Columbia Program on Indian Economic Policies

Working Paper No. 2012-1

Complementarity between Formal and Informal Manufacturing in India: The Role of Policies and Institutions

Asha Sundaram

Reshad N. Ahsan

Devashish Mitra

Complementarity between Formal and Informal Manufacturing in India: The Role of Policies and Institutions[*]

Asha Sundaram

University of Cape Town, South Africa

Reshad N. Ahsan

University of Melbourne, Australia

Devashish Mitra

Syracuse University, USA

January 19, 2012

Abstract

In this paper, we have investigated the relationship between the formal and informal manufacturing sectors in India. We find that the employment, output and the value added of the informal part of each of the manufacturing industries in the various Indian states are strongly positively correlated with the same variables for the formal part of the respective industry in these states. Our results provide support for complementarities between formal and informal manufacturing arising possibly from both agglomeration and outsourcing. We also find fairly strong support for the role of labor market flexibility in enabling this complementarity. Trade liberalization also turns out to have an important role.

1. Introduction

Are formal and informal sector activities, within an industry, substitutes of each other or complements? In other words, if labor laws, making for a rigid labor market, act as a constraint on formal sector activity (for which these restrictions are binding), is that at least partly made up by informal sector activity (which is not under the purview of such laws) in that industry? Or do both formal and informal sector activities move in the same direction due to agglomeration effects such as labor-market pooling, location of input suppliers close to where most of an industry's activity is located, various kinds of linkage effects etc, as well as sometimes relationships based on outsourcing of economic activities from formal-sector to informal-sector firms. In such cases, it is quite possible that not only will there be a positive correlation between formal and informal sector activity but that this relationship will be even stronger in regions or states where the labor laws make for a less restrictive or a more flexible labor market. An alternative hypothesis could be that this correlation is stronger where labor laws are more restrictive and make for a more rigid labor market as outsourcing from formal-sector to informal-sector firms might actually be aimed at getting around these restrictive laws.

The study of the informal manufacturing sector and its linkages with formal manufacturingis important from the public policy point of view for a number of reasons. Producers in the informal sector use outdated technologies and as a result have lower productivity, which in turn leads to lower wages. At the same time, around 80 percent of manufacturing employment is in the informal sector even though its contribution to manufacturing value added is only about 20 percent (which by itself implies a much lower productivity in informal manufacturing compared to formal manufacturing). Thus, a study of the relationship between the formal and informal manufacturing sectorsis important in sharpening our understanding of the factors that lead to poverty reduction. Agglomeration externalities arising in the process of manufacturing sector growth can benefit the informal sector through various kinds of spillovers. We study such issues in this paper. In addition, we investigate whether informal sector activity

3

is affected by trade liberalization and whether the link between formal sector activity and informal sector activity can be explained by outsourcing by the former to the latter, possibly to get around labor laws that might be restrictive.

A casual look at the broad Indian sectoral data on formal and informal employment, output and value added shows that within the manufacturing sector, the share of informal sector employment is rising slowly over time from about 75 percent in 1989 to roughly around 81 percent in 2000, while its share in value added has been stable (with minor fluctuations) at around 20 percent. While this is true, it is also true that value added has been rising over time in both the informal and formal manufacturing sectors. On the other hand, employment in the formal sector has remained static or has even been mildly declining, while in the informal sector it has been rising steadily. The above observations together imply that while in the case of value added, we get a percent-to-percent match in the growth of formal and informal manufacturing (indicative of some degree of complementarity between the two sectors), the growth in population or labor force has mainly been absorbed by the informal manufacturing sector.

Our cross-state, cross-industry analysis also shows strong positive correlation between formal and informal sector activities (employment, output and value added) at the industry-state level, This correlation lends significant support to the complementarity hypothesis. Here, however, the elasticity of informal sector activity at the industry level with respect to the corresponding formal industry level activity variable (employment or output or value added) is less than unity, which is indicative of a move towards formal production within an industry, which shows that the opposite effect in aggregate data may be through changes in the industrial composition of the economy. We also find some evidence that the positive impact of formal sector activity on informal manufacturing is bigger in states with labor laws that make for a more flexible labor market. Labor-market pooling makes sense only if hiring and firing are not too restricted. High firing costs lead to both limited hiring and limited firing, since employers do not want to hire a worker and be stuck with him/her even in bad times or if the worker turns out to be unproductive

4

or incompetent. Thus, with less restrictive labor market policies, workers located in such regions will have greater probability of employment in formal-sector firms. That by itself will act as incentive to also seek employment in the informal sector enterprises in such a region.

We explore the effect of labor-market restrictions on the complementarity or substitutability between formal and informal manufacturing activity as well as on how trade liberalization affects informal manufacturing activity by categorizing Indian states into pro-labor and pro-employer, which we will call "rigid" and "flexible" labor institution states respectively. As explained in our data section, the classification is from Gupta, Hasan and Kumar (2009).

Our results overall also seem to suggest that the positive relationship between formal and informal sector activity is stronger in industries that use more capital-intensive techniques in the formal sector. Since our measure of labor-intensity or capital intensity of an industry is the observed technique in use in the formal sector, our results may be interpreted as saying that the industries where the formal sector firms are relatively more successful in outsourcing look more capital intensive, primarily because the production activities they outsource are relatively more labor intensive. Hence, these results are suggestive of outsourcing between the formal and informal manufacturing sectors in India, leading to stronger complementarity between formal and informal sector activity.

In fact, we also find some direct evidence, albeit weak, that outsourcing by formal sector firms to informal sector firms leads to higher informal sector output in states with more flexible labor markets. Additionally, we find evidence that greater formal sector activity is associated with a greater proportion of informal enterprises selling their output (or contracting to sell their output) to another enterprise or a middleman/contractor.

Finally, trade liberalization seems to boost employment, output and value added in informal manufacturing (with just a few exceptions). This positive effect of trade liberalization is stronger in enterprises with more than five workers in states with rigid labor laws. This result coupled with results

from earlier work by Mitra and Ural (2007), that shows that the positive impact of trade liberalization on formal sector employment, output and value added is greater in states with labor laws making for a more flexible labor market, leads to the following interpretation: rigid labor laws impose a constraint on how much formal manufacturing can grow, with the remainder of the growth picked up by informal manufacturing. This might also mean that the structural change, in terms of the shares of the formal and informal sectors in output, value added and employment, being brought about by trade liberalization is of the relatively desirable kind where labor markets are relatively more flexible. In other words, the change in composition between formal and informal activities is not skewed towards the latter in the case of such states.

In the context of our analysis it important to understand that rigid labor laws constrain the ability of formal-sector firms to hire and fire workers in response to shocks to technology, relative prices of output and inputs, and the macroeconomic environment. Thus adjustment is restricted and that can have an adverse impact on the functioning of private firms and therefore on efficiency at all levels. Additionally, the realization of the beneficial effects of trade reforms requires both substantial amounts of intersectoral labor reallocation as well as intrasectoral labor reallocation across firms. Rigid labor laws can constrain such reallocation. Panagariya (2001) has argued that rigid labor laws raise the costs for employers and also constrain the size of firms by discouraging them from employing more than a fairly small number of permanent workers. He also argues that the costs of such rigid labor laws go beyond those incurred by existing entrepreneurs as these laws discourage entry. It is important to note that these effects of labor laws are expected to be seen on formal or organized manufacturing firms since these laws apply only to these firms. However, due to agglomeration externalities, possible competition effects and outsourcing possibilities, there might be spillover effects of these labor laws on the informal sector firms as well.

2.   Indian policy and insitutional framework

2.1.   The Trade Reforms in India

The general elections of 1991 brought to power a new government that inherited probably the world's most complex and restrictive trade regime and, at the same time, right upon assuming officea very severe external payments problem. Upon request from the Government of India, the IMF granted them loans, albeit with the strong conditionality of major and deep economic reforms. The reforms were initiated instantly. There were many members in the new cabinet who had been cabinet members in past governments that had tried to avoid IMF loans precisely to avoid conditionalities and that at the same time were strong believers in inward-looking trade policies and the use of tariffs as a primary source of revenues. Thus, the reforms came as a surprise.

The maximum tariff was reduced from 400 percent to 150 percent in July 1991, to 110 percent in February 1992, to 85 percent in February 1993, 64 per cent in February 1994 and to roughly 45 percent by 1997-98. The mean tariff went from 128 percent before July 1991 to 94 percent in February 1992, 71 percent by February 1993, 55 percent in February 1994 and to roughly 35 percent by 1997-98. The standard deviation of tariffs during this period went down from 41 percentage points to roughly 15. While some of the non-tariff barriers were reduced, many others were completely eliminated. Other major trade reform objectives included the removal of most licensing and other non-tariff barriers on all imports of intermediate and capital goods, the broadening and simplification of export incentives, the removal of export restrictions, the elimination of the trade monopolies of the state trading agencies, the simplification of the trade regime etc.

2.2   Labor Markets: Regulations and Rigidity

We describe here some salient features of the labor-market regulations in India. First, labor issues fall in the concurrent list of the Constitution over which both the central (federal) government as well as

individual state governments have legislative authority. The state governments have the authority to amend central statutes, introduce subsidiary legislations and enforce most labor regulations, irrespective of who enacted them. Thus there may be considerable variation in labor-marketsacross India's states.

Second, India's labor laws have seriously added to the implicit costsof the hiring and firing of workers. The Industrial Disputes Act (IDA) requires firms employing more than 100 workers to obtain the permission of state governments in order to retrench or layoff workers, with states often being unwilling to grant such permission (See Datta-Chaudhuri, 1996). There are additional provisions for job security in the Industrial Employment (Standing Orders) Act, applicable to all employers with 100 or more workers (50 in certain states), which require worker consent for modification of job descriptions or interplant transfers of workers in response to changing market conditions. This makes adjusting labor input use in response to economic shocks very difficult. The problems are further accentuated by India's Trade Union Act (TUA) that allows any seven workers in an enterprise to form and register a trade union leading to multiple unions within the same firm, consensus among which is required but becomes a virtual impossibility (See Anant, 2000).

Very minimal labor regulations apply to firms with less than 10 workers if using power (and 20 workers if not using power). Such firms are not part of the organized sector and are not subject to the Factories Act of 1948. Once the firm crosses the threshold size of 10 with power (or 20 without power), the firm has to register under the Factories Act (and becomes part of the organized or formal sector) and becomes subject to the numerous regulations relating to its facilities, worker safety, overtime work, employment of women and children, setting up of retirement funds. Reaching a threshold size of 50 requires the firm to provide health insurance and makes it subject to the worker-management dispute settlement process under the IDA. As mentioned above the other restrictions on retrenchment, firing and reassignment of worker under the IDA apply to firms with 100 employees or above (See Panagariya, 2008 for further details).

Thus, from a casual reading of such labor laws, one would infer that they are likely to encourage the growth of the informal or unorganized sector at the cost of the organized sector. These laws also probably prevent firms within the organized sector from growing.

3. Data

The unorganized sector and formal sector data we use for this study come from three main sources. A detailed description of all variables along with data sources (and details on their construction and cleaning) is presented in Appendix A2. The unorganized sector data are the enterprise level data from the national level Survey of Unorganized Manufacturing and Repairing Enterprises by the National Sample Survey Organization (NSSO), India. The data cover unorganized manufacturing and repairing enterprises which are broadly defined as enterprises employing less than ten workers if using power and less than twenty workers if not using power. These enterprises are not required to register under the Factories Act 1948 (see various reports by the NSSO on Unorganized Manufacturing Sector in India for a detailed definition of enterprises covered under the survey). We restrict our analysis on manufacturing and exclude repairing enterprises. The terms unorganized manufacturing sector, informal manufacturing sector and unregistered manufacturing sector are often used interchangeably in India. We use three rounds of repeated cross-section data for the years 1989-90, 1994-95 and 2000-01. The data we use cover fifteen major Indian states. We collapse the enterprise level data to obtain total output, value added and employment differently for rural and urban sectors, for each state, for each of the three years and for each 3-digit industry under the Indian National Industrial Classification (NIC).

We also construct a variable that measures the proportion of informal enterprises thatsell their output (or are on contract to sell) to another enterprise or a middleman/contractor for the year 2000. We argue that this can be used as a measure of outsourcing activity of informal enterprises. This is no doubt an imperfect measure of outsourcing since we are not able to observe if the informal enterprise sells to a large formal firm. However, we posit that sub-contracting between large formal firms and micro

9

enterprises is most likely carried out through middlemen and is likely to be captured by this indicator variable for each firm.

Unorganized sector enterprises produce a large variety of products including flour milling, slaughtering, sun drying fish, wooden furniture and baskets, lace, embroidery, rope, medicated water and low end medicines, tooth powder, agricultural metal tools, metal utensils, batteries, valves, cables, bulbs and electric fans. Unorganized manufacturing enterprises in India are classified into household enterprises that do not hire workers (called Own Account Manufacturing Enterprises or OAMEs), enterprises hiring less than six workers including household and hired workers (called Non-Directory Manufacturing Enterprises or NDMEs) and enterprises hiring six or more workers including household and hired workers (called Directory Manufacturing Enterprises or DMEs). DMEs were not surveyed in the 1989-90 data round. We perform our analysis separately for each enterprise type.

Our formal sector data are from the Annual Survey of Industries (ASI), Central Statistical Organization, India. The ASI covers firms, that use more than 10 employees using power or more than 20 workers not using power, that are registered under the Central Factories Act 1948.   Hence, for our study, and in the Indian context in general, the formal sector is associated with larger firm size and consists of firms that are registered under a central authority. A lot fewer labor regulations apply to unorganized enterprises, where they are also relatively loosely enforced. We use formal sector output, value added and employment for each of the fifteen states, for each year and 3-digit industry. Since we do not have this information separately for rural and urban areas, we use total state-level figures.

We obtain corresponding information on the value of outsourcing in manufactures by formal sector firms from the Prowess database collected by the Center for Monitoring the Indian Economy (CMIE). This database has been used previously by Topalova and Khandelwal (2011). It consists of all firms traded on India's major stock exchanges as well as other public sector enterprises. Together these firms represent 70 percent of output in the organized industrial sector in India (Topalova and Khandelwal, 2011). The firms in the sample were asked to report their annual expenditure on outsourcing of

manufacturing activities as well as outsourcing of professional services. Given our focus in this paper on manufacturing outsourcing between formal and informal Indian firms, we construct our aggregate outsourcing measure using only the manufacturing outsourcing data. In particular, we aggregate the firm manufacturing outsourcing data to the industry-state level. Table 1B indicates that the there is Rs. 181.9 million worth of manufacturing outsourcing in the mean industry-state cell in the sample. This translates to approximately US$ 3.65 million. Interestingly, the amount of outsourcing in 1993 was only Rs. 17.7 million, which indicates that the vast majority of outsourcing has occurred after 1993. Unfortunately, we are unable to tell if outsourcing is to an unorganized manufacturing enterprise. Hence, our outsourcing measure is a proxy for the 'outsourcing intensity' of an industry. All monetary values are converted to constant 1993 Rupees using an industry-level wholesale price index.

We also use data on the labor-intensity of each 3-digit industry in the formal sector. Labor intensity is measured using the ASI data and is defined as the ratio of wage bill to value added in each industry. We exploit this data to look at the differential association between formal sector and unorganized sector activity across industries with varying labor intensities in their techniques of production in formal-sector firms. In addition, we exploit India's diversity in the institutional environment across states to examine the differential relationship between formal sector activity, outsourcing and unorganized sector activity in states with differing labor policy and exposure to international markets.

We classify states into states with flexible labor laws and states with relatively more rigid labor laws on the basis of a labor regulation index from Gupta, Hasan and Kumar (2009).This partition is based on combining information from Besley and Burgess (2004), Bhattacharjea (2008), and OECD (2007). While Besley and Burgess create an index of the extent to which labor laws in each state are pro-employee or pro-employer based on the cumulative pro-employee or pro-employer ammendments to the IDA, Bhattacharjea characterizes state-level

11

differences in labor-market flexibility based on his own assessments of legislative amendments and judicial interpretations of Chapter VB of the IDA. The OECD study creates an index based on an aggregation of responses to a survey of key informants to identify the areas in which states have made specific changes to the implementation and administration of all labor laws including the IDA. Gupta et al take each of the three studies, partition states into those with flexible, neutral, or inflexible labor regulations and then finally come up with a composite labor market regulation indicator variable using a simple majority rule across the different partitions: Andhra Pradesh, Karnataka, Rajasthan, Tamil Nadu, and Uttar Pradesh are classified as proemployer or flexible labor market states and the remaining are proemployee or relatively rigid labor-market states (includes what was classified as neutral as well as inflexible in the prior stage).

Our state-level, employment-weighted protection are from Hasan, Mitra, and Ural (2007). These state-level measures of trade protection are at three levels of aggregation—i.e., the state as a whole, as well as for urban and rural sectors within states. In particular, industry-level tariff rates and non-tariff barrier (NTB) coverage rates for agricultural, mining, and manufacturing industries are weighted by state and sector specific employment shares (See appendix for details).

4. Results

4.1. The Relationship between the Formal and Informal Manufacturing Sectors

Tables 1A and 1B show that while informal sector employment in manufacturing rose fairly rapidly in the period 1989-2000, formal sector employment had been mildly falling over time. Value added, on the other hand, had been growing more or less at the same pace in both informal and formal manufacturing. All this is seen from Table 1C where we see that the share of the informal sector in manufacturing value added has fluctuated very little around the 20 percent mark, while the employment share has grown from 75 percent in 1989 to 81 percent in 2000. Thus, while the value added data is strongly indicative of complementarity between informal and formal manufacturing, no such inference can be drawn from the

12

aggregate data on informal and formal manufacturing employment. We, therefore, next analyze more disaggregate data.

We start by looking at the relationship between formal and informal sector activity at the industry-state level over time. In other words, our unit of observation is an industry in a state in each of the years 1989, 1994 and 2000. In Table 2A, we estimate a tobit model with informal sector activity, measured by informal (or unorganized) sector employment, output and value added, regressed on corresponding formal sector activity variables. It is important to note here that no enterprises reported activity in some state-industry-sector-year cells. We exploit the information in these observations by coding them to zero, which necessitates the use of a tobit analysis throughout our paper.[1]

In all our regressions, we control for unobservable, time in-variant state, 3-digit industry and time shocks associated with economic activity in both the formal and informal sectors. A positive coefficient on formal sector activity would indicate that formal sector activity is associated with higher activity in the informal sector, consistent with outsourcing between the formal and informal manufacturing sectors. Columns 1, 2 and 3 of Table 2A use employment, output and value added respectively to measure economic activity for OAMEs. Columns 4, 5 and 6 present corresponding results for NDMEs and columns 7, 8 and 9 for DMEs.

Table 2A shows that formal sector employment, output and value added are all positively related to informal sector employment, output and value added. More importantly, coefficients are precisely estimated for all measures of economic activity, across the three types of enterprises. Marginal effects are presented in Table 2B. Again, effects are estimated precisely in most cases, except for DMEs in the rural sector. Results indicate that a one percent increase in formal sector employment is associated with a 0.2, 0.4 and 0.7 percent increase in informal sector employment in OAMEs, NDMEs and DMEs respectively.

---

[1] See Appendix A1 for details on the computations of marginal effects. These are more important for our later regressions that have interaction terms.

A one percent increase in formal sector output is associated with a 0.2, 0.7 and 1 percent increase in informal sector output for OAMEs, NDMEs and DMEs respectively. Value added estimates are close to our output estimates. The results indicate that both formal and informal sector activities move in the same direction due to possible agglomeration effects such as labor-market pooling, location of input suppliers close to where most of an industry's activity is located, various kinds of linkage effects etc and the possibility that formal sector firms outsource some of their production activities to informal sector firms. The less than unitary elasticity of informal sector employment, output and value added in an industry with respect to the same variables in the formal sector in the same industry indicates that with positive growth, the structure of employment, output and value added in the average manufacturing industry is moving towards formal production and away from informal production. The opposite structural change in the aggregate (that is shown in Table 1C) might therefore be driven by compositional effects on the industrial structure of manufacturing.

We then examine the differential relationship between the formal and informal manufacturing sections across industries with varying labor-intensities, by considering the interaction term between formal sector activity and observed formal-sector labor-intensity in an industry. Table 3A presents these results. Again, we arrange our columns as in Table 2A, with results for regressions with employment, output and value added as our activity variables, for each of the three types of enterprises. Table 3B presents marginal effects for both the level term of formal sector activity and for the interaction between formal sector activity and labor intensity.

From Table 3A, the coefficient ofthe interaction of formal sector activity with it labor intensity is negative, indicating that the positive relationship between formal sector activity and informal sector activity is smaller in magnitude in industries that use more labor-intensive techniques in the formal sector. It also shows that at given levels of formal sector activity, informal sector activity is smaller in industries where formal sector production is observed to be more labor intensive. Coefficients are estimated precisely for NDMEs and DMEs for the rural, urban and combined sectors in most cases and precisely for

14

OAMEs in the rural sector. Overall, results seem to suggest that informal sector activity is larger in magnitude in industries that use more capital-intensive techniques in the formal sector. Since our measure of labor-intensity of an industry is the observed technique in use in the formal sector, our results may not be inconsistent with our hypothesis that formal sector firms have an incentive to retain the more capital-intensive tasks in the production process and outsource more labor-intensive tasks to the informal sector, whose labor costs are lower. In other words, our results may be interpreted as saying that the industries where the formal sector firms are relatively more successful in outsourcing look more capital intensive, primarily because the production activities they outsource are relatively labor intensive. Hence, these results are suggestive of outsourcing between the formal and informal manufacturing sectors in India, leading to stronger complementarity between formal and informal sector activity.

4.2. **The Formal and Informal Sectors and the Institutional and Policy Environment**

We next focus on the role of state-level policy and institutional environment in shaping the relationship between the formal and informal manufacturing sectors in India. First, we look at the role of labor market regulation, a pertinent feature of the institutional environment for the relationship between the formal and informal sectors. We examine if formal and informal sector activity are differentially related in states with varying regulatory environments in the labor market by adding an interaction term between formal sector activity and a dummy for the flexibility of state labor markets.

In a setting where the formal sector outsources to the informal sector to get around labor laws, one might expect the positive relationship between formal and informal sector activity to be stronger in states where labor laws make for a less flexible labor market. This would result in a negative coefficient on the interaction term between formal sector activity and the labor market flexibility dummy. However, it is possible that with some kind of positive spillovers through agglomeration externalities, complementarity between these two sectors would result in a positive relationship between formal and informal sector activity, especially in states with more flexible labor laws, where formal manufacturing might thrive (Besley and Burgess, 2004). The possibility of labor-market pooling is enhanced only if

15

hiring and firing are not too restricted. Employers do not want to hire a worker and be stuck with him/her even in bad times or if the worker turns out to be unproductive or incompetent. Thus, with less restrictive labor market policies, workers located in such regions will have greater probability of employment in formal-sector firms. That by itself will act as incentive to also seek employment in the informal sector enterprises in such a region in the hopes of future formal sector employment. This in turn could enhance outsourcing possibilities by formal firms to informal firms. This would mean a positive sign on the coefficient of the interaction term.

From Table 4A, we find evidence that formal sector activity is associated with greater informal sector activity in states with more flexible labor market regulation for DMEs and for NDMEs in the urban. For OAMEs, we find that the opposite is true. However, our coefficients are imprecisely estimated. Table 4B presents marginal effects, most of which are estimated precisely. Coefficients reported show the impact of formal sector activity on informal activity for a state and industry with median informal employment that has flexible labor laws (labor regulation dummy set to one), and in the next row, for states with rigid labor laws (labor regulation dummy set to zero).[2] Magnitudes indicate that, for instance, for NDMEs, a one percent increase in formal sector employment is associated with a 0.8 percent increase in informal employment in states with flexible labor laws, and with only a 0.6 percent increase in informal employment in other states. Similarly, for DMEs, a one percent increase in formal employment is associated with a 0.9 percent increase in informal employment in states with flexible labor laws, and with a 0.7 percent increase in informal employment in other states. To summarize, these results tie in with our hypothesis of interdependence between the formal and informal manufacturing sectors via outsourcing of tasks between these sectors and the role for labor regulation in determining this relationship. As mentioned earlier, labor-market pooling makes sense only if hiring and firing are not too restricted. High firing costs lead to both limited hiring and limited firing, since employers do not want to

---

[2] See Appendix A1 for details on the median entries and Appendix A2 for the lists of states falling in the two separate categories of labor-market regulations.

hire a worker and be stuck with him/her. Thus, with less restrictive labor market policies, workers located in such regions will have greater probability of employment in formal-sector firms. That by itself will act as incentive to also seek employment in the informal sector enterprises in such a region.

We next study the effects of industry-level outsourcing by formal-sector firms on informal-sector output and how this effect varies by labor market flexibility. Table 1B clearly shows explosive growth in outsourcing by formal manufacturing firms. While we do not have a split between domestic and foreign outsourcing, it is not unreasonable to expect that a large number of informal sector enterprises would have benefited from this outsourcing. Table 5A clearly shows that the coefficient of the interaction between the labor market flexibility dummy and the natural logarithm of industry outsourcing is positive throughout and in a number of cases, namely in case of rural sector DMEs and urban sector OAMEs and NDMEs significant as well. This shows us some evidence for the complementarity between flexible labor laws and outsourcing in raising informal employment, output and value added. This is supported by the positive marginal effects of formal sector industry-level outsourcing in relatively flexible labor market states in Table 5B across the board for both urban and rural areas combined and for the rural areas, while in the case of OAMEs in the case of urban areas. These marginal effects are precisely estimated for NDMEs in rural areas. Overall, we interpret, this as some evidence for the positive effect of formal sector outsourcing on informal sector activity in flexible labor market states. This is not difficult to explain. In states where labor laws make for relatively more flexible labor markets, firms can respond more easily to shocks by changing their employment levels. As a result, there is greater need for and possibility of labor market pooling. The probability for a person with the requisite skills or qualifications of finding formal employment in such states should be higher. As a result, people are willing to accept informal employment in such regions as a stepping stone to formal employment, where informal sector activity might come in the form of outsourcing from formal sector firms to informal sector firms. The informal sector employment can also provide some valuable experience in the interim.

Next, we consider the impact of greater exposure to international markets through trade on informal sector activity and ask if these trade liberalization effects interact with labor market institutions. We measure trade liberalization through a decrease in the state-level, employment-weighted tariff measure. Results are presented in Table 6A in the usual format. These results indicate considerable heterogeneity by enterprise type in the impact of trade liberalization on informal sector activity. For OAMEs, greater trade exposure is associated with greater informal sector activity in the overall sector, and this result seems to be driven by the rural sector. Also, trade exposure effects do not seem to differ across states with flexible and rigid labor regulation. For NDMEs, we find that trade liberalization is associated with greater activity in the informal sector in rural areas, especially in states with more flexible labor laws, again consistent with outsourcing.

For DMEs, we observe differences between rural and urban enterprises. In the rural sector, trade liberalization is associated with lower informal sector activity. However, in the urban sector, greater formal sector activity is associated withgreater informal sector activity in DMEs, very slightlymore so in states with rigid labor laws. Table 6B presents marginal effects and reports the impact of the tariff for a state and industry with median informal employment with flexible labor laws, and in the next row, with rigid labor laws. As an example, for OAMEs in the overall sector, we find that a one percent fall in tariffs is associated with a 3.36 percent increase in informal employment in states with flexible labor laws and a 3.40 percent increase in informal employment in states with rigid labor laws. Similarly, for DMEs in the urban sector, we find that a one percent fall in tariffs is associated with a 9.3 percent increase in informal employment in a state with flexible labor laws, but a 9.8 percent increase in a state with rigid labor laws. These look like large effects. However, the reason for such large effects might be several other policy changes going on with trade liberalization, making the precise identification of the effects of the latter somewhat difficult.

Overall, our analysis of trade liberalization suggests stronger positive association between trade exposure and informal activity for the smaller OAMEs and NDMEs in rural areas, and for the larger

18

DMEs in the urban areas. In rural areas, trade liberalization is associated with lower activity in DMEs, probably indicative of possible competition between DMEs and formal firms. This is a result that is not easily explained by an increase in foreign competition. Results also suggest heterogeneity in the role for labor market institutions in either augmenting or mitigating trade exposure effects, over the firm size distribution and across rural and urban sectors.

In Tables 7A and 7B, we investigate the interaction between industry outsourcing and trade liberalization to see if the positive impact of trade liberalization on formal sector output is greater in industries where there is a stronger outsourcing relationship between the formal and informal sectors. We do not find such a relationship. However, on the whole, the evidence still points towards a positive effect of trade liberalization on informal sector activity.

4.3 Evidence on Informal Sector Outsourcing

Finally, we pursue further direct evidence on outsourcing activity in the informal sector. Results from Table 8A show that greater formal sector employment, output and value-added are associated with a greater proportion of informal enterprises selling their output to other enterprises and contractors in the year 2000. Coefficients are precisely estimated for the urban sector and overall, while they are precisely estimated for all except DMEs in the rural sector. Again, these results support our hypothesis of linkages between the formal and informal manufacturing sectors through outsourcing. Table 8B presents marginal effects of formal sector activity for the year 2000. Magnitudes show that a one percent increase in formal sector activity is associated with a 2 to 7 percentage point increase in the percentage of informal enterprises selling or contracting to sell to another enterprise or middleman.

5. Conclusions

In this paper, we have investigated the relationship between the formal and informal manufacturing sectors in India. We find that there is strong complementarity between these two sectors. Across industries, we find that the employment, output and the value added of the informal part of each of these industries are strongly positively correlated with the same corresponding variables for the formal part of

the respective industry. Several alternative explanations seem plausible. Firstly, there could be agglomeration externalities arising from the growth of formal manufacturing. These externalities could arise from labor-market pooling, location of input supplies where firms in an industry are concentrated, other linkage effects etc as well as outsourcing by formal sector firms. While our results provide support for complementarities between formal and informal manufacturing arising possibly from both agglomeration and outsourcing and while we provide some evidence for the role of outsourcing by the formal manufacturing sector, we do not have the data that can help us identify the relative importance of these channels. We do find fairly strong support for the role of labor market flexibility in enabling this complementarity between formal and informal manufacturing. Trade liberalization also turns out to have an important role.

Appendix A1

Marginal Effects

Due to the non-linear nature of the tobit analysis we use in our estimation, the marginal effects of our variables of interest vary at different values of our right-hand side variables. Hence, we compute marginal effects for each table for key level and interaction terms in our regressions. Marginal effects are calculated for a state and industry with median informal sector employment in the year 1994, where medians are for each enterprise type (medians are reported in Table A1 and are calculated for each enterprise type separately by urban, rural and overall sectors). We fix our continuous variables on the right-hand side, formal sector activity, tariffs or outsourcing, at their sample mean (See Table A1 for details). We next present the details of the calculations of the marginal effects.

McDonald and Moffitt (1980) show that the unconditional expectation of the dependent variable in the Tobit model is:

$E(y) = X\beta F(z) + \sigma f(z)$

where F is the cumulative normal distribution function and f is the normal density function. $z = X\beta/\sigma$

Let the regression model with interaction terms be:

$$y=\beta_0+\beta_1 x_1+\beta_2 x_2+\beta_{12}x_1 x_2+u$$

The marginal effects are calculated as follows:

1) Level Terms: The marginal effect of x_1 is

$$(\partial E(y))/(\partial x_1)) = [\beta_1+\beta_{12}x_2]F[z]+X\beta f(z)[((\beta_1+\beta_{12}x_2)/\sigma)]+\sigma f'(z)[((\beta_1+\beta_{12}x_2)/\sigma)]$$

But $f'(z)=-zf(z)$ for the standard normal density. Hence the third term is:

$$-X\beta f(z)[((\beta_1+\beta_{12}x_2)/\sigma)]((\partial E(y))/(\partial x_1))$$

$$= \mathbf{[\beta_1+\beta_{12}x_2]F[z]}$$

2) Interaction Terms: We examine two cases.

Case 1: Both interactions are continuous variables. Now the total marginal effect of the interaction term that we want is:

$$((\partial E(y))/(\partial x_1 \partial x_2)) = \mathbf{F(z)\beta_{12}+[\beta_1+\beta_{12}x_2]f(z)[\beta_2/\sigma]}$$

Case 2: Given $((\partial E(y))/(\partial x_1))$, if x_2 is a dummy variable, then the marginal effect of the interaction is a discrete change. In this case, we evaluate both $\mathbf{[\beta_1+\beta_{12}]F[z1]}$ and $\mathbf{[\beta_1]F[z0]}$ where z1 is evaluated with the dummy set to 1 and z0 is evaluated with the dummy set to 0.

We calculate these marginal effects and standard errors using STATA's nlcom command. This is because Norton Wang and Wei (2004) show that statistical packages like STATA do not accurately compute marginal effects of interaction terms for non-linear models like the probit.

Appendix A2: Data sources, construction and cleaning

Unorganized Enterprise data (Unorganized Manufacturing, National Sample Survey Organization, India) for 1989-90 (OAMEs and NDMEs only), 1994-95 and 2000-01:

Output and value added: Value of output and gross value added in rupees are deflated by an industry whole sale price index. We drop enterprises with total employment<=0, value of materials<0, fixed assets<0, gross output<0 or employment>20 from the sample.

Labor: The average number of workers, both household and hired, working full time and part time, in the last month of the year is our measure of employment.

Outsourcing: A dummy variable which takes the value 1 if an informal enterprise sells to another enterprise or to a contractor/middleman.

Formal sector data on factor prices (Annual Survey of Industries, Central Statistical Organization, India) for 1989-90, 1994-95 and 2000-01:

Output: Value of total output and gross value added are deflated by an industry wholesale price index.

Labor: Total number of persons employed, both directly and through contractors, is our measure of formal sector employment.

Labor Intensity at 3 digit level: It is the ratio of wage bill to value added.

Prowess database, Center for Monitoring the Indian Economy (CMIE):

Outsourcing: We use total manufacturing outsourcing reported by the firm.

Output tariff data at the state level for rural, urban and overall sectors:

Lagged Tariff: Industry-level tariff rates and non-tariff barrier (NTB) coverage rates for agricultural, mining, and manufacturing industries are weighted by state and sector specific employment shares as follows:

(2)
$$Tariff_{it}^{j} = \sum_{k} \gamma_{ik,1993}^{j} * Ind\_Tariff_{kt}$$

(3)
$$NTB_{it}^{j} = \sum_{k} \gamma_{ik,1993}^{j} * Ind\_NTB_{kt}$$

where $\gamma_{ik,1993}^{j}$ is the employment share of industry k in broad sector j of state i derived from the 1993 employment-unemployment survey.[3] Ind_Tariff_{kt} and Ind_NTB_{kt} are industry-specific tariff rates and non-tariff coverage rates that are measured at the 2-digit industry level for each year t. $\sum_{k}\gamma_{ik,1993}^{j}=1$ where k represents tradable 2-digit industries (comprising agricultural, mining, and manufacturing industries). Non-tradable industries were excluded from the calculations. For each observation used in our regression analysis we use state-level protection data for the year closest to the year corresponding to our informal and formal sector activity. Our state-level protection data are for the years 1986, 1992 and 1998, on average resulting in a two-year lag in protection relative to our formal and informal sector variables on employment, output and value added.

Labor regulation dummy variable (Gupta, Hasan and Kumar 2009): The dummy takes the value one for states with flexible labor laws and zero otherwise. Table A2 provides a list of our fifteen states and their classification.

Missing Observations:

In the NSS data for the unorganized sector, we observe missing economic activity in our state-industry-sector-year cells where we observe formal sector activity. Given the NSS survey design, this suggests that no enterprises reported activity in these state-industry-sector-year cells. We exploit the information in these observations by coding them to zero and employing a tobit analysis. We also observe missing observations in a few cells in our formal sector activity variable on our right-hand side. We drop these observations due to measurement error concerns.

---

[3] The year 1993-94 is one of the middle years in the data and is thus treated as the base (reference) year in the construction of state-level openness index. Like in the case of any good index, the weights therefore are not allowed to change from one year to another.

References

Anant, T.C.A. (2000). "Reforming the labour market," in: Gangopadhyay, S., Wadhwa, W. (Eds.), *Economic Reforms for the Poor*, Konark, Delhi.

Besley, T. and R. Burgess. (2004). "Can Labor Regulation Hinder Economic Performance? Evidence from India," *Quarterly Journal of Economics* 19(1), 91-134.

Bhattacharjea, A. (2006). "Labour Market Regulation and Industrial Performance in India: A Critical Review of Empirical Evidence," *The Indian Journal of Labour Economics*, 49(2):211-32.

_____. (2008). "How do Indian firms respond to employment protection legislation?" mimeo.

Datta, R. (2003). "Labor Market, Social Institutions, Economic Reforms, and Social Costs," in S. Uchikawa, ed., *Labour Market and Institution in India, 1990s and Beyond*, Manohar, New Delhi.

Datta-Chaudhuri, M. (1996). "Labor Markets as Social Institutions in India," IRIS-India Working Paper no. 10, University of Maryland at College Park.

Dollar, D., G. Iarossi, and T. Mengistae. (2002). "Investment Climate and Economic Performance: Some Firm Level Evidence from India," mimeo, The World Bank.

Edmonds, E.V., N. Pavcnik, and P. Topalova. (2008). "Trade Adjustment and Human Capital Investments: Evidence from Indian Tariff Reform." NBER Working Paper no. 12884.

Gupta, P., R. Hasan, and U. Kumar. 2009. "Big Reforms but Small Payoffs: Explaining the Weak Record of Growth in Indian Manufacturing." *India Policy Forum*, 5.

Hasan, R., D. Mitra, and K.V. Ramaswamy. (2007). "Trade reforms, labor regulations, and labor demand elasticities: Empirical evidence from India." *Review of Economics and Statistics*, 89(3, August): 466–81.

Hasan, R., D. Mitra, and B. Ural (2007). "Trade Liberalization, Labor Market Institutions, and Poverty Reduction: Evidence from Indian States." *India Policy Forum, 2006-07*.

McDonald J F and Robert A Moffitt (1980), "The Uses of Tobit Analysis", The Review of Economics and Statistics, 62(2), 318-321.

Mitra, D. and B. Ural (2007). "Indian Manufacturing: A Slow Sector In A Rapidly Growing Economy," (with Beyza Ural) *Journal of International Trade and Economic Development* 17(4), December 2008, 525-560.

Norton E C, Wang H and Chunrong Ai (2004), "Computing interaction effects and standard errors in logit and probit models", The Stata Journal (2004), 4(2), 154-167.

Panagariya, Arvind (2001). 'Rigid Labor Laws: a Minor Barrier to Growth?'. *The Economic Times.*

Panagariya, Arvind (2008). *India: The Emerging Giant.* Oxford University Press, New York.

Sundaram, A. (2010). "The Impact of Trade Liberalization on Micro Enterprises: Evidence from Indian Manufacturing," mimeo, Syracuse University.

Topalova, P. (2005). "Trade Liberalization, Poverty and Inequality: Evidence from Indian Districts," NBER Working Paper No. 11614.

Table 1A
Summary Statistics - Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)
	By Survey Round			By Enterprise Type		
	1989	1994	2000	OAME	NDME	DME
All Regions						
Informal Employment	35,942.8	40,780.1	47,823.8	31,661.9	6,155.3	6,817.6
	[104,716]	[109,759]	[124,122]	[98,157]	[14,945]	[21,918]
Informal Output	542.6	829.9	1647.5	347.7	265.3	644.5
	[1,787.6]	[1,961.5]	[9,475.4]	[1,230]	[905.8]	[6,722.7]
Informal Value Added	236.4	337.9	494.9	173.7	100.2	140
	[653]	[813.7]	[995.2]	[462.9]	[300.9]	[409.5]
Rural						
Informal Employment	27,519.7	28,728	31,551	25,300.5	2,554.80	2,895.7
	[91,640]	[90,909]	[99,368]	[86,824.4]	[8,296]	[13,518]
Informal Output	273.8	324.5	510.8	233.3	65.2	121.3
	[1,047.3]	[1,168.6]	[1,589.8]	[1,091.2]	[185.6]	[431.1]
Informal Value Added	135.3	145.3	217.7	117.6	27.3	37.9
	[427.9]	[406.8]	[533.7]	[363.3]	[77.4]	[156.1]
Urban						
Informal Employment	8,425.1	12,054.9	16,275.8	6,362.4	3,601.6	3,922.9
	[22,045]	[33,511]	[38,172]	[18,915]	[9,065]	[12,804]
Informal Output	268.8	505.4	1136.7	114.4	200	523.2
	[1,303.5]	[1,321.3]	[9,250]	[310.5]	[848.8]	[6,695.1]
Informal Value Added	101.1	192.6	277.2	56.1	72.8	102.2
	[401.9]	[586.3]	[647.7]	[170.3]	[270.8]	[336.3]

Notes: 1) All monetary values are in millions of 1993 Rupees. 2) The numbers in brackets are standard deviations. 3) OAME refers to own-account manufacturing firms that use only household workers. 4) NDME is non-directory manufacturing enterprises. These enterprises use outside workers with no greater than five total workers. 5) DME is directory manufacturing enterprises and includes enterprises with outside workers and total workers greater than 5.

Table 1B

Summary Statistics - Formal Sector

	(1)	(2)	(3)	(4)
	Overall	1989	1993	2000
Formal Employment	11,757.8	12,134.9	11,655.6	11,488.5
	[34,436]	[45,625]	[27,187]	[27,443]
Formal Output	6,681.6	4,404.5	6,135.8	9,468.8
	[17,136.4]	[9,484.9]	[13,462]	[24,376]
Formal Value Added	1,429.3	959.5	1,430.2	1,888.9
	[4,024.1]	[2,266.2]	[3,536.7]	[5504.3]
Tariff (All - Regions)	62.8	94.4	70.7	24.5
	[30.7]	[15.7]	[4.93]	[2.97]
Tariff (Urban)	86.9	131.7	93.8	36.8
	[39.6]	[8.49]	[4.71]	[2.61]
Tariff (Rural)	59.8	89.8	67.8	22.9
	[29.7]	[16.7]	[4.74]	[2.89]
Outsourcing	181.9	14.0	17.7	502.1
	[532.2]	[13.3]	[26.8]	[820.6]

Notes: 1) All monetary values are in millions of 1993 Rupees. 2) The numbers in brackets are standard deviations.

Table 1C

Informal Activity Shares in Overall Manufacturing

	1989	1994	2000
Employment	0.75	0.78	0.81
Output	0.11	0.12	0.15
Value Added	0.20	0.19	0.21

Table 2A: The Relationship Between the Formal and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.275***	0.294**	0.277***	0.452***	0.711***	0.634***	0.692***	1.258***	1.051***
	(0.060)	(0.120)	(0.102)	(0.059)	(0.130)	(0.112)	(0.084)	(0.191)	(0.164)
Observations	1,951	1,951	1,923	1,951	1,951	1,921	1,307	1,307	1,286
Rural (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.348***	0.520***	0.539***	0.547***	0.992***	0.869***	0.626***	1.507***	1.392***
	(0.083)	(0.171)	(0.145)	(0.085)	(0.198)	(0.171)	(0.132)	(0.320)	(0.280)
Observations	1,951	1,951	1,924	1,951	1,951	1,922	1,307	1,307	1,285
Urban (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.272***	0.383***	0.316***	0.385***	0.684***	0.599***	0.680***	1.302***	0.929***
	(0.063)	(0.133)	(0.116)	(0.062)	(0.145)	(0.125)	(0.090)	(0.209)	(0.178)
Observations	1,951	1,951	1,922	1,951	1,951	1,920	1,307	1,307	1,287

Notes: 1) All regressions include 3-digit industry, state, and year effects. 2) Robust standard errors in parentheses. 3) *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2B - Marginal Effect of Formal Sector Activity
The Relationship Between the Formal and the Informal Sector

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.209***	0.223**	0.212**	0.442***	0.699***	0.625***	0.685***	1.236***	1.033***
	(0.058)	(0.101)	(0.087)	(0.569)	(0.127)	(0.110)	(0.083)	(0.188)	(0.161)
Rural (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.334***	0.499***	0.517***	0.297***	0.554***	0.472***	0.042	0.199	0.175
	(0.079)	(0.163)	(0.139)	(0.093)	(0.185)	(0.159)	(0.041)	(0.174)	(0.156)
Urban (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.261***	0.370***	0.308***	0.378***	0.673***	0.590***	0.644***	1.241***	0.889***
	(0.059)	(0.128)	(0.112)	(0.062)	(0.145)	(0.125)	(0.084)	(0.200)	(0.170)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Table 3A: Labor Intensity and the Relationship Between the Formal and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
PANEL A: All Regions (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.095	-0.336	-0.242	-0.234	-1.485***	-0.960**	0.010	-1.746	-0.993
	(0.347)	(0.616)	(0.458)	(0.269)	(0.470)	(0.380)	(0.487)	(1.175)	(0.918)
Formal sector Labor Intensity X Ln (Corresponding Formal Sector Variable)	-0.092	-0.323	-0.264	-0.351***	-1.115***	-0.803***	-0.353	-1.543***	-1.039**
	(0.158)	(0.282)	(0.204)	(0.111)	(0.185)	(0.151)	(0.235)	(0.590)	(0.473)
Observations	1947	1947	1919	1947	1947	1917	1303	1303	1282
PANEL A: Rural (Tobit)									
Ln (Corresponding Formal Sector Variable)	-0.103	-0.936	-0.794	-0.346	-1.754**	-1.209*	-1.697**	-4.269**	-3.508**
	(0.449)	(0.800)	(0.570)	(0.349)	(0.786)	(0.733)	(0.832)	(2.114)	(1.785)
Formal sector Labor IntensityX Ln (Corresponding Formal Sector Variable)	-0.233	-0.751**	-0.681**	-0.458***	-1.406***	-1.051***	-1.205***	-2.999***	-2.514***
	(0.225)	(0.377)	(0.279)	(0.154)	(0.383)	(0.342)	(0.421)	(1.087)	(0.929)
Observations	1947	1947	1918	1947	1947	1920	1303	1303	1281
PANEL A: Urban (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.173	-0.158	-0.091	-0.317	-1.531***	-1.054*	0.336	-1.138	-0.719
	(0.302)	(0.642)	(0.571)	(0.317)	(0.578)	(0.546)	(0.477)	(1.240)	(0.955)
Formal sector Labor IntensityX Ln (Corresponding Formal Sector Variable)	-0.051	-0.277	-0.208	-0.360***	-1.126***	-0.834***	-0.177	-1.252**	-0.838*
	(0.138)	(0.302)	(0.266)	(0.137)	(0.238)	(0.249)	(0.231)	(0.620)	(0.492)
Observations	1947	1947	1918	1947	1947	1916	1303	1303	1283

Notes: 1) Labor Intensity is defined for the formal sector at the 3 digit industry level as the ratio of wage bill to value added in each industry and is calculated using data from the ASI. 2) All regressions include 3-digit industry, state, and year effects. 3) Robust standard errors in parentheses clustered at the state level. 4) *** p<0.01, ** p<0.05, * p<0.1.

Table 3B - Marginal Effect of LEVELS AND THE INTERACTION
Labor Intensity and the Relationship Between the Formal and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Formal sector Labor IntensityXLn (Corresponding Formal Sector Variable)	-0.07	-0.242	-0.2	-0.345***	-1.107***	-0.797***	-0.351	-1.541***	-1.036**
	(0.12)	(0.211)	(0.155)	(0.11)	(0.184)	(0.15)	(0.234)	(0.59)	(0.472)
Ln (Corresponding Formal Sector Variable)	0.212***	0.231	0.217**	0.459***	0.736***	0.639***	0.711***	1.334***	1.079***
	(0.069)	(0.113)	(0.098)	(0.074)	(0.165)	(0.133)	(0.07)	(0.196)	(0.105)
Rural (Tobit)									
Formal sector Labor IntensityXLn (Corresponding Formal Sector Variable)	-0.218	-0.628**	-0.588**	0.3***	-1.236***	-0.847***	-0.665***	-2.985***	-2.458***
	(0.21)	(0.315)	(0.239)	(0.101)	(0.337)	(0.275)	(0.232)	(1.081)	(0.905)
Ln (Corresponding Formal Sector Variable)	0.339***	0.472***	0.489***	0.372***	0.926***	0.717***	0.391***	1.713***	1.48***
	(0.084)	(0.145)	(0.116)	(0.057)	(0.201)	(0.135)	(0.075)	(0.385)	(0.289)
Urban (Tobit)									
Formal sector Labor IntensityXLn (Corresponding Formal Sector Variable)	-0.049	-0.273	-0.204	-0.355***	-1.117***	-0.827***	-0.17	-1.237**	-0.823*
	(0.133)	(0.298)	(0.262)	(0.135)	(0.236)	(0.246)	(0.221)	(0.611)	(0.483)
Ln (Corresponding Formal Sector Variable)	0.264***	0.389***	0.319**	0.396***	0.712***	0.606***	0.661***	1.346***	0.939***
	(0.096)	(0.16)	(0.147)	(0.082)	(0.189)	(0.157)	(0.065)	(0.165)	(0.103)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Table 4A: Labor Market Regulations and the Relationship Between the Formal and the Informal Sector

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
PANEL A: All Regions (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.301***	0.350***	0.346***	0.408***	0.660***	0.592***	0.608***	1.143***	0.968***
	(0.081)	(0.131)	(0.099)	(0.089)	(0.212)	(0.169)	(0.092)	(0.218)	(0.135)
Labor Market Regulations X Ln (Corresponding Formal Sector Variable)	-0.083	-0.189	-0.231	0.143	0.174	0.142	0.284*	0.423	0.293
	(0.095)	(0.143)	(0.146)	(0.088)	(0.207)	(0.185)	(0.151)	(0.354)	(0.291)
Observations	1,951	1,951	1,923	1,951	1,951	1,921	1,307	1,307	1,286
PANEL A: Rural (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.338***	0.550***	0.582***	0.497***	0.980***	0.878***	0.488***	1.288***	1.274***
	(0.102)	(0.190)	(0.141)	(0.104)	(0.241)	(0.197)	(0.157)	(0.397)	(0.362)
Labor Market Regulations X Ln (Corresponding Formal Sector Variable)	0.034	-0.100	-0.149	0.163	0.039	-0.031	0.478**	0.834**	0.420
	(0.082)	(0.138)	(0.142)	(0.113)	(0.251)	(0.205)	(0.189)	(0.413)	(0.375)
Observations	1,951	1,951	1,924	1,951	1,951	1,922	1,307	1,307	1,285
PANEL A: Urban (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.284***	0.434***	0.390***	0.330***	0.601**	0.533***	0.610***	1.218***	0.858***
	(0.092)	(0.144)	(0.133)	(0.100)	(0.237)	(0.192)	(0.089)	(0.199)	(0.133)
Labor Market Regulations X Ln (Corresponding Formal Sector Variable)	-0.037	-0.180	-0.254	0.178**	0.293	0.230	0.233*	0.300	0.244
	(0.121)	(0.238)	(0.214)	(0.083)	(0.240)	(0.210)	(0.137)	(0.316)	(0.271)

| Observations | 1,951 | 1,951 | 1,922 | 1,951 | 1,951 | 1,920 | 1,307 | 1,307 | 1,287 |

Notes:1) Labor Market Regulations is a dummy variable that equals 1 if a state has relatively flexible labor laws (see Gupta, Hasan and Kumar, 2009)2) All regressions include 3-digit industry, state, and year effects. 3) Robust standard errors in parentheses **clustered at the state level**. 4) *** p<0.01, ** p<0.05, * p<0.1.

Table 4B - Marginal Effect of FORMAL SECTOR ACTIVITY

Labor Market Regulations and the Relationship Between the Formal and the Informal Sector

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Labor Market Regulation Dummy = 1	0.145*	0.079	0.052	0.548***	0.832***	0.732***	0.891***	1.565***	1.259***
	(0.082)	(0.102)	(0.088)	(0.098)	(0.151)	(0.144)	(0.137)	(0.309)	(0.236)
Labor Market Regulation Dummy=0	0.23***	0.265***	0.266***	0.399***	0.65***	0.584***	0.601***	1.122***	0.951***
	(0.062)	(0.099)	(0.076)	(0.087)	(0.208)	(0.167)	(0.091)	(0.213)	(0.131)
Rural (Tobit)									
Labor Market Regulation Dummy = 1	0.356***	0.431***	0.416***	0.472***	0.61***	0.433***	0.288***	1.468***	0.622***
	(0.085)	(0.16)	(0.143)	(0.081)	(0.158)	(0.091)	(0.055)	(0.277)	(0.117)
Labor Market Regulation Dummy=0	0.32***	0.538***	0.574***	0.28***	0.549***	0.475***	0.033***	0.17***	0.159***
	(0.096)	(0.185)	(0.138)	(0.058)	(0.134)	(0.106)	(0.011)	(0.058)	(0.049)
Urban (Tobit)									
Labor Market Regulation Dummy = 1	0.233	0.225	0.116	0.507***	0.893***	0.761***	0.832***	1.508***	1.092***
	(0.142)	(0.241)	(0.203)	(0.098)	(0.184)	(0.176)	(0.12)	(0.275)	(0.211)
Labor Market Regulation Dummy=0	0.272***	0.42***	0.379***	0.324***	0.591**	0.525***	0.576***	1.159***	0.819***
	(0.088)	(0.139)	(0.129)	(0.098)	(0.233)	(0.189)	(0.083)	(0.19)	(0.127)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Table 5A: Labor Market Regulations and the Relationship Between the Formal Sector Outsourcing and the Informal Sector

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
PANEL A: All Regions (Tobit)									
Ln (Industry outsourcing)	-0.081	-0.167	-0.138	-0.044	-0.226	-0.203	-0.013	-0.022	-0.031
	(0.166)	(0.417)	(0.389)	(0.142)	(0.347)	(0.327)	(0.144)	(0.320)	(0.305)
Labor Market RegulationsX	0.125**	0.230*	0.223*	0.120**	0.231	0.233*	0.069	0.090	0.075
Ln (Industry outsourcing)	(0.057)	(0.122)	(0.117)	(0.060)	(0.141)	(0.132)	(0.080)	(0.200)	(0.193)
Observations	1,973	1,973	1,971	1,948	1,948	1,946	1,295	1,295	1,292
PANEL A: Rural (Tobit)									
Ln (Industry outsourcing)	-0.128	-0.214	-0.191	0.233	0.609	0.583	-0.310	-0.881	-0.826
	(0.155)	(0.380)	(0.355)	(0.158)	(0.423)	(0.403)	(0.192)	(0.555)	(0.516)
Labor Market RegulationsX	0.087	0.072	0.104	0.185	0.367	0.367	0.492***	1.560***	1.389***
Ln (Industry outsourcing)	(0.097)	(0.208)	(0.218)	(0.124)	(0.319)	(0.303)	(0.161)	(0.405)	(0.387)
Observations	1,973	1,973	1,970	1,948	1,948	1,948	1,295	1,295	1,291
PANEL A: Urban (Tobit)									
Ln (Industry outsourcing)	0.001	-0.003	0.018	-0.157	-0.496	-0.453	0.078	0.226	0.195
	(0.152)	(0.384)	(0.361)	(0.166)	(0.416)	(0.393)	(0.172)	(0.404)	(0.389)
Labor Market RegulationsX	0.111**	0.212*	0.208*	0.155***	0.334**	0.331**	0.047	-0.056	-0.035
Ln (Industry outsourcing)	(0.056)	(0.117)	(0.112)	(0.055)	(0.157)	(0.147)	(0.102)	(0.271)	(0.258)
Observations	1,973	1,973	1,971	1,948	1,948	1,945	1,295	1,295	1,292

Notes:1) Labor Market Regulations is a dummy variable that equals 1 if a state has relatively flexible labor laws (see Gupta, Hasan and Kumar,

2009)2) All regressions include 3-digit industry, state, and year effects. 3) Robust standard errors in parentheses clustered at the 3 digit industry level. 4) *** p<0.01, ** p<0.05, * p<0.1.

Table 5B - Marginal Effect of Industry Outsourcing

Labor Market Regulations and the Relationship Between the Formal Sector Outsourcing and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Labor Market Regulation Dummy = 1	0.033	0.05	0.068	0.075	0.005	0.03	0.055	0.067	0.044
	(0.138)	(0.356)	(0.335)	(0.167)	(0.396)	(0.371)	(0.146)	(0.327)	(0.312)
Labor Market Regulation Dummy=0	-0.06	-0.13	-0.108	-0.043	-0.223	-0.2	-0.013	-0.021	-0.03
	(0.122)	(0.324)	(0.305)	(0.14)	(0.342)	(0.323)	(0.142)	(0.313)	(0.299)
Rural (Tobit)									
Labor Market Regulation Dummy = 1	-0.04	-0.136	-0.083	0.163**	0.424**	0.419**	0.012	0.068	0.054
	(0.155)	(0.357)	(0.34)	(0.072)	(0.215)	(0.207)	(0.015)	(0.06)	(0.054)
Labor Market Regulation Dummy=0	-0.123	-0.205	-0.184	0.085	0.254	0.246	-0.014	-0.06	0.055
	(0.149)	(0.365)	(0.34)	(0.059)	(0.178)	(0.172)	(0.01)	(0.043)	(0.039)
Urban (Tobit)									
Labor Market Regulation Dummy = 1	0.11	0.204	0.221	-0.002	-0.158	-0.119	0.12	0.161	0.152
	(0.153)	(0.392)	(0.367)	(0.17)	(0.406)	(0.384)	(0.175)	(0.412)	(0.391)
Labor Market Regulation Dummy=0	0.001	-0.003	0.018	-0.152	-0.482	-0.441	0.075	0.214	0.186
	(0.147)	(0.375)	(0.352)	(0.16)	(0.403)	(0.383)	(0.166)	(0.382)	(0.37)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Table 6A: Trade Liberalization and the Relationship Between the Formal and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
PANEL A: All Regions (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.276***	0.302**	0.282**	0.451***	0.712***	0.631***	0.695***	1.266***	1.059***
	(0.093)	(0.152)	(0.130)	(0.078)	(0.170)	(0.138)	(0.073)	(0.188)	(0.102)
Ln(Tariff - all regions)	-4.000***	-10.871***	-9.732***	-0.271	-4.294	-2.923	-1.971	-9.220	-6.037
	(0.875)	(2.748)	(2.295)	(1.037)	(2.652)	(2.439)	(3.825)	(11.279)	(10.112)
Ln(Tariff - all regions)XLabor Market Regulation	-0.045	-0.278	-0.256	-0.166	-0.423	-0.496	0.409	1.443*	1.499**
	(0.145)	(0.314)	(0.293)	(0.169)	(0.414)	(0.378)	(0.267)	(0.770)	(0.710)
Observations	1,951	1,951	1,923	1,951	1,951	1,921	1,307	1,307	1,286
PANEL A: Rural (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.350***	0.529***	0.546***	0.542***	0.982***	0.858***	0.620***	1.487***	1.384***
	(0.088)	(0.177)	(0.138)	(0.091)	(0.219)	(0.170)	(0.136)	(0.360)	(0.305)
Ln(Tariff - rural) lagged	-2.267***	-7.243***	-6.402***	-0.781	-5.505**	-4.317	9.733***	26.296***	28.405***
	(0.639)	(1.415)	(1.282)	(1.158)	(2.705)	(2.676)	(2.412)	(7.249)	(7.239)
Ln(Tariff - rural)XLabor Market Regulation	0.075	0.033	0.157	-0.511*	-1.415**	-1.369**	-0.532	-2.549	-2.082
	(0.270)	(0.739)	(0.698)	(0.283)	(0.713)	(0.627)	(0.537)	(1.667)	(1.614)
Observations	1,951	1,951	1,922	1,951	1,951	1,924	1,307	1,307	1,285
PANEL A: Urban (Tobit)									
Ln (Corresponding Formal Sector Variable)	0.273***	0.382**	0.314**	0.384***	0.681***	0.596***	0.689***	1.325***	0.946***
	(0.102)	(0.167)	(0.154)	(0.086)	(0.195)	(0.161)	(0.071)	(0.166)	(0.100)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ln(Tariff - urban) lagged	-0.495	-3.935	-3.952	3.527	5.292	6.203	-9.778***	-28.201***	-24.544***
	(2.312)	(6.964)	(6.821)	(2.213)	(5.387)	(5.820)	(3.541)	(10.432)	(9.148)
Ln(Tariff - urban)XLabor Market	0.060	-0.149	-0.225	-0.127	-0.339	-0.451	0.462	2.090*	1.907*
Regulation	(0.219)	(0.546)	(0.522)	(0.191)	(0.473)	(0.421)	(0.386)	(1.141)	(1.046)
Observations	1,951	1,951	1,922	1,951	1,951	1,920	1,307	1,307	1,287

Notes:1) Labor Market Regulations is a dummy variable that equals 1 if a state has relatively flexible labor laws (see Gupta, Hasan and Kumar, 2009).Tariff is defined as employment weighted nominal rate of protection. 2) All regressions include 3-digit industry, state, and year effects. 3) Robust standard errors in parentheses clustered at the state level. 4) *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6B - Marginal Effect of TARIFF

Trade Liberalization and the Relationship Between the Formal and the Informal Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
Dependent variable	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Labor Market Regulation Dummy = 1	-3.356***	-8.987***	-8.075***	-0.42	-4.627*	-3.343	-1.561	-7.775	-4.536
	(0.784)	(2.309)	(1.957)	(0.997)	(2.615)	(2.443)	(3.733)	(10.936)	(9.891)
Labor Market Regulation Dummy=0	-3.395***	-9.309***	-8.338***	-0.266	-4.254	-2.896	-1.964	-9.194	-6.007
	(0.743)	(2.341)	(1.964)	(1.016)	(2.626)	(2.417)	(3.811)	(11.244)	(10.057)
Rural (Tobit)									
Labor Market Regulation Dummy = 1	-2.127***	-7.024***	-6.083***	-0.416	-2.482**	-1.87*	0.009	0.028	0.021
	(0.555)	(1.381)	(1.321)	(0.421)	(1.107)	(1.014)	(0.006)	(0.019)	(0.015)
Labor Market Regulation Dummy=0	-2.184***	-7.048***	-6.199***	-0.444	-3.396**	-2.559	0.046*	0.386**	0.237**
	(0.614)	(1.369)	(1.237)	(0.657)	(1.664)	(1.584)	(0.025)	(0.176)	(0.115)
Urban (Tobit)									
Labor Market Regulation Dummy = 1	-0.422	-3.966	-4.061	3.214	4.761	5.463	-9.314***	-26.112**	-22.636**
	(2.308)	(6.885)	(6.744)	(2.092)	(5.215)	(5.541)	(3.573)	(10.442)	(9.205)
Labor Market Regulation Dummy=0	-0.476	-3.847	-3.879	3.411	5.17	6.052	-9.764***	-28.176***	-24.516***
	(2.223)	(6.81)	(6.696)	(2.135)	(5.259)	(5.672)	(3.534)	(10.42)	(9.133)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Trade Liberalization and the Relationship Between Formal Outsourcing and the Informal Sector

Dependent variable	(1) Ln (Informal Empl.)	(2) Ln (Informal Output)	(3) Ln (Informal VA)	(4) Ln (Informal Empl.)	(5) Ln (Informal Output)	(6) Ln (Informal VA)	(7) Ln (Informal Empl.)	(8) Ln (Informal Output)	(9) Ln (Informal VA)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
PANEL A: All Regions (Tobit)									
Ln (Industry outsourcing)	-0.332	-0.682	-0.622	0.188	0.988	0.973	1.141	3.177	2.954
	(0.435)	(0.988)	(0.955)	(0.450)	(1.019)	(0.960)	(1.028)	(2.218)	(2.101)
Ln (Industry outsourcing)X	0.089	0.180	0.169	-0.059	-0.351	-0.339	-0.356	-0.999	-0.933
Tariff	(0.106)	(0.221)	(0.220)	(0.123)	(0.278)	(0.261)	(0.316)	(0.678)	(0.642)
Ln(Tariff - all regions) lagged	-3.849**	-9.931**	-9.256**	-0.739	-4.485	-4.275	-0.627	-4.747	-4.692
	(1.553)	(4.017)	(3.842)	(1.261)	(3.541)	(3.357)	(4.211)	(11.220)	(10.499)
Observations	1,973	1,973	1,971	1,948	1,948	1,946	1,295	1,295	1,292
PANEL A: Rural (Tobit)									
Ln (Industry outsourcing)	-0.440	-0.495	-0.346	0.319	1.494	1.272	1.433	5.938	5.268
	(0.558)	(1.351)	(1.243)	(0.723)	(1.832)	(1.726)	(1.888)	(4.840)	(4.591)
Ln (Industry outsourcing)X	0.106	0.094	0.058	-0.008	-0.238	-0.177	-0.501	-2.004	-1.792
Tariff	(0.155)	(0.367)	(0.339)	(0.203)	(0.501)	(0.470)	(0.608)	(1.548)	(1.470)
Ln(Tariff - rural) lagged	-2.181	-6.126*	-5.815*	-0.480	-3.709	-3.726	12.704**	39.010**	35.891**
	(1.438)	(3.487)	(3.416)	(1.540)	(3.940)	(3.727)	(6.160)	(17.052)	(16.124)
Observations	1,973	1,973	1,970	1,948	1,948	1,948	1,295	1,295	1,291
PANEL A: Urban (Tobit)									
Ln (Industry outsourcing)	0.060	-0.094	-0.091	0.476	1.125	1.203	1.461	2.940	2.834
	(0.539)	(1.251)	(1.217)	(0.564)	(1.219)	(1.154)	(1.686)	(3.947)	(3.770)
Ln (Industry outsourcing)X	-0.007	0.041	0.046	-0.158	-0.411	-0.421	-0.384	-0.771	-0.749

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tariff	(0.128)	(0.293)	(0.287)	(0.137)	(0.292)	(0.275)	(0.455)	(1.066)	(1.019)
Ln(Tariff - urban) lagged	-3.745*	-10.133*	-10.019*	3.664*	5.272	4.487	-7.185	-22.502	-21.444
	(2.268)	(5.649)	(5.408)	(2.141)	(6.023)	(5.777)	(5.203)	(14.484)	(13.471)
Observations	1,973	1,973	1,971	1,948	1,948	1,945	1,295	1,295	1,292

Notes:1) Labor Market Regulations is a dummy variable that equals 1 if a state has relatively flexible labor laws (see Gupta, Hasan and Kumar, 2009). Tariff is defined as employment weighted nominal rate of protection.2) All regressions include 3-digit industry, state, and year effects. 3) Robust standard errors in parentheses clustered at the 3 digit industry level. 4) *** p<0.01, ** p<0.05, * p<0.1.

Table 7B: Marginal Effects of LEVLELS AND THE INTERACTION

Trade Liberalization and the Relationship Between Formal Outsourcing and the Informal Sector

Dependent variable	(1) Ln (Informal Empl.)	(2) Ln (Informal Output)	(3) Ln (Informal VA)	(4) Ln (Informal Empl.)	(5) Ln (Informal Output)	(6) Ln (Informal VA)	(7) Ln (Informal Empl.)	(8) Ln (Informal Output)	(9) Ln (Informal VA)
	OAME=1989,94,00			NDME=1989,94,00			DME=1994,00		
All regions (Tobit)									
Ln(Industry outsourcing)XLn(Tariff - All Regions)	0.21	0.414	0.374	-0.061	-0.365	-0.351	-0.364	-1.065	-0.99
	(0.274)	(0.577)	(0.547)	(0.126)	(0.295)	(0.275)	(0.317)	(0.714)	(0.675)
Ln(Tariff - All regions)	-3.121**	-8.456**	-7.891**	-0.791	-4.814	-4.598	-1.139	-6.144	-6.004
	(1.259)	(3.388)	(3.251)	(1.241)	(3.513)	(3.334)	(4.042)	(10.867)	(10.193)
Ln (Industry outsourcing)	0.02	0.03	0.047	-0.048	-0.409	-0.376	-0.184	-0.537	-0.516
	(0.133)	(0.328)	(0.31)	(0.159)	(0.385)	(0.359)	(0.202)	(0.426)	(0.404)
Rural (Tobit)									
Ln(Industry outsourcing)XLn(Tariff - Rural)	0.12	0.115	0.073	-0.021	-0.371	-0.317	0.01	0.042	0.039
	(0.171)	(0.419)	(0.387)	(0.129)	(0.611)	(0.581)	(0.018)	(0.064)	(0.06)
Ln(Tariff - Rural)	-2.019	-5.872	-5.604*	-0.184	-1.762	-1.776	0.008	0.024	0.023
	(1.406)	(3.398)	(3.328)	(0.574)	(1.75)	(1.688)	(0.007)	(0.025)	(0.024)
Ln (Industry outsourcing)	-0.023	-0.122	-0.116	0.108*	0.248	0.261	-0.0003	-0.001	-0.001
	(0.157)	(0.357)	(0.338)	(0.064)	(0.188)	(0.18)	(0.0004)	(0.001)	(0.001)
Urban (Tobit)									
Ln(Industry outsourcing)XLn(Tariff - Urban)	-0.01	0.045	0.049	-0.056	-0.315	-0.337	-0.42	-0.856	-0.819
	(0.151)	(0.339)	(0.331)	(0.058)	(0.204)	(0.209)	(0.499)	(1.184)	(1.117)
Ln(Tariff - Urban)	-3.71*	-9.999*	-9.888*	3.266*	4.632	3.89	-7.723	-23.555	-22.479*
	(2.24)	(5.573)	(5.34)	(1.966)	(5.699)	(5.501)	(5.113)	(14.347)	(13.344)

Ln (Industry outsourcing)	0.03	0.084	0.107	-0.194	-0.63	-0.6	-0.102	-0.201	-0.215
	(0.144)	(0.368)	(0.347)	(0.159)	(0.394)	(0.371)	(0.234)	(0.553)	(0.529)

Notes: 1) Marginal effects are for the year 1994 for the median industry and state by informal sector employment (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type. 3) Standard errors of the marginal effects are calculated using the delta method.

Table 8A: The Relationship Between Informal Sector Outsourcing and Formal Sector Activity: Tobit Regression
Dependent variable: Proportion of Enterprises Selling to Another Enterprise/Middleman

Activity variable (Right Hand Side)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=2000			NDME=2000			DME=2000		
	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Ln (Activity Variable)	0.039**	0.033**	0.028**	0.071***	0.058***	0.051***	0.074***	0.057***	0.048***
	(0.015)	(0.013)	(0.012)	(0.017)	(0.014)	(0.012)	(0.017)	(0.014)	(0.013)
Observations	654	654	648	654	654	648	654	654	648
Rural (Tobit)									
Ln (Activity Variable)	0.053***	0.031*	0.042***	0.041	0.043*	0.027	0.047	0.035	0.031
	(0.020)	(0.018)	(0.015)	(0.026)	(0.023)	(0.022)	(0.033)	(0.028)	(0.027)
Observations	654	654	648	654	654	648	654	654	648
Urban (Tobit)									
Ln (Activity Variable)	0.028*	0.031**	0.022*	0.076***	0.065***	0.057***	0.078***	0.067***	0.054***
	(0.017)	(0.015)	(0.013)	(0.016)	(0.014)	(0.012)	(0.018)	(0.015)	(0.014)
Observations	654	654	648	654	654	648	654	654	648

Notes: 1)All regressions include 3-digit industry, state effects. 2) Robust standard errors in parentheses. 3) *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8B - Marginal Effect of FORMAL SECTOR ACTIVITY
The Relationship Between Formal Sector Activity and Informal Sector Outsourcing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OAME=2000			NDME=2000			DME=2000		
Activity Variable (Right hand side)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)	Ln (Informal Empl.)	Ln (Informal Output)	Ln (Informal VA)
All regions (Tobit)									
Ln (Activity Variable)	0.035**	0.030**	0.026**	0.067***	0.055***	0.048***	0.062***	0.048***	0.041***
	(0.015)	(0.013)	(0.011)	(0.015)	(0.012)	(0.011)	(0.015)	(0.013)	(0.012)
Rural (Tobit)									
Ln (Activity Variable)	0.041**	0.025*	0.033***	0.01	0.011	0.006	0.006	0.003	0.003
	(0.016)	(0.014)	(0.012)	(0.012)	(0.012)	(0.008)	(0.007)	(0.006)	(0.005)
Urban (Tobit)									
Ln (Activity Variable)	0.021*	0.022**	0.016*	0.065***	0.058***	0.049 ***	0.053***	0.048***	0.039***
	(0.012)	(0.011)	(0.009)	(0.016)	(0.014)	(0.012)	(0.014)	(0.013)	(0.011)

Notes: 1) Marginal effects are for the median industry and state by informal sector employment in 1994 (see Appendix A1). 2) All continuous variables are set at their mean value for the relevant enterprise type for the year 2000. 3) Standard errors of the marginal effects are calculated using the delta method.

Table A1

List of the Median Industry and State by Informal Employment for 1994

		OAME	NDME	DME
All regions	State Code	19	7	8
	State	Orissa	Gujarat	Haryana
	3 digit NIC 98 code	331	341	181
	Industry	Medical equipment	Motor vehicles	Apparel
Rural	State Code	25	14	5
	State	UP	Maharashtra	Bihar
	4 digit NIC 98 code	252	332	352
	Industry	Plastic	Optical	Locomotives
Urban	State Code	14	4	5
	State	Maharashtra	Assam	Bihar
	5 digit NIC 98 code	359	192	269
	Industry	Transport	Footwear	Non-metallic minerals

Source: NSS data on Unorganized Manufacturing, 1994, and authors' calculations.

Table A2

State	Labor Regulation Dummy
Andhra Pradesh	1
Assam	0
Bihar	0
Gujarat	0
Haryana	0
Karnataka	1
Kerala	0
Madhya Pradesh	0
Maharashtra	0
Orissa	0
Punjab	0
Rajasthan	1
Tamil Nadu	1
Uttar Pradesh	1
West Bengal	0

Source: Gupta, Hasan and Kumar (2009)