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Determinants of Female Entrepreneurship in India

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DETERMINANTS OF FEMALE ENTREPRENEURSHIP IN INDIA

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ABSTRACT/RÉSUMÉ

Determinants of Female Entrepreneurship in India

This paper examines the nature and determinants of female entrepreneurship in India based on survey data. The first part assesses basic characteristics of female entrepreneurship in India, while the subsequent sections analyse key determinants of female entrepreneurship based on the literature, and test their importance at the state level in India with the support of regressions on panel-data. It also reviews existing policies bearing on female entrepreneurship and makes recommendations for further policies in this area. Entrepreneurship can create new economic opportunities for women and contribute to overall growth and exit from poverty. The potential flexibility in time use from entrepreneurship can also facilitate balancing work and family obligations for women. However, entrepreneurs, both male and female, are relatively scarce in India compared to peer countries, and tend to work in small units often outside the formal sector. While many of the barriers to entrepreneurship are common to both genders (access to capital and business networks, adequate training and facilities) female entrepreneurs face gender biases stemming from socio-economic factors or specific biases in laws such as inheritance laws.

This Working Paper relates to the 2014 *OECD Economic Survey of India* (www.oecd.org/eco/surveys/economic-survey-india.htm).

JEL classification*:* J16, J18, J21, J22, J46, J71, J82, J83.

Keywords: *India, gender, female economic participation, gender equality, female entrepreneurship*

Les déterminants de l'entreprenariat féminin en Inde

Ce document examine la nature et les déterminants de l'entrepreneuriat féminin en Inde à partir des données de l'enquête. La première partie évalue les caractéristiques de base de l'entrepreneuriat féminin en Inde, tandis que les sections suivantes analysent les principaux déterminants de l'entrepreneuriat féminin basé sur la littérature, et de tester leur importance au niveau de l'État en Inde avec le soutien de régressions sur données de panel. Il examine également les politiques existantes portant sur l'entrepreneuriat féminin et fait des recommandations pour de nouvelles politiques dans ce domaine. L'entreprenariat peut offrir de nouveaux débouchés économiques aux femmes et contribuer à la croissance globale et à la sortie de la pauvreté. La marge de souplesse dans l'utilisation du temps qu'offre l'entreprenariat peut également permettre de mieux concilier les obligations professionnelles et familiales des femmes. Toutefois, qu'ils soient hommes ou femmes, les entrepreneurs sont relativement rares en Inde par rapport à d'autres pays comparables, et ont tendance à travailler dans de petites entreprises souvent situées en dehors de l'économie formelle. Qu'il s'agisse du nombre d'entreprises en phase de démarrage ou du nombre d'entreprises nouvellement créées, l'Inde affiche des chiffres relativement faibles et en stagnation par rapport aux autres BRICS. Si bon nombre des obstacles à la création d'entreprise sont communs aux deux sexes (accès aux financements et aux réseaux économiques, formation adéquate, locaux), les femmes entrepreneurs se heurtent à des préjugés sexistes qui trouvent leur origine dans des facteurs socioéconomiques ou dans certains partis consacrés par le droit, notamment par le droit de l'héritage.

Ce Document de travail se rapporte à l'Étude économique de l'OCDE de l'Inde, 2014 (www.oecd.org/fr/eco/etudes/etude-economique-inde.htm).

Classification JEL: J16, J18, J21, J22, J46, J71, J82, J83.

Mots clefs : l'Inde, la participation économique des femmes, l'égalité des sexes; l'entreprenariat féminin

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DETERMINANTS OF FEMALE ENTREPRENEURSHIP IN INDIA

By Arnaud Daymard[1]

Entrepreneurship can create new economic opportunities for women and contribute to overall growth and exit from poverty. The potential flexibility in time use from entrepreneurship can also facilitate balancing work and family obligations for women. However, entrepreneurs, both male and female, are relatively scarce in India compared to peer countries, and tend to work in small units often outside the formal sector. Measured by early stage entrepreneurial activity or by the number of new enterprises created, India shows relatively low and stagnant sharesin the working age population compared to the other BRICs (Tables1 and 2). While many of the barriers to entrepreneurship are common to both genders (access to capital and business networks, adequate training and facilities) female entrepreneurs face gender biases stemming from socio-economic factors or specific biases in laws such as inheritance laws.

Table 1. **Share of entrepreneurs in the working population in selected emerging markets**

	2006		2013	
	All	**Female**	**All**	**Female**
India	10	9	10	6
South Africa	5	5	11	9
China	16	15	14	12
Brazil	12	10	17	17
Indonesia	19	19	26	25

1. Share of entrepreneurs in the working population is measured by Total early-stage Entrepreneurial Activity (TEA), which is the percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business

Source: Global Entrepreneurship Monitor

Table 2. The rate of n**ew company registrations in selected emerging markets**

	2006	**2009**	**2012**
Russia	5.4	3.9	4.3
India	0.0	0.1	0.1
South Africa	8.5	7.9	6.5
Brazil	2.1	2.2	2.2
Indonesia	0.2	0.2	0.3

1. New company registrations is measured by new density, which is the number of newly registered companies with limited liability per 1,000 working-age people (those ages 15-64).
Source: World Bank Doing Business Report

1. Arnaud Daymard worked on the India Desk in the Economics Department of the OECD as part of his PhD preparation. This paper is based on material prepared for the 2014 OECD Economic Survey of India published in November 2014 under the authority of the Economic and Development Review Committee (EDRC). The author would like to thank Piritta Sorsa, Isabelle Joumard and Urban Sila for valuable comments on earlier drafts. Thanks go to Annamaria Tuske and Hermes Mourgavi for the statistical work and Anthony Bolton for administrative support. Special thanks to Vincent Koen and Mariarosa Lunati for their contribution at various stages

This paper examines the nature and determinants of female entrepreneurship in India based on survey data. The first part assesses basic characteristics of female entrepreneurship in India, while the subsequent sections analyse key determinants of female entrepreneurship based on the literature, and test their importance at the state level in India with the support of regressions on panel-data. It also reviews existing policies bearing on female entrepreneurship and makes recommendations for further policies in this area. The methodology of the panel-data anlaysis is to be found in the annexes. The main recommendations to enhance female entrepreneurship are:

- Ensure that all children complete mandatory education and encourage young women to pursue higher education
- Extend quotas for women to state and national parliaments to increase the visibility and power of women politicians; specifically, accelerate the approval of the Women's Reservation Bill in the Lok Sabha and state parliaments
- Build energy infrastructure (access to water and electricity) and transport infrastructure to increase women's time available for work and make them potential entrepreneurs
- Fight against gender stereotypes early in school to avoid women being trapped in traditional female activities
- Widen the use of Entrepreneurship Development Programs (EDP) specifically aimed at women and marginalized populations

Basic characteristics of female entrepreneurs in India

Definition of entrepreneurs

Most entrepreneurs in India function in the unincorporated or unorganised (informal) sector which accounts for 99% of all firms (Table 3). Unincorporated and unorganised enterprises are firms of small size that are not covered by most employment and social protection laws. Data with gender classification for these small enterprises is obtained from NSSO surveys about every five years for manufacturing and service enterprises. The ASI data on larger companies is not available by gender.

Table 3. **Distribution of firms in India by status in 2006-2007**

Manufacturing			Services		
Firm type	**Count in thousands**	**Percentage of total**	**Firm type**	**Count in thousands**	**Percentage of total**
Organised	140	1	Incorporated	68	1
Unorganised	17,068	99	Unincorporated	6,661	99

Source: manufacturing: NSS 62nd and ASI, 2005-2006 services: NSS 63rd, 2006-2007. Recent numbers for trade incorporated companies are not available. A firm belongs to the organized sector if it uses power and employ ten or more workers or if it does not use power but employ 20 or more workers. A firm is said to be incorporated if it is registered under the Companies Act, 1956. Firms consisting of more than twenty persons are not allowed to stay unregistered under this act.

Entrepreneurs can be divided into those with and without workers as their characterictics and determinants tend to differ in India. Most entrepreneurs in India have no employees and often engage in subsistence activities such as street vendors. They differ in characteristics from small unorganised firms that employ people and have more structured activities. The entrepreneurs without employees often also substitute regular employment, with the purpose of having more flexibility for household tasks or children (Williams, 2004), or simply because lack of education restrains the access to labour market (Minniti, 2010). In contrast, entrepreneurs that employ workers, sometimes called "opportunity-driven entrepreneurs" (Kobeissi, 2010), generally intend to grow a company on their own and are usually more educated than the entrepreneurs without workers. This is slightly different from OECD countries, where many enrrepreneurs without workers tend to develop to larger businesses, or many highly educated young people become entrepreneurs in a difficult job market (OECD 2013).

The two types of entrepreneurs are also generally independent of each other in India (Schoar 2009), in that few entrepreneurs without workers become entrepreneurs employing people and vice versa. For instance, in developed countries entrepreneurs are generally former salary workers who benefit from networks and experience acquired throughout the years to grow a company in the same sector as their former employer (Schoar, *ibid*). Entrepreneurs without workerss, by contrast, tend to leave entrepreneurship for wage-employment when labour market improves to seize better job opportunities and go back to being entrepreneurs when the labour market deteriorates (Mondragon-Velez, 2008). Both categories also differ by their resources in India (high/low human capital) and by their motivation (fulfilment, satisfaction of career choices, prestige/necessity to earn a decent income), and thus might differ in their response to policy changes. As the determinants of entrepreneurship are likely to differ between these groups, this study will make a distinction between them in contrast to a number of past studies that combine them (Ghani et al. 2012, 2013).

The most comprehensive database on entrepreneurship in India by gender can be obtained from NSSO enterprise surveys (Box 1). The type of the entrepreneur can be inferred from the the number of and nature of people employed, as the surveys do not provide data on the the nature of the household owning the company. The surveys distinguish three types of workers: owner workers, helpers and hired workers. Owner workers are people working in the enterprise and having a stake in it. Helpers are people belonging to the household(s) of the owner(s) and working in the company without being paid. Hired workers are workers receiving a regular wage. The number of hired workers is here used to differentiate between the types of entrepreneurs for the analysis of female entrepreneurship.

The definition chosen is also supported by entrepreneurship-related statistics about the firms. Firms with hired workers have on average a larger number of workers, and are more likely to experience growth, to maintain accounts and to use a computer. (Tables 4 and 5). Entrepreneurs in firms with hired workers also focus on fewer lines of activity. The two types of entrepreneurs also work on different types of premises. Firms with hired workers are more likely to have premises outside the household, and to have a fixed structure (as opposed to a mobile structure such as a kiosk, or no structure such as a mobile vendor). While it is tempting to raise the criterion used to two hired workers or more, raising the number of hired workers would introduce sampling concerns. Firms with hired workers are about a third of the total, that is, 116 329 firms. Dividing this further into men and women, sectors and Indian states implies dividing these observations by a factor of 210 if they were uniformly distributed. Therefore, keeping a low sampling error implies keeping a relatively low criterion for the number of hired workers.

Box 1. **Main sources of entrepreneurship data in India**

Employment and entrepreneurship data in India relies on many sources partly reflecting different collection of organized and unorganized sector data.

The Annual Survey of Industries (ASI):

- The Annual Survey of Industries is the main source of data on the organized industrial sector, that is, either manufacturing enterprises using electric power and employing ten or more workers, or manufacturing enterprises not using electric power but employing twenty or more workers (sections 2m(i) and 2m(ii) of the Factories Act 1948). It was launched in 1960 and carried out every year since then. There is no breakdown by gender and the coverage is about 20% of total manufacturing employment. Along with basic data, ASI provides a mix of accounting data related to the balance sheet (fixed assets, working capital) and the income statement (revenues, expenses and profit) of the companies covered.

The NSSO Socio-Economic Surveys (NSS):

- The NSSO Socio-Economic Surveys, usually referred to National Sample Surveys (NSS) come in the form of rounds. The rounds relevant to entrepreneurship include:

  - the Unorganized Manufacture Survey covers all small manufacturing enterprises not covered by ASI;

  - the Unincorporated Non-Agricultural Enterprises Survey covers all enterprises not registered under the Companies Act 1956 and is analogous to the Unorganized Manufacture Survey except that it extends its coverage to the trade and service sector

  - the Surveys on Trade\Service sample all enterprises included in the broad activity sector chosen without any important coverage limitations.

  All these rounds provide a breakdown by gender and detailed data on the nature of the enterprises.

The Economic Census (EC):

- The Economic Census is a survey of broad coverage, aimed at listing all enterprises in India. Both agricultural (except those growing crops) and non-agricultural enterprises are covered since 1977 at roughly seven year frequency. Data collected include basic features of the business (type of ownership, type of activity, number and type of workers…) and characteristics of the owner (sex, religion, caste). More data is collected for enterprises with eight or more workers (including the use of a computer and Internet).

Table 4. **Characteristics of firms in the sample in 2011**

	All firms	**Firms with at least one hired worker**	**Firms without hired workers**
Average number of workers	1.9	4.3	1.4
Percentage of firms maintaining accounts	10.1	32.3	6.0
Percentage of firms using computers	3.2	13.9	1.2
Average number of other economic activities	0.30	0.21	0.31

Source: NSS 67th round, 2010-2011

Table 5. **Growth status of established firms in the sample in 2011**

Percentage of firms that are	Expanding	Stagnant	Contracting
All established firms	38	52	10
Established firms with at least one hired worker	51	41	8
Established firms without hired workers	36	54	10

Source: NSS 67th round, 2010-2011; established firms refer to firms which are at least three years old.

Female entrepreneurship in India is rising mostly among the entrepreneurs without workers

The number of female entrepreneurs has doubled over the past ten years to about 10 million outside the agricultural sector (Table 6) mostly due to the rise in enterprises without hired workers. Their share rose in all sectors, and women now account nearly half of total entrepreneurs without workers in manufacturing. In services and trade their shares have also grown but remained modest at about 10% of total. Given the often marginal nature of these activities, this can result from lack of wage employment opportunities elsewhere in the Indian economy. Despite solid GDP growth over the past decade only 4 million new jobs were created for women between 2000 and 2010, mostly in salaried employment in urban areas, while the female working age population not in school increased by 60 million over the period (Table 7). The remaining 58 million net new jobs were all taken by men. This suggests that the reason for the rise in female entrepreneurship can be a lack of other employment opportunities. However, not all of the rise in entrepreneurship may be captured by employment data if they work only some part of the month or year.

Table 6. **Female and male entrepreneurs in India: recent trends**

	Female entrepreneurs in % of all entrepreneurs			Count in thousands					
	2000	2005-06	2010	2000		2005-2006		2010	
				Male	Female	Male	Female	Male	Female
Entrepreneurs with workers									
Manufacturing	6	6	5	1,743	113	2,136	148	2,542	142
Trade	4	N\A	3	1,774	76	N\A	N\A	2,728	81
Services	6	8	6	1,402	95	1,885	158	2,762	188
Entrepreneurs without workers									
Manufacturing	29	43	46	8,637	3,448	8,275	6,129	7,591	6,542
Trade	6	N\A	10	14,210	945	N\A	N\A	15,693	1,770
Services	6	9	8	8,623	598	11,702	1,153	13,874	1,282

Source: various NSS rounds

Table 7. **Changes in working-age and employment population from 2000 to 2010**

		Female			Male		
		Rural	**Urban**	**Total**	**Rural**	**Urban**	**Total**
Working-age population		49	28	77	51	29	80
including:	Attending educational institutions	12	6	17	16	6	22
	Engaged in domestic duties and others	37	18	55	0	1	1
	Engaged in the labour force	0	5	5	36	22	57
including:	Unemployed population	1	0	1	0	-1	0
	Employed population	0	4	4	36	22	58
	Casual worker	0	1	1	18	4	22
including:	Salaried worker	1	3	4	2	9	12
	Paid self-employed	0	1	1	14	8	22
	Unpaid self-employed	-2	0	-2	1	1	2

Source: NSS 55th and 66th rounds. Unpaid self-employed are usually relatives of a business owner helping in running the family business.

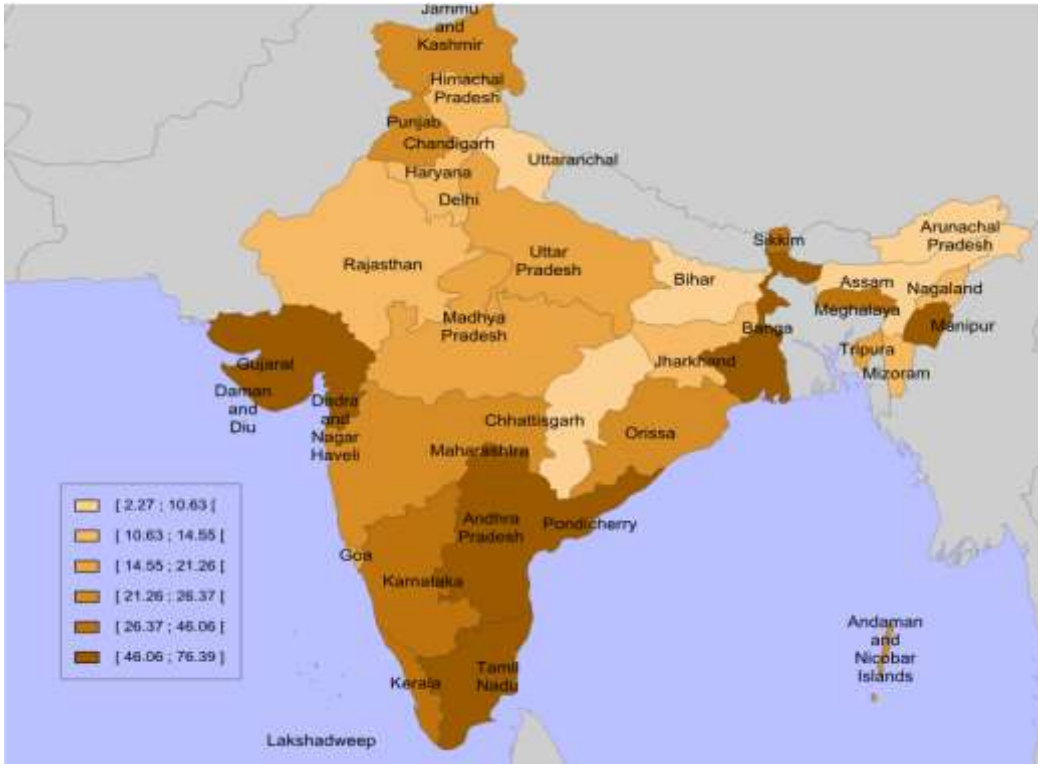
The share of female entrepreneurs that employ at least one person is small and has remained roughly stable over the decade. This suggests that problems remain for women to become entrepreneurs with workers despite the high sustained growth of the Indian economy in the past decade. They are most active the Southern and Eastern parts of the country (Figure 1). The regional concentration of entrepreneurs suggests, as with labour force participation (Sorsa 2015), that cultural factors can play a role in determining female entrepreneurship in India.

Female entrepreneurs with workers are most active in services, followed by manufacturing and trade. A more detailed sectoral breakdown shows that there are large differences between men's and women's activities. Apart from retail trade, which is the most important sector for both females and males (see Table 8), nearly half of female entrepreneurs with workers operate in traditionally female sectors. These are wearing apparel, education, health, and other personal services (beauty treatment, hairdressing, cleaning of textile, household maintenance etc.). In contrast, male entrepreneurs with workers are dispersed in more diverse activities.

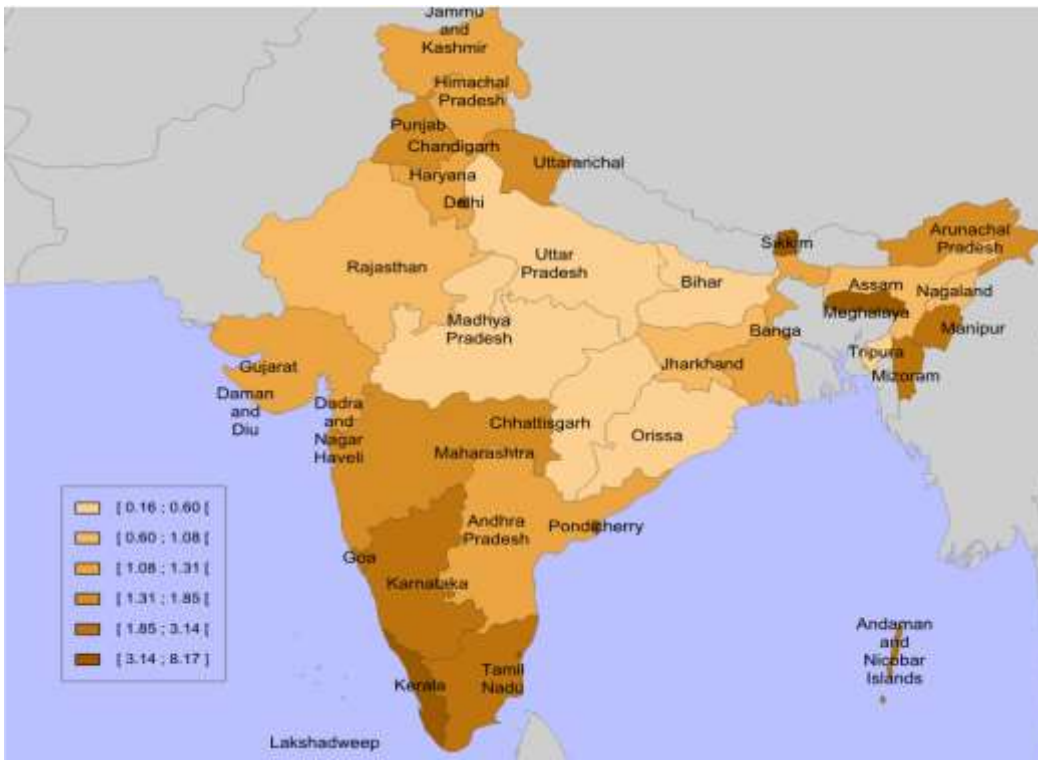
Figure 1. **Female entrepreneurship is highly concentrated in certain states (2011)**

Per 1000 women of age 15-59

Number of female self-employed



Number of female entrepreneurs



Source: NSS 67th round 2010-2011

Table 8. Sectoral breakdown of entrepreneurs with workers in 2011

Female entrepreneurs			Male entrepreneurs	
Rank	**Sector**	**in % of the total**	**Sector**	**in % of the total**
1	Retail trade, except of motor vehicles and motorcycles	17	Retail trade, except of motor vehicles and motorcycles	22
2	Manufacture of wearing apparel	14	Wholesale trade, except of motor vehicles and motorcycles	7
3	Education	12	Food and beverage service activities	7
4	Other personal service activities	11	Land transport and transport via pipelines	7
5	Human health activities	9	Manufacture of wearing apparel	5
6	Manufacture of textiles	6	Manufacture of food products	5
7	Food and beverage service activities	6	Wholesale and retail trade and repair of motor vehicles and motorcycles	5
8	Manufacture of food products	4	Manufacture of textiles	4
9	Wholesale trade, except of motor vehicles and motorcycles	3	Manufacture of fabricated metal products, except machinery and equipment	3
10	Manufacture of wood and products of wood and cork, except furniture	2	Education	3
	Total top ten sectors	83	Total top ten sectors	69

Source: NSS 67th, 2010-2011

The entrepreneurs with and without workers have distinct characteristics

Female entrepreneurs with workers tend to be more educated on average than female those without workers, with about 6 years of schooling versus 4 respectively (Table 9). This confirms the findings of previous research on differences in educational levels on types of entrepreneurship (Ardagna and Lusardi, 2008). Interestingly, although female entrepreneurs with workers are much fewer that male entrepreneurs with workers, female owned firms have more workers and are more likely to maintain accounts and to use a computer (Table 10).

Table 9. **Female educational attainment by activity status in 2010**

	Mean years of education for persons of age 15 and above
All female entrepreneurs	4.9
with workers	6.0
Without workers	3.9

Source: NSS 66th round, 2009-2010

Table10. **Firm characteristics for entrepreneurs with workers in 2011**

	Female	Male
Average number of workers	4.3	4.0
Percentage of firms maintaining accounts	35.7	30.2
Percentage of firms using a computer	17.3	12.6
Average number of other economic activities	0.15	0.21

Source: NSS 67th, 2010-2011

The main problems confronted by female entrepreneurs with workers are similar to those confronted by all entrepreneurs with workers (Table 11) such as power supply, weak demand and availability of skilled workers. The entrepreneurs without workers are more concerned by weak demand,cost and access to credit and recovery of past dues.

Table 11. **Problems faced by firms in 2011**

Problems faced over the past year	in % of all firms			in% of all proprietorships owned by women		
	All firms	Firms with at least one hired worker	Firms without hired workers	All firms	Firms with at least one hired worker	Firms without hired workers
Erratic power supply/ power cuts	5	10	4	3	9	3
Shortage of raw materials	2	2	3	3	2	3
Shrinkage /fall of demand	11	7	11	9	6	9
Non-availability / high cost of credit	8	5	8	5	4	5
Non-recovery of financial dues	9	7	9	5	6	5
Non-availability of labour as and when needed	2	7	1	0	6	0
Labour disputes and related problems	0	2	0	0	1	0
other problems	9	7	9	8	7	8

Source: NSS 67th, 2010-2011

Determinants of female entrepreneurship in India

Entrepreneurship in developing countries has been subject to numerous studies (van der Sluis *et al*. 2005, Ardagna and Lusardi, 2008, Schoar 2009). Many barriers to entrepreneurship, such as the business environment, affect both genders. There is also a growing literature on female entrepreneurship (Minniti 2010, Kobeissi 2010) and especially on India (Ghani *et al.* 2012, 2013, 2014) attempting to identify factors more specific to female entrepreneurship. These studies have identified education, income per capita, infrastructure, family situation, self-perceptions, or political representation as key to female entrepreneurship. Agglomeration and network benefits have also been deemed important (Ghani et al. 2012).

Education is of great importance for entrepreneurs

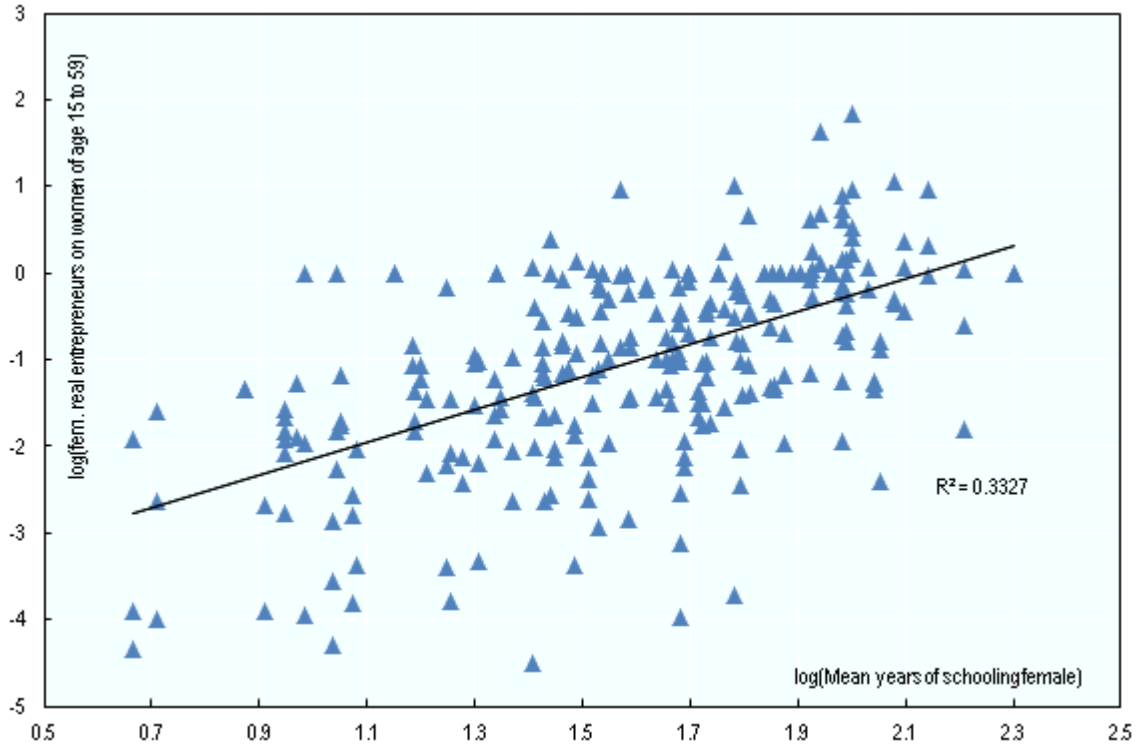
The links of education with entrepreneurship can be ambiguous. In developing countries, low education is widely recognized as a barrier to entry in the formal labour market. This would push women to create their own businesses as a way out of unemployment (Minniti and Naudé, 2010), and can explain why female entrepreneurship is often higher in developing countries than in developed ones (Kelley et al 2013). Brockhaus and Nord (1979) have suggested that workers with low education would choose entrepreneurship as a way of escaping a salary-worker environment where their low formal education give little opportunity for internal promotion. However, education can also have a positive effect on entrepreneurship by improving management skills (van der Sluis et al. 2005, Kolstad and Wiig, 2013), or facilitating access to credit by signaling ability to banks (Parker and Van Praag, 2006).

Education is likely to have different impact on entrepreneurs with and without workers. Polkovnichenko (2003) argues that an entrepreneur is willing to take risks only if she or he can cover the potential losses of failure by earning relatively high wages when going back to salary employment. Thus human capital can be interpreted not only as a hedge but as an *opportunity cost* for future entrepreneurs.

Highly educated women would then be more likely to take risks and become entrepreneurs with workers, while low educated women would be more likely to become entrepreneurs without workers because of difficulties to enter the labour market. Furthermore, in the Indian context specifically, education can also reduce the pressure for staying at home of social stereotypes and can increase womens' overall confidence when involved in business environments (Budhwar and Bhatnagar, 2005).

The regression results point to a strong and significant impact of education on the rate of female entrepreneurs with workers (Table A.3). A ten percent increase in the average years of education of women increases the number of female entrepreneurs with workers by approximately 18% . It also increases the share of female entrepreneurs with workers in the total population of entrepreneurs (Table A.4). The strong relationship of education and entrepreneurship can also be visualized with a simple regression model (Figure 2).In contrast, education is not significant for the entrepreneurs without workers even when dropping out other jointly insignificant variables (Tables A.5 and A.6) Along with the effects of human capital on confidence, ability and risk-taking explained above, this might suggest that states or districts with better educated women are less sensitive to gender stereotypes and that women entrepreneurs with workers in these locations are not considered as social outliers.

Figure 2. **Education and female entrepreneurship**



Source: cf Table A.1; data at a state and sector level for the years 2000, 2006 and 2011 is represented.

Labour force participation is more important for the entrepreneurs with workers

Female entrepreneurship is likely to be positively correlated with female labour force participation as both are influenced by general perceptions about the role of women in society, and the abandon of traditional gender stereotypes (Kobeissi 2010). Furthermore, women in the labour force acquire skills and financial resources, along with a general knowledge of business environments, that transform them into potential entrepreneurs with workers.

At the same time, a high rate of female labour force participation might reflect the necessity for women to work to supplement household income and avoid deprivation. Staying at home would be affordable only for relatively wealthier households. Eswaran et al (2013) argue that, in India, female labour force participation might be an U-shaped function of time, since "when the family income rises, it is entirely conceivable that married women change the nature of their activity, from market work to status-related work within the household." (*ibid*). The authors find a negative effect of wealth on female labour force participation when interacted with education. In this theoretical framework, high levels of female labour force participation would be positively correlated with entrepreneurship without workers, but not necessarilywith entrepreneurs with workers.

The regression results obtained tend to validate the first hypothesis, as labour force participation rate emerges as the second most significant variable with a positive effect on both types of entrepreneurs. An increase of 10 percentage points in the labour force participation of women raises female entrepreneurs with and wihtout workers by 27% and 26% respectively (Tables A.3 and A.5). The evidence is however stronger for the entrepreneurs with workers. Indeed, labour-force participation is not robust to the lagged-variable specification of female entrepreneurship without workers in Tables A.7 and A.8. It means that the positive correlation between female entrepreneurship without workers and female labour force participation can arise because of historical factors such as female networks that are persistent over time (see the methodology in the annexes for further details).

The acquisition of specific human capital through participation in the labour force seems to help turn women into entrepreneurs with workers. However, this can also reflect a demonstration effect as it may be easier to break the social barriers for working in districts where more women are already economically active. Female labour force participation is very low in India, with only 30 women out of 100 between ages 15-64 working or searching for work. It can reflect social norms that push women to stay at home, weak infrastructure endowment or slow job creation (Sorsa 2015). Female participation is also lower in urban than in rural areas.

Access to bank credit does not seem to foster female entrepreneurship

Gentry and Hubbard (2000), working on US households, report that entrepreneurs (although they do not use explicitly this name) have net wealth almost seven time larger on average than the rest of the population. This selection process results from the high cost of external financing for entrepreneurs that push them to rely on their own savings to create a business. Thus, improving credit and access to credit would decrease the cost of external financing and might increase the rate of female entrepreneurs with workers, especially since women rarelly own a substantial share of the household's financial assets. Additionally, given that the entrepreneurs without workers run mostly small, home-based businesses, credit constraints may be less effective.

Ayyagari et al (2013) found a negative relationship between financial deepening (the ratio of bank credit to net state domestic product) and the level of poverty of rural entrepreneurs. This study follows their definitions of financial deepening (bank credit/NDP) and financial broadening (number of bank branches per million people) for provision and access to credit respectively.

A bit surprisingly, access to credit has no positive effect on female entrepreneurship with workers in the regressions run. Financial deepening (bank credit/NDP) across Indian states is not statistically significant and does not become significant after removing jointly insignificant variables. Financial broadening (bank branches per capita) is even found to be negatively correlated to the share of female entrepreneurs without workers after removing jointly insignificant variables (Table A.6), but this relationship is not robust to the lagged variable specification. Furthermore, financial broadening does not affect the rate of female entrepreneurs with workers among total entrepreneurs. This suggests that male

entrepreneurs with workers are equally affected by financial broadening, and that this variable is *gender-neutral*. The result is a bit surprising and can reflect the existence of informal credit arrangements not captured by the banks-based data. Indeed, the largest source of credit in India is still friends and family (20% of people) compared to bank credit (8% of people) (Table 12).

Table 12. **Sources of credit in India for individuals**

Percentage of the population over 15 years old which had contracted a loan over the past year…			
	All	**Female**	**Male**
from a financial institution	8	7	9
from a private lender	7	6	7
from an employer	5	5	6
from family or friends	20	18	22
through store credit	7	6	7
from any source	31	28	33

Source: World Bank Findex database, 2011 Sample data has been estimated to be representative of 90% of the Indian population.

More dependent children encourages female entrepreneurship but does not increase the share relative to men

Most of the research on female entrepreneurship underlines the importance of the number of dependent children for entrepreneurship. On the one hand, children use up resources that could be invested in the business, and might increase the likelihood that women quit their business. On the other hand, children can also influence the decision to become entrepreneur, as this enables work at home and close to the children. Work flexibility and time gains obtained from not commuting would allow women to strike a balance between family and professional life (Kobeissi 2010).

In the regressions the child-woman ratio is positively related to female entrepreneurs with workers, but negatively related to femaleentrepreneurs without workers. An increase of 10% in the child-woman ratio is related to an increase of around 14% in the rate of female entrepreneurs with workers (Table A.3). However, it does not affect the share of female entrepreneurs among all entrepreneurs with workers (Table A.4). As for the female entrepreneurs without workers, one remarkable result is that child-woman ratio continues to enter significantly the regression when we include a lagged dependent variable, at least for the rate of female entrepreneurship without workers out of 1000 women (Tables A.5 and A.7). Child-woman ratio is statistically significant at least at a 5% level and the sign of the coefficient (negative) is the same.

On the surface this seems to suggest that having more dependent children would discourage the creation of firms without workers but encourage growth-oriented businesses. But such a causal relationship in the *business creation phase* seems unlikely. Table 11 shows that female entrepreneurs with workers in India have on average less dependent children than those without workers. This suggests that while the number of dependent children pushes to the creation of both types of businesses, female entrepreneurs with workers have more control on their fertility or simply choose to have less children and can therefore fully devote themselves to grow their business. Female entrepreneurs without workers, on the contrary, would be more likely to quit their business because of the need to spend time with their children. Hence, a causal relationship would link fertility and the *firm exit rates*. Alternatively, a third factor that is positively

correlated to the child-woman ratio and negatively (respectively positively) correlated to female entrepreneurs might have been omitted.

Table 13. **Child-woman ratio according to household status in 2010**

	Child-woman ratio
All households	34
Households with female entrepreneurs With workers	13
Without workers	24

Source: NSS 66th, 2009-2010. See Table A.1 for the definition of the child-woman ratio. Note that a household with female entrepreneurs may include women not involved in entrepreneurship.

Political representation of women has not raised female business ownership

Recent research has emphasized the role of *normative support* as an important determinant of entrepreneurship, that is, the degree to which women are encouraged to take high responsibilities in business or politics. In a cross-country study including 34 advanced and emerging countries, Minniti (2010) found that differences in perceptions related to fear of failure and self-confidence explained most of the variation in the gender gap in entrepreneurship along with differences in GDP per capita. In the context of India, where gender stereotypes remain strong, this variable can be important.

In the regressions, women's normative support was first proxied as the proportion of seats occupied by women in the Indian state legislative assemblies. From 2005 to 2010, women won on average 7% of the seats in state legislative assemblies across India. Self-confidence, assertiveness of women and men's acceptance to give political power to women should reflect somehow in the proportion of female candidates elected at states legislative assemblies. Besides, this variable is likely to affect more the entrepreneurs with workers than without, given that the latter is often a substitute for regular employment among poor women and thus less norm-breaking.

Female political representation at the state level shows no significant relationship to female entrepreneurship (Tables A.3 to A.8). It may be due to the overall low level of seats occupied. Elected women may also not have sufficient visibility in the media so that they cannot 'lead the way' for other women. Alternatively, as Clots-Figueras (2005) have suggested, if elected women mostly belong to upper classes, it is likely that they will reflect the achievement of a specific social group more than the achievement of women in general. Women from other classes will therefore not identify with them.

Another important aspect of normative support is the implementation of reservation policies (quotas) for women in local politics. In India, the 73rd Constitutional Amendment enacted in 1993 has provided for a reservation of one third of seats for women in the district, block and village councils. This legislation has been effectively implemented at various dates throughout India, creating a fertile ground for research. As regards entrepreneurship, Ghani *et al.* (2013) have found evidence that these quotas have led to an increase in the creation of women-owned small businesses in the manufacturing sector.

The second proxy of women's normative support was then constructed as the number of years since effective implementation of women reservations policies, that is, since the first elections with quotas for women have been carried out. This variable simply replaces the political representation variable in Table A.3 to A.6, and the new regression results are not shown to avoid redundance. Likewise, female reservations policies show no significant relationship with female entrepreneurship at a state-level.

However, given the broad definition of entrepreneurship that we have used (all female business owners) these result do not contradict Ghani *et al.*'s results where quotas have been found to impact the rate of *new* female business owners and not the rate of female business owners itself.

The share of marginalised populations affects negatively female and male entrepreneurship

In India certain disadvantaged social groups are identified in the constitution for affirmative action in areas such as access to education (the so-called scheduled castes and scheduled tribes). Earlier research has emphasized the role of social groups on restrictions put on women's economic participation. Eswaran et al (2013) argue that women from higher income social groups are subject to more restrictions on work and social life on behalf of men, because of status concerns. Upper social class women are meant to preserve their purity or respectability by staying away from men other than their husbands, which generally imply that they must stay at home in some parts of the country. Lower social classes women, on the contrary, would not generally be subject to such constraints given less concern for status, and low incomes necessitating that women also work. Thus the share of scheduled castes and tribes in the state population (a survey category used in India for most disadvantaged social groups) would presumably have a positive effect on both types of female entrepreneurs.

Yet Iyer et al (2011) found scheduled castes and scheduled tribes to be significantly underrepresented in the ownership of Indian enterprises across states and time. Additionally, their firms are usually of a smaller size and fewer of them hire labour outside the family. Thus, the lack of economic power of these groups could be detrimental to female entrepreneurship making the sign of the correlation unclear.

In testing for the importance of social background, the results do not show a significant relationship between the share of scheduled caste and tribes in the state population and female entrepreneurs without workers. However, a negative relationship emerges between the share of scheduled caste and tribes and the rate of female entrepreneurs with workers (Table A.3), although it does not seem to affect women more than men (Table A.4). This matches with the observation of Iyer et al (*ibid*) that the enhanced political representation of theses categories due to affirmative action has not significantly improved their economic power. Still marginalized, these categories would lack of wide business networks that other social groups already benefit from.

Population density and income per capita affect male and female entrepreneurs equally

Population density appears to be an important control variable, for both female entrepreneurs with and without workers (Tables A.3 and A.5). The concentration of population over a small area gives entrepreneurs access to a wide consumer base without having to create subsidiaries in other districts. Therefore, it allows entrepreneurs to benefit from economies of scale. It is gender neutral, affecting men and women equally. Indeed, the effect of density on the share of women entrepreneurs with and without workers among entrepreneurs depend on a sample bias and is ambiguous (Tables A.4 and A.6). Table A.3 shows that an increase in population density of 10% is associated with an increase in the rate of female entrepreneurs with workers by 3%. Thus, the effect of density on entrepreneurship cannot be neglected.

Interestingly, the role of income per capita that can measure the level of demand is very limited, having a positive impact only on the rate of female entrepreneurs with workers out of 1000 women. Like density, it is an important factor for entrepreneurship in general, but it is gender neutral and is not at the heart of gender issues.

Several control variables were also chosen such as income per capita and state religion. Control variables refer to background factors which are usually not directly under control of policy makers and are thus used to dissociate the effects of policy variables from other factors. Field et al (2010) have shown that the main religions practiced in India affect differently female entrepreneurship behavior through the

strength of their social constraints. A control for the proportion of Hindu people has therefore been included, given that some states have a majority of Muslim or Christian people and the mechanisms at work are likely to differ substantially. The proportion of rural population has also been taken into account, given that agricultural enterprises are outside the coverage of the database, and female entrepreneurs are mechanically less numerous in rural areas. Finally, when working on the ratio of female entrepreneurs without workers to all entrepreneurs without workers, the sex ratio of female to male for the 15-59 aged population is taken into account to control for the relative scarceness of women in certain states.

Entrepreneurship Policies

India has a long tradition in implementing various policies to enhance entrepreneurship in general (Box 2) and more specifically among women (Box 3). They have included mostly micro interventions in training, facilitating access to credit, marketing support, technological upgrading and networking. They are likely to have helped many female entrepreneurs in small scale activities,. Especially the entrepreneurship development Programme should be expanded to provide more training to future entprepreneurs. It would be useful to evaluate more what works and why. It might also be important to differentiate the programmes for entrepreneurs that employ people and those that do not.

The analysis and regression results also point to the need to broader measures that address socio-economic barriers to female entrepreneurship. Potential measures include dealing with infrastructure deficiencies to increase women's time for outside work, further enhance opportunities for secondary and higher education, and remove gender stereotypes from school materials. A number of studies have also shown that extending quotas for women from local councils to state and national parliaments can enhance women's ability to take advantage of new opportunities as independent entrepreneurs (Ghani et al.).

Conclusions

The results obtained strongly support the idea that distinguishing between entrepreneurs with and without workers can help explain some of the at times conflicting results in aggregate studies on determinants of female entrepreneurship. Often, in empirical or theoretical papers, this distinction is implicit, but not explicitly stated by the author, so that when results are summarized, it gives rise to contradiction with previous research results. The present paper proposed a way of solving some of these contradictions by using an empirical criterion to distinguish between both types of entrepreneurs. On some points, such as education, or fertility, a striking contrast emerged between both categories, and with the case of fertility, giving rise to more questions to be addressed in subsequent research.

Education and female labour force participation emerge as the main factors driving female entrepreneurs in India, not only among the female population, but among the population of female and male entrepreneurs with workers. As to female entrepreneurs without workers, only female labour force participation might have a positive impact on the share of women entrepreneurs without workers, while education seems not to be an important factor. This points to the importance of female human capital, both general human capital through education, and specific human capital through labour force participation as drivers of female entrepreneurship in India.

Finally, the density of population affects positively both types of entrepreneurs, but it is found to be gender neutral. Variables such as access to bank credit, provision of credit or income per capita, where not recognized as important barriers or facilitators of female entrepreneurship. Caution, though, is required to interpret the results on credit since this study is dealing with state-level variables and formal sector credit, and while it covers a wide range of topics, it does not have the accuracy of surveys using micro-data.

Box 3. **Female entrepreneurship policies in India**

The **Ministry of Women and Child Development** has several ambitious programs for female self-employment:

Support to Training & Employment Programme for Women (STEP) was launched in 1986 to help groups of vulnerable women to set up their own business to get out of poverty and improve their social status. The first stage of the process is the creation of a Self Help Group (SHG) that will help women to build self-confidence and give them a first experience of money management by collection of savings and lending to individual members. A business plan is then prepared by a non-government organization (NGO) with a focus on traditional sectors of employment relevant to the specific area. Members of the SHG then receive suitable vocational training, and fixed assets as well as working capital requirements are financed jointly through a government grant and the NGO grant/loan or a bank loan. Government subsidies are then phased out over a period of 5 years with the ultimate goal of self-sufficiency. STEP also provides support services such as health check-ups and child care for the duration of the project, and organizes general awareness programs about nutrition and gender issues.

The National Credit Fund for Women, also known as **Rashtriya Mahila Kosh** (RMK) was set up in 1993 provides access to micro-credit to poor Indian women, by making loans to microfinance institutions (MFI) involved in women empowerment. Non-profit organizations can apply for a loan from RMK, including NGOs, Cooperative societies, Government organizations, or State Women Development Corporations (state-level equivalents of the Ministry of Women & Child Development), provided the organization has sufficient experience in credit management. RMK also finances agricultural vocational trainings through a dozen partner institutions across India.

The **Swayam Sidha Scheme**, also known as Integrated Women Empowerment Programme was launched in 2001 and ended in 2008, its objectives are similar to STEP, except that it put more emphasis on the first stage of STEP. After the creation of the initial Self-Help Groups, the Swayam Sidha Scheme requires the SHGs to federate into Village Societies, including representatives of each SHG and local functionaries. The Village Societies will then federate into Block Societies, (the block being the administrative unit directly under the district) that can ask for registration as non-profit society. The aim is to strengthen the links between women SHGs to make them more powerful. This hierarchical structure is also meant to provide a single channel for the delivery of the various schemes of the Ministry of Women and Child Development.

Besides actions of the Ministry of Women and Child Development, certain schemes of the **Ministry of Micro, Small and Medium Enterprises** (Ministry of MSME) and its Development Commissioner, give preferential treatment to women. This preferential treatment is usually shared with SC/ST categories, North-Eastern states, and sometimes with micro-enterprises (defined in terms of the size of fixed assets). Under the **Prime Minister's Employment Generation Programme** (PMEGP) discussed in Box 2 the share of the government grant in setting up a micro-enterprise rise from 15% to 25% in urban areas and from 25% to 35% in rural areas when the beneficiary is a woman. Additionally, the share of the project cost to be supported by the beneficiary drops from 10% to 5%, the remaining 70% to 60% being covered by a bank loan.

Under the **Micro and Small Enterprises - Cluster Development Programme** (MSE – CDP) created in 2007, clusters with more than 50% of female-owned enterprises benefit from a government grant of 90% for "Soft Interventions" (organization of training sessions and seminars, hiring of business consultants etc.) and for "Hard Interventions" (creation of common facility centres, such as testing centres, warehouses, effluent treatment plant etc.) instead of a government grant of respectively 75% and 70% for low-priority clusters. The government grant is also raised to 80% (instead of 60%) for "Infrastructure Development" (construction of roads, power or water distribution networks etc.) and the minimum threshold to benefit from soft interventions is lowered from 25 to 20 cluster units.

Under the **Credit Guarantee Fund Scheme for Micro and Small Enterprises**, launched in 2000, the guarantee cover for women-owned businesses in case of default is extended to 80% of the bank loan instead of 75%.

The **Trade Related Entrepreneurship Assistance and Development (TREAD) for Women** aims at improving access to credit for female entrepreneurs in non-agricultural activities. The objective is to mobilize the help of local NGOs to formulate business plans and obtain bank loans for one or several female entrepreneurs, and provide technical training and business advice. The government grant amounts to 30% of the total project cost, which in the guidelines of TREAD includes not only fixed assets and working capital but also training and consultancy fees and participation in product exhibitions.

The **Mahila Coir Yojana**, managed by the Coir Board under the Ministry of MSME: was launched in 1994 to modernize the traditional industry of the coir fibre by providing technical training and subsidies for the use of motorized spinning machines. Only women are eligible for assistance. They first receive a two-months training on the new equipment assorted with a training stipend, and the spinning machine is then purchased using a 75% government subsidy.

SIDBI ha0s also its own scheme for women entrepreneurs, namely the **Mahila Udyam Nidhi Scheme** to make subsidized loans to female entrepreneurs in small-scale businesses. New businesses as well as existing businesses can apply for assistance to upgrade technology, increase of production capacity or financial bailout. The soft loan (subsidized loan) is not to exceed 25% of the project cost, while the remaining 65% (taking into account the beneficiary's own contribution of 10%) can be financed under the usual SIDBI loan policy.

Finally, the **Ministry of Rural Development** and the **Ministry of Housing and Urban Poverty Alleviation** have designed a preferential treatment for women through their own self-employment schemes (respectively the Swarna Jayanti Gram Swarozgar Yojana and the Swarna Jayanti Shahari Rozgar Yojana). These schemes are analogous to PMEGP but they each apply to rural or urban areas only. The Ministry of Rural Development has issued guidelines stating that women should constitute no less than 40% of the beneficiaries, and the Ministry of Housing and Urban Poverty Alleviation has provided for a women-specific component of its own scheme similar to STEP.

Recommendations to foster female entrepreneurship

- Ensure that all children complete mandatory education and encourage young women to pursue higher education
- Extend quotas for women to state and national parliaments to increase the visibility and power of women politicians; specifically, accelerate the approval of the Women's Reservation Bill in the Lok Sabha and state parliaments
- Build energy infrastructure (access to water and electricity) and transport infrastructure to increase women's time available for work and make them potential entrepreneurs
- Fight against gender stereotypes early in school to avoid women being trapped in traditional female activities
- Widen the use of Entrepreneurship Development Programs (EDP) specifically aimed at women and marginalized populations

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ANNEXES

Methodology and the model

A panel data is constructed using Indian state-level variables. Data on female and male entrepreneurs is collected for the years 2000, 2006 and 2011 and on the independent variables simultaneously. The database includes entrepreneurs from the manufacturing, trade and service sector. Data for trade companies is not available in 2006, and entrepreneurs are split into three categories, manufacturing, trade and service, to bridge this gap in data. The dependent variables are computed at a state and sector level, but all the independent variables are computed at a state level, except for the sector dummies. Table A.1 describes the variables used and their sources, and Table A.2 provides summary statistics for them.

Rates of female entrepreneurs with ans without workers are computed out of 1000 women and out of 1000 entrepreneurs. The study does not distinguish between young firms and established businesses, and female entrepreneurs is to be taken in a broad meaning. This will keep the sample large enough to provide reliable estimates of the rates of female entrepreneurs across Indian states.

The study uses the following model:

$$y_{it} = \boldsymbol{x}_{it}\boldsymbol{\beta} + u_{it} \qquad i = 1,2 \dots N \; ; \; t = 1,2 \dots T \tag{1}$$

Where $\boldsymbol{x}_{it}$ is a row vector including both the variables we want to test and the control variables and including a constant. Tables A.3 to A.8 show the first set of results, which consist in estimating (1) by pooled OLS using fully robust variance estimator (2).

$$\widehat{Avar(\boldsymbol{\beta})} = \left(\sum_{i=1}^{N} \boldsymbol{X}_i'\boldsymbol{X}_i\right)^{-1} \left(\sum_{i=1}^{N}\sum_{t=1}^{T}\sum_{s=1}^{T} \hat{u}_{it}\hat{u}_{is}\, \boldsymbol{x}_{it}'\boldsymbol{x}_{is}\right)\left(\sum_{i=1}^{N} \boldsymbol{X}_i'\boldsymbol{X}_i\right)^{-1} \tag{2}$$

Where $\hat{u}_{it}$ are the pooled OLS residuals and $\boldsymbol{X}_i = \begin{pmatrix} \boldsymbol{x}_{i1} \\ \boldsymbol{x}_{i2} \\ \vdots \\ \boldsymbol{x}_{iT} \end{pmatrix}$.

This variance estimator is robust to arbitrary form of heteroskedasticity and arbitrary form of serial correlation in the error terms. In stata, it is computed using a clustering option on the cross-sectional observations i. Although this specifications are welcome in panel-data modelling, they will not be robust to the presence of an unobserved effect (sometimes refered to as cross-sectional intercepts), except if the unobserved effect is uncorrelated with the explanatory variables. In the latter case, pooled OLS will be consistent and the standard errors computed from (2) will be asymptotically valid. However, there is no reason to believe that an unobserved effect will be uncorrelated with the explanatory variables. This is why a test is carried out to determine the presence of an unobserved effect. The following estimator is used.

$$\frac{\sum_{i=1}^{N}\sum_{t=1}^{T-1}\sum_{s=t+1}^{T}\hat{u}_{it}\hat{u}_{is}}{[\sum_{i=1}^{N}(\sum_{t=1}^{T-1}\sum_{s=t+1}^{T}\hat{u}_{it}\hat{u}_{is})^2]^{1/2}} \qquad (3)$$

(3) is asymptotically distributed ($N \to \infty, T$fixed) as standard normal under the hypothesis of no unobserved effect. See Wooldridge (2010) for further details. We give the results of this test for each pooled OLS regression in tables A.3 to A.8, using a two-tailed test at a 5% significance level.

There are no signs of an unobserved effect as regards female entrepreneurs with workers, but strong evidence of one as regards female entrepreneurs without workers. This might reflect, as Ghani et al (2013) suggested, the role of female networks and hence the prevalence of past levels of female entrepreneurs without workers in their current rates. Fixing this using a random-effects estimator would not solve the problem of correlation between the unobserved effect and the explanatory variables. Using a fixed-effect estimator might seem appropriate, but there is strong evidence that the strict exogeneity assumption required for consistency of the fixed-effect estimator does not hold:

$$E(u_{it} \mid \boldsymbol{x}_{i1}, \boldsymbol{x}_{i2} \dots \boldsymbol{x}_{iT}, c_i) = 0 \qquad t = 1,2 \dots T$$

Where c_i is an unobserved effect. It is then better to model the lagged effect of female self-employment directly. Hence, the following model is used:

$$y_{it} = y_{it-1} + \boldsymbol{x}_{it}\boldsymbol{\beta} + u_{it} \qquad i = 1,2 \dots N\ ;\ t = 1,2 \dots T$$

Which is estimated by pooled OLS and using variance estimator (2) for female entrepreneurs without workers. This new set of results is shown in tables A.7 and A.8. Once included the lagged dependent variable, no signs of an unobserved effect have been found.

Table A.1 **Description of the variables**

Dependent variables		
Variable name	**Description**	**Source and remarks**
Female entrepreneurs	Female entrepreneurs are defined as female owners of a proprietary enterprise with at least one hired worker.	NSS Unincorporated non-agricultural enterprises 55th, 67th, Unorganized manufacturing 62nd, Unorganized services 63rd.
	Defined as female owners of a proprietary enterprise without hired workers.	id.
Female entrepreneurs on female of age 15 to 59	$\frac{\text{female entrepreneurs}}{\text{female of age 15 to 59 years old}} \text{ X } 1000$	id.
Female entrepreneurs on all entrepreneurs	$\frac{\text{female entrepreneurs}}{\text{female entrepreneurs + male entrepreneurs}} \text{ X } 1000$	id.

Independent variables - Hypotheses		
Variable name	**Description**	**Source and remarks**
Mean years of schooling female	Average years of education of the state female population of age 15 and above. See Table A.9 in the annexes for further details.	NSS 55th, 62nd and 66th rounds, Employment and Unemployment.
LFPR 15-59 female	$\frac{\text{female of age 15 to 59 years old in the labour force}}{\text{total female population of age 15 to 59 years old}} \text{ X } 100$	National Sample Survey (NSS) 55th, 62nd and 66th rounds, Employment and Unemployment. LFPR 15-59 male is computed analogously.
Credit to NSDP	$\frac{\text{credit granted by scheduled commercial banks}}{\text{net state domestic product}}$	Quarterly Statistics on Deposits and Credit of Scheduled Commercial Banks, Reserve Bank of India
Branches per capita	$\frac{\text{bank offices of scheduled commercial banks}}{\text{state population}} \text{ X } 10^6$	Quarterly Statistics on Deposits and Credit of Scheduled Commercial Banks, Reserve Bank of India
Child-woman ratio	$\frac{\text{children under 5}}{\text{female of age 15 to 49}} \text{ X } 100$ Female of age 15 to 49 refers to the child-bearing population of women	Census of India 2001 and 2011; for the year 2006, estimates from the Report of the technical group on population projections, May 2006, have been used
Political representation of women	Arithmetic mean of the share of women elected in states Legislative assemblies for the last 10 years.	Statistical reports of Assembly elections, Election Commission of India
Women reservations score	Number of years since the first elections with women reservations have been carried out	Ministry of Panchayati Raj (cf. bibliography); various government websites
Scheduled castes and tribes	$\frac{\text{households under the schd. castes or schd. tribes list}}{\text{state household population}} \text{ X } 100$	NSS 55th, 62nd and 66th rounds, Employment and Unemployment

Independent variables - Control variables		
Variable name	**Description**	**Source and remarks**
Trade	Trade is a dummy variable equal to one if the dependent variable is collected for the trade sector and equal to zero otherwise. Manufacturing has been chosen as the base group.	
Service	Service is a dummy variable equal to one if the dependent variable is collected for the service sector and equal to 0 otherwise.	
NDP per capita	Net domestic product per capita at constant prices (base year 2004-2005).	Planning Commission, Government of India
Access to electricity in urban	$\frac{\text{households in urban areas using electricity for lighting}}{\text{urban state household population}}$ X 100	NSS 55th, 62nd and 66th rounds, Household Consumer Expenditure
Density	$\frac{\text{state population}}{\text{state area in square meters}}$	Census of India 2001 and 2011, and Report of the technical group on population projections, May 2006, for the year 2006
Rural	$\frac{\text{rural population}}{\text{state population}}$ X 100	Census of India 2001 and 2011, and Report of the technical group on population projections, May 2006, for the year 2006
Hinduism	$\frac{\text{Hindu households}}{\text{state household population}}$ X 100	NSS 55th, 62nd and 66th rounds, Employment and Unemployment
Sex ratio 15-59	$\frac{\text{female population of age 15 to 59}}{\text{male population of age 15 to 59}}$ X 100	Census of India 2001 and 2011, and Report of the technical group on population projections, May 2006, for the year 2006

Table A.2 **Sample characteristics**

Variable	Observations	Mean	Standard Deviation	Min.	Max.
Dependent variables					
Female entrepreneurs with workers	271	3,706	5,825	0	28,750
Female entrepreneurs without workers	271	80,707	184,209	0	1,418,908
Female entrepreneurs with workers on female of age 15 to 59	243	0.53	0.71	0	6.30
Female entrepreneurs with workers on all entrepreneurs with workers	271	0.07	0.07	0	0.52
Female ent without workers on women of age 15 to 59	243	7.3	8.9	0	50.7
Female ent. Without workers on all without workers	271	0.20	0.18	0	0.87
Independent variables (Hypotheses)					
Mean years of schooling female	271	5.2	1.7	2.0	10.0
LFPR 15-59 female	271	31	15	6	65
Credit to NSDP	247	0.46	0.60	0.04	3.99
Branches per capita	271	89	49	32	306
Child-woman ratio	243	37	9	22	60
Political representation of women	231	5.3	3.2	0	12.1
Women reservations score	263	6.8	5.6	0	17
Scheduled castes and tribes	271	38	25	3	99
Independent variables (Control variables)					
Manufacturing (base group)	271	0.38	0.49	0	1
Trade	271	0.25	0.43	0	1
Service	271	0.38	0.49	0	1
NDP per capita	247	34	21	6	105
Access to electricity in urban	249	93	7	68	100
Access to electricity in rural	251	73	25	6	100
Density	271	1,041	2,249	13	11,320
Rural	271	65	21	3	90
Hinduism	271	70	28	1	99
Sex ratio 15-59	243	92	9	52	111

Table A.3 **Dependent variable: log (female entrepreneurs with workers on women of age 15 to 59)**

	(1)	(2)	(3)
log(Mean years of schooling female)	1.724***	1.665***	1.662***
	(0.364)	(0.349)	(0.350)
LFPR 15-59 female	0.024***	0.024***	0.024***
	(0.005)	(0.005)	(0.005)
log(Credit to NSDP)	0.168	0.125	0.126
	(0.144)	(0.116)	(0.112)
log(Branches per capita)	0.196	0.013	
	(0.170)	(0.189)	
log(Child-woman ratio)	1.359***	1.379***	1.379***
	(0.426)	(0.454)	(0.454)
Pol. Representation of women	0.017		
	(0.024)		
Schd castes and tribes	-0.009*	-0.012***	-0.012***
	(0.005)	(0.005)	(0.005)
Trade	-0.355**	-0.319**	-0.319**
	(0.153)	(0.155)	(0.154)
Service	0.397***	0.416***	0.416***
	(0.139)	(0.139)	(0.138)
log(NSDP per capita)	0.518*	0.730**	0.739***
	(0.275)	(0.286)	(0.231)
Access to electricity	0.000		
	(0.004)		
log(Density)	0.280***	0.272***	0.271***
	(0.096)	(0.079)	(0.078)
Rural	0.032**	0.046***	0.046***
	(0.015)	(0.016)	(0.016)
Rural²	-0.000**	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)
Hinduism	-0.012***	-0.012***	-0.012***
	(0.004)	(0.004)	(0.004)
Dummy 2006	-0.262	-0.292	-0.298*
	(0.192)	(0.203)	(0.173)
Dummy 2010	-0.578**	-0.609***	-0.615***
	(0.236)	(0.227)	(0.189)
Constant	-12.895***	-13.072***	-13.026***
	(2.464)	(2.466)	(2.463)
R-squared	0.630	0.615	0.615
N	212	224	224
Unobserved effect estimator	0.47	0.70	0.70
Evidence of an unobserved effect	No	No	No

Significance levels for Tables A.3 to A.8: * 10%; ** 5%; *** 1%

Table A.4 **Dependent variable: log (female entrepreneurs with workers on all entrepreneurs with workers)**

	(1)	(2)	(3)
log(Mean years of schooling female)	1.181***	1.292***	1.160***
	(0.289)	(0.241)	(0.249)
LFPR 15-59 female	0.023**	0.024***	0.019***
	(0.009)	(0.004)	(0.003)
log(Credit to NSDP)	-0.076	-0.094	
	(0.164)	(0.076)	
log(Branches per capita)	-0.165	-0.137	
	(0.177)	(0.134)	
log(Child-woman ratio)	0.753	0.588*	0.39
	(0.458)	(0.330)	(0.328)
Pol. Representation of women	0.009		
	(0.017)		
Schd castes and tribes	-0.003	-0.005	
	(0.006)	(0.004)	
Trade	-0.553***	-0.543***	-0.505***
	(0.128)	(0.117)	(0.120)
Service	0.178*	0.195*	0.194*
	(0.102)	(0.101)	(0.104)
log(NSDP per capita)	0.150		
	(0.285)		
Access to electricity	0.002		
	(0.004)		
log(Density)	0.171*	0.130**	0.093
	(0.100)	(0.063)	(0.063)
Rural	0.017	0.018	0.019*
	(0.012)	(0.012)	(0.012)
Rural²	-0.000*	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)
Hinduism	-0.011***	-0.010***	-0.009***
	(0.004)	(0.003)	(0.003)
Sex ratio 15-59	0.003		
	(0.026)		
Dummy 2006	0.003		
	(0.193)		
Dummy 2010	-0.138		
	(0.338)		
Constant	-8.859**	-7.351***	-7.107***
	(3.665)	(1.901)	(1.846)
R-squared	0.522	0.506	0.451
N	212	224	237
Unobserved effect estimator	-0.28	-0.18	-0.02
Evidence of an unobserved effect	No	No	No

Table A.5 **Dependent variable: log (female entrepreneurs without workers on women of age 15 to 59)**

	(1)	(2)	(3)
log(Mean years of schooling female)	0.32	0.371	
	(0.513)	(0.517)	
LFPR 15-59 female	0.023***	0.022***	0.019***
	(0.007)	(0.007)	(0.007)
log(Credit to NSDP)	0.028		
	(0.18)		
log(Branches per capita)	0.02		
	(0.328)		
log(Child-woman ratio)	-1.487**	-1.557**	-1.664**
	(0.684)	(0.634)	(0.672)
Pol. Representation of women	-0.029	-0.026	
	(0.035)	(0.03)	
Schd castes and tribes	-0.001		
	(0.009)		
Trade	-0.461*	-0.461*	-0.398*
	(0.251)	(0.248)	(0.238)
Service	-1.045***	-1.043***	-0.998***
	(0.193)	(0.193)	(0.188)
log(NSDP per capita)	-0.756	-0.64	-0.54
	(0.569)	(0.412)	(0.375)
Access to electricity	0.004		
	(0.008)		
log(Density)	0.511***	0.478***	0.337***
	(0.183)	(0.155)	(0.126)
Rural	0.069***	0.070***	0.052***
	(0.025)	(0.022)	(0.017)
Rural²	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Hinduism	-0.005	-0.004	
	(0.007)	(0.005)	
Dummy 2006	0.770**	0.733***	0.657***
	(0.300)	(0.231)	(0.220)
Dummy 2010	0.497	0.447*	0.443**
	(0.352)	(0.225)	(0.220)
Constant	3.752	4.071	5.936
	(4.658)	(4.089)	(4.023)
R-squared	0.437	0.434	0.399
N	212	212	224
Unobserved effect estimator	2.87	2.92	2.79
Evidence of an unobserved effect	Yes	Yes	Yes

Table A.6 **Dependent variable : log (female entrepreneurs without workers on all without workers)**

	(1)	(2)	(3)
log(Mean years of schooling female)	0.003		
	(0.325)		
LFPR 15 59 female	0.026**	0.027***	0.019***
	(0.01)	(0.006)	(0.006)
log(Credit to NSDP)	-0.115	-0.099	
	(0.194)	(0.136)	
log(Branches per capita)	-0.281	-0.287	-0.410**
	(0.271)	(0.226)	(0.194)
log(Child-woman ratio)	-0.945	-1.034**	-1.078***
	(0.651)	(0.416)	(0.386)
Pol. Representation of women	-0.014	-0.02	
	(0.019)	(0.025)	
Schd castes and tribes	-0.002		
	(0.008)		
Trade	-1.051***	-1.052***	-1.001***
	(0.187)	(0.186)	(0.172)
Service	-1.142***	-1.142***	-1.123***
	(0.134)	(0.132)	(0.127)
log(NSDP per capita)	-0.11		
	(0.355)		
Access to electricity	0.002	0.001	
	(0.005)	(0.004)	
log(Density)	0.297**	0.321***	0.097
	(0.114)	(0.11)	(0.089)
Rural	0.019	0.025**	0.015
	(0.013)	(0.011)	(0.011)
Rural²	-0.000**	-0.000***	-0.000**
	(0.000)	(0.000)	(0.000)
Hinduism	-0.013**	-0.013***	-0.008**
	(0.006)	(0.003)	(0.003)
Sex ratio 15-59	0.009		
	(0.030)		
Dummy 2006	0.419*	0.365***	0.296***
	(0.214)	(0.103)	(0.094)
Dummy 2010	0.309	0.245	0.187*
	(0.375)	(0.157)	(0.096)
Constant	0.728	1.233	3.766*
	(4.833)	(2.552)	(2.214)
R-squared	0.585	0.583	0.504
N	212	212	242
Unobserved effect estimator	2.62	2.56	2.62
Evidence of an unobserved effect	Yes	Yes	Yes

Table A.7 **Dependent variable: log (female entrepreneurs without workers on women of age 15 to 59)**

	(1)	(2)	(3)
Dependent variable (t-1)	0.535***	0.502***	0.491***
	(0.161)	(0.122)	(0.111)
log(Mean years of schooling female)	-0.284	-0.240	
	(0.447)	(0.315)	
LFPR 15-59 female	-0.005	-0.004	-0.003
	(0.009)	(0.004)	(0.004)
log(Credit to NSDP)	-0.022		
	(0.203)		
log(Branches per capita)	-0.537	-0.362	-0.239
	(0.481)	(0.253)	(0.242)
log(Child-woman ratio)	-1.821***	-1.747***	-1.689***
	(0.492)	(0.553)	(0.520)
Pol. Representation of women	-0.033	-0.036	-0.033
	(0.039)	(0.034)	(0.031)
Schd castes and tribes	-0.005	-0.005	
	(0.008)	(0.008)	
Service	-0.579**	-0.628***	-0.644***
	(0.255)	(0.215)	(0.198)
log(NSDP per capita)	0.233	0.252	
	(0.458)	(0.328)	
Access to electricity	0.004		
	(0.013)		
log(Density)	-0.040		
	(0.189)		
Rural	0.022	0.032*	0.033**
	(0.024)	(0.017)	(0.016)
Rural²	0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)
Hinduism	-0.001		
	(0.007)		
Dummy 2010	-0.525**	-0.533***	-0.533***
	(0.201)	(0.118)	(0.114)
Constant	9.799***	8.395**	8.122***
	(3.433)	(3.168)	(2.948)
R-squared	0.783	0.781	0.779
N	78	78	78
Unobserved effect estimator	-0.50	-0.36	-0.36
Evidence of an unobserved effect	No	No	No

Table A.8 **Dependent variable : log (female entrepreneurs without workers on all without workers)**

	(1)	(2)	(3)
Dependent variable (t-1)	0.863***	0.861***	0.817***
	(0.188)	(0.168)	(0.135)
log(Mean years of schooling female)	-0.062		
	(0.304)		
LFPR 15-59 female	-0.006	-0.004	-0.003
	(0.013)	(0.005)	(0.004)
log(Credit to NSDP)	0.149	0.132	
	(0.208)	(0.152)	
log(Branches per capita)	-0.247	-0.225	-0.041
	(0.174)	(0.179)	(0.087)
log(Child-woman ratio)	0.231	0.106	
	(0.74)	(0.231)	
Pol. representation of women	-0.019	-0.023	-0.013
	(0.021)	(0.021)	(0.016)
Schd castes and tribes	-0.004	-0.004	-0.004
	(0.006)	(0.004)	(0.003)
Service	-0.257	-0.259	-0.31
	(0.277)	(0.251)	(0.223)
log(NSDP per capita)	0.167	0.059	
	(0.275)	(0.257)	
Access to electricity	0.007	0.007	0.006*
	(0.006)	(0.005)	(0.003)
log(Density)	-0.023		
	(0.108)		
Rural	0.008	0.009	0.010*
	(0.01)	(0.008)	(0.006)
Rural²	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Hinduism	0.000		
	(0.006)		
Sex ratio 15-59	0.01	0.003	
	(0.029)	(0.011)	
Dummy 2010	-0.705**	-0.674***	-0.580***
	-0.275	(0.162)	(0.128)
Constant	-1.009		
	(5.05)		
R-squared	0.954	0.954	0.952
N	96	96	102
Unobserved effect estimator	-1.15	-1.15	-1.07
Evidence of an unobserved effect	No	No	No

Table A9.. **The Indian education system**

Type of education	Length in years	Cumulated years of education	Entering age
Lower primary	5	5	5-6
Upper primary	3	8	10-11
Secondary	2	10	13-14
Higher secondary	2	12	15-16
Certificate or diploma	0.5 to 4	8.5 to 14	10 to 16
Higher education – Bachelor	3	15	17-18

Source: The System of Education in India (2006), Nordic Recognition Information Centres; various websites.

Level of general education	Assumption on the years of education completed
Not literate	0
Literate and up to lower primary[2]	5
Upper primary	8
Secondary	10
Higher secondary	12
Certificate\diploma	12
Graduate and above	15

2. Literate persons without formal schooling are included.

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