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Informality, Micro and Small Enterprises, and the 2016 Demonetisation Policy in India

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Informality, Micro and Small Enterprises, and the 2016 Demonetisation Policy in India[#]

March 2018

Takashi Kurosaki[*]

Research Highlights

- Micro/small firms and their owners were compared between unregistered (more informal) and registered (more formal) units, using panel data over the 2016 Demonetisation
- Unregistered firms performed better than registered ones in terms of profit rates, through active innovation in process and marketing
- Micro and small enterprises that were highly credit constrained at the time of establishment performed worse than others even after when they were registered
- Dependent more on cash transactions, unregistered firms were affected more adversely by Demonetisation than registered firms, but their mode of transactions remained highly sticky

Abstract

Using a panel dataset collected in 2014–2017, we examine small and micro entrepreneurs in Delhi, India, distinguishing registered (more formal) and unregistered (more informal) enterprises. The dataset contains not only characteristics of entrepreneurs and firms but also GSS trust information. Quantitative analysis comparing two types of entrepreneurs reveals that their social backgrounds and trust were different and the difference is correlated with firm performance. In the micro and small enterprises sector in Delhi, registered and unregistered firms coexist with different kinds of superiority, but business transactions of both types remain highly cash-dependent even after the 2016 Demonetisation shock.

Key words: demonetization, entrepreneurship, informal sector, innovation

JEL Classification: O17, O14, L26

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1. Introduction

The informal sector is an important research topic in development economics. According to a survey by La Porta and Shleifer (2014), there are three major views toward the informal sector in development economics. First, the informal sector is led by small businessmen with viable entrepreneurship so that it has a high potential to grow if the government refrains from protecting formal-sector firms. This view originates from the ILO's view toward the informal sector during the 1980s, which called for the support of the informal sector. The second view, which is opposite to the first, characterizes the informal sector as the parasite, dominated by low productive entrepreneurs, who survive because of their advantage that unlike formal-sector firms, informal-sector firms are subject to neither taxation nor labor/environmental regulations. Under this view, the government should extend taxation and regulations to the whole economy in order to reduce the unfair advantage enjoyed by informal-sector firms. The third view, which could lie between these two extreme ones, is a dual economy, in which the informal sector is segregated from the formal sector. Under this view, the informal sector gradually dies out as poverty reduction proceeds.

Using mostly the evidence from World Bank Enterprise Surveys (WBES) across the globe, La Porta and Shleifer (2014) favor the third view. They show that informal-sector entrepreneurs are less educated and less dynamic than formal-sector ones, informal-sector firms are more isolated from modern financial services, and they do not formalize much even when the cost of registration/formalization is reduced. They conclude that the lowly-educated, low-ability entrepreneurs are the key factor distinguishing the informal sector from the formal sector. Based on this conclusion, they call for development policies to strengthen entrepreneurship in small and micro enterprises.[1]

Nevertheless, our understanding is highly limited regarding what characterizes entrepreneurship in the informal sector and how to develop entrepreneurship out of the sector. For example, does more education automatically improve entrepreneurs' ability in the informal sector? What kind of training is effective in nurturing the entrepreneurship?[2] As the first step toward answering these questions, this study characterizes the informal-sector entrepreneurship in India using a primary dataset collected by the author's group.

In India, where persistent absolute poverty and increasing regional inequality are

[1]However, the first and second views may not contradict each other but could be a reflection of continuous distribution of heterogeneous firms with different levels of informality. For example, Ulyssea (2017) develops and estimates an equilibrium model for Brazil where heterogeneous firms can exploit two margins of informality (firm registration and worker regularization).

[2]Recently, a number of empirical studies address these questions using randomized controlled trials (RCT), although they do not explicitly link their research motivation with the informal sector in developing countries. See for example, Karlan and Valdivia (2011), Gine and Mansuri (2014), etc.

becoming a serious concern, micro, small, and medium enterprises (MSMEs) are attracting attention because such enterprises are perceived as labor-intensive, and labor-intensive industrial growth is effective in reducing poverty. However, scientific evidence is limited with respect to coverage of sectors and different levels of information, resulting in a lack of deep understanding what characterizes entrepreneurship in India's MSMEs and how to develop MSME entrepreneurship.[3]

This study attempts to fill in these research gaps. It characterizes entrepreneurship in micro and small enterprises in Delhi using a panel dataset compiled from our primary surveys covering both manufacturing-sector and service-sector firms and firms with different levels of formality. More concretely, a random-sampling survey of 506 micro and small enterprise businessmen was conducted in northeastern areas of Delhi in November–December 2014, as a baseline survey. In the baseline survey, not only were the characteristics of entrepreneurs and firms studied but trust questions in the General Social Survey (GSS) style were also addressed. In June–August 2017, the endline survey was conducted to collect panel information on firm performance. As the Demonetisation[4] policy in November 2016, in which high value banknotes were demonetized overnight, affected small and micro enterprises substantially, specific questions on its impact were added in the endline survey. The panel data provide us with valuable information to investigate how small and micro entrepreneurs coped with the Demonetisation shock. Needless to say, ability to cope with such a macro shock is one of key elements of entrepreneurship.

In this paper, these data are analyzed to address two questions: (1) What characterizes more informal entrepreneurs/firms in comparison with more formal entrepreneurs/firms? (2) What is the impact of being more formal on firms' performance including coping with the Demonetisation? Regarding the second question, however, the results shown in this paper are descriptive, without controlling for endogeneity of the registration decision. Nevertheless, due

[3]Most of quantitative studies use survey data covering either organized manufacturing or unorganized manufacturing firms. As exceptions, Kathuria et al. (2012) and Sato (2008) combine two types of data. But the comparability of two types of datasets remains a problem. Some authors use a large-scale dataset focusing on unorganized firms, such as Iyer et al. (2013) using the Economic Census, and Deshpande and Sharma (2014) using the Fourth All India Census of MSMEs. These studies, however, do not examine the entrepreneurship in detail. Nikaido et al. (2015), Sasidharan and Raj (2014), and Sharma (2014) analyze unorganized firms based on research motivations somewhat similar to ours. None of these studies, however, cover service-sector firms, although such firms occupy a large share in the informal sector in India. Finally, there are several case studies that focus on a particular sector where informal-sector firms dominate, such as waste pickers (Hayami et al. 2006) and cycle rickshaws (Kurosaki et al. 2012). Such studies are insightful but lacking in the variation in the level of formality among firms.

[4]In this paper, the historical event of the Indian demonetization in November 2016 is denoted "Demonetisation" with capitalization and in British spelling. To refer to similar events in general, the term "demonetization" is used without capitalization and in American spelling.

to the unique nature of the dataset, the descriptive analysis provided in this paper is expected to shed new light on the informality and policies toward micro and small enterprises in India.

The remainder of the paper is organized as follows. Section 2 describes the data used in this study. Section 3 explains the empirical strategy. Sections 4-6 provide the results of the empirical analysis, first for the characteristics of more informal entrepreneurs/firms, second for the firm performance in the baseline, and third for the heterogeneous impact of the 2016 Demonetisation policy. Section 7 concludes the paper with policy discussion.

2. Data

Manufacturing firms in India are classified into "Organised Sector" firms and "Unorganised Sector" firms, depending on whether the firm is registered under the Factories Act, 1948. Under the act, manufacturing firms employing ten or more workers (using power) or twenty or more workers (without using power) are required to register. Once registered under the Factories Act, firms are subject to labor and environment regulations. Service firms in India are classified similarly, depending on whether the firm is registered under the Companies Act, 2013. Unlike the case of manufacturing firms, the registration is not required for those service firms employing workers over a threshold.

Both manufacturing and service firms whose capital investment is below stipulated limits can register under the MSME Development Act (MSMED Act) of 2006. Once registered under the MSMED Act, firms are eligible for various incentives such as indirect tax exemption, ISO support, government credit, and government procurement. In addition to these direct benefits, firms registered under the MSMED Act can expect indirect gains in credit access from private financial institutions. Many micro and small firms that are not registered under the Factories Act or Companies Act are registered under the MSMED Act.

Therefore, firms not registered under any of these acts are most informal than registered ones. In this paper, we denote such firms as "unregistered firms" and compare them with "registered firms." Due to the data limitation, we cannot distinguish the impact of each act.

The surveys in northeastern areas of Delhi centered around Shahdara were conducted by a non-profit organization (NPO) that conducted similar surveys on waste pickers (Hayami et al. 2006) and cycle rickshaws (Kurosaki et al. 2012). Due to these experiences, the NPO was able to access micro and small entrepreneurs who tend to be highly skeptical against outsiders.

Detail of the baseline survey is described by Kurosaki et al. (2015). Using a private business directory, we conducted a questionnaire-based survey of 506 firms out of approximately 1,000 firms in November–December 2014, spread over ten locations (clusters).

In the sampling, those firms classified as medium enterprises under the MSMED Act were excluded. The 506 baseline sample thus represents micro and small enterprises in northeastern areas of Delhi in manufacturing and services, excluding self-employed business without fixed offices/stores/workshops and grocers and constructors and restaurants. The median number of employees among the 506 sample firms was 4. About two-thirds operated in manufacturing, and one-third in services, both including various industries (see Section 4 for more details). As shown in Table 1, 231 firms out of 506 were unregistered with the government, representing the most informal firms.

<Insert Table 1>

Between June and August 2017, the endline survey was conducted with the target of resurveying all 506 firms in the baseline (see Banerji et al. 2018 for details). The questionnaire comprised two parts. The first part was on firm operation and the second part on the impact of Demonetisation.[5] When the owner changed, we interviewed the new owner. We were able to resurvey 287 firms. The attrition rate was higher than we expected, with major reasons for attrition being non-cooperation, business closure, and moving without contact information. The frequent cases of non-cooperation reflected businessmen's rising concerns against disclosing business details to outsiders against the backdrop of a policy environment comprising formalization drives by the government, including Demonetisation in November 2016 and the introduction of Goods and Services Tax (GST) in July 2017.

As shown in Table 1, the attrition rate was higher among registered firms than among unregistered ones and higher among manufacturing firms than among service firms. Attrition was also correlated with location, firm size, and entrepreneurs' characteristics (see Appendix Tables 1-2).

3. Empirical Strategy

To answer the question "What characterizes more informal entrepreneurs/firms in comparison with more formal entrepreneurs/firms?", we compare registered and unregistered firms (entrepreneurs) in two ways: bivariate comparison and multiple regression using the registration dummy as the dependent variable. The motivation for the multiple regression is

[5]At 8 PM, November 8, 2016, Prime Minster Modi suddenly announced that the highest banknotes of Rs. 500 and Rs. 1,000 would be demonetized at 0 AM, November 9, 2016. Although citizens were allowed to deposit the demonetized banknotes into their bank accounts until December 30, serious shortages of banknote supply continued and affected the economy until early months of 2017. See Government of India (2017) for their explanation of policy justification and how they estimated the growth slowdown due to the shock. See Ghosh et al. (2017) for leftist economists' criticism against the policy.

descriptive—we are interested in identifying partial correlation, controlling for other variables. Therefore, we estimate linear probability models by OLS (probit or logit analysis is conducted as robustness check) with the registration dummy as the dependent variable. As the number of observations is small but manufacturing and service firms are potentially different, we first allow slopes to differ between the two and impose restrictions of the same slope if the slope difference is statistically insignificant.

To answer the question "What is the impact of being more formal on firms' performance?", we first compare firm performance at the time of the baseline survey between registered and unregistered firms in two ways (bivariate comparison and OLS regression). In the multiple regression models, explanatory variables include the registration dummy and the list of variables employed in the first part of the analysis. We then compare the impact of Demonetisation between registered and unregistered firms using bivariate comparison. The analysis using the endline data is subject to potential bias due to attrition. To address this concern, we redo the baseline analysis using the subsample comprising panel observations. If the results are not significantly different from those reported using the full sample, which is the case, attrition bias is not likely to be serious.

A major weakness of this empirical strategy is the endogeneity of registration. As the registration dummy is endogenous, the bivariate difference and the OLS coefficient on it cannot be interpreted as causal. The reverse causality of selection may dilute the coefficient, in addition to the effect through third and omitted variables. As a descriptive analysis, we do not attempt to control for the endogeneity problem[6] but attempt to interpret OLS coefficients carefully, paying due attention to the possibility of endogeneity bias. More concretely, we interact the dummy variables with the manufacturing/service dummies and other pre-determined variables. By investigating the patterns in coefficients on such interaction terms, we hope to shed light on the relation between registration and firm performance. Rigorous identification of causal impact is left for further study. As before, we allow slopes of other explanatory variables to differ between the manufacturing and service sectors but impose restrictions of the same slope if the slope difference is statistically insignificant.

[6]To identify the causal impact of registration on firm performance, Sharma (2014) applies the propensity score matching (PSM) method. However, as the sample size is not large in her dataset, the list of observable variables included in PSM was limited, raising a concern that her results were potentially contaminated by endogeneity bias due to unobservables. On the other hand, Nikaido et al. (2015) do not control for the endogeneity of the registration status, the approach similar to ours.

4. Characteristics of Informal Entrepreneurs/Firms

4.1 Bivariate analysis

Table 2 compares characteristics of entrepreneurs running unregistered (more informal) and registered (more formal) firms. The average age of entrepreneurs is 42.5 among registered firms, whereas it is 37.5 among unregistered firms. The education level of unregistered entrepreneurs is substantially lower than that of registered entrepreneurs. The majority of our sample entrepreneurs are male but there are ten female entrepreneurs, eight of which run unregistered firms. Our sample includes 95 religious minority entrepreneurs: 31 Jain entrepreneurs (high registration rate) and 64 Muslim entrepreneurs (low registration rate). There are 19 migrant entrepreneurs, most of whom are running unregistered firms. Therefore, younger, less-educated, female, Muslim, and migrant entrepreneurs tend to run unregistered firms, all of these bivariate correlations are statistically significant. Our result regarding education is similar to those found in developing countries in general (La Porta and Shleifer 2014).

<Insert Table 2>

As an attempt to capture entrepreneurship in more detail, GSS trust questions were addressed to survey respondents. As shown in Table 2, there is no difference between registered and unregistered entrepreneurs regarding general trust. In contrast, specified trust questions reveal that registered entrepreneurs trust relatives/friends and neighbors more than unregistered entrepreneurs; unregistered entrepreneurs trust the police and law officers more than registered entrepreneurs. Given that corruption including bribes from the police, administration, and law officers affects business management in India (Carlin and Schaffer 2012), the last finding suggests that entrepreneurs who were registered were exposed to harassment from the police and law officers so that they showed less trust in them.

Now we move to the correlation between firm characteristics and registration status. The registration status and location among 10 survey clusters are significantly correlated (1% level of significance) with the pattern that registration rate is higher among enterprises in industrial estates. Because different location implies different access to infrastructure and local markets, location fixed effects are included in multiple regression analyses below. The registration status and industry classification are also significantly correlated at the 1% level, as shown in Table 3. The registration rate among manufacturing firms is approximately 60%, whereas that among service firms is approximately 40%. The difference is likely to reflect the fact that most of promotion policies under the MSMED Act target manufacturing industries. Within the manufacturing sector, the registration rate is higher among auto parts, plastic goods,

electric wires, and electronics. Within the service sector, the registration rate is higher among publishing services. Because different industry is associated with different technology and markets, industry fixed effects are also included in multiple regression analyses below. In other words, in the multiple regression, we examine which of firm/entrepreneur characteristics remains significantly correlated even after controlling for differences attributable to location and industry.

<Insert Table 3>

Other firm characteristics are compared between registered and unregistered firms (Table 4). Regarding the ownership structure, single proprietorship dominates in both categories. This reflects the micro and small nature of our sample firms. The exception in the form of private limited company is observed only among registered firms. Out of 506 sample firms, 18 had ISO, all of which belong to registered firms. Registered firms are approximately four years older than unregistered firms. As a measure of employment, we define the size of labor force as the sum of the entrepreneur, unpaid family members, and employees. The average labor force size was 10.7 persons among registered firms, significantly larger than 4.5 persons among unregistered firms. In our sample, there are 11 unregistered manufacturing firms with 10 or more employees. It appears that by separating workshops on paper or through other measures, these manufacturing firms avoid registration under the Factories Act. Registered firms' labor force contained more females, less unpaid family members, and more technical specialists than unregistered firms' labor force. Our finding that informality is associated with self-employment orientation is similar to those found in developing countries in general (La Porta and Shleifer 2014).

<Insert Table 4>

In terms of capital investment as well, registered firms are larger than unregistered firms—the average size was Rs. 1.68 million and Rs. 0.64 million,[7] respectively. If we compare them with the thresholds in the MSMED Act (manufacturing: Rs. 2.5 million and Rs. 50 million; services: Rs. 1 million and Rs. 20 million), our average figures fall on the "micro" category. There are a few firms categorized as "small" under this definition but no firm categorized as "medium", reflecting our sampling strategy. There is similar disparity if we look at the initial capital investment.

In our survey, we asked how the initial investment was financed using ten financial

[7] The exchange rate at the time of the survey was US$ 1 = Rs. 62 (Government of India 2017).

measures. In Table 4, we aggregate the results into three mutually-exclusive dummy variables. Approximately 20% of our firms depended only on their own savings. The access to government or bank credit was limited. The majority of firms relied on informal credit such as friends/relatives, moneylenders, and Chit funds. The difference between registered and unregistered firms was not statistically significant.

4.2 Regression results

Does the bivariate correlation shown in Tables 2-4 remain even after controlling for other variables? To examine this, OLS multiple regression analysis is applied to the same data including selected variables from Tables 2-4 simultaneously as explanatory variables. In the first specification, only those variables that are exogenous to firm behavior are included, while in the second specification some variables that could be endogenous to firm behavior are added. As we cannot reject the null hypothesis that all slopes (except for industry and location fixed effects) are equal between the manufacturing and service sectors, we report the results pooling the two sectors and imposing the restrictions of the same slopes. The results are reported in Table 5. The results in Table 5 were robust to other specifications.[8]

<Insert Table 5>

Most of explanatory variables remain to have the same sign as in Tables 2-4. However, many of them become statistically insignificant in the multiple regression. For example, the entrepreneur's age and migrant dummy become insignificant. The reason for the insignificance for the migrant dummy is that the Muslim share is high among migrants and the partial correlation between the Muslim dummy and registration status absorbs most of the correlation between the migrant dummy and registration status. On the other hand, the tendency for Jains, university graduates, and those with less trust in the police to register remains to be significant.

Many of the firm characteristics in Table 4 that were significantly associated with registration status now have insignificant coefficients in Table 5. This implies that most of the bivariate correlation observed in Table 4 was attributable to the correlation between location/industry fixed effects and registration status. On the other hand, industry fixed effect cannot explain everything. As shown in last rows in Table 5, the registration rate among manufacturing firms is estimated to be higher by 7 percentage points than the rate among

[8]For example, we attempted probit or logit instead of OLS; different definitions of education, location, and industries; different subsets used for regression (to exclude firms with zero employees or using the panel sample only). Details are available from the author on request.

service firms (the difference is statistically significant at the 5 to 10 % level). Remember that without controlling for other variables, the registration rate among manufacturing firms was higher by 20 percentage points than the rate among service firms in Table 3. Table 5 thus shows that approximately 60% of the manufacturing/service disparity reported in Table 3 was actually attributable to other variables included in Table 5.

5. Firm Performance and Informality

5.1 Bivariate analysis

Table 6 compares firm performance of unregistered (more informal) and registered (more formal) firms from three angles. The first angle is the qualitative information on innovation. There is no missing information in these measures. Tendency of responses from registered firms observed in our dataset is consistent with similar information recorded in WBES 2013. As the strength of our dataset against WBES, we compare two types of firms and find: (1) innovation has been adopted regardless of registration status, and (2) unregistered firms have adopted product innovation less but process or marketing innovation more than registered firms. The second finding suggests that unregistered firms are handicapped regarding product innovation as it requires a large investment in equipment or production lines. Process innovation defined here includes any attempt that contributed to an increase in production with no change in the products/services produced and the workforce number. This type of broadly-defined process innovation can be easily adopted by unregistered firms, thereby overcoming their handicap in product innovation. A reason for registered firms not to emphasize marketing innovation could be the guaranteed market of public procurement under the MSME promotion policies.

<Insert Table 6>

The second angle to measure firm performance is the annual growth rate of capital since firms' establishment. There are some data concerns such as missing information, arbitrariness in valuing land and buildings, and underreporting. However, as data on the capital growth rate among unregistered firms are highly limited in government documents, we include the variable in the table. The average growth rate among registered firms was 2.5%, whereas that among unregistered firms was 1.2%, indicating higher growth of registered firms. However, as the variance is large, the difference between registered and unregistered firms was not statistically significant.

As the third angle to measure firm performance, we calculated four measures related with sales and current profits. In Table 6, we give summary statistics of the four measures only

for those firms whose current profit was positive. This is because eight firms that reported negative profits (four each in registered and unregistered categories) appear to be outliers due to transient reasons or measurement error. Both sales and current profits were larger among registered firms than unregistered firms with the statistical significance at the 1% level. On the other hand, both profit/sales ratio and ROAs were lower among registered firms than unregistered firms. In case of ROAs, the difference was not statistically significant due to huge heterogeneity within each category of registration status. In contrast, the difference in profit/sales ratio was statistically significant and economically large—the average profit/sales ratio among registered firms was 28.8%, whereas the average ratio among unregistered firms was as high as 48.7%.

5.2 Regression results

The bivariate comparison shown in Table 6 thus shows that unregistered firms appear to overcome their handicap through adopting more process and marketing innovations, resulting in higher profit rates, although they still remain less profitable in terms of the total amount. Does this observation remain when entrepreneur/firm characteristics are controlled? The analysis in the previous section suggests that location or industry fixed factors could underlie the difference between registered and unregistered firms. To examine these, OLS multiple regression is applied to the same data, with performance indicators in Table 6 as the dependent variable. Explanatory variables include the registration dummy and those variables used in Table 5. As the registration dummy is endogenous, the coefficient on it could reflect both the causal impact of registration on firm performance and the selection effect.

<Insert Table 7>

Table 7 reports the results when the entrepreneur/firm characteristic variables are limited as in specification (1) in Table 5. We first allowed the slopes of these variables to differ between manufacturing and service firms. We then dropped those interaction terms involving the service sector dummy if the difference was not statistically significant at the 5% level to improve the degree of freedom from our small-size dataset. Regarding the interaction term of registration and the service-sector dummy, we keep it regardless of its statistical significance, as we are interested in differentiated impacts of registration between the manufacturing and service sectors. The coefficient on the interaction term is a sort of difference-in-difference (DID), suggesting the additional impact of registration if the firm is in the service sector in comparison with a firm in the manufacturing sector.

In columns (1)-(3), Table 7, we report results regarding innovation in three areas out

of five, which showed significant difference between registered and unregistered firms in Table 6 (bivariate analysis). The regression results show: (i) the tendency for unregistered firms to focus on process innovation remains statistically significant among manufacturing firms but it is cancelled by the service-sector interaction term, suggesting that the tendency is not statistically significant among service firms; and (ii) the tendency for registered firms to focus on product innovation also remains statistically significant, but again the tendency is attenuated among service firms. In other words, the contrast in innovation observed in Table 6 was mostly due to the difference within the manufacturing sector. Furthermore, as shown in columns (4)-(8), all measures of the capital growth rate, sales, and current profits were not significantly different between registered and unregistered firms once other entrepreneur/firm characteristics are controlled. The overall insignificance of registration status on firm performance suggests that entrepreneur/firm characteristics absorb the most of bivariate correlation between registration status and profit-related performances.

Among coefficients on entrepreneur/firm characteristics, we focus on credit access here. The results in Table 7 show that (iii) firms that used bank or government credit at the time of establishment tend to have higher sales, current profits, and profit/sales ratios (but the tendency was attenuated among service firms). This relation suggests that firms with better access to formal credit from the beginning remain to be advantaged in manufacturing, which requires larger investment than service firms.

To deepen our understanding between registration status and firm performance, we extended the model in Table 7 into different directions as well (full results are available on request). For instance, when we included interaction terms of the registration status and the firms' initial funding patterns, it is found that if a firm that used bank/government credit at the time of establishment is registered, the product innovation probability goes up. Combining this finding with insignificant coefficient on the dummy in column (2), Table 7, the registration brought substantial gain to firms that already had good access to institutional credit but not to firms without it. In other words, micro and small enterprises that were highly credit constrained at the time of establishment performed worse than others even after when they were registered.

These results were robust to other alterations.[9] The results are dropped for brevity (but available on request from the author). One notable finding was that the results were robust even when we excluded 96 manufacturing-sector firms that had ten or more employees. The 96 excluded firms may have different motivations to register or remain unregistered, as they are

[9]First, we added five more additional variables corresponding to column (2) of Table 5 characteristics. Then we attempted alternative specifications explained in footnote 8.

required to register under the Factories Act. All other firms register themselves mostly seeking for the benefits under MSMED Act. Nevertheless, the re-estimation with a smaller sample did not affect the results qualitatively. Overall, our results thus suggest that firm-level benefits attributable to registration were positive on average but not very strongly so.

6. The 2016 Demonetisation and Informality

Before discussing the Demonetisation impact, we compared firm/entrepreneur characteristics at the time of endline survey between registered and unregistered firms[10] (see Appendix Table 3). Despite nonrandom attrition, the contrast in ownership structure, firm size, entrepreneurs' age and education remained similar to those at the baseline.

Given this similarity, we compare the Demonetisation impact between registered and unregistered firms. As a rough measure of overall impact of Demonetisation on small and micro enterprises, we asked their owners what the levels of sales, employment, and input purchases were, during and after Demonetisation with the pre-Demonetisation level being at 100. The "during" Demonetisation period is defined as the one from November 9, 2016 (the first day after the demonetization of banknotes) to December 30, 2016 (the last day for depositing old notes in bank accounts). This is a subjective assessment whose answer tends to be round numbers such as 50, 75, 90, and 100, but still informative of the raw perception of entrepreneurs.

The average of the subjective assessment is reported in Table 8, first for the whole endline sample, then separately for registered and unregistered firms. During Demonetisation, firm sales declined to half, on average, and recovered only to the level of 70% or so during the post Demonetisation period. The drop was larger among unregistered firms than among registered firms. Employment also declined substantially but the decline in the number of workers and hours of work per worker were similar among the two types of firms, whereas the decline in wage payment was larger among unregistered firms. In other words, unregistered firms did not reduce the amount of employment but reduced or delayed the wage payment. This suggests that informal-sector firms employ workers based on networks (for example, hiring relatives) so that they are not able to adjust employment flexibly in the face of adverse shocks. The change in the purchase of raw materials and input followed the change in sales

[10]The registration status is at the time of the endline. Out of 109 baseline-registered firms, 93 remained registered and 16 changed into the unregistered status; out of 178 baseline-unregistered firms, 127 remained unregistered and 51 changed into the registered status. New registration mostly occurred in preparation for GST administration. De-registration occurred among micro units who failed to renew the registration status. The endline results reported in this paper remain qualitatively similar but with weaker contrast if we use the registration status at the time of the baseline.

closely.

<Insert Table 8>

Did Demonetisation drive informal entrepreneurs to change their business mode from cash-based to bank-based?

In India, commercial banks offer savings accounts to individuals and current accounts to enterprises. Both accounts allow the account holder to deposit savings, remit, draw and deposit checks, etc., but current accounts allow more generous use of checks and bank transfers. Therefore, among large and medium firms in India, using current accounts for business is the norm. Unlike such firms, among our sample firms, only 39% had current accounts for business. The disparity between unregistered and registered firms is huge: only 6% of unregistered firms used current accounts while 73% of registered firms did (statistically significant at the 1% level). Among unregistered firms, 11% used neither savings nor current accounts for business. They were not able to use bank-based transactions at all before Demonetization. Even after Demonetisation, the situation did not change much. Except for one case, in which a no-bank-account businessman started to use his savings account for business after Demonetisation, all others kept the same status in the use of bank accounts for business.

But this stickiness may hide changes in intensive margin of bank-based transactions. In Tables 9-10, we summarize the percentage of sales and wage payment going through banks. Regarding the receipt of sales (Table 9), bank-based transactions occupied about 25% before Demonetisation and the share marginally increased by 5 percentage points or so during Demonetisation, mostly reflecting the shortage of cash, and then remained at similar levels after Demonetisation. Unregistered firms relied less on bank-based transactions, i.e., less than 10%, on average. As shown in Panel B of Table 9, there were 15 firms who moved from “Cash only” to “Using banks” (they may continue to use cash as well) during Demonetisation but nine out of the 15 movers were registered firms. Furthermore, four out of the six movers among unregistered firms turned back to “Cash only” after Demonetisation. The informal firms’ dependence on cash transactions is indeed strong and sticky.

<Insert Table 9>

The importance of bank transactions in wage payments was lower than sales receipts, both before and after Demonetisation (Table 10). As the question did not apply to purely self-employed business without any paid employee, the number of observations in Table 10 is smaller than that in Table 9. Unregistered firms’ use of banks for wage payment is highly exceptional (only two cases of checks and zero case of bank transfers). Even among registered

firms, less than 10% of total wage payment went through banks among our sample of small and micro enterprises. As shown in Panel B of Table 10, the mode of wage payment is stickier than the mode of sales receipt. There are only three cases out of 198, which changed the mode, all of which were among registered firms. There is no case of de-banking for wage payment, in contrast to the case of sales receipt. In case of wage payment, workers need to have bank accounts in order for the entrepreneur to change his mode of payment from cash to check (bank transfer). But many low-income workers employed by these micro firms do not own any bank accounts.

<Insert Table 10>

One reason for the stickiness in transaction modes could be a business network. Most of our sample firms conduct their business through informal networks. To move from "Cash only" to bank-based transactions, all members of the network may need to change simultaneously. This is not an easy task due to high coordination cost.

7. Conclusion

Using a primary dataset collected by the author's group, two types of small and micro entrepreneurs in Delhi, India, were compared in this paper: registered and unregistered. A unique feature of the dataset is that it covers both manufacturing- and service-sector firms; firms with different levels of formality; and two periods separated by three years. The baseline survey in November–December 2014 covered 506 sample entrepreneurs, in which 46% were unregistered with the government, implying they were highly informal. The endline survey conducted in June–August 2017 collected panel information on firm performance and the impact of Demonetisation in November 2016, covering 287 out of the 506 baseline enterprises. Out of the 287 endline sample, 50% were unregistered.

The quantitative analysis comparing registered (more formal) and unregistered (more informal) enterprises reveals the followings. Unregistered entrepreneurs were characterized by lower (higher) trust in family/relatives (administration/police) than registered entrepreneurs. Unregistered firms were smaller and headed by less educated entrepreneurs than registered ones but they performed better than registered ones in terms of profit rates. Their disadvantage in fixed capital investment is compensated by active innovation in process and marketing. Unregistered firms depended more on cash transactions than registered firms did; unregistered firms were affected more adversely by Demonetisation than registered firms were. Demonetisation drove a few firms to shift from cash-only transactions to bank-based transactions but the transition occurred only rarely, some of which even returned to cash-only

transactions after the Demonetisation turmoil was over. In the micro and small enterprises sector in Delhi, registered and unregistered firms coexist with different kinds of superiority, and their mode of business transactions is highly sticky. This is in some sense a re-confirmation of the favor given by La Porta and Shleifer (2014) to the dual economy view. However, our results also show that two types of firms are not indeed different substantially, as shown in regression results where many of the differences between the two types disappeared once observables were controlled.

An important policy finding from the results is that firm-level benefits attributable to registration and the MSMED Act were positive on average but not very strongly so. The credit access at the time of firm establishment continues to affect firm performance and changes the impact of registration on firm performance. Those micro enterprises that were highly constrained in access to institutional credit at the time of establishment performed worse than others even after when they were registered. Another important policy finding is that a shock therapy such as Demonetisation did not drive unregistered firms into bank-based transactions. It appears that the introduction of GST was more effective in promoting registration and bank-based transactions as unregistered firms felt the pressure to register from their business network (i.e., business suppliers or buyers who belong to the formal sector). To enhance entrepreneurship among MSMEs and promote their production so that labor-intensive economic growth is accelerated, policymakers need to pay sufficient attention to the diverse nature of MSMEs.

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Table 1. Sector-wise Distribution of Sample Firms in Northeastern Delhi

	Baseline survey	Endline survey	
	n	*n*	% attrition
Total	506	287	43.3
Manufacturing vs. Services			
Manufacturing sector	343	172	49.9
Services sector	163	115	29.4
Registration status at the baseline			
Registered (formal sector)	275	109	60.4
Unregistered (informal sector)	231	178	22.9

Note: The baseline survey started on November 4, 2014, and ended on December 7, 2014. The endline survey started on June 28, 2017, and ended on August 23, 2017. In this table, 3 firms engaged both in manufacturing and services are classified in the manufacturing sector (see Table 3 also).
Source: The author's primary survey dataset (same for the following tables).

Table 2. Entrepreneurs' Characteristics and Registration Status

	Total (n =506)	Registered firms (n =275)	Unregistered firms (n =231)	Statistical significance of the difference due to registration status[1] (p -value)
Average age	40.23	42.49	37.55	(0.000)
Distribution of education				(0.000)
Less than 10th grade	19	9	10	
10th grade	84	15	69	
12th grade (incl. technical diploma)	196	73	123	
University graduate	203	176	27	
Master's degree or more	4	2	2	
Sex				(0.028)
Male	496	273	223	
Female	10	2	8	
Religion				(0.000)
Hindu and others[2]	411	240	171	
Jain	31	26	5	
Muslim	64	9	55	
Migrant status				(0.000)
Migrant	19	3	16	
Born in Delhi	487	272	215	
Average of trust indicators[3]				
General	0.374	0.404	0.338	(0.129)
Relatives and friends	0.787	0.942	0.602	(0.000)
Neighbors	0.796	0.880	0.697	(0.000)
Business buyers/sellers	0.850	0.865	0.831	(0.302)
Municipal Corporation	0.488	0.462	0.519	(0.243)
Govt officials for services (water, electricity, et	0.320	0.305	0.338	(0.495)
Police	0.275	0.215	0.346	(0.005)
Law officers	0.354	0.316	0.398	(0.063)

Notes: 1. For a continuous variable, the p -value is for t -test allowing for unequal variance; for a discrere variable, the p -value is for chi2-test. .

2. "Hindu and others" include 406 Hindus and 3 unidentified.

3. Each of the trust indicator takes the value +1 (most people can be trusted), 0 (some; no opinion), -1 (most people cannot be trusted).

Source: Compiled by the author using the survey data in 2014-15, described in the text (same for the following tables.

Table 3. Industries and Registration Status

	Total (n =506)	Registered firms (n =275)	Unregistered firms (n =231)	% of unregistered firms
Manufacturing sector				
Auto parts	12	11	1	8.3
Electrical wires	73	63	10	13.7
Electronics	6	5	1	16.7
Food products	23	3	20	87.0
Garments	68	10	58	85.3
Metal and steel	36	21	15	41.7
Plastic goods	62	58	4	6.5
Wood products	15	8	7	46.7
Other manufacturing	48	31	17	35.4
(Manufacturing, sub-total)	(343)	(210)	(133)	(38.8)
Service sector				
Auto/cycle repair	36	8	28	77.8
Electric/electronics repair & service	24	7	17	70.8
Garments stitching/embroidery/tailor	13	3	10	76.9
Publishing service	40	24	16	40.0
Metal/steel related service	11	5	6	54.5
Other service	42	20	22	52.4
(Service, sub-total)	(166)	(67)	(99)	(59.6)

Notes: The grand total of this table is 509 as three firms engaged both in manufacturing and service. We re-classified these three firms as the manufacturing sector and then tested the independence of the two distributions using the 506 firms. The test results in chi-square of 166.41 (p -value =0.000).

Table 4. Firms' Characteristics and Registration Status

	Total (n =506)	Registered firms (n =275)	Unregistered firms (n =231)	Statistical significance of the difference due to registration status[1] (p - value)
Ownership				
Single proprietorship	492	264	228	(0.076)
Joint prop. with family members	6	3	3	
Joint prop. with non-family	3	3	0	
Private limited company	5	5	0	
Firm age, average	12.37	14.31	10.06	(0.000)
Labor force[2]				
Total, average	7.87	10.71	4.49	(0.000)
Share of employees in the labor force	0.678	0.841	0.484	(0.000)
Share of females in the labor force	0.027	0.041	0.010	(0.000)
Share of unpaid family members in the labor force	0.067	0.014	0.129	(0.000)
Existence of technical specialists[3] in the labor force				(0.000)
Yes	64	59	5	
No	442	216	226	
Distribution of the number of employees				(0.000)
0	74	7	67	
1-9	304	156	148	
10-19	94	82	12	
20 or more	34	30	4	
Investment[4]				
Initial investment funding sources				(0.112)
Own saving only	104	57	47	
Informal borrowing and own saving	222	110	112	
Borrowed from banks and/or government	180	108	72	
Current investment value[5](Rs. Million)	1.211	1.684	0.638	(0.000)

Notes: 1. See Table 2.

2. The labor force is defined as the entrepreneur him/her-self, employees, and unpaid family members. Therefore, its minimum is 1.

3. A technical specialist is defined as a person having "Certificate", "Diploma", or "Degree" in the engineering relevant to the business.

4. Investment includes land, building, machinery, and equipment.

5. As there are one registered and five unregistered firms with missing information, the sample size Is 500.

Table 5. Entrepreneur/Firm Characteristics and Registration Status (OLS results)

Explanatory variables	Dependent variable = Registration dummy			
	(1)		(2)	
Entrepreneur characteristics				
Age (minus 40 years)/10	-0.001	(0.023)	-0.001	(0.023)
Female dummy	-0.135 *	(0.063)	-0.138	(0.094)
Jain dummy	0.084 **	(0.029)	0.083 **	(0.035)
Muslim dummy	-0.145 **	(0.047)	-0.136 **	(0.045)
Migrant dummy	-0.055	(0.042)	-0.067	(0.042)
Education less than 10th grade	0.038	(0.092)	0.036	(0.091)
Education at 10th grade	-0.083	(0.062)	-0.091	(0.063)
Education at the degree level or more	0.100 **	(0.039)	0.084 *	(0.040)
Trust indicator: relatives and friends			0.068	(0.087)
Trust indicator: Police			-0.061 **	(0.027)
Firm characteristics				
Location cluster fixed effects	Yes ***		Yes ***	
Industry fixed effects	Yes ***		Yes **	
Firm age (minus 12 years)	0.001	(0.001)	0.001	(0.001)
Dummy for own saving only initially	-0.022	(0.056)	-0.021	(0.060)
Dummy for bank/govt credit initially	0.024	(0.054)	0.041	(0.037)
Labor force (minus 7)			-0.002	(0.004)
Dummy for technical specialists			0.020	(0.033)
Current investment (minus Rs. 1 million)			0.012 *	(0.006)
Intercept[#]	0.677 ***	(0.050)	0.626 ***	(0.090)
R^2	0.668		0.672	
F-stat for zero slope	8.95 ***		43.29 **	
F-stat for model (1)			2.50	
Average industry fixed effects in the manufacturing sector	0.665		0.607	
Average industry fixed effects in the service sector	0.595		0.536	
F-test for no difference between manufact. and service	4.89 *		5.33 **	

Notes: The number of observations is 506 for (1) and 500 for (2) (6 observations dropped due to missing investment information). See Tables 2-4 for definition and summary statistics of empirical variables. Cluster robust standard errors are reported in parentheses using location as the cluster. * p <0.1, ** p<0.05, *** p<0.01.

The intercept is the expected value of registration ratio for the reference category. The reference category is a firm managed by a 40-years old, male, Hindu, non-migrant entrepreneur with 12 years of education; the firm belongs to Vishwash Nagar, operates in "other manufacturing", established in 2003, using own saving and informal credit at the time of establishment, with no technical person, with in its labor force of 7 persons, and capital investment of Rs. 1 million. Coefficients on location and industry fixed effects are dropped but available on request from the author. The industry fixed effects are based on the note to Table 3.

Table 6. Firm Performance and Registration Status

	Total	Registered firms	Unregistered firms	Statistical significance of the diff.[1] (p-value)
Innovation adopted since the establishment[2]	(n=506)	(n=275)	(n=231)	
Any innovation, average of the dummy variable	0.808	0.829	0.784	(0.199)
Process innovation, average of the dummy variable	0.395	0.331	0.472	(0.001)
Product innovation, average of the dummy variable	0.540	0.673	0.381	(0.000)
Marketing innovation, average of the dummy variable	0.385	0.262	0.532	(0.000)
Training of workers, average of the dummy variable	0.524	0.491	0.563	(0.107)
Annual growth rate of investment[3]	(n=500)	(n=274)	(n=226)	
Average	0.019	0.025	0.012	(0.109)
Current profit in the last month[4]	(n=505)	(n=275)	(n=230)	
Ratio of firms with positive current profit	0.984	0.985	0.983	(0.801)
Profit indicators among firms with positive current profi	(n=497)	(n=271)	(n=226)	
Sales (Rs. million)	0.542	0.809	0.221	(0.000)
Current profit (Rs. million)	0.176	0.236	0.103	(0.001)
Profit/Sales Ratio[5]	0.378	0.288	0.487	(0.000)
Returns on Assets [ROA][6]	0.214	0.101	0.352	(0.111)

Notes: 1. Statistical significance is based on t-tests allowing for unequal variance.

2. We asked innovations in 18 areas. If at least one of them was employed, then "Any innovation" was conducted.

3. The annual growth rate was calculated as (ln(current investment)-ln(initial investment))/firm age - 0.065, where 0.065 is the average WPI inflation rate in India in the last decade (taken from Government of India 2017).

4. Current profit is defined as Sales - (intermediate input costs + fuel costs + labor costs + repair expenditure + transport expenditure + license fee + indirect tax + rental fee + contract expenditure + administration cost + other expenditure).

5. Profit/Sales Ratio is defined as the current profit divided by sales.

6. ROA is defined as the current profit defined by the current investment in Table 4. Due to missing information on the current investment, n = 270 (registered) and n=221 (unregistered).

Table 7. Firm Performance, Entrepreneur/Firm Characteristics, and Registration Status (OLS results)

	Dependent variable =							
	(1) Dummy for process innovation	(2) Dummy for product innovation	(3) Dummy for marketing innovation	(4) Annual growth rate in capital	(5) Sales (Rs. million) for firms with positive	(6) Current profits (Rs. million) for firms	(7) Profit/ sales ratio for firms with positive profits	(8) ROA for firms with positive profits
Registration dummy	-0.180 *	0.238 **	-0.101	-0.001	-0.003	-0.158	-0.040	0.133
	(0.083)	(0.081)	(0.095)	(0.016)	(0.127)	(0.113)	(0.049)	(0.229)
Registration dummy * Service dummy	0.091 *	-0.108	0.102	-0.021	-0.011	0.101	-0.004	-0.033
	(0.043)	(0.065)	(0.064)	(0.022)	(0.067)	(0.059)	(0.038)	(0.195)
Entrepreneur characteristics								
Age (minus 40 years)/10	-0.018	0.032	-0.004	-0.008	0.046 *	-0.006	-0.023 **	0.119
	(0.037)	(0.025)	(0.018)	(0.005)	(0.025)	(0.013)	(0.009)	(0.100)
Female dummy	-0.234	-0.059	-0.219 **	0.055 *	-0.018	-0.067	-0.097	0.183
	(0.151)	(0.100)	(0.081)	(0.028)	(0.100)	(0.072)	(0.059)	(0.274)
Jain dummy	-0.072	0.047	0.030	-0.012	0.154 *	0.088	0.004	-0.095
	(0.076)	(0.067)	(0.036)	(0.011)	(0.075)	(0.089)	(0.024)	(0.053)
Muslim dummy	-0.204 **	0.152	0.055	-0.002	0.014	-0.015	-0.027	0.793
	(0.084)	(0.113)	(0.079)	(0.010)	(0.049)	(0.021)	(0.031)	(0.670)
Migrant dummy	-0.162 **	0.048	-0.086	0.046	-0.018	-0.011	0.098 *	1.564
	(0.061)	(0.190)	(0.219)	(0.045)	(0.072)	(0.035)	(0.051)	(1.200)
Education less than 10th grade	-0.095	-0.054	-0.211 **	-0.036 **	-0.146	-0.091	0.025	-0.659
	(0.116)	(0.107)	(0.093)	(0.015)	(0.144)	(0.099)	(0.036)	(0.648)
Education at 10th grade	0.009	-0.196 ***	-0.059	-0.002	0.026	-0.030	-0.011	0.221
	(0.060)	(0.061)	(0.074)	(0.009)	(0.044)	(0.041)	(0.019)	(0.248)
Education, 10th * Service dummy		0.248 ***						
		(0.074)						
Education at degree or more	-0.056	0.060 *	-0.006	0.002	0.134 ***	-0.016	-0.038 **	0.074
	(0.094)	(0.029)	(0.065)	(0.005)	(0.022)	(0.039)	(0.016)	(0.094)
Firm characteristics								
Location cluster fixed effects	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***
Industry fixed effects	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes ***	Yes
Firm age (minus 12 years)	-0.004	0.006 *	-0.001	-0.001	0.004	0.001	0.000	0.012
	(0.003)	(0.003)	(0.003)	(0.001)	(0.005)	(0.002)	(0.001)	(0.022)
Firm age * Service dummy							-0.007 ***	
							(0.002)	
Dummy for own saving only initially	-0.096 **	0.115 **	0.037	0.026	0.066	-0.004	-0.024	-0.085
	(0.041)	(0.040)	(0.054)	(0.016)	(0.046)	(0.026)	(0.027)	(0.089)
Dummy for bank/govt credit initially	-0.061	-0.064	0.113	0.009	0.403 **	0.258 **	0.085 ***	0.039
	(0.057)	(0.043)	(0.069)	(0.010)	(0.134)	(0.107)	(0.023)	(0.117)
Bank/govt credit * Service dummy					-0.173 **	-0.181 **	-0.056 *	
					(0.075)	(0.035)	(0.030)	
Intercept[#]	0.516 ***	0.411 ***	0.362 ***	0.033 **	0.354 ***	0.174	0.260 ***	-0.173
	(0.075)	(0.061)	(0.107)	(0.011)	(0.090)	(0.104)	(0.042)	(0.360)
R^2	0.124	0.296	0.279	0.158	0.350	0.174	0.498	0.114
F-stat for zero slope	56.98 ***	24.39 ***	25.23 ***	4.16 **	15.20 ***	37.16 ***	32.73 ***	2.69 *
Number of observations	506	506	506	500	497	497	497	491

Notes: See Tables 2-6, and the text for definition and summary statistics of empirical variables. Cluster robust standard errors are reported in parentheses using location as the cluster. * p <0.1, ** p<0.05, *** p<0.01.

The intercept shows the expected value of the dependent variable for the reference category. The reference category is unregistered firm with characteristics shown in the note to Table 5.

Table 8. Impact of the demonetisation (subjective assessment)

	n	Index with the Pre-Demonetisation level as 100, sample average[1]		
		Total	Registered	Unregistered
A. Sales				
During（2016/11/9-2016/12/30)	282	51.0	59.2	42.8 ***
Post (2016/12/31-endline)	281	72.2	79.1	65.3 ***
B1. Number of workers				
During（2016/11/9-2016/12/30)	204	84.5	86.7	81.3
Post (2016/12/31-endline)	204	95.2	97.3	92.0 *
B2. Working hours per worker				
During（2016/11/9-2016/12/30)	187	90.7	95.7	92.1
Post (2016/12/31-endline)	199	95.4	97.4	90.9 *
B3. Total wage payment to workers				
During（2016/11/9-2016/12/30)	201	83.9	90.6	73.8 ***
Post (2016/12/31-endline)	201	97.6	105.1	86.3 **
C. Purchase of raw materials and inputs				
During（2016/11/9-2016/12/30)	279	51.1	59.7	42.4 ***
Post (2016/12/31-endline)	281	71.2	78.9	63.5 ***

Notes: The number of responses is than 287, as several respondents did not answer the demonetisation part. Furthermore, when the respondent refused to answer the specific question or the question was not applicable to the respondent, the number of responses declined further. For example, the question "Working hours per worker" does not apply to the firm if the umber of workers during (or post) demonetisation was zero. The "workers" here is broader than the one adopted in Table 3, including contract workers as well. The difference between the registered and unregistered is statistically significant at *** 1%, ** 5%, * 10%.

1. Simple average over the sample, without weighting.

Table 9. Demonetisation and bank-based transactions in receiving revenue from sales

	n	Total	Registered	Unregistered	
A. Share of bank-based transactions in total sales, sample average[1] (%)					
Pre（-2016/11/8)	281	24.6	45.5	3.8	***
During（2016/11/9-2016/12/30)	276	29.3	53.6	5.6	***
Post (2016/12/31-endline)	281	28.5	51.6	5.5	***
B. Transition in the transaction modes					
Pre => During	276				***
"Cash only" in both periods		167	45	122	
Shifted from "Cash only" to "Using banks"[2]		15	9	6	
Shifted from "Using banks" to "Cash only"		2	2	0	
"Using banks" in both periods		92	80	12	
During => Post	276				***
"Cash only" in both periods		168	47	121	
Shifted from "Cash only" to "Using banks"		1	0	1	
Shifted from "Using banks" to "Cash only"		5	1	4	
"Using banks" in both periods		102	88	140	

Notes: The number of responses is less than 287 due to response refusal or question non-applicability (for example, if the sales were zero during the demonetisation, the share of bank-based transactions cannot be defined). The difference between the registered and unregistered is statistically significant at *** 1%, ** 5%, * 10%.

1. Simple average over the sample, without weighting. "Bank-based" includes receiving by checks, bank transfers, demand drafts, etc.

2. "Using banks" includes "Bank-based transactions only" and "Bank-based and cash mixed".

Table 10. Demonetisation and bank-based transactions in paying wages

	n	Total	Registered	Unregistered	
A. Share of bank transfers and checks in total wage payment, sample average[1] (%)					
Pre（-2016/11/8)	203	3.9	6.2	0.4	**
During（2016/11/9-2016/12/30)	188	6.3	9.8	0.6	**
Post (2016/12/31-endline)	198	5.3	8.4	0.4	**
B. Transition in the transaction modes					
Pre => During	188				*
"Cash only" in both periods		171	102	69	
Shifted from "Cash only" to "Using banks"[2]		3	3	0	
Shifted from "Using banks" to "Cash only"		0	0	0	
"Using banks" in both periods		14	12	2	
During => Post	187				**
"Cash only" in both periods		170	102	68	
Shifted from "Cash only" to "Using banks"		0	0	0	
Shifted from "Using banks" to "Cash only"		0	0	0	
"Using banks" in both periods		17	15	2	

Notes: The number of responses is less than 287 due to response refusal or question non-applicability (for example, if the number of workers was zero during the demonetisation, the share of bank-based transactions cannot be defined). The difference between the registered and unregistered is statistically significant at *** 1%, ** 5%, * 10%.
1. Simple average over the sample, without weighting. "Bank transfer" + "Checks" + "Cash" = 100% by construction.
2. "Using banks" includes "Bank-based transactions only" and "Bank-based and cash mixed".

Appendix, not to be included in the published paper

Appendix Table 1. Correlates of Attrition (Bivariate comparison)

Baseline characteristics	MSSI businessmen			
	Baseline sample (n =506)	Endline sample (n =287)	Attrition sample (n =219)	p -value
Entrepreneur characteristics				
Average age	40.23	38.66	42.29	0.000
Distribution of sex				0.665
Male	496	282	214	
Female	10	5	5	
Religion				0.000
Hindu & others	411	230	181	
Jain	31	9	22	
Muslim	64	48	16	
Distribution of birthplace				0.294
Migrants	19	13	6	
Delhi areas	487	274	213	
Distribution of education level				0.000
Lower than 10th grade	19	11	8	
10th grade or equivalent	84	64	20	
12th grade or equivalent technical	196	138	58	
Bachelor's degree	203	73	130	
Master's degree or more	4	1	3	
Average of GSS trust indicators[1]				
General	0.374	0.366	0.384	0.688
Relatives and friends	0.787	0.679	0.927	0.000
Neighbors	0.796	0.763	0.840	0.038
Business buyers/sellers	0.850	0.847	0.854	0.827
Municipal Corporation	0.488	0.540	0.420	0.016
Govt officials for services (water, electr	0.320	0.338	0.297	0.387
Police	0.275	0.324	0.210	0.016
Law officers	0.354	0.404	0.288	0.008
Firm characteristics				
Firm age, average in years	12.37	11.05	14.10	0.000
Labor force[2]	7.87	5.62	10.82	0.000
Distribution of registration status				0.000
Registered	275	109	166	
Unregistered	231	178	53	
Distibution of business location (10 locations)				0.000
Distribution of industry				0.000
Manufacturing sector				
Auto parts	12	5	7	
Electrical wires	73	24	49	
Electronics	6	5	1	
Food products	23	19	4	
Garments	68	47	21	
Metal and steel	36	16	20	
Plastic goods	62	26	36	
Wood products	15	9	6	
Other manufacturing	48	21	27	
(Manufacturing, sub-total)	(343)	(172)	(171)	
Service sector				
Auto/cycle repair	36	29	7	
Electric/electronics repair & service	22	16	6	
Garments stitching/embroidery/tailor	13	11	2	
Publishing service	39	22	17	
Metal/steel related service	11	7	4	
Other service	42	30	12	
(Service, sub-total)	(163)	(115)	(48)	

Notes: The p -value allows for unequal variance n the case of continuous variable. For distribution, the p -value is for the chi2 test for the independence.

1. Each of the trust indicator takes the value +1 (most people can be trusted), 0 (some; no opinion), -1 (most people cannot be trusted).

2. The labor force is defined as the entrepreneur him/her-self, employees, and unpaid family members. Therefore, its minimum is 1.

Appendix Table 2. Correlates of Attrition
(OLS regression results with Endline-attrition dummy as the dependent variable)

Baseline characteristics	(1) Full specification	(2) Entrepreneur's age	(3) Entrepreneur's religion	(4) Entrepreneur's education	(5) Entrepreneur's GSS trust	(6) Firm age	(7) Firm's labor force	(8) Firm's registration status
Entrepreneur characteristics								
Age	0.002	0.002						
	(0.003)	(0.002)						
Female dummy	0.250							
	(0.148)							
Jain dummy	0.221 ***		0.233 ***					
	(0.049)		(0.056)					
Muslim dummy	-0.083		-0.141 **					
	(0.062)		(0.046)					
Migrant dummy	0.063							
	(0.080)							
Education less than 10th grade	0.083			0.066				
	(0.100)			(0.095)				
Education at 10th grade	-0.011			-0.023				
	(0.033)			(0.039)				
Education at the degree level or more	0.152 **			0.181 ***				
	(0.048)			(0.053)				
GSS trust for relatives and friends	0.093 **				0.120 ***			
	(0.032)				(0.026)			
GSS trust for law officers	-0.038				-0.045			
	(0.057)				(0.051)			
Firm characteristics								
Firm age	0.003					0.005		
	(0.004)					(0.003)		
Labor force	0.007 ***						0.010 ***	
	(0.002)						(0.003)	
Registration dummy (ref=unregistered)	0.045							0.108 ***
	(0.030)							(0.030)
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.292	0.236	0.251	0.255	0.241	0.239	0.251	0.239
F-stat for zero slopes except for location & industry fixed effects	103.20 ***	1.27	27.38 ***	6.97 **	10.95 ***	2.79	13.33 ***	13.12 ***
Number of observations	506	506	506	506	506	506	506	506

Notes: Robust standard errors are reported in parentheses using location as the cluster. * p <0.1, ** p<0.05, *** p<0.01.

Appendix Table 3. Firms' and Entrepreneurs' Characteristics and Registration Status, Endline

	Total (n =287)	Registered firms (n =144)	Unregistered firms (n =143)	Statistical significance of the difference due to registration status (p -
A. Firms' characteristics				
Ownership				(0.072)
Single proprietorship	261	126	135	
Joint prop. with family members	13	8	5	
Joint prop. with non-family	8	6	2	
Private limited company	4	4	0	
Labor force				
Total, average	3.69	5.24	2.12	(0.000)
Distribution of the number of employees				(0.000)
0	108	36	72	
1-4	115	51	64	
5-9	54	47	7	
10-19	8	8	0	
20 or more	2	2	0	
B. Entrepreneurs' characteristics				
Average age	42.06	44.31	39.79	(0.000)
Distribution of education				(0.000)
Less than 10th grade	92	30	62	
10th grade	62	19	43	
12th grade (incl. technical diploma)	65	40	25	
University graduate	47	45	2	
Master's degree or more	4	3	1	

Notes: See Tables 2 and 4 for definitions of variables. As there is missing information several observations, the sum of distribution is sometimes less than 287.