

# The Exceptional Persistence of India's Unorganized Sector

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## Abstract

The transformation of India's unorganized sector is important to its modernization, growth, and attainment of regional economic equality. This paper documents several key facts about India's unorganized sector in manufacturing and services. First, the unorganized sector is large, accounting for more than 99 percent of establishments and 80 percent of employment in manufacturing. Second, the unorganized sector is stubbornly persistent—it accounted for 81 percent of manufacturing employment in 1989 and 2005. Third, this persistence is not due to particular subsets of industries or states, as most industries and states show limited change in unorganized sector employment shares. Fourth, the degree to which localized unorganized activity exists is important as it is associated with weaker production functions for manufacturing firms.

Building from these facts, the paper investigates conditions promoting transformation by state-industry. Decomposition exercises find that both within and between adjustments for state-industries weakly reduce unorganized sector shares. The aggregate persistence instead comes from the covariance term, where fast-growing state-industries witness rising unorganized sector activity. Regressions quantify that growth in the organized sector by state-industry reduces the unorganized sector employment share, but only marginally reduces employment levels in unorganized activity. Analysis of the establishment size distribution highlights that entrepreneurship and larger organized sector plants are most important for transitions in the manufacturing sector, while small establishments play a key role in the services sector.

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## Introduction

The informal sector constitutes a very large portion of employment in many developing economies, often greater than 90% of workers. Moreover, many new enterprises that are formed are in the informal sector, creating persistence (e.g., Schoar 2009, Ardagna and Lusardi 2008). Informal sectors are associated with high poverty rates, poor jobs, and gender discrimination (e.g., OECD 2009, Kanbur 2011), and evidence for India suggests that the productivity growth for the informal sector is not keeping pace with the formal sector (Kathuria et al. 2010). Simple cross-sectional plots like Figures 1 and 2 highlight the importance of understanding the origins of the informal sector, its economic consequences, and its relationship to the formal sector.

To realize sustained development, many policy makers and business leaders want to encourage the informal-to-formal sector transition of workers (e.g., NCEUS 2009, Unni 2005). A number of studies focus on issues like property rights, business registration procedures, and financial access that are important for this transition, often with specific application to whether entrepreneurs choose to enter the formal economy or not (e.g., de Soto 1989, Bruhn 2011). These studies have been very influential in the design of policies to aid regional economic growth and development. Addressing these issues at the local level is one of the most pressing challenges for regional planners in many developing economies.

We consider these informal-to-formal sector transitions within India. As we define in greater detail in Section 2, our data allow us to consider unorganized and organized sectors of the Indian economy for manufacturing and services. Establishments in the unorganized sector in India are unregistered, do not pay taxes, and are generally outside the purview of the state, so this division closely parallels common discussions and definitions of informal and formal sectors. Our paper starts by outlining some key facts about India's unorganized sector. We then undertake several empirical analyses to identify traits of state-industries where transitions occur.

The Indian data exhibit four key facts about the unorganized sector:

1. *The unorganized sector is very large* – This fact is fairly well known, but worth repeating. For the manufacturing sector in 2005, 99% of establishments and 81% of employment are in the unorganized sector. The estimated size of the unorganized sector for services depends upon definitions, as discussed below, and ranges from 74% to 90% of services employment in 2006. Even if viewed from an establishment size distribution perspective, these shares are much larger than in the United States, for example. Moreover, Figure 1 shows that India's unorganized sector is large for its stage of development.
2. *The unorganized sector is extremely persistent* – India's economy has undergone amazing changes during the past 20 years, but the share of the unorganized sector has remained stubbornly persistent. The employment share in the unorganized sector for manufacturing in

2005 is almost exactly the same as it was in 1989 at 81%. While the organized sector has grown over the past two decades, the unorganized sector has kept pace.

3. *This persistence is not due to particular subsets of states or industries* – India’s states vary substantially in their unorganized sector shares, from less than 50% to above 90%. India’s industries also range from less than 10% to above 98% in unorganized sector shares. While these disparities are important, particular groups of states or industries do not explain the persistence, which is instead ubiquitous. Thus, the persistence is not due to diverging trends, with some states or industries becoming much more organized, and others becoming less so. The persistence is more systematic and requires state-industry level analyses to understand how the transitions that have occurred came about.
4. *Greater concentrations of localized business activity in the unorganized sector are associated with weaker production functions for manufacturing firms* – Estimations of augmented production functions for Indian manufacturing firms find both standard urbanization and agglomeration premiums, with higher local business density promoting greater output for the set of inputs. We show, however, that the share of this local business density that is concentrated in the unorganized sector is associated with weaker production functions. This unorganized activity is important, and its transition will help India’s further economic progress.

Building off of these observations, we study transitions that have occurred since 1989 at the state-industry level to identify attributes that have helped localized transitions in India. Our approach complements prior work but analyzes these transitions from two new perspectives.<sup>1</sup> We first conduct decomposition exercises of these changes. These decompositions show a very interesting pattern. Within- and between-components of state-industries both push towards lower unorganized sector shares within manufacturing. That is, state-industries generally exhibit declining unorganized sector shares when weighted by initial employment, and employment generally flows towards state-industries with lower initial unorganized sector shares. The persistence instead comes from a covariance term that works in the opposite direction: state-industries with high employment expansion through the period are also increasing their unorganized sector shares.

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<sup>1</sup> Our work connects to a literature on the role of the informal sector in India (e.g., Kundu 1999, Chakrabarti and Kundu 2009, Nataraj 2011, Kar and Marjit 2009, Amin 2010, Kathuria et al. 2010, Siggel 2010) and other developing economies (e.g., Chen et al. 1999, Chen 2001, Schneider 2002, Maloney 2004, Gulyani and Talukdar 2010, Kweka and Fox 2011). Schneider and Enste (2000), Guha-Khasnobis et al. (2006), and Kanbur (2009, 2011) review many aspects of this literature. Basu et al. (2011) offer a recent theoretical model of the formal-informal sectors.

We next quantify at the state-industry level how changes in the size and industrial organization of the organized sector relate to changes in the employment share of the unorganized sector for the state-industry. Our outcome measures consider both changes in the fraction of the state-industry's employment in the unorganized sector and raw changes in the unorganized sector's size. Our metrics on industrial organization are indicator variables for where in the establishment size distribution the employment growth occurs and the degree of initial entrepreneurship. We control for state and industry fixed effects.

Three important themes emerge from this empirical analysis:

1. *In both manufacturing and services, the most important factor for reducing the unorganized sector share is growing the overall size of the organized sector* – Our primary estimations separate the overall growth of the organized sector from its establishment size distribution and entrepreneurship rates. Growth in the sector size, versus the particulars of where in the establishment size distribution growth occurs, is central to reducing the share of state-industry workers in the unorganized sector. Demonstrating the strong persistence of the unorganized economy, however, this overall organized sector growth has limited effect on the absolute levels of unorganized sector employment. Its effect comes through increase in the overall state-industry size, and thereby reducing the unorganized sector's share.
2. *Within manufacturing, the most consistent force for reducing the unorganized sector share is growth in employment in large establishments in the organized sector. High rates of initial entrepreneurship in the organized sector are also important since 2000* – Our manufacturing data allow us to observe three time periods: 1989-1994, 1994-2000, and 2000-2005. Across these three periods, state-industries with their strongest relative employment growth in large establishments with more than 100 workers have the greatest declines in unorganized sector shares. Moreover, these state-industries experience absolute reductions in unorganized sector employment levels. In 2000-2005, high initial entrepreneurship rates in the organized sector also closely links with declines in the unorganized sector's employment share and level. This role is exclusive to entrepreneurs and is not evident in small manufacturing establishments generally.
3. *By contrast, employment growth in small establishments is the essential factor for services, and this role of small establishments is less linked to entry* – Ghani (2010b) describes the unique role of the services sector in India's development, in part allowing India to overcome its underdevelopment in manufacturing. Given the importance of services to current South Asian growth, we quantify its unorganized sector transition for 2001-2006 in an estimating framework similar to that of manufacturing. Throughout our services study, the development of small establishments is the most important factor for reducing the share of employment in the unorganized sector.

In summary, understanding the evolution of the unorganized sector in developing and emerging economies is a very important task for regional scientists, development economists, and policy makers. Our inquiry provides some initial steps towards understanding its evolution for India. One strong conclusion emerges from the Indian experience—single, grand theories about India’s unorganized sector and its transitions are likely to be inadequate. The persistence of the unorganized sector across so many different states and industries is too great to afford a single, unifying explanation. Taking somewhat smaller steps, our work highlights that growth of the organized sector does reduce the unorganized sector share. There are also some key establishment size distribution properties for India in how the transition occurs.

The plan of this paper is as follows. Section 2 discusses our data and the levels of unorganized activity in the Indian economy. Section 3 estimates production functions for Indian manufacturing establishments. In both of these sections, we make comparisons to U.S. establishments where appropriate. Section 4 presents the decomposition of state-industry changes, and Section 5 analyses industrial traits in the organized sector and changes in unorganized sector activity. The final section concludes and discusses implications from this work.

## **Indian Data for the Organized and Unorganized Sectors**

We employ cross-sectional establishment-level surveys of manufacturing and service enterprises carried out by the Government of India. Our manufacturing data are taken from surveys conducted in fiscal years 1989, 1994, 2000, and 2005. The service sector has only more recently been surveyed in fiscal years 2001 and 2006. In all six cases, the survey was undertaken over two fiscal years (e.g., the 1994 survey was conducted during 1994-1995), but we will only refer to the initial year for simplicity. This section describes some key features of these data for our study.<sup>2</sup>

It is important to first define and characterize the distinction between the organized and unorganized sectors in the Indian economy. These distinctions in the Indian context relate to establishment size. In manufacturing, the organized sector is comprised of establishments with more than ten workers if the establishment uses electricity. If the establishment does not use electricity, the threshold is 20 workers or more. These establishments are required to register

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<sup>2</sup> For additional detail on the manufacturing survey data, we refer the reader to Kathuria et al. (2010), Fernandes and Pakes (2010), Hasan and Jandoc (2010), Nataraj (2011), and Ghani et al. (2011b). Dehejia and Panagariya (2010) and Ghani et al. (2011b,c) provide a detailed overview of the services data and its important characteristics.

under the India Factories Act of 1948. The unorganized manufacturing sector is, by default, comprised of establishments which fall outside the scope of the Factories Act.

In the service industries, there is no simple legal distinction as in manufacturing. Service establishments, regardless of size or other characteristics, are not required to register and thus are all officially unorganized. There are various existing methodologies to comparably differentiate small-scale, autonomous establishments from larger employers which constitute the organized sector, as generally defined. We assign establishments with less than five workers and/or listed as an “own-account enterprise” (OAE) to the unorganized sector. OAE enterprises are firms that do not employ any hired worker on a regular basis. The choice of five employees as the size cutoff recognizes that average establishment size in services is significantly smaller than in manufacturing. Our results are robust to also using a ten-employee demarcation for services.

The organized manufacturing sector is surveyed by the Central Statistical Organisation every year through the Annual Survey of Industries (ASI), while unorganized manufacturing and services establishments are separately surveyed by the National Sample Survey Organisation (NSSO) at approximately five-year intervals. Establishments are surveyed with state and four-digit National Industry Classification (NIC) stratification. We use the provided sample weights to construct population-level estimates of total establishments and employment at the state and three-digit NIC level. We focus mostly on state and industry variation in our empirical analyses, but we also consider district-level variation as a robustness check and to allow more localized traits where warranted. Districts are administrative subdivisions of Indian states or union territories.

Tables 1a and 1b document the establishment size distribution for India. In manufacturing, over 98% of establishments are unorganized, most with fewer than five workers. The last column compares this skewness to the distribution evident in the 1997 Census of Manufacturers for the United States. Only 51% of U.S. manufacturing establishments have fewer than ten employees. More broadly, about 74% of establishments have fewer than ten employees in the U.S. County Business Pattern data (regardless of sector). From an establishment size distribution perspective, India has an extreme concentration of very small establishments, as many others have noted.

These unorganized establishments account for 79% to 83% of all manufacturing employment in India. This concentration of employment among small establishments contrasts even more sharply with the United States, where the vast majority of output comes from larger establishments that would be part of the organized sector using India’s definitions. Despite



India's dramatic transformation since 1989, there has only been a small decline, if any, in the share of workers in the unorganized sector for manufacturing.<sup>3</sup>

The patterns also hold in Table 1b's account of the establishment size distribution in services. The estimated size of the unorganized sector for services depends upon definitions. Using our simple cut-off of five employees, the unorganized sector would still account for 76% of services employment in 2001, well above the comparable 9% for the United States. If using a 20 employee cut-off, the unorganized sector accounts for 90% of services employment in 2006. The share of services in the unorganized sector declines 3% from 2001 to 2006. Our panel is unfortunately too short to identify whether this decline is a short-term fluctuation (similar to the 2%-4% jumps in manufacturing in Table 1a) or part of a long-term trend.

Table 2 lists the 20 states that are in our sample and their unorganized sector shares. These 20 states are a subset of all 35 states/union territories. The 15 exclusions were due to three potential factors: 1) the state was not sampled across all of our surveys, 2) the small sample size for the state raised data quality concerns, or 3) persistent conflict and political turmoil existed in the region. Our explicit criteria with respect to size are that the district has a population of at least one million in the 2001 census and has 50 or more establishments sampled. The exclusions are minor in terms of economic activity, and the resulting panel accounts for over 90% of employment in the manufacturing and services sectors throughout the period of study.

Among major states, the unorganized sector shares are particularly high in Bihar, Orissa, Uttar Pradesh, and West Bengal. These four states have an unweighted average share exceeding 85% across our six surveys. In contrast, low unorganized sector shares are evident in Gujarat, Haryana, Maharashtra, and Punjab, as well as some of the smaller states. These states have an unweighted average share of employment in the unorganized sector of less than 70%. This regional distribution in part correlates with economic advancement of regions (Ghani 2010a).

Tables 3a and 3b provide similar unorganized sector shares by two-digit NIC industry in manufacturing and services, respectively. Within manufacturing, unorganized shares exceed 95% in industries related to wood products and furniture, with industries related to tobacco, textiles, and food products coming next. At the opposite end, unorganized shares of 20% or less are often evident in industries related to computer, communications, motor vehicles, and base metals. Among services industries, unorganized sector shares exceed 90% in industries related to sanitation, personal service activities, communications, and transportation and railway. Industries related to education and computers have lower rates again. These patterns suggest that more

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<sup>3</sup> Hsieh and Klenow (2011) also emphasize these establishment size distribution differences and further link them to differences between India and the United States via establishment age and size. Trivedi et al. (2011) provide a broad study of the recent performance of India's manufacturing sector.

technologically advanced, capital intensive, and globally integrated industries typically have lower unorganized sector shares in India.

Discussions of India's industrial landscape and transformation often use the terms "traditional" and "modern", although there are no established or precise definitions of these sectors. To provide some traction for this work, we defined these sectors ourselves through grouping the industries in Tables 3a and 3b. We classify an industry as being modern if its unorganized share is the less than the unweighted average unorganized share across industries for its sector in 2000-2001. Thus, by definition, the traditional sector has a larger unorganized worker share than the modern sector. More important, the unorganized share is very stagnant in traditional industries for both manufacturing and services. This share is increasing in the modern manufacturing sector and decreasing in modern services.

These descriptive tables highlight several key traits of India's unorganized sector. First, the unorganized sector is very large. Second, the unorganized sector is extremely persistent. Despite India's rapid changes over the past two decades, the unorganized share shows no signs of declining. While the organized sector has grown over the past two decades, the unorganized sector has kept pace.<sup>4</sup> Third, this persistence is not due to particular subsets of states or industries. Despite the great range in average levels of unorganized sector shares in Tables 2-3b, the persistence over time is pervasive. Thus, the persistence is not due to diverging trends, with some states or industries becoming much more organized, and others becoming less so.

Tables 4a and 4b quantify these observations. Table 4a shows correlations of unorganized sector changes with district-level traits taken from the 1991 and 2001 Population Censuses. Column headers indicate sector and time period. Panel A considers how district traits correlate with the change in unorganized sector share of district employment; Panel B quantifies instead correlations with log unorganized sector employment growth. We show results from the district level to maximize the number of observations and the granularity in local conditions.

Our selected district traits reflect several factors that prior studies have found important for India's economic geography. Population and population density are natural baselines. We next model the district's age structure (Bönte et al. 2009) as the ratio of working age population to non-working age population. This ratio relates to the demographic dividend often discussed in

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<sup>4</sup> As a useful comparison point, many commentators worry about India's slow path to urbanization. Across the 1989-2005 period, the share of Indian manufacturing employment that is urbanized grew from 33% to 41% (Ghani, Grover, et al. 2011). This change is much more substantial than anything present for the unorganized share. This decoupling of urbanization change and informality change in India is an important topic for future work, empirically and to inform two-sector theoretical models (e.g., Harris and Todaro 1970, Zenou 2011). Henderson (2010) reviews the literature on urbanization and development.

the Indian context. We also consider the share of the district population in a scheduled caste/tribe and the female labor force participation rate (e.g., Iyer et al. 2011, Klapper and Parker 2011).

Education and infrastructure are two factors consistently linked to India's regional development.<sup>5</sup> We measure education level as the district's percentage of adults with a graduate (post-secondary) degree and through literacy rates. Our infrastructure measures are the share of villages in a district with electricity access or paved roads. Finally, spatial locations relative to major population centers are frequently found to be important.<sup>6</sup> We thus include a measure from Lall et al. (2011) of the driving time from the central node of a district to the nearest of India's ten largest cities<sup>7</sup> as a measure of physical connectivity and across-district infrastructure. This is calculated based on data on India's road networks gathered using GIS software. We finally model the strength of the household banking sector for each district.

The univariate correlations in Table 4a are weak. The upper panel considers changes in the unorganized sector share. These basic traits do not connect systematically with unorganized share adjustments—the correlations except three are all less than 0.1 and statistically insignificant. The bottom panel considers growth in unorganized sector employment. Some of the correlations are stronger, with growth drivers identified in past work like education and infrastructure being again linked to unorganized sector growth. The comparison of the two panels reveals, however, that this is a general district growth effect that is not decreasing the unorganized sector's share. Table 4b finds similar results when looking at industry traits and changes in the level of unorganized activity by industry.

The stability of these patterns suggests that the persistence of India's unorganized sector is not due to a particular subset of regions or industries. For example, it is not the case that there are rapid shifts out of the unorganized sector in advanced technology industries, while lagging technologies are becoming more unorganized and holding the aggregate transformation back. Likewise, similar stories about different regions, city classes, or related spatial dynamics are difficult to support. Instead, given the limited movement at the aggregate level across both of these spatial and industry dimensions, we turn to state-industry analyses to identify conditions that have been associated with the transition. Before doing so, we pause briefly to provide simple evidence on why a very large unorganized sector can be worrisome.

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<sup>5</sup> For example, Lall (2007), Amin and Mattoo (2008), Mukim (2011), and Ghani et al. (2011a).

<sup>6</sup> For example, Partridge and Rickman (2008), Volpe Martincus (2010), and Lall et al. (2011).

<sup>7</sup> These are Ahmedabad, Bangalore, Bhubaneswar, Chennai, Delhi, Guwahati, Hyderabad, Kolkata, Mumbai, and Patna.

## Manufacturing Production Function Estimations

Table 5 analyzes whether a large unorganized sector is associated with lower performance for Indian manufacturing establishments. Columns 1-5 consider India, and Columns 6-7 consider the United States for comparison. We use the 2000 Indian sample for this exercise. We estimate a very simple production function with log output of each establishment as the dependent variable. We use establishment weights from the surveys to create a population level estimation. We control for the basic plant inputs of log employees, log book values of capital, and log costs of materials. We exclude plants with missing values, and we continue to exclude districts that are very small in size as noted in the prior section. Regressions include industry fixed effects to capture broad differences in production techniques.

Our focus is on the district and district-industry conditions that surround each plant. In Column 1, we include the log manufacturing employment density per square kilometer in the district. This measure captures urbanization premiums commonly highlighted in economic geography literature;<sup>8</sup> we use a per square kilometer normalization as Indian districts vary in spatial size. We also add a simple measure of the concentration of the unorganized sector as the log share of district employment in the unorganized sector.

The second column further considers these two metrics defined by district-industry, similar to industry-specific agglomeration premiums in the economic geography literature. The third column refines the unorganized sector's role by separating out the share of local workers who are not being paid. Unpaid workers are mostly family members, and the surveys directly collect evidence on the extent of their involvement in establishments. Columns 4 and 5 again split the Indian sample by traditional versus modern sectors. Standard errors are clustered by district.

The U.S. estimations in Columns 5-6 are built on the 1997 Census of Manufacturers. This dataset is a universal survey of U.S. manufacturing establishments conducted every five years. We estimate the local conditions by county and industry. We again normalize the local activity measures by the area of the county. We do not attempt to align U.S. industries with Indian industries, and we recognize that there are substantial differences in survey techniques and measurement quality between the two countries. Likewise, there are more advanced techniques for both production function estimation and urbanization/agglomeration premium estimation. But for our purposes, these two samples and transparent regressions provide an intuitive platform to observe differences between the two countries.

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<sup>8</sup> For example, Ciccone and Hall (1996), Duranton and Puga (2004), and Rosenthal and Strange (2004, 2011). Indian studies include Lall et al. (2004), Lall and Mengistae (2005), Deichmann et al. (2008), and Fernandes and Sharma (2011).

The first three rows show broadly similar elasticity patterns for inputs in the two countries. Looking across the fourth row of the table, the first observation is that the urbanization premium in India, as measured by the log employment density in district/county variable, is not too different from the United States. If anything, it may be slightly higher in India. Likewise, the agglomeration premium measured through log employment density by district-industry or county-industry is comparable. It again might be slightly lower in the United States than in India, but the many differences noted above warn against over-interpretation. The strong emphasis for modern sectors to have agglomeration premiums over urbanization premiums links to their frequent placements outside of Indian city centers, especially for capital- and land-intensive industries (e.g., Ghani, Grover, et al. 2011).

A very stark difference, however, is the strong association of lower output, conditional on the inputs and local density of activity, for manufacturing plants in an Indian district with high shares of unorganized activity. This association is not evident in the United States when we use the establishment size distribution to generate an unorganized share similar to India's definitions. The urbanization decline is stronger and more robust than the agglomeration decline. Column 3 shows that in particular it operates through a high share of unpaid workers in the local district-industry. These patterns hold across a number of estimation variants: using non-log shares, winsorizing extreme values, including different input combinations, and similar.

We stress that these estimations only document partial correlations, and we have not identified an exogenous shifter in the local unorganized shares of local activity. Given the persistence of the unorganized share spatially and across industries, we doubt that such a causal analysis will emerge. Nonetheless, this fourth fact that greater concentrations of localized business activity in the unorganized sector are associated with weaker production functions for manufacturing firms in India highlights why we should be concerned with the aggregate extremely high levels and aggregate persistence of India's unorganized economy.<sup>9</sup>

### **Decomposition of India's Unorganized Sector Share Changes**

Given the aggregate persistence along spatial and industrial dimensions, we turn now to two state-industry analyses. We first decompose the observed changes in the aggregate Indian

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<sup>9</sup> Several papers provide related evidence. Kathuria et al. (2010) find that productivity development in the unorganized sector in India has not kept pace with the organized sector. Bollard et al. (2011) stress the importance of within-plant productivity growth in some of India's largest plants. The unconditional convergence observed by Rodrik (2011) has been documented for the formal part of the manufacturing sector only.

unorganized sector share into within, between, and covariance components. Our decomposition follows Foster et al. (2001) and Baily et al. (1992). The results are reported in Table 6.

Our decomposition employs the following definitions using manufacturing as an example:  $\underline{I}$  is the aggregate informal/unorganized sector share of Indian manufacturing employment;  $I_k$  is the unorganized sector share for a state-industry  $k$  within the manufacturing sector; and  $S_k$  is state-industry  $k$ 's share of Indian manufacturing employment. States and industries are defined as in Tables 2 and 3a.

By definition,  $\underline{I} = \sum_{k=1, \dots, K} S_k \cdot I_k$  for a given year, where  $K$  is the full index of state-industries within the manufacturing sector. Our decomposition of changes from 1989 to 2005 for manufacturing takes the form:

$$\Delta \underline{I}_{89-05} = \sum_K S_{k,89} \cdot \Delta I_{k,89-05} + \sum_K (I_{k,89} - \underline{I}_{89}) \cdot \Delta S_{k,89-05} + \sum_K \Delta I_{k,89-05} \cdot \Delta S_{k,89-05}$$

The first term,  $\sum_K S_{k,89} \cdot \Delta I_{k,89-05}$ , is the within component. The within component represents changes in unorganized sector shares within state-industries from 1989 to 2005 ( $\Delta I_{k,89-05}$ ) weighted by initial employment shares for the Indian economy in 1989 ( $S_{k,89}$ ). Negative values indicate that state-industries tended to have declining unorganized shares from 1989 to 2005 when weighted by initial employment shares in 1989.

The second term,  $\sum_K (I_{k,89} - \underline{I}_{89}) \cdot \Delta S_{k,89-05}$ , is the between component. The between component represents changes in employment shares across state-industries from 1989 to 2005 ( $\Delta S_{k,89-05}$ ) interacted with the initial deviation of state-industries from the national unorganized sector share ( $I_{k,89} - \underline{I}_{89}$ ). Negative values indicate employment tended to be reallocated over the 1989 to 2005 period towards state-industries that had lower initial unorganized sector shares in 1989.

The third term,  $\sum_K \Delta I_{k,89-05} \cdot \Delta S_{k,89-05}$ , is the covariance component. The covariance component represents the interaction of changes in unorganized sector shares for state-industries across the period ( $\Delta I_{k,89-05}$ ) with changes in employment shares for state-industries across the period ( $\Delta S_{k,89-05}$ ). Positive values indicate that state-industries that experienced substantial growth in employment shares also experienced rising unorganized sector shares.

These three components by definition sum to the total change in unorganized sector share for India. As we do not consider entry or exit of state-industries, our decomposition requires a balanced panel, documented in Panel B of Table 6. This panel closely mirrors the aggregate unorganized share in Panel A. Panel C provides the decomposition terms.

The results in Columns 1-4 of Table 6 for manufacturing are quite striking. The within- and between-components both act to lower unorganized sector shares across the 1989 to 2005

period. These patterns are also evident in the sub-periods. The persistence evident in India instead comes from the covariance component. Over the 1989 to 2005 period, the positive covariance component counterbalances all of the within- and between-effects; these effects are also substantial in economic magnitude at 7% of the manufacturing employment. In the most recent period, the covariance term dampens by 2.6% what would otherwise have been a 4.7% decline.<sup>10</sup>

The process within services in Column 5 is somewhat different. The within component again pushes for a lower unorganized sector rate in 2006 compared to 2001. The between component, however, does not increase or decrease the unorganized sector share. To the extent that employment was reallocated across states and industries within services, it did not do so in a way that was correlated with initial unorganized sector shares in 2001. The covariance term for services is also small in economic magnitude at -0.9%.

### **Empirical Analyses of State-Industry Transitions**

Our second exercise characterizes unorganized sector transitions through a series of linear regressions at the state-industry level. We undertake separate cross-section estimations across each time period: 1989-1994, 1994-2000, and 2000-2005 for manufacturing, and 2001-2006 for services. This approach allows us to compare the final period for manufacturing and services directly and to see changes in behavior in manufacturing over time. We restrict the sample to state-industry observations that have both organized and unorganized employment in each survey. Our primary dependent variable is the change in the share of employment in the state-industry that is in the unorganized sector.

Our first explanatory variable is the overall employment change in the organized sector during the period relative to the initial size of the state-industry employment, combining both organized and unorganized sectors. We winsorize this metric at its 1% and 99% values to guard against outliers. It has a mean value of 0.16, with a standard deviation of 0.69. We find even stronger patterns without winsorizing, but we prefer the more cautious approach that is often taken with Indian data.

Beyond this broad growth by state-industry in the organized sector, our next two explanatory variables are indicator variables for where in the establishment size distribution this change is most occurring. We create three categories using surveyed employment levels in

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<sup>10</sup> The covariance effect holds for traditional and modern sectors. The within, between, and covariance components for traditional sectors from 1989 to 2005 are -0.022, -0.057, and 0.069, respectively. These components for modern sectors are 0.052, 0.006, and 0.051.

establishments: 0-39, 40-99, and 100+ employees. We measure the absolute change in employment levels across the period for each state-industry in these bins. We then create an indicator variable for the most employment change occurring among small establishments (0-39 employees); a second indicator variable signifies that the most employment change is occurring among large establishments. State-industries where the most employment growth is in the 40-99 employee bin are the reference category; this category is also the majority of cases. In 17% and 24% of state-industry observations the employment growth is highest in the small and large establishment bins, respectively. These indicator variables model the underlying establishment size distribution independent of the aggregate growth for the state-industry.<sup>11</sup>

Our final explanatory variable is an indicator variable for high entrepreneurship rates in the organized sector at the start of the period. This metric captures differences between new entry and young establishments versus small businesses generally. A number of studies stress the growth impact of young establishments versus small establishments in both advanced and developing economies.<sup>12</sup> We measure at the start of each sample period the number of young establishments per worker in the organized sector, where young is defined as being less than three years old. The indicator variable takes a unit value if this measure of young establishments is above the median for state-industries in the year.

In each cross-sectional estimate, we include vectors of state and industry fixed effects. These fixed effects control for the fixed differences across states and industries highlighted in the previous section. We weight estimations by log initial employment in the state-industry, combining both organized and unorganized sectors. This approach provides a better sense of the mean treatment effects, although we find very similar results in unweighted estimations. We report robust standard errors.

Table 7 provides our central results using the share change as the dependent variable. Column headers indicate the industry group and time period considered in the estimations. Negative coefficients indicate a decline across the period in the employment share of the unorganized sector for the state-industry. The manufacturing estimations have 563 observations, where we restrict the sample to state-industries where we observe unorganized employment in all periods. Services estimations have 525 observations, which are similarly restricted to state-industries where we observe unorganized employment in both 2001 and 2006.

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<sup>11</sup> We find similar results when restricting our indicator variables for the most prominent points of changes in the establishment size distribution to require changes exceed a growth threshold like 10% of the prior period's employment.

<sup>12</sup> For example, Khanna (2008), Glaeser and Kerr (2009), Delgado et al. (2010), Haltiwanger et al. (2010), Klapper et al. (2010), Ghani et al. (2011a), and Mukim (2011).



The first row shows that for all four transitions, growth in the size of the organized sector correlates with a decline in the share of employment in the state-industry in the unorganized sector. While perhaps not very surprising, this pattern is not a mechanical relationship either. Despite a 37% employment growth in organized sector for manufacturing from 1989-2005, the unorganized sector also grew 31%, resulting in the very weak changes in the unorganized sector shares evident in Table 3a. Nevertheless, state-industries that grew their organized sector also experienced declines in the unorganized share of activity.

The next two rows describe employment changes in the establishment size distribution within the organized sector, while the last row considers initial entrepreneurship rates in the organized sector. Across the periods, the most consistent factor associated with declines in the local employment share of the unorganized sector for manufacturing is employment growth in large establishments. In the final period of 2000-2005, entrepreneurship is also linked to sector transformations. Estimations that split the entrepreneurship indicator into high entry rates (>75th) and moderate entry rates (>50th and  $\leq$ 75th) show the effects are most prominent among state-industries within the high entry rate group.

The contrast between manufacturing and services is also striking, although we can only analyze the 2001-2006 change for services. Beyond broad sector growth, declines in unorganized sector shares are most prominent in state-industries where small establishments have increased their share. Entrepreneurship does not play an extra role, and neither do large services establishments. The explanatory power of the estimation as measured by the adjusted R-squared is higher for services.

Table 7's estimations consider changes in the share of state-industry employment in the unorganized sector. Changes in shares can be due to shifts in either unorganized or organized sector employment levels. This comprehensive view is perhaps most important from a policy perspective, but it is also important to quantify what changes in the organized sector are associated with reduced employment levels in the unorganized sectors in an absolute sense.

To investigate these absolute employment changes and the general robustness of our results, Tables 8a and 8b repeat the estimations with four alternative dependent variables. Table 8a considers manufacturing from 2000 to 2005, while Table 8b provides comparable estimations for services. The first estimation in both tables examines a simple indicator variable for whether the unorganized employment share grows; the second is a similar indicator variable for whether the absolute employment level in the unorganized sector increases over the period. The indicator variables are defined in a way that retains the expected negative coefficient values.

The third estimation returns to the share change evaluated in Table 7, but measures it relative to the average value across the period for each state-industry:  $[\text{Share}_t - \text{Share}_{t-1}] /$

$\{[\text{Share}_t + \text{Share}_{t-1}]/2\}$ . Davis et al. (1996) discuss the merits of this formulation with respect to reducing the scope for outliers or mean reversion to influence our estimates. The final estimation uses this change formulation relative to average values to consider changes in employment levels across the period studied.

The coefficient patterns in Tables 8a and 8b are mostly similar to Table 7, but with a few key differences. The first difference is that growth in the overall size of the organized sector is not systematically related to absolute declines in unorganized sector employment. This is true using both the indicator variable approach and looking at employment changes directly. The organized sector's growth impact on the unorganized employment share comes primarily through growing the overall economy. This demonstrates the persistence of the unorganized sector of the Indian economy in the face of substantial organized sector growth.

On the other hand, results related to the establishment size distribution and initial entrepreneurship retain most of their patterns and statistical significance. Employment growth among large establishments in manufacturing still links to absolute declines in unorganized sector employment, in addition to the share results. Initial entrepreneurship in the organized sector robustly links to declines in both the share and levels of unorganized sector employment in manufacturing. For services, the special role for small establishments in reducing the share of employment in the unorganized sector is robustly confirmed with the alternative dependent variables. There is only a weak link, at best, to reductions in the absolute levels of employment in services. The point estimates retain their direction but the results are imprecisely estimated.

We have confirmed these patterns hold in a variety of robustness checks and extensions. First, we find similar results in unweighted estimations and when dividing the sample based upon employment levels. This stability indicates that the results are not overly dependent upon the outcomes in any one state or industry. Our estimations are robust to also controlling for initial levels of unorganized sector entrepreneurship, which themselves strongly predict unorganized sector growth. There is little change to the results regarding the establishment size distribution if excluding the entrepreneurship metric. By taking state-industries as the unit of observation, our approach does not model well the ability of workers to move across industries. Development of the organized sector for base metals, for example, may pull unorganized workers from other industries. We find similar patterns when instead using the district as the unit of observation.<sup>13</sup>

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<sup>13</sup> A number of studies have noted the role of labor regulations in the Indian economy (e.g., Besley and Burgess 2004, Ahsan and Pages 2007, Aghion et al. 2008). Dropping the state fixed effects and instead including regulations shows that states with more stringent labor regulations have had lower transition out of the unorganized sector in manufacturing.

## Conclusions and Implications

The share of workers employed in the unorganized sector is remarkably large and persistent in India. While the unorganized sector in India will never shrink to zero (as it is defined by the establishment size distribution and small establishments will always exist and be important), the unorganized sector's extreme size does appear to hold back the efficiency of the Indian economy. Understanding how the transition to organized involvement occurs is thus important for regional planning and policy choices. Understanding why the unorganized share has remained so persistent during a period when India has undergone such dramatic change is a key topic for further research; most studies have focused on cross-sectional properties, but the longitudinal dimension may be the most important feature.

Beyond documenting some new facts about the unorganized sector, this paper has identified two key points for future research. The most important launches from the covariance term in the decomposition exercises—the persistence of the unorganized sector in India's manufacturing sector is fully explained by the fact that state-industries with rising employment shares are also experiencing rising unorganized sector shares. At this point, we are unable to discern if this is a good or bad thing. One good scenario, for example, would be that the twin growth rates are both the outcomes of a particularly high rate of migration from subsistence agriculture into the unorganized manufacturing sector. This scenario is particularly plausible for India given its low urbanization rate of 30%. As India's urban population is expected to grow by 250 million persons in the next two decades, quantifying this connection and whether the big increase in urbanization will promote further persistence in the unorganized sector is important for future research. A second scenario, which we are currently investigating, is how increases in female labor force participation and entrepreneurship in India may connect with this persistence.

We need to study more from a spatial approach how the manufacturing and services sectors are embedded in the state economies to test these cross-sector features (e.g., Chakrabarti and Kundu 2009). Encouragingly, McMillan and Rodrik (2011) find positive aggregate sector reallocation features for India. We likewise need closer inspection of how new state-industry clusters emerge in India and whether they are more reliant on very small establishments than in other countries. The close link of education and infrastructure to regional growth in India, but not to unorganized sector regional transformations, are suggestive of this hypothesis. The trend growth in unorganized sector shares for modern industries within manufacturing also suggests this may be important. A better understanding of these dynamics will inform our understanding of how India's productivity develops after reforms (e.g., Bollard et al. 2011, Virmani and Hashim 2011).

We also suspect that greater attention to traditional versus modern industries may be fruitful going forward for understanding unorganized sector transitions. India today is an extremely heterogeneous landscape (e.g., Hsieh and Klenow 2009) that juxtaposes some of the world's most modern firms with some of its least developed. Multiple aspects of India's growth path (e.g., the rapid rise of services) are not part of the typical development playbook. While we examined many industry traits (e.g., capital intensity, average wage) and found them mostly uncorrelated with big adjustments in the unorganized sector share, we may have poorly reflected deeper heterogeneity in terms of production techniques within each industry. Identifying data and steps to analyze these features is important going forward.

A final conclusion from our paper's analysis is also important to note. Single grand theories for spatial development and their associated transformations are always attractive, from both a theoretical perspective and for the (over)confidence they provide in policy recommendations. The exceptional persistence of India's unorganized sector across so many industries and states, however, suggests that a single theory may not emerge to explain where these transitions take hold versus where they do not. Instead, researchers and planners may need to search for regularities that emerge within local settings similar to our establishment size distribution exercises. While these studies may require extra effort and attention to details, they are also likely to offer sounder advice.

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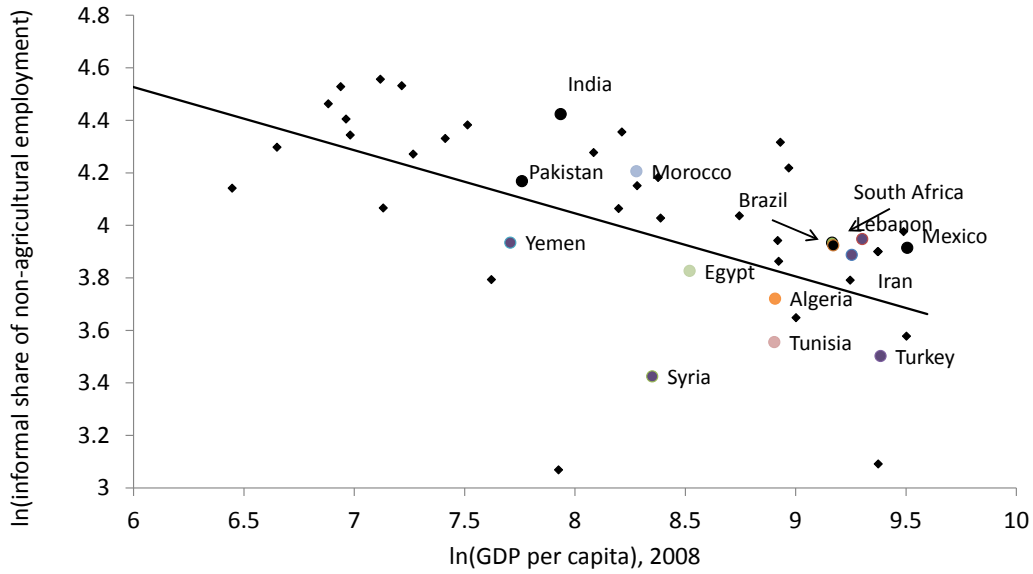
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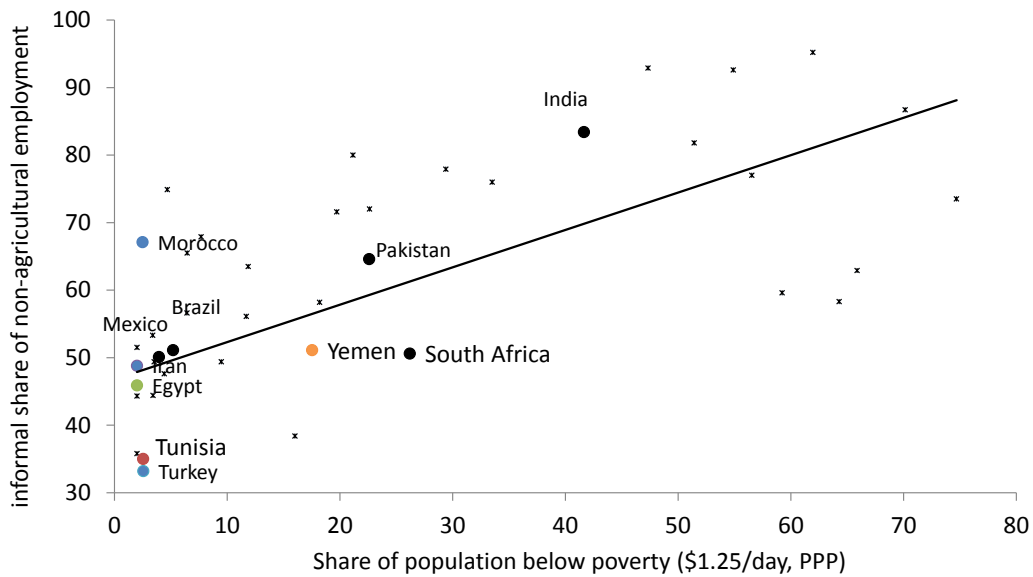


**Figure 1: Informal Jobs in South Asia**



Source: OECD, 2009. World Development Indicators, 2010.  
 Note: 48 countries with available data shown. Chart uses latest data on informal share of employment available (1995-99 or 2000-07). GDP per capita is in 2005 constant PPP international \$.

**Figure 2: Informal sectors and poverty rates**



Source: OECD, 2009. World Development Indicators, 2010.  
 Note: 45 countries with available data shown. Chart uses latest available data on informal share of employment (1995-99 or 2000-07).

Table 1a: Establishment size distribution for manufacturing

	India 1989	India 1994	India 2000	India 2005	US 1997
A. Establishment count distribution					
Unorganized tiny (1-9 employees)	0.959	0.914	0.937	0.935	0.512
Unorganized micro (10-19 employees)	0.034	0.066	0.048	0.047	0.156
Unorganized small (20+ employees)	0.000	0.012	0.010	0.012	
Organized tiny (1-9 employees)	0.001	0.001	0.001	0.001	
Organized micro (10-19 employees)	0.002	0.002	0.002	0.002	
Organized small (20-39 employees)	0.002	0.002	0.001	0.001	0.124
Organized medium (40-99 employees)	0.001	0.002	0.001	0.001	0.111
Organized large (100-499 employees)	0.001	0.001	0.001	0.001	0.084
Organized mega (500+ employees)	0.000	0.000	0.000	0.000	0.013
Total unorganized share	0.994	0.992	0.994	0.994	0.668
Total organized share	0.006	0.008	0.006	0.006	0.332
B. Employment weighted distribution					
Unorganized tiny (1-9 employees)	0.731	0.593	0.649	0.618	0.040
Unorganized micro (10-19 employees)	0.076	0.142	0.126	0.128	0.046
Unorganized small (20+ employees)	0.003	0.054	0.053	0.061	
Organized tiny (1-9 employees)	0.002	0.003	0.003	0.003	
Organized micro (10-19 employees)	0.010	0.011	0.011	0.011	
Organized small (20-39 employees)	0.019	0.018	0.014	0.015	0.074
Organized medium (40-99 employees)	0.029	0.037	0.025	0.029	0.148
Organized large (100-499 employees)	0.049	0.061	0.054	0.071	0.366
Organized mega (500+ employees)	0.081	0.081	0.064	0.064	0.326
Total unorganized share	0.810	0.789	0.828	0.807	0.086
Total organized share	0.190	0.211	0.172	0.193	0.914

Notes: Indian descriptive statistics taken from Annual Survey of Industries and National Sample Statistics. U.S. descriptive statistics taken from 1997 Census of Manufacturers. Unorganized/organized shares for United States use establishment sizes to mimic Indian definitions.

Table 1b: Establishment size distribution for services

	India 2001	India 2006	US 1997
A. Establishment count distribution			
Tiny (1-5 employees)	0.953	0.956	0.649
Other OAE (6+ employees)	0.002	0.001	
Micro (6-19 employees)	0.041	0.039	0.241
Small (20-39 employees)	0.003	0.002	0.054
Medium (40-99 employees)	0.000	0.001	0.034
Large (100-499 employees)	0.000	0.000	0.020
Mega (500+ employees)	0.000	0.000	0.003
Total unorganized share	0.955	0.957	0.649
Total organized share	0.045	0.043	0.352
B. Employment weighted distribution			
Tiny (1-5 employees)	0.748	0.727	0.090
Other OAE (6+ employees)	0.014	0.007	
Micro (6-19 employees)	0.172	0.170	0.163
Small (20-39 employees)	0.039	0.033	0.099
Medium (40-99 employees)	0.015	0.022	0.140
Large (100-499 employees)	0.011	0.013	0.258
Mega (500+ employees)	0.001	0.028	0.251
Total unorganized share	0.761	0.733	0.090
Total organized share	0.239	0.267	0.911

Notes: See Table 1a. U.S. descriptive statistics taken from 1997 Census of Services. "Own-account enterprises" (OAE) are firms that do not employ any hired worker on a regular basis.

Table 2: Employment share in unorganized sector by state

	Manufacturing				Services	
	1989	1994	2000	2005	2001	2006
Andhra Pradesh	0.79	0.69	0.78	0.76	0.81	0.76
Bihar	0.84	0.91	0.94	0.94	0.92	0.89
Chandigarh	0.33	0.66	0.69	0.22	0.58	0.12
Delhi	0.65	0.81	0.90	0.80	0.62	0.69
Goa	0.57	0.57	0.66	0.42	0.64	0.53
Gujarat	0.64	0.72	0.69	0.67	0.59	0.71
Haryana	0.57	0.48	0.58	0.58	0.67	0.75
Himachal Pradesh	0.93	0.80	0.78	0.72	0.82	0.77
Karnataka	0.80	0.78	0.84	0.80	0.72	0.61
Kerala	0.83	0.65	0.79	0.82	0.70	0.67
Madhya Pradesh	0.80	0.77	0.87	0.88	0.70	0.65
Maharashtra	0.63	0.64	0.72	0.71	0.67	0.66
Orissa	0.96	0.95	0.94	0.93	0.87	0.86
Pondicherry	0.52	0.21	0.50	0.52	0.52	0.63
Punjab	0.61	0.55	0.65	0.57	0.72	0.70
Rajasthan	0.87	0.78	0.83	0.80	0.75	0.68
Tamil Nadu	0.79	0.73	0.78	0.75	0.74	0.70
Uttar Pradesh	0.86	0.89	0.90	0.87	0.79	0.77
West Bengal	0.90	0.87	0.91	0.91	0.84	0.85
Total	0.81	0.79	0.83	0.81	0.76	0.73

Notes: See Table 1a.

Table 3a: Employment share in unorganized sector by manufacturing industry

NIC	Industry Description	1989	1994	2000	2005
15	Food products and beverages	0.85	0.83	0.84	0.82
16	Tobacco products	0.87	0.81	0.87	0.90
17	Textiles	0.82	0.82	0.82	0.82
18	Wearing apparel; dressing and dyeing of fur	0.79	0.68	0.94	0.92
19	Tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear	0.85	0.80	0.76	0.75
20	Wood and wood products, except furniture; articles of straw and plating material	0.99	0.99	0.99	0.98
21	Paper and paper products	0.52	0.52	0.57	0.66
22	Publishing, printing and reproduction of recorded media	0.73	0.73	0.82	0.77
23	Coke, refined petroleum and nuclear fuel	0.36	0.32	0.36	0.26
24	Chemicals and chemical products	0.36	0.28	0.41	0.49
25	Rubber and plastic products	0.42	0.57	0.59	0.49
26	Other non-metallic mineral products	0.83	0.82	0.84	0.76
27	Basic metals	0.09	0.22	0.24	0.19
28	Fabricated metal products, except machinery and equipments	0.78	0.81	0.86	0.83
29	Machinery and equipment, n.e.c.	0.59	0.63	0.55	0.55
30	Office, accounting and computing machinery	0.06	0.09	0.07	0.13
31	Electrical machinery and apparatus, n.e.c.	0.22	0.29	0.53	0.53
32	Radio, television, and communication equipment and apparatus	0.17	0.20	0.27	0.18
33	Medical, precision and optical instruments, watches and clocks	0.16	0.42	0.35	0.31
34	Motor vehicles, trailers and semi-trailers	0.09	0.14	0.33	0.21
35	Other transport equipment	0.21	0.26	0.28	0.39
36	Furniture, manufacturing n.e.c.	0.98	0.98	0.97	0.94
	Total	0.81	0.79	0.83	0.81
	Traditional	0.87	0.86	0.88	0.86
	Modern	0.33	0.40	0.44	0.43

Notes: See Table 1a.

Table 3b: Employment share in unorganized sector by services industry

NIC	Industry Description	2001	2006
55	Hotels and restaurants	0.75	0.71
60	Transportation and railway	0.94	0.92
61/63	Freight and cargo	0.59	0.49
64	Communications	0.92	0.95
70	Real estate	0.78	0.75
71	Renting of equipment	0.91	0.88
72	Computer hardware	0.25	0.12
73/74	Business services and research	0.72	0.76
80	Education and training	0.32	0.28
85	Health	0.76	0.63
90	Sanitation	0.99	0.93
91	Organizations	0.89	0.90
92	Media & recreation	0.57	0.53
93	Personal service activities	0.98	0.98
	Total	0.76	0.73
	Traditional	0.95	0.94
	Modern	0.60	0.54

Notes: See Table 1a.

Table 4a: District traits and unorganized employment changes

	Manufacturing 1989-2005	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)
A. Correlation with change in unorganized sector share of employment			
Log population	-0.028	-0.023	-0.002
Log population density	0.086	-0.030	0.035
Age profile	-0.030	0.007	0.021
Share of population in scheduled caste/tribe	-0.101*	-0.006	-0.047
Female labor force participation rate	-0.063	0.008	0.022
Educated worker share	0.068	0.002	-0.017
Literacy rate	0.003	-0.007	-0.032
Infrastructure: electricity access	0.009	-0.009	-0.001
Infrastructure: paved roads	-0.054	-0.121*	0.041
Travel time to nearest of India's ten largest cities	-0.065	-0.072	0.020
Strength of household banking sector	0.117*	0.071	-0.017
B. Correlation with unorganized sector log employment growth rate			
Log population	0.057	-0.007	-0.147*
Log population density	0.041	-0.002	-0.010
Age profile	0.096*	0.109*	-0.005
Share of population in scheduled caste/tribe	0.047	-0.028	0.045
Female labor force participation rate	-0.031	-0.034	0.004
Educated worker share	0.170*	0.050	-0.094*
Literacy rate	0.105*	0.073	0.032
Infrastructure: electricity access	0.126*	0.106*	0.027
Infrastructure: paved roads	-0.030	0.037	0.109*
Travel time to nearest of India's ten largest cities	-0.070	-0.142*	0.051
Strength of household banking sector	0.123*	0.130*	0.081

Notes: Table documents correlations between district traits and unorganized sector employment changes. The top panel considers the change in the unorganized sector's share of district total employment. The bottom panel considers the log growth in unorganized sector employment across the period as measured by  $\log(\text{unorganized employment end} / \text{unorganized employment start})$ . District traits in Column 1 are from the 1991 Population Census; district traits in Columns 2 and 3 are from the 2001 Population Census. District traits are expressed in log values or percentage point values as indicated. In both panels, a negative correlation indicates that the district trait is associated with a decline in relative unorganized activity across the period. An asterisk denotes a correlation is statistically significant at the 10% level.

Table 4b: Industry traits and unorganized employment changes

	Manufacturing 1989-2005	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)
A. Correlation with change in unorganized sector share of employment			
Log labor intensity	0.022	-0.075	-0.026
Log capital intensity	-0.095	0.031	
Log materials intensity	-0.065	0.051	0.040
Log average wage	0.020	0.183	-0.093
Log financial dependency	-0.063	0.025	
Log import dependency	0.067	0.093	
B. Correlation with unorganized sector log employment growth			
Log labor intensity	0.113	-0.049	-0.186
Log capital intensity	-0.054	0.058	
Log materials intensity	-0.064	0.020	0.211
Log average wage	-0.103	0.151	-0.058
Log financial dependency	0.046	-0.159	
Log import dependency	0.126	-0.003	

Notes: Table documents correlations between industry traits and unorganized sector employment changes. The top panel considers the change in the unorganized sector's share of industry total employment. The bottom panel considers the log growth in unorganized sector employment across the period as measured by log (unorganized employment end / unorganized employment start). Industry traits are measured in 2000-2001. Intensity measures are measured relative to industry sales. In both panels, a negative correlation indicates that the district trait is associated with a decline in relative unorganized activity across the period. No correlation is statistically significant at the 10% level.



Table 5: Estimations by manufacturing production functions and local unorganized sector shares

	DV: Log output in manufacturing establishment						
	India 2000 Sample					U.S. 1997 Sample	
	Full	Full	Full	Traditional	Modern	Full	Full
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log employment in establishment	0.514+++ (0.027)	0.511+++ (0.025)	0.526+++ (0.024)	0.512+++ (0.026)	0.449+++ (0.054)	0.318+++ (0.003)	0.312+++ (0.004)
Log capital in establishment	0.061+++ (0.006)	0.061+++ (0.006)	0.057+++ (0.006)	0.061+++ (0.007)	0.050+++ (0.014)	0.123+++ (0.002)	0.127+++ (0.002)
Log materials in establishment	0.508+++ (0.013)	0.509+++ (0.013)	0.504+++ (0.013)	0.505+++ (0.013)	0.565+++ (0.017)	0.607+++ (0.003)	0.610+++ (0.003)
Urbanization premium: log manufacturing employment density in district or county	0.031++ (0.013)	0.021 (0.016)	0.011 (0.016)	0.022 (0.017)	-0.001 (0.026)	0.018+++ (0.001)	0.013+++ (0.001)
Log share of local manufacturing employment in unorganized sector	-0.328+++ (0.114)	-0.298++ (0.119)	-0.104 (0.166)	-0.182++ (0.075)	-0.280+ (0.146)	0.026+++ (0.002)	0.019+++ (0.003)
Log share of local manufacturing employment that is unpaid workers			-0.266 (0.212)				
Agglomeration premium: log employment density in district- or county-industry		0.012 (0.020)	0.031 (0.022)	0.010 (0.021)	0.082+ (0.047)		0.006+++ (0.001)
Log share of local industry employment in unorganized sector		-0.149+ (0.089)	-0.049 (0.102)	-0.088 (0.065)	0.015 (0.082)		0.007+++ (0.001)
Log share of local industry employment that is unpaid workers			-0.301++ (0.140)				
Observations	215,957	215,957	215,957	192,622	23,335	367,802	341,926
Adjusted R-squared	0.852	0.852	0.854	0.837	0.955	0.975	0.973
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Estimations consider simple production functions for manufacturing establishments in India and the United States, with country and time period indicated by column headers. Indian data are taken from Annual Survey of Industries and National Sample Statistics; U.S. data are from 1997 Census of Manufacturers. Metrics for Urbanization and Agglomeration Premiums are built upon the local density of manufacturing and own-industry employment, respectively. Metrics for shares of local activity in the unorganized sector use definitions shown in Table 1a; the U.S. estimations use the establishment size distribution to mimic the unorganized sector definitions for India. Estimations report standard errors clustered by district or county, include industry fixed effects, and weight Indian observations by sample weights. + significant at 10% level; ++ significant at 5% level; +++ significant at 1% level.

Table 6: Decomposition of changes in unorganized sector employment share

	Manufacturing 1989-2005	Manufacturing 1989-1994	Manufacturing 1994-2000	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)	(4)	(5)
<b>A. Full unorganized sector change</b>					
Unorganized employment share start	0.810	0.810	0.789	0.828	0.761
Unorganized employment share end	0.807	0.789	0.828	0.807	0.733
Unorganized employment share change	-0.003	-0.021	0.039	-0.022	-0.028
<b>B. Balanced state-industry panel for decomposition</b>					
Unorganized employment share start	0.811	0.810	0.792	0.828	0.761
Unorganized employment share end	0.813	0.790	0.833	0.807	0.733
Unorganized employment share change	0.002	-0.021	0.041	-0.021	-0.028
<b>C. Decomposition</b>					
Within state-industry component	-0.014	-0.023	0.007	-0.020	-0.020
Between state-industry component	-0.052	-0.030	-0.017	-0.027	0.001
Covariance term	0.068	0.033	0.051	0.026	-0.009
Total	0.002	-0.020	0.040	-0.021	-0.028

Notes: Table decomposes changes in unorganized sector employment shares. Column headers indicate sectors and time periods. Decomposition technique follows Foster et al. (2001) and Baily et al. (1992). The within component represents changes in unorganized sector shares within state-industries with state-industries weighted by initial employment shares for the Indian economy. Negative values indicate that state-industries tended to have declining unorganized shares when weighted by initial employment. The between component represents changes in employment shares across state-industries interacted with the initial deviation of state-industries from the national unorganized sector share. Negative values indicate employment tended to be reallocated towards state-industries that had lower initial unorganized sector shares. The covariance component term represents the interaction of changes in unorganized sector shares for state-industries across the period with changes in employment shares for state-industries across the period. Positive values indicate that fast growing state-industries also experienced rising unorganized sector shares. The three components by definition sum to the total change in unorganized sector share for India.

Table 7: Estimations of changes in employment shares in unorganized sector by state-industry

	DV: Change in unorganized sector's employment share for state-industry			
	Manufacturing 1989-1994	Manufacturing 1994-2000	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)	(4)
Employment growth in organized sector for state-industry across the time period relative to starting total employment	-0.074+++ (0.028)	-0.084+++ (0.032)	-0.120+++ (0.040)	-0.159+++ (0.015)
Indicator for employment growth in organized sector being greatest in small establishments (39 or fewer employees)	0.022 (0.021)	-0.027 (0.020)	-0.003 (0.020)	-0.049+++ (0.019)
Indicator for employment growth in organized sector being greatest in large establishments (100 or more employees)	-0.047++ (0.020)	-0.035+ (0.020)	-0.072+++ (0.019)	-0.003 (0.033)
Indicator for entrepreneurship level in organized sector in state-industry at the start of period being above median	-0.010 (0.019)	-0.005 (0.020)	-0.043++ (0.018)	0.008 (0.019)
Observations	563	563	563	525
Adjusted R-squared	0.148	0.187	0.217	0.368
State and industry fixed effects	Yes	Yes	Yes	Yes

Notes: Estimations consider changes in state-industry employment shares in the unorganized sector, with industry group and time period indicated by column headers. Negative values indicate a decline across the period in the employment share of the unorganized sector for the state-industry. Explanatory variables are changes in industrial conditions of the organized sector. Employment growth in the organized sector is measured relative to the total employment in the state-industry at the start of the period. Indicator variables model whether employment growth in the organized sector is greatest among small or large establishments, with employment growth being greatest among establishments with 40-99 workers being the baseline. An indicator variable models whether initial entrepreneurship rates in the organized sector are above the median for state-industries in the survey year. Estimations report robust standard errors, include state and industry fixed effects, and weight observations by the log initial employment for the state-industry combining the unorganized and organized sectors. + significant at 10% level; ++ significant at 5% level; +++ significant at 1% level.

Table 8a: Extensions of Table 7 with alternative dependent variables for manufacturing, 2000-2005

	Indicator variable for increase in unorg. sector's employment share	Indicator variable for increase in unorg. sector's employment level	Change in unorg. sector's employment share relative to average values	Change in unorg. sector's employment level relative to average values
	(1)	(2)	(3)	(4)
Employment growth in organized sector for state-industry across the time period relative to starting total employment	-0.199+++ (0.049)	0.022 (0.051)	-0.377+++ (0.101)	0.091 (0.099)
Indicator for employment growth in organized sector being greatest in small establishments (39 or fewer employees)	-0.047 (0.058)	0.024 (0.061)	-0.027 (0.056)	-0.047 (0.090)
Indicator for employment growth in organized sector being greatest in large establishments (100 or more employees)	-0.219+++ (0.052)	-0.085 (0.054)	-0.119++ (0.050)	-0.135+ (0.076)
Indicator for entrepreneurship level in organized sector in state-industry at the start of period being above median	-0.075+ (0.044)	-0.105++ (0.046)	-0.096+ (0.050)	-0.174++ (0.071)
Observations	563	563	563	563
Adjusted R-squared	0.178	0.092	0.184	0.127
State and industry fixed effects	Yes	Yes	Yes	Yes

Notes: See Table 7.

Table 8b: Extensions of Table 7 with alternative dependent variables for services, 2001-2006

	Indicator variable for increase in unorg. sector's employment share	Indicator variable for increase in unorg. sector's employment level	Change in unorg. sector's employment share relative to average values	Change in unorg. sector's employment level relative to average values
	(1)	(2)	(3)	(4)
Employment growth in organized sector for state-industry across the time period relative to starting total employment	-0.192+++ (0.020)	0.028 (0.021)	-0.360+++ (0.032)	0.109++ (0.043)
Indicator for employment growth in organized sector being greatest in small establishments (39 or fewer employees)	-0.240+++ (0.052)	-0.039 (0.049)	-0.085+ (0.045)	-0.080 (0.067)
Indicator for employment growth in organized sector being greatest in large establishments (100 or more employees)	-0.097 (0.079)	0.013 (0.071)	-0.046 (0.084)	-0.049 (0.106)
Indicator for entrepreneurship level in organized sector in state-industry at the start of period being above median	-0.030 (0.046)	-0.014 (0.044)	-0.056 (0.044)	-0.012 (0.067)
Observations	525	525	525	525
Adjusted R-squared	0.283	0.285	0.455	0.405
State and industry fixed effects	Yes	Yes	Yes	Yes

Notes: See Table 7.