro-employer* and *Pro-worker* is the Besley-Burgess characterization of a state's labor regulation as "pro-employer" or "pro-worker". The default labor regulation category is "neutral".

Table 4: Delicensing, Labor Regulation and the Informal Manufacturing Sector during 1988-2000: Robustness Checks

	Number of Establishments				Employment (in logs)	
	(1)		(2)			
			(3)	(4)		
Post*Pro-employer	-.348 (.124)***	-.345 (.186)*	-.275 (.133)**	-.267 (.194)		
Post*Pro-worker	-.171 (.139)	-.223 (.210)	-.218 (.149)	-.351 (.219)		
Post2*Pro-employer	.310 (.098)***	.302 (.187)	.240 (.104)**	.200 (.195)		
Post2*Pro-worker	.128 (.110)	.100 (.214)	.044 (.118)	-.098 (.224)		
Delicensed	-.265 (.152)*	.059 (.127)	-.217 (.162)	.094 (.132)		
Delicensed*Pro-employer	-.028 (.164)	-.098 (.197)	-.013 (.175)	-.110 (.206)		
Delicensed*Pro-worker	-.005 (.185)	.120 (.222)	.076 (.198)	.168 (.232)		
Obs.	6217	6217	6217	6217		
Year Dummies	Y	Y	Y	Y		
State-Industry FEs	Y	Y	Y	Y		
Industry*Time Trends	Y	N	Y	N		
Tariff Controls	N	Y	N	Y		
Balanced Panel	N	N	N	N		

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. Columns (1) and (3) include industry-specific time trends as controls, while columns (2) and (4) control for industry-level tariff changes. Tariff controls (not shown) are the log of the 3-digit industry tariff rate and its interactions with *Pro-employer* and *Pro-worker*. Results for the balanced panel (not shown) are similar.

Table 5: Delicensing, Labor Regulation and Value Added Per Worker
in the Informal Manufacturing Sector during 1988-2000

	Value Added Per Worker (in logs)					
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Pro-employer	.360 (.099)***	.316 (.096)***	.378 (.124)***	.274 (.095)***	.250 (.092)***	.355 (.118)***
Post*Pro-worker	-.183 (.110)*	-.193 (.107)*	-.324 (.140)**	-.290 (.104)***	-.297 (.101)***	-.418 (.132)***
Post2*Pro-employer	-.113 (.078)	-.097 (.075)	-.138 (.125)	-.063 (.075)	-.075 (.072)	-.005 (.119)
Post2*Pro-worker	.054 (.088)	.068 (.085)	-.125 (.143)	.139 (.083)*	.146 (.080)*	-.020 (.133)
Delicensed	-.149 (.083)*	-.055 (.117)	-.144 (.085)*	-.159 (.081)*	-.158 (.108)	-.157 (.082)*
Delicensed*Pro-employer	.026 (.130)	.062 (.126)	.005 (.132)	.080 (.124)	.107 (.120)	.062 (.125)
Delicensed*Pro-worker	.253 (.146)*	.292 (.142)**	.245 (.148)*	.305 (.137)**	.338 (.134)**	.301 (.139)**
Obs.	6203	6203	6203	4291	4291	4291
Year Dummies	Y	Y	Y	Y	Y	Y
State-Industry FEs	Y	Y	Y	Y	Y	Y
Industry*Time Trends	N	Y	N	N	Y	N
Tariff Controls	N	N	Y	N	N	Y
Balanced Panel	N	N	N	Y	Y	Y

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. Value Added per Worker has been deflated to 1988 prices using all-India three-digit industry deflators.

Table 6: Delicensing, Labor Regulation and Revenue Earned in the Informal Manufacturing Sector during 1988-2000

	Revenue (in logs)					
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Pro-employer	-.175 (.163)	-.223 (.146)	-.093 (.204)	-.121 (.165)	-.130 (.150)	.062 (.206)
Post*Pro-worker	-.457 (.182)**	-.401 (.163)**	-.398 (.231)*	-.407 (.181)**	-.413 (.165)**	-.438 (.230)*
Post2*Pro-employer	.191 (.129)	.183 (.114)	.200 (.206)	-.032 (.131)	-.051 (.118)	.127 (.207)
Post2*Pro-worker	.177 (.145)	.234 (.129)*	.236 (.236)	.199 (.145)	.190 (.131)	.152 (.233)
Delicensed	.011 (.137)	-.319 (.178)*	.016 (.139)	.050 (.141)	-.174 (.177)	.034 (.143)
Delicensed*Pro-employer	-.104 (.214)	.016 (.192)	-.155 (.217)	.028 (.216)	.006 (.197)	-.002 (.218)
Delicensed*Pro-worker	.276 (.241)	.173 (.217)	.239 (.244)	.169 (.240)	.152 (.219)	.155 (.242)
Obs.	6217	6217	6217	4296	4296	4296
Year Dummies	Y	Y	Y	Y	Y	Y
State-Industry FEs	Y	Y	Y	Y	Y	Y
Industry*Time Trends	N	Y	N	N	Y	N
Tariff Controls	N	N	Y	N	N	Y
Balanced Panel	N	N	N	Y	Y	Y

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. Revenue has been deflated to 1988 prices using all-India three-digit industry deflators.

Table 7: Controlling for State Domestic Product

	Number of Establishments		Value Added Per Worker	
	(1)	(2)	(3)	(4)
Post*Pro-employer	-.377 (.140)***	-.308 (.166)*	.358 (.110)***	.322 (.143)**
Post*Pro-worker	-.317 (.169)*	-.173 (.192)	-.190 (.112)*	-.358 (.157)**
Post2*Pro-employer	.299 (.131)**	.338 (.166)**	-.101 (.079)	-.120 (.155)
Post2*Pro-worker	.037 (.161)	.120 (.188)	.100 (.089)	-.078 (.148)
Delicensed	.075 (.123)	-.216 (.162)	-.151 (.086)*	-.020 (.117)
Delicensed*Pro-employer	-.097 (.187)	-.023 (.166)	.027 (.144)	.040 (.134)
Delicensed*Pro-worker	.135 (.214)	-.004 (.190)	.254 (.140)*	.281 (.141)**
Post*SDP	.081 (.093)	.045 (.093)	.010 (.060)	.015 (.061)
Post2*SDP	.044 (.105)	.027 (.092)	-.061 (.057)	-.072 (.057)
Obs.	6217	6217	6203	6203
Year Dummies	Y	Y	Y	Y
State-Industry FEs	Y	Y	Y	Y
Industry Trends	N	Y	N	Y
Tariff Controls	N	Y	N	Y
Balanced Panel	N	N	N	N

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. *SDP* is the State Domestic Product, averaged over 1985-89.

Table 8: Robustness Check: Including Missing Cells

	Number of Establishments	Employment		
	(1)	(2)	(3)	(4)
Post*Pro-employer	-2488.486 (1081.225)**	-1444.043 (700.477)**	-3969.897 (1837.981)**	-2245.396 (1189.326)*
Post*Pro-worker	-1940.947 (1206.727)	-1013.274 (814.940)	-3560.017 (2051.323)*	-1852.258 (1383.670)
Post2*Pro-employer	1586.411 (851.650)*	1175.294 (555.062)**	2048.756 (1447.725)	1591.972 (942.428)*
Post2*Pro-worker	1070.392 (961.218)	1206.815 (649.343)*	1941.644 (1633.980)	2134.669 (1102.507)*
Delicensed	275.368 (910.977)	187.008 (586.298)	715.889 (1548.575)	488.957 (995.463)
Delicensed*Pro-employer	-558.919 (1419.325)	-11.823 (930.848)	-963.577 (2412.720)	-80.512 (1580.468)
Delicensed*Pro-worker	200.718 (1597.418)	-242.154 (1092.411)	-405.404 (2715.462)	-836.567 (1854.783)
Obs.	6217	8223	6217	8223
Year Dummies	Y	Y	Y	Y
State-Industry FEs	Y	Y	Y	Y
Full Panel	N	Y	N	Y

Robust standard errors in parenthesis; ***indicates significance at 1% level, ** at 5% and * at 10%. An observation is a state*industry*year cell. The “full” panel includes an average of 170 three-digit industries in the 16 states, in the years 1988, 1994 and 2000. It assumes that employment and the number of establishments is zero in a state-industry-year cell to which no sampled establishment belonged in the respective NSSO survey round.