

Political Reservations and Women's Entrepreneurship in India

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Poverty Reduction and Economic Management Network
Economic Policy and Debt Unit
January 2013



Abstract

This paper quantifies the link between the timing of state-level implementations of political reservations for women in India with the role of women in India's manufacturing sector. It does not find evidence that overall employment of women in manufacturing increased after the reforms. However, the analysis finds significant evidence that more women-owned establishments were created in the unorganized/informal sector. These establishments were concentrated in industries where women entrepreneurs have been traditionally active and the entry was mainly

found among household-based establishments. This heightened entrepreneurship does not appear linked to changes in reporting, better access to government contracts and business, or improved financing environments. One interpretation of these results is that the implementation of the political reservations inspired more women to open establishments, and they did so at a small establishment scale in industries where they had experience and/or the support networks of other women.

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Keywords: Women, female, gender, entrepreneurship, political reservations, development, informal sector, India, South Asia.

JEL Classification: D22, E26, H11, J16, L10, L26, L60, M13, O10, R00, R10, R12.

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Acknowledgments: We thank David McKenzie and Petia Topalova for helpful comments on this work. We also thank Mani Shankar Iyer, Pratap Banhu Mehta, Meera Chatterjee, Prabir De, Ria Mukherji, Reema Nanavaty, Bhishma Rout, and Nupur Tiwary for extremely useful discussions on Panchayati Raj Institutions. We thank the World Bank's South Asia Labor Flagship team for providing the primary datasets used in this paper. We are particularly indebted to Shanthi Nataraj for sharing her wisdom regarding the industrial survey data. Funding for this project was provided by World Bank and Multi-Donor Trade Trust Fund.. The views expressed here are those of the authors and not of any institution they may be associated with.

1. Introduction

The implementation of political reservations for women in India has proven to affect many aspects of the economic, political and social lives of women. A brief review, which we expand upon further below, links these reservations to greater local investment in infrastructure and related public goods valued by women (Chattopadhyay and Duflo 2004b), improved perceptions of women by men when exposed to women in leadership roles and greater aspirations for younger women (Beaman et al. 2009, 2012), greater reporting of crimes against women (Iyer et al. 2012), and more. Moreover, the available evidence suggests these effects persist (e.g., Deininger et al. 2011). This literature is among the most powerful evidence assembled for the significant economic benefits of gender equality (Duflo 2005, 2011, Klapper and Parker 2011, World Bank 2012).

This paper contributes to this literature by looking at an underexplored issue of the link between political and economic empowerment. What role, if any, have these political reservations had for women's role in the workforce? Despite the many positive impacts associated with these reforms, their role in promoting women's engagement in the local economy remains uncertain. This is critical for identifying the short- and long-term impact of these policies. Significant empowerment of women in the workforce may be the strongest mechanism possible for entrenching and amplifying the positive impacts associated with these political reservations.

We consider in particular the role of women in the manufacturing sector over the 1994-2005 period. Our data provide gender-based ownership and employment in unorganized manufacturing establishments by state and industry in 1994, 2000 and 2005. The unorganized sector is of particular interest as it has constituted approximately 99 percent and 80 percent of total manufacturing establishment counts and employment in India consistently since the early 1990s. We also observe gender-based employment in the organized sector. In 1994, female-owned businesses comprised 9 percent of total manufacturing employment; by 2005, this share had grown tremendously to 19 percent. Therefore it is of crucial importance to understand more deeply the factors that have contributed to this sharp emergence of female entrepreneurship and business ownership over a relatively short time period.

The empirical strategy follows Iyer et al. (2012) by using differences in the timing of the implementation of reservations across Indian states. We conduct a panel analysis at the state-industry level that allows us to exploit this state-level timing variation and differences in traits across industries. Empirical results yield a mixed message regarding the extent to which these reforms improved women's participation in the workforce. On one hand, we do not identify that women's employment in manufacturing increased after the implementation of reservations. This limited response is true in both the unorganized and organized sectors, and it holds for employment in both female- and male-owned establishments.

On the other hand, we find significant evidence that women's entrepreneurship in India increased with the implementation of political reservations. This increase occurs with a state-level timing that follows the implementation of the reservations, and it persists even after controlling for contemporaneous male entrepreneurship by state-industry. We also show that the state-level timing of the implementations was not linked to pre-existing differences in entrepreneurship by state, further adding to the plausible exogeneity introduced by Iyer et al. (2012).

We further investigate the channels through which this entrepreneurship flourishes. The heightened start of women-owned establishments is concentrated in industrial sectors in which women have traditionally owned establishments. As important, the greater entrepreneurship is mostly concentrated in household-based enterprises, rather than establishments opening as independent facilities. On the other hand, we do not find evidence that the entrepreneurship is linked to changes in reporting or to greater access to government-sponsored contracts and business. Likewise, improved financing conditions appear to play a limited role, as the increase in female-owned loan-holding establishments is weaker than the total effect registered and suggests that financing responded to the increased entry rather than the reverse.

On the whole, these patterns—especially the increase in household-based establishments in sectors where women have traditionally had a relatively stronger ownership presence—echo the greater aspirations of women found in Beaman et al. (2012). The reservations appear to have increased the entrepreneurial desire of women, and the concentrated expression of this came in sectors where women have traditionally been active and at a household-based scale of operation that was feasible to achieve.

This study contributes to three strands of academic literature. Most directly, our work connects to prior studies of the impact of political reservations for India and women's economic outcomes. To our knowledge, we are the first in this literature to quantify the entrepreneurship effects in a panel setting that uses state-level variation in implementation timings for identification. Second, our work builds upon prior studies of gender differences in entrepreneurship¹ and studies of the spatial distribution of entrepreneurship in India.² Third, and more broadly, we contribute to a larger literature on women's advancement.³

These findings are also important for Indian policy makers and business leaders. By 2011, India had achieved significant acknowledgement for the level of gender parity in political participation and empowerment. For example, India ranked 19th out of 135 countries in women's political empowerment in the 2011 Global Gender Gap Report (Hausmann et al. 2011). Yet, despite India's many economic advancements since liberalization began, the role of women in the Indian economy still lags well behind that of advanced economies. This paper quantifies the strengths and limits of the political reservations in closing this gap.

The next section of this paper describes the political reservations enacted in India and the state-level implementations that we exploit. Section 3 outlines our data and provides some basic descriptive statistics, and Section 4 provides evidence on the exogenous timing of the political reservations to the women's entrepreneurship that we study. Section 5 provides our core empirical analysis, and the last section concludes.

2. Political Reservations for Women in India

History of Political Reservations

The increased role and status of women seen in the 20th century has contributed substantially to the changing economic and political fabric of both developing and developed countries alike.

¹ Examples of this work include Rosenthal and Strange (2011), Estrin and Mickiewicz (2011), Minniti (2009, 2010), Minniti and Naudé (2010). Parker (2009) and Klapper and Parker (2011) offer a comprehensive review of this literature and further references.

² Ghani et al. (2011a) and Mukim (2011) provide spatial analyses of manufacturing entrepreneurship in India with our data, and Ghani et al. (2011b) consider gender differences in entrepreneurship for India specifically.

³ Examples include Mammen and Paxson (2000), Dhaliwal (2000), Mitra (2002), Ghosh and Cheruvalath (2007), Amin (2010), Field et al. (2010), Pillania et al. (2010), Verheul et al. (2006), Bruhn (2009), Munshi (2011), Kobeissi (2010), and World Bank (2011).

While much of this progress has come about organically, many governments have implemented policies to increase the speed at which gender parity is achieved along various social and economic measures. One popular policy has been the reservation of positions for women (quotas) among governmental bodies. In particular, there have been significant efforts in recent decades to increase the political participation of women in countries where women's involvement in politics has traditionally been low (UN 2008): by 2001, quotas for women in parliaments were in force in more than 30 countries (Duflo 2005).

India presents one such case: at the national level, reservations for women in elected bodies originated with the 73rd and 74th Indian Constitutional Amendment Acts. These Amendments gave national support to the formalization and implementation of an historical decentralized governance structure known as the panchayat (or, more formally, Panchayati Raj Institutions). Traditionally, panchayats operated at the village level and consisted of a small number of individuals chosen by a village to oversee various local affairs. However, panchayats were not standardized in their structures, organization, operations, or responsibilities, nor were they necessarily elected bodies. By the mid-20th century, panchayats were widely recognized to embody “concealed forms of social prejudice, oppression and exploitation that were firmly rooted in local power structures” (GOI 2008). In the latter half of the 20th century, there was support for the revival of a reformed panchayat system, with some states indeed restructuring their local government systems to provide for the decentralized panchayat system. By 1989 there was strong support at the national level to give constitutional status to a broad panchayat system.

In 1993, two pieces of national legislation came into effect: the 73rd Constitutional Amendment Act instituted a three-tiered system of local government at the village, sub-district (block), and district levels in rural areas of the country, while the 74th Constitutional Amendment Act instituted a revised local governance structure in municipalities (hereafter referred to as “the Amendments”). The Amendments intended to provide large-scale devolution and decentralization of powers to the local bodies. Responsibilities of the panchayat include administration of state transfer programs, planning and implementation of schemes for economic development, establishment and administration of local public goods such as educational and medical facilities, oversight of local infrastructure (water, sewage, roads, etc.) and the monitoring of civil servants (Duflo 2005). Furthermore, the Amendments stipulated that

members of the local governance bodies were to be elected at five-year intervals, and at least one-third of all seats at each governance level were required to be filled by women.

The Amendments required states adjust or amend local elections to comply with the provisions of the Amendments, and all states amended existing laws or passed new laws to be compliant within one year of the passing of the Amendments. Compliant elections were eventually held by most states/union territories (UTs), and there is considerable variation in the timing of “effective implementation” (i.e., the first election held which implemented the provisions of the Amendments) across states. This implementation timing varies exogenously primarily due to state authorities waiting for the term of existing elected local governing bodies to expire before conducting compliant elections.

Figure 1 shows the considerable variation in timing of effective implementation of the Panchayati Raj across states/UTs. Beyond the visible variation in timings, two features are important to note. First, two states incorporated provisions regarding political reservations for women before the Amendments. Andhra Pradesh provided for 22 to 25 percent reservations for women in 1964; Karnataka introduced a similar level of reservations for women in 1985 (GOI 2008).⁴ Second, reservations have not been implemented in all Indian states/UTs. Some states (Meghalaya, Mizoram and Nagaland) were explicitly excluded from the purview of the Amendments. Jammu & Kashmir introduced reservations at a level consistent with the Amendments via state-level legislation, but the election of panchayats under its own Act has not yet taken place. In the empirical section we describe steps to take into account these features.⁵

Literature Review

A number of studies have examined aspects of the Panchayati Raj and its effect on economic and social outcomes. Besley et al. (2004) found that reservation of a leadership position for

⁴ Kerala and West Bengal restructured their institutions of local government before the passing of the 73rd Act (in 1991 and 1992, respectively), but elections implementing these reservations were not held until after enforcement in 1993. Bihar was prevented from implementation due to legal issues regarding certain provisions of the Amendments (Iyer et al. 2012).

⁵ Data on the timing of political reservations comes from several publications documenting the implementation and progress of the reservations (Mathew 1995, 2000; GOI 2008; Iyer et al. 2012). Appendix Table 1 lists years. Beginning with Bihar in 2006, several states increased their reservations for women above the 33% required by the Amendments. These changes occur after our sample period ends in 2005.

Scheduled Caste/Scheduled Tribe (SC/ST) individuals increased access among SC/ST households to infrastructure or services via government schemes. Chattopadhyay and Duflo (2004a) use information on the location of public goods to show that when an area has leadership positions reserved for SC individuals, the share of public goods going to that group is significantly higher. Chattopadhyay and Duflo (2004b) use village-level variation in political reservations for women to predict the type of public goods provided in 265 reserved and unreserved areas in West Bengal and Rajasthan, finding that leaders invest more in infrastructure that is directly relevant to the needs of their own genders. Overall, the group identity of leaders has been shown to matter in the type of public goods provided under the purview of the governing body; this has been shown in various contexts not limited to the Indian case (e.g., Powley 2007, Washington 2008, Clots-Figueras 2011).

Women leaders may also have an effect on the institutional environment. Topalova and Duflo (2004) find that women leaders in India are less likely to take bribes than their male counterparts. Another strand of literature looks at how attitudes towards women change once quota policies are in effect. Hoff and Stiglitz (2010) develop a conceptual framework to show how changes in power, technology and contacts with the outside world matter especially because they can lead to changes in ideology. Beaman et al. (2009, 2012) show how perceptions of women improve once men are exposed to women in leadership roles, providing substantial evidence of the framework regarding attitudes and bias implicit in Hoff and Stiglitz (2010).

Duflo (2005) provides an assessment of the case for political reservations for women and other historically-underrepresented groups. Using evidence from India, Duflo (2005) concludes that reservations have been shown to incur a significant reallocation of public goods toward the preferred allocation of the group in power. Pande and Ford (2011) provide a more recent comprehensive review of the literature on gender quotas.

The above studies primarily use the cross-sectional nature of the randomized reservation system to identify treatment effects. However, variation in the timing of the implementation of the 73rd Amendment was also plausibly exogenous, as noted above and further tested later in this paper. Iyer et al (2012) use this state-level variation to investigate the effects of political representation on crime against women, finding significant evidence that political empowerment resulted in greater reporting of crimes against women.

3. Indian Manufacturing Data

Our primary data sources are repeated cross-sectional establishment-level data from surveys of the unorganized manufacturing sector carried out by the Government of India. The data are taken from surveys conducted in fiscal years 1994, 2000 and 2005.⁶ This section describes some key features of these data for our study, and we refer readers to Ghani et al. (2011a), Nataraj (2011) and Kathuria et al. (2010) for greater details and general descriptive statistics on these manufacturing surveys.

Our work mainly considers the portion of the Indian economy surveyed by the National Sample Survey Organisation (NSSO). The NSSO collects information on a representative sample of the unorganized manufacturing sector. A manufacturing establishment is considered part of the unorganized sector if it has fewer than ten employees and uses electricity. If the establishment does not use electricity, the threshold is 20 workers. As of 2005, the unorganized sector accounts for approximately 99% of Indian manufacturing establishments, 80% of Indian manufacturing employment, and 16% of Indian manufacturing output.

Establishments are surveyed by the NSSO with state and four-digit National Industry Classification (NIC) stratification. Using the provided sample weights, we construct population-level estimates of establishments and employment, and aggregate the cross-sectional microdata to the state and three-digit NIC level. This allows observation of state-industry cells at three periods during which political reservations were implemented differentially by state. This time variation provides for our difference-in-differences identification strategy.

The outcome measures of business ownership and creation (as well as the control variables) are based on the number of observations in each state-industry cell multiplied by the sampling weight. In the estimations which use an employment-based measure of entrepreneurship, we consider the total employment at an establishment to consist of working owners plus any paid and unpaid employees.

We assign the gender of the business owner based on a survey field which captures detail regarding the ownership of the establishment. The NSSO surveys since 1994 include questions

⁶ In all 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.

which classify the ownership of each establishment among several types (1994 titles): proprietary (male), proprietary (female), partnership with members of the same household, partnership between members not of the same household, cooperative society, public sector, limited company (outside public sector), or other/unknown. We focus primarily on the establishments listed as either male proprietary or female proprietary, which constitute 98% of establishments in the unorganized manufacturing sector. The information captured in this field is an outcome of the survey and not a factor in the stratification design.

In our later analysis, we also investigate specifically household-based establishments by employing a survey question which captures detail regarding premises of the establishment. The establishment premises can be listed as any of the following (1994 titles): no fixed premises, premises same as household's residence, and premises independent of household's residence.⁷ Household-based establishments are defined using the second group above.⁸

Our analysis primarily considers recent women entrepreneurs, who are a subset of women establishment owners. We identify entrepreneurs using a survey field which asks the growth status of the enterprise over the past three years: expanding, stagnant, contracting, or operated for less than three years. Those owners who answer as having operated their business for less than three years constitute our subset of recent entrepreneurs.

We supplement our investigation into women's labor market dynamics using data from the Annual Survey of Industries (ASI). The ASI provides microdata on the organized manufacturing sector of the economy, which is not covered by NSSO. The two surveys are designed to be almost entirely mutually exclusive, jointly surveying a representative sample of the entire manufacturing sector. We use ASI surveys from the same fiscal years as the NSSO data described above to investigate employment of women in the organized sector. ASI surveys have a similar design and stratification as the NSS surveys, and we construct population-level estimates of employment in the organized sector at the state-industry level similar to above. We

⁷ The categories listed for the ownership and premises fields are taken from the 1994-5 survey instrument. Later surveys added additional ownership categories that do not overlap with the primary male/female proprietary categories used in this work.

⁸ There have been recent efforts to better measure and classify home-based work (Chen 2012), and it is possible that some household-based workers previously considered business owners may be reclassified as wage workers in future surveys. Adjustments during our sample period are very small, if present at all, and would have been applied uniformly to states in a way that would not bias a differences-in-differences strategy.

capture separate men's and women's employment in the organized sector based on separate fields in the ASI survey instrument capturing employment by gender.

Unfortunately, ASI surveys do not collect the gender of the establishment owners, and so we can only examine those outcomes with the unorganized sector. Even within the unorganized sector, our results below emphasize household-based establishment entry rather than independent facilities. This pattern suggests that the lack of ownership data in the ASI is not a material concern as it is unlikely that we would observe heightened women's entrepreneurship in the organized sector.

Table 1 provides descriptive statistics on our sample. The first three columns provide aggregate establishment counts, employment, and output for each year across all of India. Since we have data on the timing of political reservation implementation for all states/UTs in India, we do not restrict our sample geographically. These aggregates are broken down into organized-versus unorganized-sector contributions. For the unorganized sector, we further report women-owned establishments and then household- versus non-household-based establishments for women. Column 4 describes the growth rate of each economic activity from 1994 to 2005, and Columns 5-7 provide shares relative to the total.

As noted earlier, the unorganized sector accounts for a large share of establishment counts and employment. Moreover, these shares are very persistent, as discussed further in Ghani et al. (2012). Women-owned establishments in the unorganized sector account for a small share of total manufacturing activity: in 2005, they represent 36% of establishments, 19% of employment, and 1% of output. Most of this activity is household-based. For example, 90% of employment in women-owned establishments was in household-based operations in 2005.

While being a small share of total activity, women-owned establishments have experienced much more rapid growth during the 1994-2005 period than the manufacturing sector as a whole. While manufacturing employment generally grew 17% from 1994 to 2005, employment in women-owned establishments in the unorganized sector grew 138%, roughly doubling the share of total activity accounted for by these establishments. Our study analyzes in part the extent to which political reservations for women can account for this strong performance.

Among the major states, those with the highest share of new proprietary businesses in the unorganized sector owned by women in 1994 are Karnataka, Tamil Nadu, Andhra Pradesh, and Kerala. Those with the lowest share of female entrepreneurs are Uttar Pradesh, Haryana, Maharashtra, Madhya Pradesh, and Rajasthan. Similar patterns hold across states when comparing overall business ownership rates by gender. All but one state (Sikkim) saw an increase in the share of new businesses owned by women during the period we study.

Women's entrepreneurship and business ownership rates relative to men are highest among traditional and low-technology industries such as tobacco, paper, textiles, and wood products. These same industries comprise the industries in which most women-owned businesses are found in absolute terms. During our sample period, more than 90 percent of new female-owned businesses were found in six of 22 broad 2-digit industries: textiles, tobacco, wood products, food products, furniture, and chemical products. At the 2-digit level, nine industries saw an increase in the share of new businesses created by women between 1994 and 2005, with the largest increases for female entrepreneurship being among these traditional industries.

4. Analysis of Reform Timing and Pre-Existing Entrepreneurship

Iyer et al. (2012) introduce the technique of using state-level variation in the timing of effective implementation of the Indian reservations. Iyer et al. (2012) further provide evidence that the effects they document of the reservations on state-level reporting of crime against women follow after the implementations in a manner that indicates the reservations were implemented in manner plausibly exogenous to their outcome of interest. This section provides similar evidence with respect to our measures of women-owned establishments.

Figure 2 first analyzes initial economic conditions of states in 1994 and the order with which states implemented the reservations. The upper left panel starts with a cross-sectional plot of the log count of women-owned establishments per capita in the state on the vertical axis against the year of reservation implementation by state on the horizontal axis. Bubble size indicates the size of the state using log employment.

The trend line in this panel is flat, indicating that the timing of implementation was not linked to the initial prevalence of women-owned manufacturing establishments in the state. The same holds in the lower left panel that consider the shares of unorganized manufacturing

establishments that are women owned. The two right panels consider similar graphs of initial women entrepreneurship for manufacturing in the states. Again, the relationship is very limited, if any exists at all. The t-statistics for all trend lines are less than 0.5.

As Manipur is a persistent outlier on these graphs, we cap its value at the second highest state's value for visual ease. Given Manipur's very small size and mid-point timing for implementation of political reservations, this treatment does not affect trend lines calculated. Likewise, the very small state of Arunachal Pradesh shows very low initial activity by women in manufacturing and very late implementation. We have confirmed that that all results in the paper hold if excluding Arunachal Pradesh.

Figure 3 provides a second data description that shows our raw data and provides some evidence on these reservations using major states within India. For each state and survey, we calculate the ratio of entering female-owned establishments in the unorganized sector compared to male-owned entrants. We then plot this ratio across years with each state centered so that the vertical black line at zero represents the year when the state implemented the reservations. While some deviations exist, in most states the ratio is stable prior to reservation implementation, and then the ratio increases after implementation. Our empirical analysis quantifies these responses in a more systematic manner than this raw data plot affords, but this simple picture of the data also provides some assurance that the connection we observe between political reservations and female entrepreneurship is broad-based and with a reasonable timing.

5. Empirical Analysis

This section provides our core empirical results. We begin with a broad analysis of the impact for women in manufacturing that includes wage employment and establishment ownership. After observing the concentrated impact on entrepreneurship, we conduct a focused analysis on the industry differences and household-basis of the entrepreneurship finding. We finally test several hypotheses about channels through which this effect operates.

State-Level Patterns

Table 2 provides a broad analysis of women's role in the manufacturing sector following the implementation of political reservations. We have 3,606 observations that come from 32 states

(pre-2001 definitions) and 59 3-digit NIC industries.⁹ We weight regressions by the log initial employment in the state-industry and cluster standard errors by state. Outcome variables are in logs. As we encounter some zero-valued cells, we add one to all outcome variables before taking logs. This maintains a consistent sample over outcomes, and it is not an important factor given our weights of initial employment in state-industries.

Following the empirical approach developed by Iyer et al. (2012), our primary regressor is similar to an indicator variable that takes a value of zero before the implementations and a value of one afterwards. We additionally take into account the initial conditions of the two states with earlier, partial set-asides by assigning those states an initial value equal to their reserved share compared to the mandated level after the Amendments (e.g., a value of 25%/33%). This approach captures that the changes caused by the Amendments in these states were smaller than the discontinuities in other states that did not have prior set-asides.

We conduct our regressions at the state-industry-year level to allow for an easy segue to the industry differences that we later study. This approach also allows us to control directly for industrial composition by state and changes in women-owned establishment activity that would be predicted by secular trends in industries nationally. We include in estimations a vector of state-industry fixed effects and a vector of industry-year fixed effects. State-industry fixed effects remove aggregate levels differences across our sample in terms of the outcome variables, focusing on within-cell changes with the implementation of political reservations. Industry-year fixed effects control for common patterns across states for each industry.

Outcome variables are indicated by column headers. Panel A models an indicator variable for a state-year observation where political reservations have been implemented in the state. Panel B includes an additional control variable that is the male-owned establishment analogue specific to the outcome variable studied. Thus, the dependent variable in the first column is the log count of new women-owned establishments in the unorganized sector measured by state-industry-year, and the additional regressor is the log count of new male-owned establishments in the unorganized sector in the same state-industry-year. This additional control

⁹ The total number of possible cells, in this case, would be 5,664 from interacting 32 states with 59 industries and three time periods. This theoretical count is reduced to 3,606 unique state-industry-year cells due to a number of state-industry cells not reporting any data in certain years. Nearly all of the remaining state-industry cells (95%) have a full panel among the final 3,606 observations.

provides a very powerful test by quantifying the relationship of reservations and women-owned establishments over-and-above contemporaneous male-owned business activity.

The results in Table 2 have a mixed message. On one hand, Columns 1 and 2 show a solid connection between the implementation of political reservations and women's entrepreneurship. The elasticities suggest a growth in new women-owned establishments and associated employment of approximately 40% after political reservations were implemented. New women-owned establishments account for on average 15% of all women-owned establishments. In Column 3, this growth in entry is associated with a positive response in total counts of women-owned establishments, but this response is imprecisely estimated. This smaller aggregate response may be due to the relatively short time frame for these changes to accrue; it may also indicate that some of the induced entry is very short-lived.

Column 4 considers the log employment of women overall in manufacturing for the state-industry, and Columns 5-7 separately consider employment in male-owned unorganized establishments, female-owned unorganized establishments, and the organized sector. While point estimates tend to be positive, there is no measurable evidence that political reservations increased women's employment in manufacturing. Thus, the implementation of political reservations in India connects to heightened entry of women-owned establishments but not to increased employment generally of women in manufacturing. From here on, we report exclusively the entrepreneurship findings as this null finding for wage work generally holds in the additional tests below.

Industry Variation and Household-Based Businesses

To help understand this entrepreneurship response, Table 3 quantifies the industry traits associated with the greater new establishment rates. For all columns in Table 3, the outcome variable is the log count of new women-owned establishments in the state-industry-year. The column headers of Table 3 indicate various industry traits that we measure at the national level in 1994 by industry. The key explanatory variable is an interaction of the implementation of state-level political reservations with the indicated industry trait.

By tapping into industry heterogeneity, we can provide further structure to our estimation framework by including state-year fixed effects. These fixed effects control for the aggregate

changes in activity by state in each year, including the main effects for state implementation that we quantified in Table 2. Thus, we only identify effects in Table 3 by looking at whether women-owned establishment entry in industries with a given trait responded more compared to other industries in the same state. To aid comparison across columns, we transform all industry traits to have unit standard deviation before interacting.

Column 1 shows that the state-level entry response to the political reservations was stronger in industries where women-owned establishments represented a larger share of establishments nationally in 1994. Appendix Table 2 documents these shares at the two-digit industry level across manufacturing industries, which range from over 40% in chemical products and tobacco products to less than 5% in over half of the two-digit industries. Estimations exploit variation at the three-digit NIC level that is similarly large. The log increase in entry rates for women-owned establishments is two times higher for each standard-deviation increase in the extent to which women have traditionally owned establishments in the sector.

Column 2 finds heightened entry in industries that traditionally centered on household-based establishments, and Column 3 connects the first two results by modeling the intensity of women-owned household-based establishments by industry in 1994. Given the power evident in Columns 1-3, we analyze further below in Table 5 the extent to which the heightened entry we observe descends from household-based versus independent establishments. Columns 4-6 show the corollary that the heightened women's entrepreneurship was weaker in industries with larger average establishment sizes, value-added per worker, and fixed capital intensity. These negative patterns continue to hold when calculating these three industry traits using only female-owned establishments in 1994.

The skewness of the traditional women-ownership shares raises concern that the strong patterns in Columns 1-3 may be driven by just a few outlier industries. Table 4 tests this concern by considering two different formats: log female shares and indicator variables for terciles of share intensity. Similar results are found in these variants, and the indicator variable approach in particular suggests that the most important difference occurs between the bottom tercile of traditional ownership (the excluded group) and the upper two terciles. We likewise find similar results with other treatments of the two states with prior adoption of reservations. The 0.390 (0.134) elasticity in Panel B and Column 3 of Table 3 is 0.339 (0.133) if excluding these two

states entirely, and it is 0.388 (0.127) if coding them as full adopters before our sample period starts.

Table 5 next builds upon the observed importance of household-based interactions to test more systematically the extent to which heightened women-owned establishment entry is occurring in household-based establishments versus independent facilities. To do so, we expand the sample to have a fourth dimension of establishment type, where type identifies household- or non-household-based establishments. Thus, our dataset now has four dimensions: state, industry, year and establishment type.

The first column of Table 5 regresses women-owned establishment entry rates in these cells on the earlier indicator variable for state-level implementation of reservations, a second indicator variable for the dimension of household-based establishment type, and an interaction of these two indicator variables. We also include state-industry fixed effects, industry-year fixed effects, and the male-owned establishment entry rate in the state-industry-type-year cell. The main effect in these regressions estimates the elasticity of non-household-based establishment entry to the implementations, while the interaction effect estimates the differential response for household-based establishments. Standard errors are clustered by state.

The first column finds that all of the effective response is concentrated in household-based establishments. The entry response is statistically different from zero and from the reference category of non-household based businesses. The pattern continues to hold after including state-industry-type and industry-type-year fixed effects, although these coefficients are no longer statistically significant at the 10% level. Columns 3 and 4 display similar patterns when examining employment-based measures.

Discussion

In summary, Tables 3-5 suggest that the growth in women's entrepreneurship after state-level implementations of political reservations was concentrated in industries where women have traditionally owned establishments and in a form that favored household-based enterprises. One plausible interpretation of these results is that the implementations of political reservations inspired women to open new establishments, which would be consistent with other studies of the impact of political reservations in India.

Consistent with this interpretation, women would likely have found it easier to start establishments in industries where they had prior work experience or where other women could aid them. Ghani et al. (2011b) in particular note the extent to which female entrepreneurship in India is stronger in districts and industries where incumbent women-owned enterprises exist. This work in the agglomeration literature may indicate why the concentration of activity after political reservations were implemented favored industries where women have historically owned more establishments nationally.¹⁰ The household scale of these establishments is perhaps a more surprising result, although as Table 1 points out, most women-owned establishments in unorganized manufacturing are household-based.

On the whole, however, we are cautious about this interpretation given that others may exist and we do not have direct evidence on the motivations of the women entrepreneurs. We have investigated three alternative hypotheses that do not seem to be supported by the data that we describe next.

Potential Channel: Reporting Bias

Iyer et al. (2012) find that reported crimes against women increased after state-level implementations of political reservations. They credit this increase not to higher underlying crime rates, but instead greater confidence among women to report crimes. One possible channel for our findings is that a similar growth in confidence or security led women to be more likely to report their household-based establishments after the reservations were implemented.

We doubt that this type of phenomena is behind our work for two reasons. First, conversations with experts on Indian data have not raised flags about this concern. We have also identified a variable in the NSSO that describes whether respondents appear to the survey administrator to be non-responsive or evasive. While the variable is only modestly populated, we have not identified with the records that we have anything to suggest behavioral changes for women-owned establishments around the reforms.

¹⁰ Ghani et al. (2011b) also find that women-owned establishment entry rates are stronger when there are more women-owned establishments in related industries (e.g., customer-supplier industries, industries that share similar labor needs) within the district even after controlling for incumbent ownership in the district-industry. This approach uses the agglomeration frameworks of Ellison et al. (2010) and Glaeser and Kerr (2009).

Second, the pattern of results speaks against this interpretation. We find that entry increased disproportionately in industries where women establishment owners were more concentrated before the reforms nationally. It seems to us unlikely that there would have been systematically more under-reporting in industries where women's ownership rates were very high.

Potential Channel: Access to Government Contracts or Business

A second potential channel is that placing women in political positions led to increased government contracts and related business flowing to women-owned establishments, which prompted the higher entry rates. This could have been due to politicians enacting explicit set-asides of contracts, or due to favoritism in contract awards.

Two questions on the NSSO survey inquire about the extent to which the establishment either buys from or sells to the government. We analyzed these questions using the format of Table 3, examining whether industries that disproportionately relied on these government contracts witnessed a disproportionate increase in women entrepreneurship. These interactions do not indicate any special relationship, finding elasticities that are very close to zero.

Potential Channel: Access to Finance

A third potential channel is that the political reservations led to a better financing environment for women entrepreneurs, perhaps due to the encouragement of microfinance organizations that served women-owned establishments. We investigated this channel in three ways that all suggest to us that finance is not a key mechanism. It is clear that more female-owned establishments with financial backing enter after the reforms, but this seems to follow the general trend for female entrepreneurship rather than lead it.

The NSSO collects data on external financing of unorganized establishments. The first piece of evidence comes when using Table 2's regression format and specifying the outcome variable to be the log count of new women-owned establishments with external financial backing. The coefficient estimates are 0.270 (0.159) and 0.243 (0.137) when using the formats of Panels A and B, respectively. These are weaker than the total entry elasticities of 0.391 (0.214) and 0.333 (0.194).

The second piece of evidence is reported in Column 7 of Table 3, where we test if the response was stronger in industries that were more dependent on external finance in 1994. This does not appear to be the case. Finally, a concern with these approaches is that they mix two things: 1) ability to get loans conditional on type with 2) changes in the type of establishments. To confirm this was not obscuring a strong role for finance, we estimated a series of regressions at the establishment level with outcome variables like loan access and interest rates. This approach allowed us to control for establishment traits, and the results again pointed to a limited role. On the whole, it appears that financing followed the increased entry rates, rather than finance playing a causal role.

6. Conclusions

The implementation of political reservations had strong effects for empowering women in India in many spheres. While we do not see evidence that this increased women's employment in manufacturing, we do identify that women are more likely to start new establishments in the unorganized sector after the reforms. This growth in entrepreneurship was concentrated in industries that women have traditionally been active in and at the household-establishment scale.

This study provides among the first evidence of how political reservations can affect economic outcomes for women. This linkage is important given that many long-term gains and entrenchment of the empowerment benefits from political reservations can be aided by better economic opportunities that grow in parallel with political voice. These linkages may also affect economies in other ways, given the rise in women's participation. In ongoing work, we are investigating the extent to which the higher entry that we document in this study has affected the persistence of the informal sector and potential agglomeration economies for Indian manufacturing.

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Table 1: Descriptive statistics

	Levels			Growth	Shares of total activity		
	1994	2000	2005	1994-2005	1994	2000	2005
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Establishment counts (000s)</u>							
Total	12,125	16,986	16,948	40%			
Organized sector	93	99	105	12%	0.8%	0.6%	0.6%
Unorganized sector	12,032	16,887	16,843	40%	99.2%	99.4%	99.4%
Women-owned establishments	2,037	4,419	6,176	203%	16.8%	26.0%	36.4%
Household based	1,919	4,146	5,818	203%	15.8%	24.4%	34.3%
Non-household based	118	273	358	203%	1.0%	1.6%	2.1%
<u>Employment (000s)</u>							
Total	34,424	40,702	40,336	17%			
Organized sector	6,775	6,723	7,470	10%	19.7%	16.5%	18.5%
Unorganized sector	27,649	33,979	32,866	19%	80.3%	83.5%	81.5%
Women-owned establishments	3,180	5,554	7,555	138%	9.2%	13.6%	18.7%
Household based	2,882	4,934	6,800	136%	8.4%	12.1%	16.9%
Non-household based	298	620	755	153%	0.9%	1.5%	1.9%
<u>Output (MM 2005 USD at PPP)</u>							
Total	459,689	650,566	870,224	89%			
Organized sector	384,375	501,638	705,215	83%	83.6%	77.1%	81.0%
Unorganized sector	75,314	148,927	165,009	119%	16.4%	22.9%	19.0%
Women-owned establishments	3,154	7,142	10,362	229%	0.7%	1.1%	1.2%
Household based	2,071	3,194	5,730	177%	0.5%	0.5%	0.7%
Non-household based	1,083	3,948	4,632	328%	0.2%	0.6%	0.5%

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

Table 2: Estimations of main effects of state political reservations on women's economic activity

	Log count of new women- owned establishments in unorganized sector	Log employment in new women- owned establishments in unorganized sector	Log count of women-owned establishments in unorganized sector	Log women employed	Log women employed in male-owned establishments in unorganized sector	Log women employed in women-owned establishments in unorganized sector	Log women employed in organized sector
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Base estimation							
(0,1) state has political reservations	0.391+	0.421+	0.215	0.015	0.075	0.137	0.039
	(0.214)	(0.242)	(0.289)	(0.311)	(0.266)	(0.299)	(0.154)
Observations	3606	3606	3606	3606	3606	3606	3606
Adjusted R-squared	0.733	0.701	0.818	0.825	0.817	0.808	0.838
Controls	State x industry and Year x industry fixed effects						
B. Panel A including male analogue of activity in state-industry-year							
(0,1) state has political reservations	0.333+	0.359	0.233	0.089	0.122	0.001	-0.004
	(0.194)	(0.216)	(0.262)	(0.205)	(0.182)	(0.200)	(0.110)
DV analogue for male-owned establishments in state-industry-year	0.118+++	0.111+++	0.216+++	0.442+++	0.389+++	0.515+++	0.366+++
	(0.024)	(0.024)	(0.030)	(0.048)	(0.055)	(0.043)	(0.048)
Observations	3606	3606	3606	3606	3606	3606	3606
Adjusted R-squared	0.737	0.706	0.824	0.853	0.840	0.865	0.855
Controls	State x industry and Year x industry fixed effects						

Notes: Regressions quantify adjustments in women's entrepreneurship and employment in India surrounding the implementation of state-level political reservations for women. Column headers indicate dependent variables. Regressions contain 3606 state-industry observations and include state x industry and year x industry fixed effects. Panel A includes a modified indicator variable for the period after a state implements political reservations. The modification allows for fractional values in two states that had pre-existing reservations that were below the level mandated by the Amendments. Panel B further includes a control for the analogue of the dependent variable for male-owned establishments. Regressions are weighted by log initial employment in state-industry in 1994 and cluster standard errors by state.

Table 3: Estimations of industry traits associated with increased entry of new women-owned establishments

	DV is log count of new women-owned establishments in unorganized sector by state-industry						
	Industry trait used in interaction, calculated in 1994 at the national level:						
	Share of unorganized establishments owned by women	Share of unorganized establishments that are household-based	Share of unorganized establishments that are household-based and female-owned	Log average establishment size	Log average value-added per worker	Log average fixed capital per worker	Log average financial liabilities as a share of output
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Base estimation							
(0,1) state has political reservations x industry trait in column header	0.306++ (0.151)	0.224+ (0.121)	0.399+++ (0.135)	-0.291++ (0.133)	-0.192 (0.146)	-0.280+ (0.151)	0.110 (0.092)
Observations	3606	3606	3606	3606	3606	3606	3606
Adjusted R-squared	0.737	0.736	0.738	0.735	0.735	0.735	0.736
Controls	State x industry, State x year, and Year x industry fixed effects						
B. Panel A including male analogue of activity in state-industry-year							
(0,1) state has political reservations x industry trait in column header	0.306++ (0.147)	0.211+ (0.119)	0.390+++ (0.134)	-0.263++ (0.132)	-0.184 (0.145)	-0.277+ (0.150)	0.108 (0.091)
Log count of new male-owned establishments unorganized sector for state-industry-year	0.097+++ (0.031)	0.096+++ (0.031)	0.096+++ (0.031)	0.105+++ (0.036)	0.107+++ (0.036)	0.107+++ (0.036)	0.097+++ (0.031)
Observations	3606	3606	3606	3606	3606	3606	3606
Adjusted R-squared	0.740	0.739	0.740	0.738	0.738	0.738	0.739
Controls	State x industry, State x year, and Year x industry fixed effects						

Notes: Regressions quantify industry traits associated with adjustments in women's entrepreneurship in India surrounding the implementation of state-level political reservations for women. The dependent variable is log count of new women-owned establishments in the unorganized sector by state-industry. Regressions contain 3606 state-industry observations and include state x industry, year x industry, and year x state fixed effects. Panel A includes a modified indicator variable for the period after a state implements the political reservation interacted with the industry trait from 1994 given in the column header. The modification allows for fractional values in two states that had pre-existing set-asides that were below the level mandated by the Amendments. Fixed effects absorb the main effects of the interactions. Industry traits are transformed to have unit standard deviation to aid in interpretation. Panel B further includes a control for the analogue of the dependent variable for male-owned establishments. Regressions are weighted by log initial employment in state-industry in 1994 and cluster standard errors by state-industry.

Table 4: Variations on interaction approaches of industry traits

	DV is log count of new women-owned establishments in unorganized sector by state-industry					
	(1)	(2)	(3)	(4)	(5)	(6)
(0,1) state has political reservations x women's ownership share in industry, 1994	1.965++ (0.973)			1.969++ (0.944)		
(0,1) state has political reservations x log women's ownership share in industry, 1994		2.556++ (1.218)			2.558++ (1.184)	
(0,1) state has political reservations x (0,1) women's ownership in 33-66th percentile			0.644++ (0.299)			0.647++ (0.299)
(0,1) state has political reservations x (0,1) women's ownership above 66th percentile			0.913++ (0.356)			0.895++ (0.355)
Log count of new male-owned establishments in unorganized sector for state-industry-year				0.097+++ (0.031)	0.097+++ (0.031)	0.096+++ (0.031)
Observations	3606	3606	3606	3606	3606	3606
Adjusted R-squared	0.737	0.737	0.737	0.740	0.740	0.740
Controls	State x industry, State x year, and Year x industry fixed effects					

Notes: See Table 3.

Table 5: Estimations of household- versus non-household-based entrepreneurship for women

	Log count of new women-owned establishments		Log employment in new women-owned establishments	
	(1)	(2)	(3)	(4)
(0,1) state has political reservations	-0.114 (0.147)	0.024 (0.162)	-0.047 (0.163)	0.070 (0.197)
(0,1) state has political reservations x household establishments	0.470+++ (0.160)	0.369 (0.239)	0.373++ (0.177)	0.318 (0.259)
(0,1) household-based business cells	0.872+++ (0.148)		0.816+++ (0.157)	
DV analogue for male-owned establishments in state-industry-type-year	0.218+++ (0.029)	0.101+++ (0.019)	0.194+++ (0.025)	0.091+++ (0.019)
Observations	5247	5247	5247	5247
Adjusted R-squared	0.555	0.668	0.524	0.626
State x industry fixed effects	Yes		Yes	
Year x industry fixed effects	Yes		Yes	
State x industry x type fixed effects		Yes		Yes
Year x industry x type fixed effects		Yes		Yes

Notes: See Table 2. Regressions quantify adjustments in women entrepreneurship within household-based establishments surrounding the implementation of state-level political reservations for women. Column headers indicate dependent variables. Regressions contain 5247 state-industry-type observations, where type indicates household- versus non-household-based establishments.

App. Table 1: Effective implementation by state of political reservations

State	Year of 73rd CAA enforcement	First election with mandated reservations
Andhra Pradesh*	1994	1996
Arunachal Pradesh	1997	2003
Assam	1994	2001
Bihar	1993	2001
Chhattisgarh	1997	2005
Goa	1995	2000
Gujarat	1997	1995
Haryana	1994	1995
Himachal Pradesh	1994	1995
Karnataka*	1993	1995
Kerala	1994	1995
Madhya Pradesh	1994	1994
Maharashtra	1994	1997
Manipur	1994	1997
Orissa	1996	1997
Punjab	1994	1998
Rajasthan	1994	1995
Sikkim	1993	1997
Tamil Nadu	1994	1996
Tripura	1994	1994
Uttar Pradesh	1994	1995
Uttarakhand	1994	1996
West Bengal	1993	1993
<i>UTs and States not under purview of 73rd Act Amendment</i>		
A&N Islands	1995	
Chandigarh	1998	
Dadra & Nagar Haveli	1995	
Daman & Diu	1995	
Lakshadweep	1997	
Meghalaya	n/a	
Mizoram	n/a	
Nagaland	n/a	
Delhi	n/a	
Pondicherry	not held	
Jharkhand	not held	
Jammu & Kashmir	not held	

Source: Figure 1.1, Study on EWRs in Panchayati Raj Institutions, Ministry of Panchayati Raj, GOI (2008). Notes: Table displays implementation of nationally-mandated political reservations. *: Andhra Pradesh and Karnataka had state-level mandated political reservations prior to the Amendments. "n/a" denotes that the states of Meghalaya, Mizoram and Nagaland, and the national capital territory of Delhi are excluded from the purview of the 73rd Amendment. "not held" denotes states have not held elections subject to 73rd Amendment provisions up to this point.

App. Table 2: Shares of establishments in unorganized sector owned by women in 1994

Industry	Share
24 Chemicals and Chemical Products	69%
16 Tobacco Products	43%
21 Paper and Paper Products	37%
17 Textiles	32%
25 Rubber and Plastic Products	19%
20 Wood and Products of Wood and Cork, except Furniture; Articles of Straw and Plating Materials	15%
18 Wearing Apparel; Dressing and Dyeing of Fur	14%
36 Furniture; Manufacturing N.E.C.	10%
15 Food Products and Beverages	9%
22 Publishing, Printing and Reproduction Of Recorded Media	5%
32 Radio, Television and Communication Equipment and Apparatus	4%
19 Tanning and Dressing of Leather; Luggage, Handbags Saddlery, Harness and Footwear	4%
35 Other Transport Equipment	4%
26 Other Non-Metallic Mineral Products	2%
33 Medical, Precision and Optical Instruments, Watches and Clocks	2%
27 Basic Metals	2%
31 Electrical Machinery and Apparatus N.E.C.	1%
29 Machinery and Equipment N.E.C.	1%
28 Fabricated Metal Products, Except Machinery and Equipments	1%
34 Motor Vehicles, Trailers and Semi-Trailers	1%
23 Coke, Refined Petroleum Products and Nuclear Fuel	0%
30 Office, Accounting, Computing Machinery	0%

Table 1b: Share of Businesses Owned by Women, 1994, 2000 and 2005
Unorganized Sector Manufacturing

State	<i>New Businesses</i>			<i>All Businesses</i>		
	1994	2000	2005	1994	2000	2005
Karnataka	44%	66%	54%	32%	51%	58%
Tamil Nadu	42%	48%	68%	37%	43%	53%
Andhra Pradesh	35%	39%	60%	24%	29%	52%
Kerala	34%	42%	60%	41%	49%	54%
West Bengal	24%	56%	70%	19%	31%	49%
Assam	21%	9%	34%	21%	18%	26%
Tripura	15%	16%	24%	12%	15%	28%
Punjab	15%	35%	54%	12%	33%	40%
Sikkim	14%	12%	3%	6%	3%	7%
Jammu & Kashmir	11%	12%	31%	9%	10%	22%
Himachal Pradesh	10%	22%	49%	9%	18%	27%
Orissa	10%	11%	40%	11%	22%	27%
Delhi	10%	14%	13%	7%	7%	12%
Bihar	10%	17%	13%	11%	8%	23%
Gujarat	9%	23%	35%	7%	12%	23%
Uttar Pradesh	8%	16%	42%	14%	19%	27%
Haryana	7%	17%	30%	3%	14%	21%
Maharashtra	6%	30%	38%	6%	22%	32%
Madhya Pradesh	3%	16%	39%	3%	19%	20%
Rajasthan	1%	30%	26%	2%	23%	28%
Total	20%	33%	50%	17%	27%	38%

Table X: Lead-lag approaches

	Log count of new women- owned businesses	Log count of new male- owned businesses
	(1)	(2)
(0,1) 1-3 years before a state implements political reservations	0.009 (0.128)	-0.466 (0.303)
(0,1) 0-1 years after a state implements political reservations	0.071 (0.256)	0.003 (0.495)
(0,1) 2-4 years after a state implements political reservations	0.448++ (0.197)	0.100 (0.480)
(0,1) 5+ years after a state implements political reservations	0.437 (0.265)	-0.047 (0.616)
Observations	3606	3606
Adjusted R-squared	0.523	0.655
Controls	State x industry and Year x industry fixed effects	

Notes: See Table 3.

Table 5: Estimations of household- versus non-household-based entrepreneurship for women

	Log count of new women-owned establishments				Log employment in new women-owned establishments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(0,1) state has political reservations	-0.114 (0.147)	0.162 (0.178)		0.024 (0.162)	-0.047 (0.163)	0.227 (0.201)		0.070 (0.197)
(0,1) state has political reservations x household establishments	0.470+++ (0.160)	0.060 (0.195)	0.055 (0.200)	0.369 (0.239)	0.373++ (0.177)	-0.035 (0.206)	-0.039 (0.213)	0.318 (0.259)
(0,1) household-based business cells	0.872+++ (0.148)				0.816+++ (0.157)			
DV analogue for male-owned establishments in state-industry-type-year	0.218+++ (0.029)	0.105+++ (0.018)	0.090+++ (0.021)	0.101+++ (0.019)	0.194+++ (0.025)	0.096+++ (0.017)	0.081+++ (0.020)	0.091+++ (0.019)
Observations	5247	5247	5247	5247	5247	5247	5247	5247
Adjusted R-squared	0.555	0.666	0.668	0.668	0.524	0.624	0.625	0.626
Net effect of reservations (main effect + interaction term)	0.356++ (0.165)	0.222 (0.207)		0.392 (0.250)	0.326+ (0.178)	0.192 (0.214)		0.388 (0.253)
State x industry fixed effects	Yes				Yes			
Year x industry fixed effects	Yes	Yes	Yes		Yes	Yes	Yes	
Year x state fixed effects			Yes				Yes	
State x industry x type fixed effects		Yes	Yes	Yes		Yes	Yes	Yes
Year x industry x type fixed effects				Yes				Yes

Notes: See Table 2. Regressions quantify adjustments in women entrepreneurship within household-based establishments surrounding the implementation of state-level political reservations for women. Column headers indicate dependent variables. Regressions contain 5247 state-industry-type observations, where type indicates household- versus non-household-based establishments.