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Female Business Ownership and Informal Sector Persistence

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Abstract

The informal sector in India has been exceptionally persistent over the past two decades. Is this a bad thing? Not necessarily. This paper shows that a substantial share of the persistence in India's unorganized manufacturing sector is due to the rapid increase in female-owned businesses. Had women's participation remained in the proportion to male-owned businesses that was evident in 1994, the unorganized manufacturing sector would have declined in share rather than increased. Most of these new female-owned businesses are opened in the household and at a small scale, about a third of the size of a typical male-owned business in the informal sector. Yet, it appears that these businesses offer economic opportunities not otherwise present and a transition for some women from unpaid domestic work.

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1. Introduction

The unorganized sector in India is exceptionally persistent, despite the efforts by many policy makers to reduce it. For example, the employment share in the unorganized sector of manufacturing rose from 80.3% in 1994 to 81.5% in 2005. A useful comparison point for India is the urbanization rate, which is also a policy priority. During this same period, the urbanization rate of Indian manufacturing rose by 8%, from 33% to 41% (Ghani, Grover, and Kerr 2011). Thus, despite all of the exceptional changes to the Indian economy over the past 20 years and its overall growth, the relative size of the unorganized sector has not declined in the least. While the organized sector has grown over the past two decades, the unorganized sector has kept pace.

Understanding what lies behind this persistence is very important, as international comparisons like Figures 1 and 2 show that India has a relatively large informal sector for its stage of development. (As described in greater detail below, establishments in the unorganized sector in India are unregistered, do not pay taxes, and are generally outside the purview of the state, so this group closely parallels common discussions and definitions of the informal sector.) Hsieh and Klenow (2009, 2013) also describe India's skewed employment concentration towards small firms that lack strong growth prospects. Informal sectors are frequently 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 unorganized sector is not keeping pace with the organized sector (Kathuria et al. 2010).

This account sounds quite negative, and indeed there are many ways in which the Indian economy could function better. This study, however, adds a silver lining to the persistence of the unorganized sector. As we document below, virtually all of the persistence in employment and establishment counts for the unorganized sector from 1994 to 2005 was caused by a rapid increase in the share of women-owned businesses in India. Expansion of the economic role of women is highly desired, and women's participation in the workforce and business ownership is a metric on which India sorely lags its peers. Most women-owned enterprises enter the unorganized sector at a very small scale, and they are typically based out of the household. Thus,

achieving goals to promote women's participation—especially as business owners and entrepreneurs—may have a medium-term consequence of expanding the unorganized sector.[1]

In an earlier paper, Ghani, Kerr, and O'Connell (2013) study unorganized-to-organized sector transitions in India that have occurred since 1989 at the state-industry level for manufacturing. This earlier work undertakes decomposition exercises of how sector transitions occur and reveals an interesting pattern on which this study builds. These decompositions show that state-industries generally exhibit declining unorganized sector shares when weighted by initial employment, and that employment generally flows towards state-industries with lower initial unorganized sector shares from places with high initial shares. Thus, both of the core "within" and "between" components of decompositions contribute to a shrinking unorganized sector. Instead and quite remarkably, the overall persistence of the unorganized sector is fully explained by the fact that state-industries that are rapidly growing are also simultaneously becoming increasingly informal (the "covariance" term in these types of decompositions).

It is difficult to interpret this covariance term—whether it is good or bad—without knowing why rapidly growing places are also becoming more informal (Gunther and Launov 2012). One good scenario, for example, would be that the twin growth rates are both the outcomes of a particularly high rate of migration from non-employment into the unorganized manufacturing sector. In such a scenario, the persistence of the unorganized sector is likely a good thing as it represents workers obtaining higher incomes and better livelihoods than what would otherwise be possible. An example of a bad scenario would be if growth of the local manufacturing base was pushing workers out of better jobs in the organized manufacturing sector. Such a scenario might result from worsening policy environments that penalized organized sector firms and made informality a more attractive option.

This paper does not attempt to fully explain this "covariance" feature, but it does show that at least one positive scenario is occurring and underlying the persistence observed. We demonstrate that the rise in women-owned business in India plays an important role for the persistence of the unorganized sector in Indian manufacturing. As one example, approximately

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[1] More broadly, most new enterprises in developing economies are created in the informal sector, which contributes to persistence (e.g., Schoar 2009, Ardagna and Lusardi 2008). This cautions against a pure policy focus on the single metric of the informal sector's size.

84% of the net change in employment in the unorganized manufacturing sector from 1994 to 2005 is due to the increased role of women-owned businesses. Had women's ownership rates remained in proportion to their levels in 1994 relative to male-owned firms, the unorganized share of manufacturing employment would have fallen to 79.3% by 2005, instead of increasing to 81.5%. While this counterfactual difference is small in absolute terms, it would represent meaningful progress towards reducing informality. We also show district-level regressions that indicate that this link is present when exploiting variations across districts within Indian states and accounting for many traits of districts (e.g., size, income levels, education levels, population growth rates). Places where women have increased most their business ownership have also had stronger persistence in the unorganized sector. The relationship is evident, but also significantly weaker, in the services sector. The relationship holds in simple instrumental variable estimations that combine the initial industry composition of a district with the national change for each industry in the women-owned business share.

The second half of the paper then evaluates whether or not the women who are leading these new unorganized sector firms have better prospects than they did before they entered the manufacturing sector. Our data do not permit us to do this at the level of the individual business owners, but we develop suggestive evidence from aggregate survey tabulations. We first note that the female-owned businesses are typically household based and that they are smaller and less productive than male-owned businesses. Moreover, the growth in the female ownership rate is associated with deteriorations in these ratios. That is, the additional entry is increasing the raw gap between male- and female-owned establishments. This is a simple consequence of most of these new entrants occurring among small, household-based establishments. Yet, even at the small entry sizes, these female-owned establishments appear to make an important step forward in economic participation. Using household-based surveys from the Census, it appears that these new entrants are moving out of unpaid domestic work.[2]

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[2] With further development, it may be that paid employment positions emerge in the organized sector that are superior to owning a small business in the unorganized sector. We cannot address this issue in this study. We only depict how the steps that women are taking with respect to business ownership in the unorganized sector are better than other opportunities available to the women at the time of their choices.

This study contributes to several academic literature strands. Most directly, our study contributes to the literature on the informal sector that is reviewed comprehensively by Schneider and Enste (2000), Guha-Khasnobis et al. (2006), and Kanbur (2009, 2011).[3] Our paper documents how gender advancement can help explain persistence in the Indian context, and we hope that this link can be evaluated in other countries, too. Our work also builds upon prior studies of gender differences in entrepreneurship (e.g., Estrin and Mickiewicz 2011). Parker (2009) and Klapper and Parker (2011) offer a comprehensive review of this literature and appropriate references. Existing research mostly employs cross-country studies of gender ratios in entrepreneurship (e.g., Minniti 2010, Minniti and Naudé 2010) or provides insights into gender-based network linkages (e.g., Ghani, Kerr, and O'Connell 2011c). This paper traces out a related economic consequence of female entrepreneurship in developing economies. These contributions finally constitute an important input to the growing body of work on entrepreneurship and economic advancement in developing countries (e.g., Ardagna and Lusardi 2008, Khanna 2008, Schoar 2009, Klapper et al. 2010).

These findings can also aid Indian policy makers in the evaluation of economic trends. Despite significant economic advancement since liberalization began, the role of women in the Indian economy still lags well behind that of advanced economies (e.g., Dunlop and Velkoff 1999, Mammen and Paxson 2000, World Bank 2011). Cross-country data from the World Bank Entrepreneurship Snapshots find that India's rate of entrepreneurship is lower than its stage of development would suggest; similar comparisons also highlight that India's gender ratio among entrepreneurs is lower than its peers. This dual under-performance has cultural and economic antecedents, but it is starting to change. Women are making economic gains in the Indian economy, and further progress represents a tremendous growth opportunity for the country. This paper identifies how this process can contribute to persistence of the informal sector, which is an important consideration for how policy makers view and treat the informal sector.

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[3] Work regarding India includes Kundu (1999), Chakrabarti and Kundu (2009), Nataraj (2011), Kar and Marjit (2009), Amin (2010), Kathuria et al. (2010), Siggel (2010), Ghani, Kanbur, and O'Connell (2013), and Ghani, Kerr, and O'Connell (2013). Work regarding other developing economies includes Chen et al. (1999), Chen (2001), Schneider (2002), Maloney (2004), Gulyani and Talukdar (2010), and Kweka and Fox (2011). Basu et al. (2011) offer a recent theoretical model of the formal-informal sectors.

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 provides detailed tabulations of the role of women-owned businesses in the unorganized sector and their role in generating persistence in the unorganized sector's share. Section 4 considers empirical evidence of this link using variations across Indian districts. Section 5 discusses comparative evidence on the other opportunities available to these women that are choosing to open businesses in the unorganized sector. The final section concludes and discusses implications from this work.

2. Indian Data for the Organized and Unorganized Sectors

We employ establishment-level surveys of manufacturing and service enterprises carried out by the Government of India. These surveys are repeated cross-sections of the Indian economy. Our manufacturing data are taken from surveys conducted in fiscal years 1994, 2000, and 2005. The service sector has only more recently been surveyed in fiscal years 2001 and 2006. In all five 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.[4]

We first define and characterize the distinction between the organized and unorganized sectors in the Indian economy. These distinctions relate to establishment size and sector. 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 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.

Establishments in the services sector, regardless of size or other characteristics, are not required to register and thus are all officially unorganized. Thus, there is no simple legal distinction between unorganized and organized activity as in manufacturing. There are various

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[4] 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, Kerr, and O'Connell (2011b). Dehejia and Panagariya (2010) and Ghani, Kerr, and O'Connell (2011b,c) provide a detailed overview of the services data and its important characteristics.

existing methodologies to comparably differentiate small-scale, autonomous establishments from larger employers which constitute the organized sector, as generally defined. Following Ghani, Kerr, and O'Connell (2013), 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. The results that we show below are robust to varying the demarcation point 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. These surveys are the foundation for many published reports on the state of Indian businesses and government agency monitoring of the Indian economy. The typical survey collects data from over 150,000 Indian establishments. In this respect, the surveys are comparable to the Annual Survey of Manufacturing conducted in the United States, with the Indian sampling frame being about three times larger.

Establishments are surveyed with state and four-digit National Industry Classification (NIC) stratification. The survey provides sample weights that we use to construct population-level estimates of total establishments and employment spatially and by industry. We use state and industry variation in our descriptive analyses, and our empirical regressions consider district-level variation. Districts are administrative subdivisions of Indian states or territories that provide meaningful local economic conditions. The average district size is around 5,500 square kilometers—roughly twice the size of a U.S. county—and there is substantial variability in district size (standard deviation of ~5,500). Indian districts can be effectively considered as self-contained labor markets.

We consider a sample of 20 states that 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. Across our state sample, there are 514 districts. Due to changes in district definitions (e.g., bifurcations, combinations), we build a

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concordance of district definitions that is longitudinally consistent. This concordance reduces the number of unique districts to 368. This number of unique areas is then reduced slightly to 325 when we exclude districts that have less than one million in population in the 2001 census or fewer than 50 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.

The NSSO surveys the ownership type of each establishment. Establishments can be listed as male proprietary, female proprietary, other owned, cooperative, household partnership, multi-household partnership, private LLC, and unknown. We focus primarily on the establishments listed as either male proprietary or female proprietary. As tabulated below, these two groups constitute more than 95% of establishments in the unorganized sectors for manufacturing and services. These questions regarding the gender of business ownership are an outcome of the survey and not a factor in the stratification design. Our business ownership statistics include establishments of all ages. The gender distinction is only available starting in 1994, which defines the first period of our study.

Unfortunately, the ASI does not collect the gender of business owners for establishments in the organized manufacturing sector. This survey limitation prevents us from studying women's business ownership across the full manufacturing sector, with our focus instead on the stricter definition of women's business ownership in the unorganized sector. As described below, the unorganized sector accounts for over 99% of establishments, over 80% of employment, and about 20% of output in manufacturing. Thus, for the first two dimensions of establishments and employment, the potential differences between our calculations based on the unorganized sector only versus what we would have calculated across the whole distribution are very small. For output, persistence of the unorganized sector is not as meaningful given that it is a small minority share. We thus focus on employment and establishments in this paper.

3. Tabulations of Women's Business Ownership by Sector

Tables 1a-1b tabulate the organized and unorganized distributions for manufacturing. Table 1a considers employment levels in establishments, while Table 1b considers establishment counts. The tables follow a similar format, with Panel A providing shares, Panel B providing baseline

aggregates, and Panel C documenting some specific statistics with respect to household-based businesses. The first three columns are for our three survey years, while the last two columns document relative growth from 1994 for surveys undertaken in 2000 and 2005.

In Table 1a, the top two rows show the relative persistence of the unorganized sector. While both sectors have grown, as is evident in Panel B, the unorganized sector has more than kept pace such that the unorganized sector's share of employment has increase from 80.3% in 1994 to 81.5% in 2005. The third through fifth rows of Table 1a disaggregate the unorganized sector's share by organizational form. What is striking is the substantial increase in female-owned business from 9.2% of employment in 1994 to 18.7% of employment in 2005. The last column shows how strong this growth is compared to the rest of the sector.

How big is share growth of 9.5%? One can depict it in several ways. First, as a simple calculation of net changes, 83.9% of the net growth in employment in the unorganized sector from 1994 to 2005 is due to increases in employment in female proprietorships (i.e., (7,555-3,180)/(32,866-27,649)). A simple counterfactual analysis can also help depict the results with respect to persistence. In 1994, female-owned proprietorships in the unorganized sector were 13.9% of the male-owned proprietorship stock. Had this proportion remained through 2005, the net increase in the unorganized sector's employment level would have been 3.3%, compared to 18.9%. Under this scenario, the sector share in 2005 would have also fallen to 79.3% rather than the 81.5% observed. (The reason why this change of 2.2% is less than the 9.5% is because most of the reclaimed share would be reallocated to male-owned unorganized businesses rather than the organized sector.)

While it is unrealistic that there would have been no other change in the other organization forms absent the increase in female-owned businesses, this procedure does not necessarily overstate or understate the actual counterfactual change. It could have been that male-owned businesses in the unorganized sector would have increased more than they did in order to meet customer demand, suggesting that this example overstates the role of women-owned businesses in persistence for the unorganized sector. But it also could have been that women-owned businesses have inter linkages with male-owned businesses (e.g., customer/supplier relationships) that helped increase the number of male-owned businesses, in which case this counterfactual scenario understates the role of female-owned businesses. The

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small household-based nature of the female-owned businesses that we describe next suggests that the counterfactual depiction's assumption of limited interaction is not too far off.

Panel C of Table 1a highlights the important role of household-based businesses in these patterns. Approximately 90% of female-owned businesses are based out of the home rather at an independent facility. This share is constant from 1994 to 2005, so that most of the growth in the unorganized sector share in Panel A is coming through increased business penetration at the household level.

Table 1b documents an even stronger story when using the evolution of establishment counts. In Indian manufacturing, over 99% of establishments are unorganized, most with fewer than five workers. This unorganized sector share is strikingly large. Of course, given that the definition is based upon establishment size, we would never expect the unorganized sector share to be zero. But the skewness in the Indian distribution is much more pronounced than in other countries. Ghani, Kerr, and O'Connell (2013) calculate, for example, that only 51% of U.S. manufacturing establishments have fewer than ten employees, compared to about 93% in India. From an establishment size distribution perspective, India has an extreme concentration of very small establishments, as many others have noted (e.g., Hsieh and Klenow 2009, 2013).

Without employment weights, a household-based establishment counts the same as 100-person facility. Given that female-owned businesses are more prominent in households, this shift in focus leads to a much larger share adjustment. Female-owned business account for 36.4% of Indian manufacturing establishments in 2005, up from just 16.8% in 1994. The increase in female-owned businesses accounts for 86% of the increase in unorganized sector firm counts across the period. Given the organized sector's very small share of establishment counts, the persistence measure remains above 99% if the trend in female-owned businesses is kept at the 1994 ratio to male-owned businesses.

Tables 2a-2b provide a similar depiction for the service sector. As noted in the prior section, we are mimicking an organized/unorganized division in the services sector using a cut-off of five employees. Using this simple cut-off, the unorganized sector would still account for about 75% of services employment in 2001, well above the comparable 9% for the United States. Thus the same skewed concentration of Indian employment and establishments in small enterprises that is observed in manufacturing is again present. The share of services in the

unorganized sector declines from 2001 to 2006. Our panel is unfortunately too short to identify whether this decline is a short-term fluctuation (similar to 2000 to 2005 declines in manufacturing in Table 1a) or part of a long-term trend.

Looking at the relative growth of female- and male-owned businesses, one sees larger increases for female-owned businesses. This parallels what we observe in the manufacturing sector. However, the differences in the services sector are not very strong. Moreover, they are somewhat obscured by the even larger increases in organizational categories where we do not observe the gender of the business owner (e.g., cooperatives). Excluding these other categories, women-owned businesses account for 27.7% of the net growth in the services sector unorganized employment, well above their baseline share. Thus, while we see elements in the services sector of increased women's business ownership contributing to the persistence of small-scale businesses, the pattern is only suggestive and substantially weaker than in manufacturing.

4. Variation across Districts and Industries

We turn now to describing traits of places and industries that correlate with increases in female business ownership in the unorganized sector. As a reference, App. Table 1a-1b lists the states that are in our sample, the change in their organized sector shares, and the changes in their unorganized sector shares. App. Tables 2a-2b provide statistics by two-digit NIC industry in manufacturing and services, respectively.

Table 3a shows correlations of unorganized sector changes with district-level traits taken from the 1991 and 2001 Population Censuses. We show traits from the district level to maximize the number of observations and the granularity in local conditions. Column headers indicate sector and time period, and district traits are measured at the start of each time period. We consider the univariate correlation to several factors that have been found important for India's spatial development by prior work. Population and population density are natural baselines. We next model the district's age structure as the ratio of working age population to non-working age population. This ratio relates to the demographic dividend often discussed in 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 (e.g., Lall 2007, Amin and Mattoo 2008). 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. Spatial locations relative to major population centers are frequently found to be important. 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 as a measure of physical connectivity and across-district infrastructure.[5] We finally model the strength of the household banking sector for each district, the district's urbanization rate, and the district's average income per capita.

Table 3a finds a positive correlation of better education and infrastructure with increases in the business ownership rates of women. These results correspond to several recent studies of India that have found important roles in more rigorous frameworks for education and infrastructure in explaining women's entrepreneurship (e.g., Mukim 2011, Ghani, Kerr, and O'Connell 2011a,b). The final three rows show that increases in women's business ownership are occurring most in more urban and wealthier areas of India.

Table 3b provides a similar analysis of industry-level traits. The results are much sharper than the district correlations in Table 3a. Industries that are conducive to small, household-based establishments have seen the most substantial increases in the ownership rates of women. Rather than expanding into industries where they hold a smaller presence, the growth in women's ownership is strongly associated with women expanding their role in sectors where they have a tradition of activity.

With this background, we measure by district the share of unorganized sector activity (employments or establishment counts) that is held within women-owned businesses. For this calculation, we form the denominator through businesses where we know the gender of the owner (i.e., excluding the small share of activity in other categories). We also calculate the change in the size of the unorganized sector. For this work, we only consider the manufacturing sector. Figure 3 shows that the trend observed for India as a whole in our tabulations is present in the districts. The slope of the trend line is 0.097 (0.046).

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[5] These are Ahmedabad, Bangalore, Bhubaneshwar, Chennai, Delhi, Guwahati, Hyderabad, Kolkata, Mumbai, and Patna. Distances are calculated based on data on India's road networks gathered using GIS software.

Table 4 reports results of a cross-sectional regression of the form,

$$\Delta UnorgSectorShare_d = \beta \Delta UnorgSectorWomenOwnership_d + \eta_s + \gamma X_d + \varepsilon_d,$$

where d indexes districts. The outcome variable is the change in unorganized sector share of activity for district d. The key explanatory variable is the change in the share of unorganized sector firms that are owned by women. We include in regressions a vector of state fixed effects to control for broad differences across states in terms of the economic development and growth rates. These fixed effects also control the large variation that exists across states in how integrated women are into the local economy. Finally, we include in some specifications district-level control variables that are described below. Estimations weight district observations by an interaction of the log of district population, have 325 observations, and report robust standard errors.

The first three columns of Table 4 consider the persistence of employment levels, and we define the core regressor using employment shares for women-owned businesses as well. Panel A leaves the variables in raw shares, while Panel B considers shares expressed in unit standard deviations. We find a positive elasticity that is statistically significant at a 10% level. A 10% increase in the share of unorganized sector businesses owned by women is correlated with a 1% increase in the share of the unorganized sector overall in the district. The coefficient without the state fixed effects is 0.132 (0.074) for Panel A. Thus, the macro pattern that we observe for manufacturing is also exhibited using variations across districts within states.

The second column shows that these results hold when including as control variables a variety of district traits measured in the 2001 Census. These covariates include log population, log population density, literacy rates, age profiles, a composite infrastructure index, the strength of household banking, travel time the nearest large city, income per capita, and the urbanization rate. These covariates sharpen the estimation slightly for our core regressor, but they have fairly limited additional power, similar to persistence laid out in Ghani, Kerr, and O'Connell (2013). The third column show similar stability to including the population growth of the district.

Columns 4-6 consider instead the persistence of establishment counts. The coefficients in these columns are substantially smaller in Panel A given the reduced variation for the establishment counts in the outcome variables (i.e., the unorganized sector is a very large share

across the board), and the increased spread in the explanatory variable (i.e., women's share of establishments can increase or decrease much faster than the employment share). The economic magnitudes in Panel B, however, are very comparable. These estimates are precisely measured, with a 10% increase in the share of unorganized sector businesses owned by women being correlated with a 0.1% increase in the share of the unorganized sector overall in the district.

The relationships measured in Table 4 and Figure 3 could be due to reverse causality (e.g., places that could not transition well into more formal sector employment drew women into local business ownership) or omitted factors. To provide some additional assurance in the patterns and our interpretation of them, Table 5 reports instrument variable estimations. We instrument for the actual changes in the share of unorganized sector businesses owned by women with the share change that would have been expected due to the industry mix initially present in the district and the national rates by industry of female ownership. Using the 1994 industry distribution, we first calculate the expected rate of women-owned businesses in the district based upon national rates by industry of women's ownership in 1994. We then calculate the expected rate in 2005 by combining the 1994 industry distribution (held fixed at its initial level) with the national rates by industry of women's ownership in 2005. The changes in these expected values for districts serve as the instrument for actual changes observed.

The first stage is quite strong with a coefficient of 0.68 (0.13) and F-statistic of 27.2. Table 5 shows that the second stage results are somewhat stronger than those estimated in least squares, although one would generally accept that the least squares coefficients are not statistically different. One possible reason for the potential downward bias in the least squares estimations is that the surveys possess measurement error with respect to the changes in female-ownership shares, but other explanations may exist. The overall message of Table 5 is that the relationship that we identify at the aggregate level and in district changes continues to hold with basic instrumental variable corrections.

5. Comparison with Other Opportunities

The above empirical analyses support the overall notion that increases in women's business-ownership are associated with a more persistent unorganized sector. Given that the majority of these new businesses are household-based and of small scale, this link is intuitive (even if its

policy implications are not). This section turns to the challenging question of evaluating if this pattern represents advancements for women. This notion has been somewhat implicitly held through the discussions, but it should be delineated more carefully. Recent work stresses the potential heterogeneity of businesses and opportunities in the unorganized sector and how that can influence policy perspectives (e.g., Gunther and Launov 2012).

Table 6 begins by comparing women-owned business in the unorganized sector to those owned by men. In Panel A, we present the average values for five metrics over the 1994-2005 period by gender and their ratio. Women-owned businesses have about 18% of the output or shipments of their male counterparts, 60% of the employment, and 32% of the asset base. It is clear that women-owned businesses are typically smaller. The last two columns further show that they are less productive and capital intensive on a per employee basis. Panel B shows these ratios over time. The ratios for shipments and employment have declined from their 1994 values to 2005, while fixed assets has been stable.[6] The labor productivity measure has also declined. Capital intensity improved, but only because average employment declined.

Thus, the rapid expansion in business ownership for women has been at a very small business size that widened the gap between women- and male-owned enterprises in the unorganized sector. This trend is important to keep in mind while evaluating the increased

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[6] Appendix Table 3a documents trends in characteristics of the average female-owned unorganized enterprise changed from 1994 to 2005, relative to the trend in male-owned unorganized enterprises. There is almost no change in real output of the average female-owned proprietorship over the time period, whereas male-owned proprietorships nearly doubled in output (not conditioning on other inputs). The average size of female enterprises fell slightly over the time period, relative to male-owned enterprises that are larger on average in any given period and whose average size remained stable. In terms of asset values, female-owned businesses saw a large increase in the value of fixed assets, although this is not as large as the increase in fixed assets among the average male-owned enterprise. Labor productivity similarly increased among both female- and male-owned enterprises, although the differential between the two groups grew during the time period. At the same time, women-owned businesses remained concentrated as household-based businesses (94% of establishments in any given year) whereas male-owned businesses increasingly located production outside the household (from 70% of businesses within the household in 1994 to 61% in 2005). Appendix Table 3b shows the employment size distribution within the unorganized sector for male- and female-owned enterprises. The largest within-class growth among female-owned businesses occurred in the one-employee size category (both in terms of growth rate, and number employed), underlying the fall in average establishment size shown in Appendix Table 3a. For male-owned enterprises, the largest growth in both share and levels was in the 11+ size class—overall suggesting distinctly different net growth patterns in female- versus male-owned enterprises over this period. Ghani, Kanbur, and O'Connell (2013) provide more details on raw values within each survey.

business ownership for women. The extensive margin of entrants is at a very small scale—in 2005, perhaps a third of the size of the typical unorganized sector business—and so the trend by itself is not sufficient evidence for a positive outcome.

To evaluate this second piece, Table 7 presents the breakdown of employment shares and mean wages calculated using microdata from five rounds of the NSSO's household-level Employment-Unemployment survey; the sampling frame comprises a representative sample of the Indian population and aggregate figures are calculated based on the sampling weights provided with the data. These figures tabulate the share of women engaged across labor force activity types (as wage worker or own-account enterprise workers) and sectors (agriculture/mining, manufacturing, services, and unpaid domestic duties). We note that the wage point for OAE work in manufacturing, which is the closest parallel for many women business owners, is at the low end of the scale compared to other major activity types throughout the period covered. Thus it appears likely the case that participation in unorganized manufactures is a stepping stone for women who would not otherwise work.

Our work and tabulations in this regard complement other micro-level studies of female entrepreneurs in the informal sector. Female informal sector workers cite several positive reasons for engaging in small-scale activity (e.g., social prestige and "white-collar" type jobs; flexibility, self-direction and the ability to work from home), and the opportunity to earn income without facing discrimination and harassment often found in the formal sector (Geetika et al. 2011, Williams and Gurtoo 2011). However, the many drawbacks to informal sector activity should not be overlooked: low wages and bargaining power, irregular work and few labor protections, and lack of credit and assets, among others (Mohapatra 2012). The conclusion from this work is that these female-owned businesses represent a solid opportunity for advancement but cannot serve as the ultimate goal for women's role in the economy.

6. Conclusions

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

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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.

This study makes a very simple contribution. While the unorganized sector has been remarkably persistent over the past, we describe how much of this persistence is due to increased ownership by women of firms in this sector. Increased women's participation in economic activities is celebrated in most circles and seen as an important stepping stone for further advancement at the individual and national levels (e.g., Duflo 2005, 2011, World Bank 2008, 2011, 2012). Our work documents that this increased participation comes at an establishment scale and magnitude that is mostly responsible for the persistence of India's informal sector.

This is a stark trend, and we suspect that it is true for other developing countries as well. Our work thus highlights the importance for policymakers to understand that the informal sector is dynamic and actively changing among gender lines. Thus, new policies aimed at affecting the informal sector need to take into account the increasingly female constituent base among both workers and entrepreneurs. Likewise, policy efforts that encourage female entrepreneurship—either directly or indirectly through avenues like infrastructure investment—will also be influencing the relative size and persistence of the informal sector.

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Figure 1: Informal Jobs in South Asia
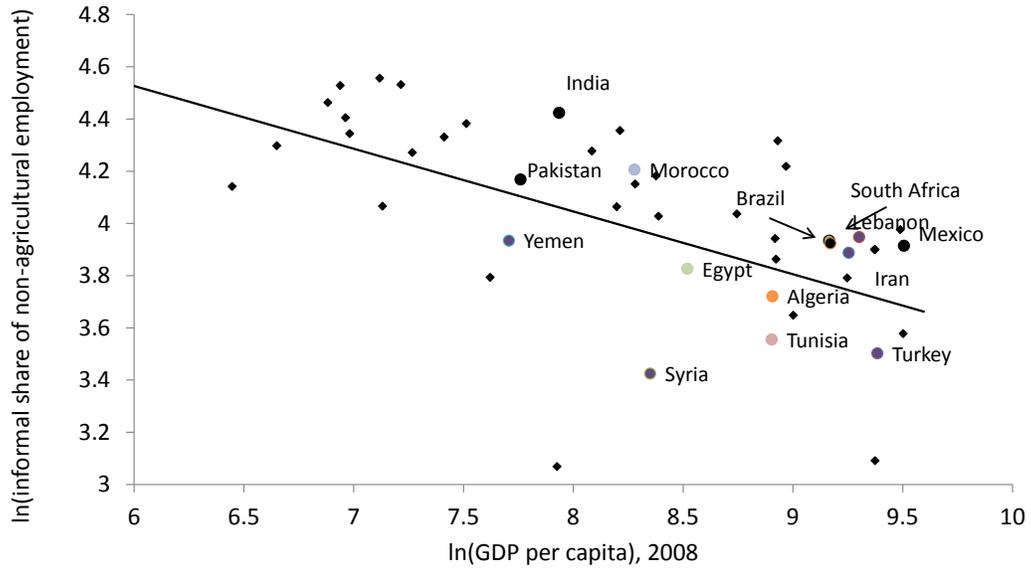
Figure 2: Informal sectors and poverty rates
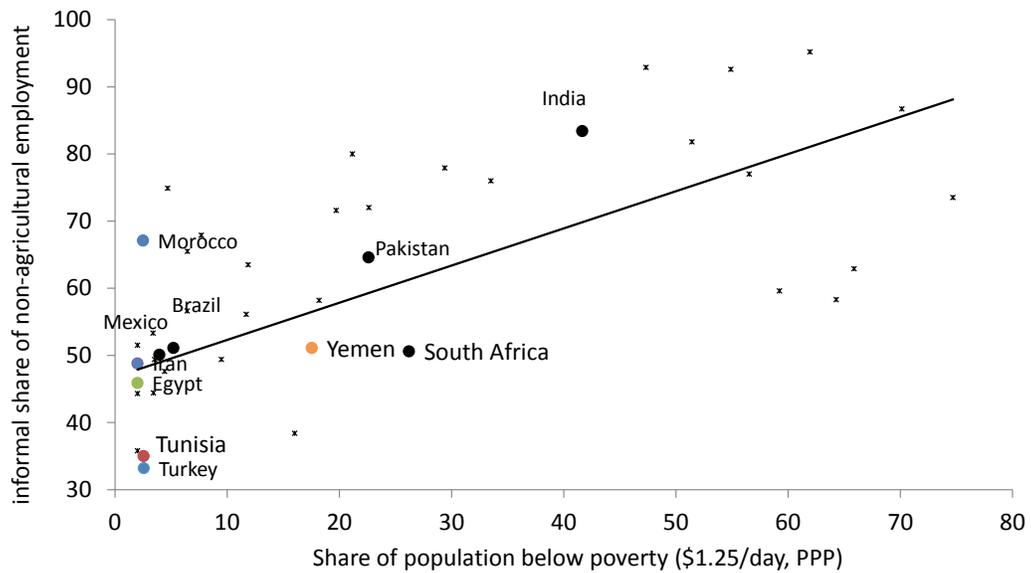
Figure 3: District-level female-ownership increases and persistence, 1994-2005
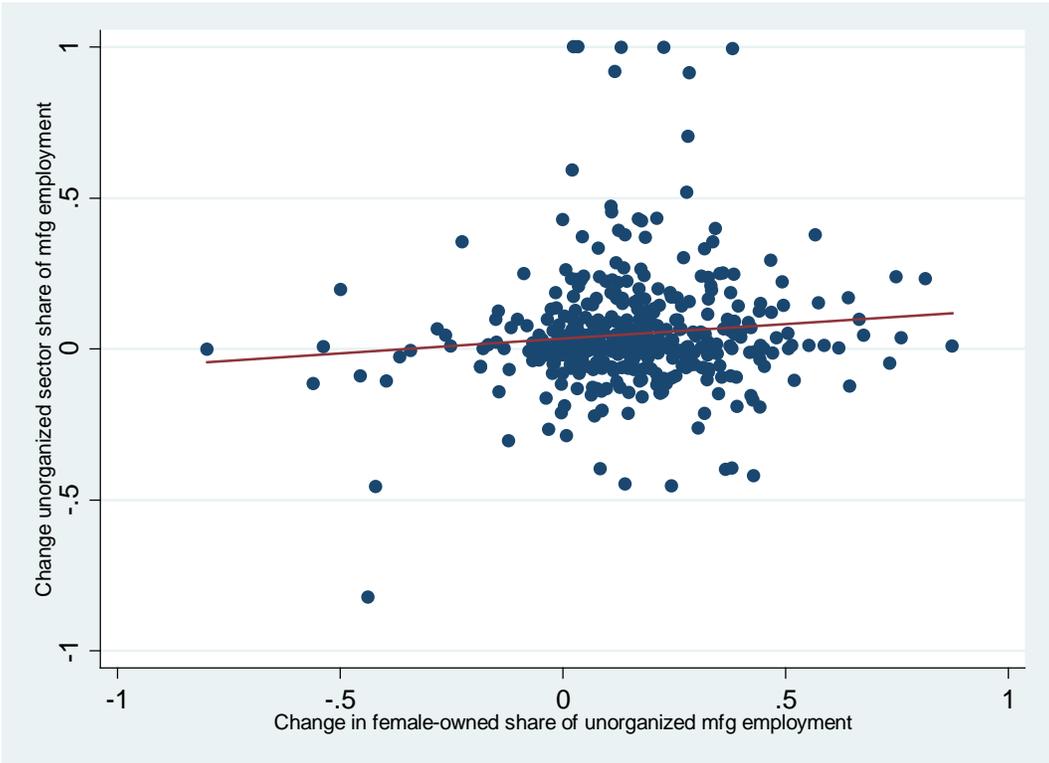
Table 1a: Manufacturing employment distribution by gender of owner and sector

	1994	2000	2005	Value relative to 1994 2000	2005
A. Employment weighted distribution in shares					
Total organized share	0.197	0.165	0.185	0.839	0.941
Total unorganized share	0.803	0.835	0.815	1.039	1.014
Female proprietorships	0.092	0.136	0.187	1.477	2.027
Male proprietorships	0.663	0.653	0.577	0.985	0.870
Other categories	0.048	0.045	0.051	0.944	1.054
B. Employment weighted distribution in raw counts (in 000s)					
Total sector size	34,424	40,702	40,336	1.182	1.172
Total organized value	6,775	6,723	7,470	0.992	1.103
Total unorganized value	27,649	33,979	32,866	1.229	1.189
Female proprietorships	3,180	5,554	7,555	1.746	2.376
Male proprietorships	22,813	26,576	23,265	1.165	1.020
Other categories	1,656	1,849	2,046	1.116	1.235
C. Household distribution for female proprietorships					
Household value of female businesses	2,882	4,934	6,800	1.712	2.359
Household share of female businesses	0.906	0.888	0.900	0.980	0.993
Female household share of total sector	0.084	0.121	0.169	1.448	2.013

Notes: Indian descriptive statistics taken from Annual Survey of Industries and National Sample Statistics.

Table 1b: Manufacturing establishment count distribution by gender of owner and sector

	1994	2000	2005	Value relative to 1994	
				2000	2005
A. Establishment count distribution in shares					
Total organized share	0.008	0.006	0.006	0.759	0.803
Total unorganized share	0.992	0.994	0.994	1.002	1.002
Female proprietorships	0.168	0.260	0.364	1.548	2.169
Male proprietorships	0.802	0.718	0.607	0.896	0.757
Other categories	0.022	0.016	0.022	0.704	1.000
B. Establishment count distribution in raw counts (in 000s)					
Total sector size	12,125	16,986	16,948	1.401	1.398
Total organized value	93	99	105	1.063	1.122
Total unorganized value	12,032	16,887	16,843	1.404	1.400
Female proprietorships	2,037	4,419	6,176	2.169	3.032
Male proprietorships	9,725	12,202	10,291	1.255	1.058
Other categories	269	266	376	0.987	1.397
C. Household distribution for female proprietorships					
Household value of female businesses	1,919	4,146	5,818	2.160	3.032
Household share of female businesses	0.942	0.938	0.942	0.996	1.000
Female household share of total sector	0.158	0.244	0.343	1.542	2.169

Notes: See Table 1a.

Table 2a: Services employment distribution by gender of owner and size

	2001	2006	2006 value relative to 2001
A. Employment weighted distribution in shares			
Total share in establ. with >5 workers	0.253	0.331	1.308
Total share in establ. with <=5 workers	0.747	0.669	0.896
Female proprietorships	0.057	0.052	0.919
Male proprietorships	0.669	0.546	0.817
Other categories	0.022	0.071	3.256
B. Employment weighted distribution in raw counts (in 000s)			
Total sector size	26,378	33,466	1.269
Total value in establ. with >5 workers	6,669	11,065	1.659
Total value in establ. with <=5 workers	19,709	22,401	1.137
Female proprietorships	1,502	1,751	1.166
Male proprietorships	17,634	18,285	1.037
Other categories	572	2,365	4.131
C. Household distribution for female proprietorships			
Household value of female businesses	772	930	1.205
Household share of female businesses	0.514	0.531	1.033
Female household share of total sector	0.029	0.028	0.950

Notes: Indian descriptive statistics taken from National Sample Statistics. "Own-account enterprises" (OAE) are firms that do not employ any hired worker on a regular basis.

Table 2b: Services establishment count distribution by gender of owner and siz

	2001	2006	2006 value relative to 2001
A. Establishment count distribution in shares			
Total share in establ. with >5 workers	0.047	0.056	1.190
Total share in establ. with <=5 workers	0.953	0.944	0.991
Female proprietorships	0.074	0.077	1.036
Male proprietorships	0.862	0.797	0.925
Other categories	0.017	0.070	4.180
B. Establishment count distribution in raw counts (in 000s)			
Total sector size	14,341	16,508	1.151
Total value in establ. with >5 workers	679	930	1.370
Total value in establ. with <=5 workers	13,662	15,578	1.140
Female proprietorships	1,062	1,266	1.192
Male proprietorships	12,359	13,154	1.064
Other categories	241	1,158	4.812
C. Household distribution for female proprietorships			
Household value of female businesses	578	725	1.254
Household share of female businesses	0.544	0.573	1.052
Female household share of total sector	0.040	0.044	1.090

Notes: See Table 2a.

Table 3: Correlation between district traits and increase in female-owned business share

	Manufacturing 1994-2005	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)
Log population	0.017	0.082	0.130*
Log population density	-0.064	0.018	0.131*
Age profile	0.080	0.301*	0.397*
Share of population in scheduled caste/tribe	-0.022	-0.103	-0.081
Female labor force participation rate	0.082	0.085	0.010
Educated worker share	0.060	0.084	0.338*
Literacy rate	0.059	0.274*	0.355*
Infrastructure: electricity access	0.158*	0.195*	0.374*
Infrastructure: paved roads	0.025	0.207*	0.315*
Travel time to nearest of India's ten largest cities	-0.009	0.040	-0.099
Strength of household banking sector	-0.037	0.026	0.156*
Urbanization rate	0.104*	0.148*	0.365*
Average income per capita	0.108*	0.173*	0.322*

Notes: Table documents correlations between district traits and increase in female-owned business share. 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. A positive correlation indicates that the district trait is associated with an increase in relative female-owned business share across the period. An asterisk denotes a correlation is statistically significant at the 10% level.

Table 3b: Correlation between industry traits and increase in female-owned business share

	Manufacturing 1994-2005	Manufacturing 2000-2005	Services 2001-2006
	(1)	(2)	(3)
Log labor intensity	0.3689*	0.3235*	0.3114*
Log capital intensity	-0.035	0.0671*	0.1423*
Log materials intensity	-0.1601*	-0.1556*	-0.2284*
Log average wage	-0.2229*	-0.1889*	-0.0781*
Log financial dependency	-0.1537*	-0.1593*	-0.1065*
Share of unorganized establishments owned by women	0.4548*	0.3697*	0.3819*

Notes: See Table 3a. Industry traits are measured in 1994-5 for columns 1-2, and in 2001 for column 3. Intensity measures are measured relative to industry sales. Industry traits are measured at the national level.

Table 4: Multivariate analysis of unorganized sector persistence and female ownership, manufacturing

| | DV: Change in unorganized sector share of district using the indicated | | | | | |
| | Employment levels | | | Establishment counts | | |
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Estimations with raw shares					
Change in share of businesses in unorganized sector owned by women for district	0.085+ (0.045)	0.094+ (0.050)	0.098+ (0.050)	0.007++ (0.003)	0.008++ (0.004)	0.007++ (0.004)
	B. Estimations with shares expressed in unit standard deviations					
Change in share of businesses in unorganized sector owned by women for district	0.118+ (0.062)	0.131+ (0.070)	0.136+ (0.070)	0.129++ (0.059)	0.137++ (0.070)	0.138++ (0.070)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
District 2001 Covariates		Yes	Yes		Yes	Yes
District Population Growth Control 1991-2001			Yes			Yes

Notes: Estimations quantify the relationship between the change in district share of manufacturing activity in the unorganized sector and the change in female ownership rates for businesses from 1994-2005. The core regressors regarding the change in unorganized activity are constructed to consider the form of manufacturing activity considered in the outcome variable. District-level traits are taken from the 1991 and 2001 Censuses. Estimations include state fixed effects, weight observations by an interaction of the log of district population, have 325 observations, and report robust standard errors. + indicates statistical significance at a 10% level, ++ at a 5% level, and +++ at a 1% level.

Table 5: IV analysis of unorganized sector persistence and female ownership, manufacturing

| | DV: Change in unorganized sector share of district using the indicated | | | | | |
| | Employment levels | | | Establishment counts | | |
	(1)	(2)	(3)	(4)	(5)	(6)
	A. Estimations with raw shares					
Change in share of businesses in unorganized sector owned by women for district	0.142 (0.096)	0.133 (0.087)	0.131 (0.087)	0.014++ (0.007)	0.010+ (0.005)	0.010+ (0.005)
	B. Estimations with shares expressed in unit standard deviations					
Change in share of businesses in unorganized sector owned by women for district	0.197 (0.133)	0.184 (0.121)	0.181 (0.121)	0.258++ (0.124)	0.179+ (0.102)	0.179+ (0.102)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
District 2001 Covariates		Yes	Yes		Yes	Yes
District Population Growth Control 1991-2001			Yes			Yes

Notes: See Table 4. Estimations instrument for the change in women-owned business shares in a district with an interaction of the district's initial industry distribution and the national change by industry for women-owned business shares.

Table 6: Average establishment traits by gender of owner, manufacturing

	Total shipments	Total employment	Fixed assets	Output per employee	Assets per employee
	(1)	(2)	(3)	(4)	(5)
A. Averages over 1994-2005 period					
Female-owned establishments	1614	1.35	909	810	635
Male-owned establishments	8802	2.26	2841	2818	1151
Female-to-male ratio	18%	60%	32%	29%	55%
B. Trend in ratio during the 1994-2005 period					
Ratio in 1994	29%	67%	31%	37%	38%
Ratio in 2000	17%	58%	34%	29%	58%
Ratio in 2005	15%	54%	31%	24%	53%

Notes: Tabulations depict traits of establishments by gender of business owner taken from NSS. Appendix Tables 3a and 3b provide more detailed tabulations of annual values.

Table 7: Primary activity of women and earnings

	1987	1993	1999	2004	2009
	(1)	(2)	(3)	(4)	(5)
A. Share of women's activity over 1994-2005 period					
Domestic activities	60%	64%	63%	60%	68%
Agriculture and mining	29%	27%	27%	28%	21%
Manufacturing	3%	3%	3%	4%	3%
Services and transportation	6%	6%	6%	7%	7%
B. Average monthly earnings for workers listing as main activity as OAE (2005 constant INR)					
Agriculture and mining	162	155	195	188	298
Manufacturing	145	191	198	173	253
Services and transportation	251	195	179	264	356
C. Average monthly earnings for workers listing main activity as wage work (2005 constant INR)					
Agriculture and mining	237	352	442	499	695
Manufacturing	390	476	563	541	908
Services and transportation	862	819	1284	1164	1722

Notes: Tabulations depict traits of women workers taken from household-level surveys.

App. Table 1a: State-level employment distributions for manufacturing sector

	Unorganized sector share			Women-owned businesses share of unorganized sector		
	1994 level	2005 level	Change	1994 level	2005 level	Change
Andhra Pradesh	0.75	0.77	0.02	0.18	0.32	0.14
Bihar	0.95	0.95	0.01	0.07	0.10	0.03
Chandigarh	0.66	0.22	-0.44	0.04	0.18	0.13
Delhi	0.82	0.80	-0.02	0.03	0.05	0.02
Goa	0.62	0.43	-0.19	0.10	0.13	0.02
Gujarat	0.73	0.71	-0.02	0.04	0.10	0.06
Haryana	0.51	0.59	0.08	0.03	0.09	0.06
Himachal Pradesh	0.82	0.74	-0.08	0.08	0.20	0.12
Karnataka	0.82	0.80	-0.02	0.17	0.35	0.18
Kerala	0.68	0.83	0.15	0.27	0.30	0.03
Madhya Pradesh	0.78	0.90	0.12	0.02	0.16	0.13
Maharashtra	0.66	0.72	0.06	0.04	0.15	0.11
Orissa	0.95	0.94	-0.01	0.10	0.19	0.08
Pondicherry	0.56	0.58	0.01	0.06	0.23	0.17
Punjab	0.78	0.82	0.04	0.02	0.17	0.16
Rajasthan	0.75	0.76	0.01	0.19	0.30	0.11
Tamil Nadu	0.95	0.88	-0.06	0.10	0.12	0.03
Uttar Pradesh	0.90	0.89	-0.01	0.12	0.18	0.06
West Bengal	0.87	0.92	0.05	0.13	0.35	0.21

Notes: See Table 1a.

App. Table 1b: State-level employment distributions for services sector

	Unorganized sector share			Women-owned businesses share of unorganized sector		
	2001 level	2006 level	Change	2001 level	2006 level	Change
Andhra Pradesh	0.785	0.701	-0.085	0.118	0.098	-0.020
Bihar	0.916	0.895	-0.020	0.028	0.055	0.027
Chandigarh	0.579	0.116	-0.463	0.117	0.104	-0.012
Delhi	0.615	0.675	0.060	0.110	0.101	-0.009
Goa	0.623	0.522	-0.101	0.130	0.222	0.092
Gujarat	0.589	0.697	0.109	0.066	0.067	0.000
Haryana	0.665	0.732	0.067	0.060	0.073	0.012
Himachal Pradesh	0.808	0.717	-0.091	0.085	0.055	-0.030
Karnataka	0.713	0.633	-0.080	0.072	0.074	0.002
Kerala	0.686	0.609	-0.077	0.112	0.105	-0.007
Madhya Pradesh	0.678	0.609	-0.069	0.062	0.061	-0.001
Maharashtra	0.641	0.615	-0.026	0.104	0.099	-0.005
Orissa	0.764	0.399	-0.365	0.056	0.046	-0.009
Pondicherry	0.477	0.628	0.151	0.136	0.180	0.044
Punjab	0.717	0.687	-0.030	0.076	0.080	0.004
Rajasthan	0.750	0.672	-0.078	0.040	0.045	0.005
Tamil Nadu	0.734	0.646	-0.088	0.112	0.095	-0.017
Uttar Pradesh	0.791	0.748	-0.043	0.062	0.057	-0.005
West Bengal	0.795	0.737	-0.058	0.072	0.063	-0.009

Notes: See Table 2a.

App. Table 2a: Industry-level employment distributions for manufacturing sector

		Unorganized sector share			Women-owned businesses share of unorganized sector		
NIC	Industry Description	1994 level	2005 level	Change	1994 level	2005 level	Change
15	Food products and beverages	0.83	0.82	-0.01	0.07	0.10	0.03
16	Tobacco products	0.83	0.90	0.07	0.32	0.62	0.30
17	Textiles	0.83	0.83	0.00	0.19	0.25	0.06
18	Wearing apparel; dressing and dyeing of fur	0.70	0.92	0.21	0.07	0.33	0.27
19	Leather; luggage, handbags, saddlery, harness and footwear	0.81	0.75	-0.06	0.03	0.05	0.02
20	Wood and wood products, except furniture; straw and plating	0.99	0.99	0.00	0.11	0.19	0.08
21	Paper and paper products	0.51	0.65	0.14	0.24	0.59	0.35
22	Publishing, printing and reproduction of recorded media	0.73	0.78	0.04	0.05	0.07	0.02
23	Coke, refined petroleum and nuclear fuel	0.30	0.33	0.03	0.00	0.07	0.07
24	Chemicals and chemical products	0.33	0.51	0.18	0.42	0.52	0.10
25	Rubber and plastic products	0.57	0.47	-0.10	0.06	0.11	0.06
26	Other non-metallic mineral products	0.85	0.79	-0.06	0.02	0.03	0.02
27	Basic metals	0.22	0.20	-0.03	0.02	0.06	0.04
28	Fabricated metal products, except machinery and equipments	0.81	0.84	0.03	0.02	0.03	0.01
29	Machinery and equipment, n.e.c.	0.63	0.57	-0.06	0.02	0.02	0.00
30	Office, accounting and computing machinery	0.22	0.34	0.12	0.00	0.00	0.00
31	Electrical machinery and apparatus, n.e.c.	0.29	0.52	0.23	0.01	0.05	0.04
32	Radio, television, and communication equipment and apparatus	0.19	0.18	-0.01	0.01	0.20	0.19
33	Medical, precision and optical instruments, watches and clock	0.41	0.32	-0.09	0.01	0.05	0.04
34	Motor vehicles, trailers and semi-trailers	0.15	0.25	0.10	0.02	0.02	0.00
35	Other transport equipment	0.27	0.40	0.13	0.03	0.46	0.43
36	Furniture, manufacturing n.e.c.	0.98	0.95	-0.03	0.07	0.08	0.01
	Total	0.803	0.815	0.012	0.115	0.230	0.115
	Traditional	0.861	0.868	0.007	0.116	0.230	0.114
	Modern	0.398	0.445	0.046	0.106	0.235	0.129

Notes: See Table 1a.

App. Table 2b: Industry-level employment distributions for services sector

		Unorganized sector share			Women-owned businesses share of unorganized		
NIC	Industry Description	2001 level	2006 level	Change	2001 level	2006 level	Change
55	Hotels and restaurants	0.742	0.705	-0.037	0.093	0.097	0.004
60	Transportation and railway	0.937	0.925	-0.011	0.006	0.007	0.001
61/63	Freight and cargo	0.609	0.512	-0.097	0.036	0.021	-0.015
64	Communications	0.917	0.950	0.033	0.142	0.092	-0.050
70	Real estate	0.783	0.759	-0.023	0.032	0.090	0.058
71	Renting of equipment	0.893	0.875	-0.018	0.023	0.024	0.000
72	Computer hardware	0.246	0.124	-0.122	0.140	0.032	-0.108
73/74	Business services and research	0.719	0.758	0.038	0.055	0.037	-0.018
80	Education and training	0.325	0.284	-0.041	0.242	0.297	0.055
85	Health	0.758	0.633	-0.124	0.105	0.126	0.021
90	Sanitation	0.993	0.917	-0.076	0.722	0.395	-0.327
91	Organizations	0.883	0.817	-0.066	0.027	0.005	-0.022
92	Media & recreation	0.441	0.426	-0.015	0.015	0.032	0.017
93	Personal service activities	0.934	0.968	0.034	0.089	0.125	0.037
	Total	0.747	0.669	-0.078	0.076	0.078	0.002
	Traditional	0.929	0.767	-0.162	0.051	0.057	0.006
	Modern	0.589	0.537	-0.052	0.110	0.118	0.008

Notes: See Table 2a.

App. Table 3a: Trends in plant characteristics for male- and female-owned proprietorships, 1994 - 2005

Total output (sales)*	1994	2000	2005	Change
Female-owned	1,548	1,615	1,678	130
Male-owned	5,297	9,542	11,566	6,268
difference	3,749	7,927	9,888	6,139
ratio F:M	29%	17%	15%	
Persons engaged				
Female-owned	1.6	1.3	1.2	-0.3
Male-owned	2.3	2.2	2.3	-0.1
difference	0.8	0.9	1.0	0.3
ratio F:M	67%	58%	54%	
Fixed assets				
Female-owned	76.7	1,208.8	1,442.7	1,366.0
Male-owned	247.2	3,553.3	4,721.9	4,474.7
difference	170.5	2,344.6	3,279.2	3,108.7
ratio F:M	31%	34%	31%	
Output per person engaged				
Female-owned	737.1	869.0	824.1	87.0
Male-owned	1,968.0	3,011.2	3,475.6	1,507.6
difference	1,230.9	2,142.3	2,651.5	1,420.6
ratio F:M	37%	29%	24%	
Located in household				
Female-owned	0.942	0.938	0.942	0.000
Male-owned	0.701	0.622	0.608	-0.093
difference	-24%	-32%	-33%	-0.093

Source: National Sample Survey data, various rounds.

*: in 2005 USD at PPP.

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App Table 3b: Trend in size distribution of plants by gender, 1994-2005

Persons Engaged, female-owned establishments by establishment size						Establishment Size Share of Persons Engaged, female-owned establishments				
Size	1994	2000	2005	change		Size class	1994	2000	2005	
Total	3,180	5,554	7,555	4,375	138%	Total	100%	100%	100%	0%
1	1,112	2,925	4,160	3,048	274%	1	35%	53%	55%	20%
2--4	1,866	2,312	2,975	1,109	59%	2--4	59%	42%	39%	-19%
5--7	125	162	221	95	76%	5--7	4%	3%	3%	-1%
8--10	28	80	85	57	205%	8--10	1%	1%	1%	0%
11+	49	75	115	66	133%	11+	2%	1%	2%	0%

Persons Engaged, male-owned establishments by establishment size						Establishment Size Share of Persons Engaged, male-owned establishments				
	1994	2000	2005	change		Size class	1994	2000	2005	
Total	22,809	26,575	23,262	453	2%	Total	717%	479%	308%	-409%
1	2,940	4,183	3,519	579	20%	1	13%	16%	15%	2%
2--4	14,045	16,010	12,845	-1,200	-9%	2--4	62%	60%	55%	-6%
5--7	3,089	3,188	3,198	110	4%	5--7	14%	12%	14%	0%
8--10	1,195	1,330	1,393	199	17%	8--10	5%	5%	6%	1%
11+	1,540	1,865	2,306	766	50%	11+	7%	7%	10%	3%

App. Table 4: Data sources and years

Variable	Data source	Year
Organized manufacturing data	GOI Ministry of Statistics and Programme Implementation Annual Survey of Industries	1994-2005
Unorganized manufacturing data	GOI National Sample Survey Organisation, Socio-Economic Surveys	1994-2005
Unorganized services data	GOI National Sample Survey Organisation, Socio-Economic Surveys	1994-2005
District-level covariates (e.g., population, literacy rate)	Census of India, District-level tabulations	2001
Consumption per capita (2005USD at purchasing power parity)	GOI National Sample Survey Organisation, Socio-Economic Survey 55th Round: July 1999 – June 2000, Household Schedule 10: Employment and Unemployment	1999
Stringency of labor adjustment laws for district's state	Ahsan & Pages (2009)	2001
Stringency of labor disputes laws for district's state	Ahsan & Pages (2009)	2001
Travel time to closest of 10 largest cities (by population), in driving	Authors' calculation	n/a