The Economic Impact of Infrastructure Development on Microenterprises and Entrepreneurship: Evidence from Rural India

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Abstract

This paper evaluates the impact of Rashtriya Sam Vikas Yojana (RSVY) - an infrastructure development program directed towards India's most backward regions – on the performance of rural microenterprises. Using data from both the National Sample Surveys (NSSs) and Economic Censuses (ECs), we adopt a Fuzzy Regression-Discontinuity Design to exploit RSVY's transparent assignment mechanism. We find that microenterprises in treated districts reported a lower probability of contracting in size, and correspondingly, greater levels of sales and expenditures. Treated firms also report a higher probability of receiving government assistance. Using data from ECs, we show that district' share of OAMEs significantly increase at the cutoff, and the policy impact is highly concentrated among the society's backward social classes (Scheduled Caste/Scheduled Tribe – SC/ST).

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I. Introduction

Much like other developing economies, India is predominantly rural. According to estimates from the National Sample Survey in 2005, two-thirds of the country's total population live in rural areas. One major characterization of the current development status quo in these poor regions is the lack of proper social and physical infrastructures. Infrastructure deficit is a direct constraint to regional economic growth and productivity.

In recent years, having acknowledged the economic significance of improvement in rural infrastructure, India's policy-makers have introduced various large-scale interventions towards the provision and upgrade of infrastructural public goods. However, the high investment costs of such programs mean that their placements often endogenously rely on both observed and unobserved economic, political, and social factors – especially under the context of a developing country. This poses an empirical threat to any rigorous attempt in quantifying the potential economic impacts of these policies. In this paper, we exploit unique rule-based allocation characteristics of a rural infrastructure development scheme to isolate its impacts on rural economic activity. Particularly, we evaluate the program's effects on various measures of business performance for micro enterprises – the dominant type of business establishment in rural India.

Rashtriya Sam Vikas Yojana (RSVY) – the infrastructure development program in question – was launched in the fiscal year of 2003-04 with the main goals of facilitating physical infrastructure developments in most economically "backward" regions in India. This program is one of the first direct attempts carried out by the Central Government to identify and support India's backward areas in reducing regional economic imbalances and speeding up developments. The Central Government first developed specific guidelines to prioritize the 147 most backward districts based on a transparent Backwardness Index with replicable criteria[3]. Next, they determined the number of RSVY eligible districts for each of the 17 States[4]. These numbers are proportional to the states' poverty headcount ratios. The central government then allocated a pre-specified budget to each of the 17 State Governments. This budget equals to the calculated number of district per state multiplied by 450 million Indian Rupees INR (approx. 7.2 million USD) – which is the amount that each eligible district was equally entitled to receive over the course of a proposed three-year period. Finally, to comply with the decentralized political

[3] The total current number of India's districts is approximately 600.

[4] The Backwardness Index was constructed based on historical development information for districts belong to 17 major India's States. Data was unavailable in some States due to internal instability when the data was collected. Further discussion will be provided in Section 4.

movement, the Central Government allowed each State Government to designate the districts which they see fit to receive this 450 million INR. However, the Central Government's specific guideline for RSVY implementation still specifically requested that the most backward districts - based on the Backwardness Index – must be the ones chosen as beneficiaries of the RSVY program. It is worth noticing that the Backwardness Index's parameters/criteria are both transparent and historical[5], which are immune from any purposeful manipulation at the time RSVY was introduced (Zimmermann, 2012; Bhargava, 2014).

Due to the complete transparency of RSVY assignment guidelines, we propose to reconstruct the government's assignment algorithm by utilizing the Backwardness Index and ranking procedure information. We observe, at the outset, certain level of incompliance to the assignment algorithm, which is most likely due to districts suffering from endogeneity assignment issues[6]. We address this in several steps. First, we utilize the states' number of RSVY-eligible districts as assigned by the Central Government, as well as the Backwardness Index rankings, for all districts within a state. These two sets of information allow us to construct a normalized state-specific district ranking, assigning rank 0 at the cutoff district[7]. We then obtain a total of 17 cutoffs and associated sets of districts' normalized rankings. This reconstructed ranking serves crucially as the running variable for our Fuzzy Regression Discontinuity Design (FRD). Second, we address the "fuzziness" of our identification strategy due to assignment slippages by instrumenting the actual RSVY assignments with the Central Government's transparent guidelines for the program assignments. The assignment's prediction accuracy is greater than 80 percent, which lends confidence to our approach. Finally, we run our FRD regressions on various district-level outcomes using India's enterprise data collected from both the National Sample Surveys and Economic Censuses, controlling parametrically and flexibly for different polynomial functions of the running variable.

This paper provides several contributions. First, we find new evidence on potential spillover effects of infrastructural improvements to rural micro enterprises' economic performance. We show, at the district-level, evidence indicating short-run responses of manufacturing firms to improved infrastructure conditions. Specifically, our paper is the first to indicate a potential causal connection of rural infrastructural development and entrepreneurial activities in the manufacturing industry. Adopting an FRD technique, we are able to confirm this suggestive evidence by exploring two separate datasets. First, with the detailed information on manufacturing enterprises' business activities provided by the

[5] The Backwardness Index was constructed by adopting historical parameters with equal weights: (i) value of output per agricultural worker (1990-1993); (ii) agriculture wage rate (1996-1997); and (iii) districts' percentage of low-caste populations – Scheduled Castes/ Scheduled Tribes (1991 Census).
[6] For example, it is unclear how several districts belonging to the States with no Backwardness Index were chosen.
[7] We provide detailed description of the index reconstruction in Section 4.

National Sample Surveys[8], we discover a significantly greater business engagement for Own Account Manufacturing Enterprises (OAMEs) -- the micro, informal manufacturing firms – operating in districts eligible to receive RSVY funds. Second, using data from the Economic Census, we find a discontinuously greater percentage of entrepreneurial activities – measured by the district's share of micro enterprises -- at the RSV-eligibility cutoffs. In our extended discussion, we further discover that, within the informal sector, much of the changes in district's entrepreneurial activities can be attributed towards the society's backward classes (Scheduled Cast/Scheduled Tribe -- SC/ST). This finding is also relevant to the overall judgements on the effectiveness of India's macro cash transfer programs, with anecdotal criticisms about the programs' exposure to political and social corruptions at the managerial levels.

The rest of the paper proceeds as follows: Section 2 summarizes the most relevant literature on both direct and indirect economic impacts of rural infrastructure development programs, as well as various cash transfers programs. Section 3 provides more detailed descriptions on RSVY, its objectives, and unique assignment algorithm. Section 4 describes our empirical strategy. Section 5 explains the data used for analysis. Section 6 presents and discusses the empirical results. Section 7 concludes.

II. Literature

The objectives and characteristics of RSVY directly relate the contributions of our study to two separate strands of economic literatures. First and foremost, granted its uniqueness in nature, RSVY is one of the growing government's attempts in addressing infrastructure development as an important driver to facilitate economic activities and alleviate poverty. While most notable studies examining the effects of rural infrastructures usually focus on one particular large-scale road network or irrigation system investment, RSVY is different due to the implementation flexibility that beneficiary districts obtain. Because the allocated budget was in the form of quasi-conditional cash transfers, districts could freely choose to invest in any one or more infrastructural projects they judge suitable for their local economies. This level of flexibility would enhance the return on investments and generate positive economic and labor market outcomes if the funds are effectively utilized. However, potential investment ineffectiveness could arise under scenarios of poor-functioning governments with low managerial capacity or with conflicts of interest. Second, our research adds to the expanding body literature on various micro and macro cash transfer schemes, as part of the larger social protection programs.

[8] We utilize data provided by the National Sample Survey Round 56 and 62, Schedule 2.2: Manufacturing Enterprises. Detailed discussion on data sources is provided in "Data and Variable Formation" section.

1. First strand on the impacts of infrastructure investment programs

The expanding literature on the economic importance of infrastructure investments have emphasized a critical linkage between infrastructure and regional growth. While researches differ on investigation strategies and quantitative findings, there is evidently a consensus on the causal impact of infrastructure to economic performance. Among all possible infrastructural drivers to rural economic growth, developments of road networks and irrigation systems are singled out to be the most influential.

Of the two drivers, the impacts of road network and connectivity have understandably received greater academic attention. The literature on road itself is highly diverse. Within a more urban framework, studies have investigated various impacts of new and improved interstates highways. In the U.S., Michaels (2008) finds that the construction of the US Interstate Highway System generates both sectoral and wage growth. On suburbanization, Baum-Snow (2007) estimates an 18 percent reduction in population for central city having one new high way passing through. In Russia, firm-level evidences indicate that infrastructure investment policies which improve market access between peripheral regions to Moscow generate higher productivity for new and privately-owned firms (Brown, Fay, Felkner, Lall, & Wang (2008)). In China, Banerjee, Duflo, & Qian (2012) show that proximity to transportation networks pertains a large positive causal effect on per capita GDP growth rates across sectors, driven mainly by increases in aggregate production rather than displacement of productive firms. Within the context of India, several state-of-the-art studies using firm-data have examined the impacts of the Golden Quadrilateral (GQ) – a large-scale highway construction and improvement project. Datta (2011) documents enhanced input sourcing and inventory efficiency for formal manufacturing enterprises located on GQ network. Ghani, Goswami, & Kerr (2016) adopt a straight-distance IV framework and attribute the improved infrastructure and road quality to greater allocative efficiency of manufacturing activity in local areas lying along the connection between rural and urban sites. On economic activity concentration, Khanna (2014) finds evidences for a dispersion of economic development around the GQ upgrades, as proxied by nightlight luminosity.

Given that RSVY setting is chiefly rural, it is worth emphasizing the literature progress on rural infrastructures. First, compared to investments in urban highways and interstates, rural roads possess very different economic effects. Dating back to the early 1980s, researchers have indicated that rural connectivity is influential to agricultural development - the main sector driving economic development of developing countries. Moore (1980) reveals a significant increase in the intensity of land use and area under cultivation followed greater access to markets. Also relevant to agricultural production and investment, Binswanger, Khandker, & Rosenzweig (1993) find a direct contribution of rural roads to

growth in agricultural outputs and increased use of fertilizer. Recent studies with more advanced econometric techniques are more cautious with the positive conclusions, producing mixed findings. In Africa, Gollin & Rogerson (2010) adopt a structural multi-sector model and predict that investments in Uganda in road infrastructure, which reduces transport costs, would lead to reallocation and optimization of labor to non-farm industries. Casaburi, Glennerster, & Suri (2013) shows a downward-pressure effect of rural feeder roads on market prices of local agricultural goods. In Asia, Khandker & Koolwal (2009) investigates the impact of Bangladesh's rural road program on short-run village-level consumption and poverty. Using propensity score matching method, they show that access to road, on average, increases village's consumption while decrease the poverty level. Ven de Walle & Cratty (2007) use Vietnam's village-level survey data to study the impact of a World Bank-sponsored rural road rehabilitation program and indicate the importance of recipient government's fungibility to program's success. In India, several notable works analyze the effects of a national rural road improvement scheme: the Pradhan Mantri Gram Sadak Yojana (PMGSY). Banerjee, Kumar, & Pande (2012) use village sample in one India State and find that PMGSY increases village's non-farm employment, raises agricultural prices and lowers consumer prices. Aggarwal (2017) finds increase availability and lower prices for non-local goods in treatment areas, suggesting greater rural market integration.

Asides from rural road network, another direct and important infrastructural driver to growth in local agricultural economies is the improvement in irrigation systems. Numerous studies have shown positive economic impacts of improved irrigations on total factor productivity, as well as agricultural GDP and outputs. Fan & Zhang (2004) find, in China, that among all infrastructure indicators, irrigation improvement plays a vital role in explaining agricultural productivity differences among regions. Mundlak, Larson, & Butzer (2002) examine the significance of Research and Development in technologies related to fertilizers and irrigation system by exploiting an innovative introduction of high-yielding varieties of cereals in the 1960s in Indonesia, Thailand, and the Philippines. They show a positive causal relationship between high quality irrigated land and production outputs. In India, Fan, Hazell, & Thorat (2000) use historical state-level data and develop a simultaneous equation model to study effects of different types of government expenditure on Indian rural economies. Unlike previous studies, their results indicate that investments in irrigation only have a modest influence on growth and poverty per additional INR spent.

2. Second strand on the impact evaluation of cash transfer programs

Since RSVY is fundamentally an infrastructure development cash transfer scheme, our study also relates to the economic literature on impact evaluation of cash transfer programs. This extensive literature

predominantly evaluates the effectiveness of both conditional cash transfers (CCTs) and unconditional cash transfers (UCTs) at the micro levels. Most CCTs and UCTs are established in the forms of developing government's interventions to smooth consumption of the poorest or targeted population, with the beneficiaries being households and individuals. The conditionality can heterogeneously vary from work – as in most public works programs, to other pre-specified investments in household wealth, health, or human capital. Systematic evidences have generally concluded that cash transfer is a powerful tool for poverty alleviation, especially in developing countries (Banerjee A. , et al. (2015); Banerjee, Hanna, Kreindler, & Olken (2015)).

Supporting results indicate that the poor can realize high economic returns on investment if they are set free from constraints of market imperfections such as limited credit (Banerjee & Duflo (2005); Karlan & Zinman (2009); Townsend (2011)). Kabeer & Waddington (2015) performs a meta-analysis and documents the overall effectiveness of 46 high-quality CCTs impact evaluations on several economic outcomes such as increase in household consumption, investment and consumption smoothing, or decrease in child labor.

Even though CCTs are often found successful in contributing to economic improvements of the targeted population, there are potential disadvantages related to this policy approach. The obstacle CCTs face is relatively higher delivery costs in the monitoring and administrative expenses to ensure specific conditions being satisfied. From this perspective, UCTs are often more attractive. UCTs has the flexibility advantage in allowing beneficiaries to invest the exogenous wealth to the projects they see fit Baird, McIntosh, & Özler (2011). However, such "free money" programs also entail noticeable drawbacks from the policy implementation's point of view. Households or individuals might substitute leisure for immediate labor supply due to the income effect; or they might spend the transferred cash on temptation goods and thereby lower the interventions' long run impacts (Cesarini, Lindqvist, Ostling, & Wallace (2016)). In addition, potential conflicts between recipients and non-recipients can arise due to assignment eligibility, especially for randomized programs (Bobonis, Gonzalez-Brenes, & Castro (2013)).

In African settings, a few evaluations on CCTs and UCTs cash grant interventions have also shown significant improvements in girls' and marginalized children's education and health outcomes in Malawi, Burkina Faso, and Marocco ((Baird, McIntosh, & Ozler (2011); Baird, Chirwa, de Hoop, & Ozler (2013); Benhassine, et. al (2013)), adult's health outcomes in Kenya (Handa et. al (2014)), or microenterprise's survival and profitability in Ghana (Fafchamps et. al (2011)).

Asides from the micro cash transfers schemes that usually target only localized population with imperfect characteristics, developing countries' policy makers have increasingly adopted more

progressive, large-scale approaches to fight poverty and promote regional economic growth. Unlike the case of micro cash transfers, the macro development programs are often designed and executed by the central governments who elicit much more sizable budgets to targeted local authorities. The development intentions also vary. Within the context of India, cash transfers can function conditionally as public works which serve as the employment safety net for rural workers, especially during agricultural off-season. Zimmermann (2012) uses a regression-discontinuity design to evaluate the employment impact of the Rural Employment Guarantee Act (NREGA), a flagship public workfare program guaranteeing short-term manual work for all rural workers. The study finds improved private-sector wages, especially for women, without any negative impacts on private employment. Also analyzing the impacts of NREGA on labor market outcomes, Imbert & Papp (2015) uses a difference-in-difference approach and provides evidences suggesting that public sector hiring crowded out private sector work and increased private sector wages. Other studies on NREGA have attributed the program to increases in labor force participation (Azam, (2012)), unskilled labor wages (Azam (2012); Berg, Bhattacharya, Durgam, & Ramachandra (2012)), increased use of labor-saving agricultural technology (Bhargava (2014)), or the unintended impact to social violence (Khanna & Zimmermann (2017)).

III. The Scheme

The Government of India launched the Rashtriya Sam Vikas Yojana (RSVY) in 2003-04. The main objectives were to "remove barriers to economic growth, accelerate the development process, and improve the quality of life of the people" (Planning Commission (2003a)). The program was one of the first direct attempts carried out by the Central Government to identify and support India's backward areas in reducing regional economic imbalances and speeding up development. RSVY covered a total of 147 backward districts, out of approximately 600 districts in the country. Under RSVY, each district was entitled to receive unconditional cash transfer amounts of 450,000,000 Rupees (approx. $7.2 million USD) over the course of 3 fiscal years: 04-05, 05-06, and 06-07. The proposed transfer mechanism was equal payments of 150,000,000 Rupees, i.e. one-third of total fund, per year. Figure 1a graphically details the recipients, broken down by 2 separate groups: (i) 115 regular districts that were selected based on a transparent assignment mechanism discussed in the next sub-section, and (ii) 32 left-wing districts affected by Naxalite movement, that were automatically included.

Each RSVY-eligible district had to submit a three-year master plan that detailed specific fund allocations to actually receive the cash transfers. According to the Planning Commission's detailed guidelines for the implementation of RSVY, all proposed programs needed to address critical gaps in physical and social infrastructure to alleviate the problems of low agricultural productivity and

unemployment (Planning Commission (2003b)). Due to the strict requirement on districts' submission of viable project proposals, not all districts received the entirety of funds by the end of fiscal year 06-07. Based on the report on district-wise fund release, over two-thirds of the total designated fund was transferred to RSVY districts by fiscal year 06-07.[9]

Details on the characteristics of programs undertaken at the district level are not publicly available. However, according to an official evaluation study that surveyed a representative sample covering 15 districts from 11 States (Program Evaluation Organization (2010)) approximately 77% of the transferred fund was invested in infrastructural interventions, including agriculture and irrigation improvements, rural connectivity, and electrification projects. The complete district-wise program intervention characteristics is shown in Appendix 1.

Assignment Mechanism

The allocation mechanism for RSVY was transparently identified by the Government of India. The eligibility of districts under RSVY, i.e. treatment assignment, was based on a two-step algorithm. In the first step, the Central Government determined the number of treatment districts that would be assigned to each of the 17 Indian states. In order to ensure inter-state fairness, the number of districts allocated to a given state was made proportional to the "incidence of poverty" across states. This state-level poverty measure is derived from the state's poverty headcount ratio and provides an estimate for the number of citizens living below poverty line in that state. The percentage of treatment districts allocated to the state was then made proportional to this poverty headcount percentage.

In the second step, the respective state governments chose specific treatment districts within their state. The selection was based on an existing development ranking referred to as the Backwardness Index. This ranking index was publicly reported in the Planning Commission 2003's document, and constructed the level of districts' economic underdevelopment from three historical parameters with equal weights: (i) value of output per agricultural worker (1990-1993); (ii) agriculture wage rate (1996-1997); and (iii) districts' percentage of low-caste populations – Scheduled Castes/ Scheduled Tribes (based on the 1991 population census) (Planning Commission (2003a)). This Backwardness Index ranked a total of 447 districts in 17 major states with available data for all three parameters above. In addition to the algorithm, the government had a separate list of 32 districts heavily affected by Maoist/Naxalite violence. These districts were automatically selected into the RSVY program. Detailed explanation on the complete Planning Commission's construction process of the Backwardness Index is provided in Appendix 2.

[9] Detailed government's fund release by years are publicly documented (Social Watch India (2007)).

IV. Empirical Strategy - Fuzzy Regression Discontinuity

Since RSVY program assignment is based on the specific ranking criteria discussed above, it is feasible to evaluate the effects of the program using a regression discontinuity design (RDD). A preliminary glance at the ranking index suggests that there was a certain degree of non-compliance with the assignment algorithm. Specifically, in several states, there were districts with a significantly higher ranking, i.e. the "richer" district that were chosen in places of lower-ranked districts. To explicitly examine the degree of compliance, we reconstruct the government algorithm by utilizing the publicly available Backwardness Index and ranking procedure.

Table 1a and 1b provide an overview of how well the Central Government's proposed assignment algorithm predicts RSVY treatment status for 17 major Indian states for all districts with non-missing development rank information. The Backwardness Index's rank data is available for 447 of 618 districts in India. Data on the economic under-development parameters was unavailable for the remaining Indian states. Therefore, it is unclear how the state governments with missing district rankings chose eligible RSVY districts. In our sample of 147 RSVY districts, 19 (12.9%) belong to the missing-data states. To the extent that the actual RSVY assignments to these 19 districts are endogenous – they were funded without having Backwardness Index information – we choose to drop them from our empirical analysis. We argue that this sample restriction will not affect the qualitative findings of our estimation. Quantitatively, our estimates will provide a lower-bound of the actual impact of RSVY.

Table 1a matches the "normal" districts that actually received RSVY and those predicted to receive RSVY if the assignment algorithm had been perfectly adhered to. We drop the districts affected by left-wing extremist violence, since they were chosen for RSVY funds without going through the selection process. Out of 115 normal[10] RSVY districts, 96 had available ranking data. As discussed above, the 19 districts that were chosen without available ranking data are more likely to have endogenous treatment status, and hence we also remove them from our FRD analysis. The assignment algorithm had a prediction accuracy of 80.2% and correctly predicted 77 of the 96 districts that received RSVY (and had a

[10] Normal districts are those that were not affected by Maoist/Naxalite violence, and thus were supposed to be chosen based on the assignment algorithm, i.e. not included automatically as in the case of the 32 left-wing extremist districts.

Backwardness Ranking)[11] .Table 1b performs the same analysis but also includes the left-wing affected districts. Prediction accuracy drops to 75.8% (94 out of 124 are correctly predicted)[12], which indicates that these left-wing districts were, on average, less backward than the RSVY eligible districts, and would have been ineligible if the assignment algorithm had been strictly followed. Table 2 further examines the prediction accuracy of assignment algorithm for each state. The table reveals that there is considerable heterogeneity in the performance of the algorithm across states, but overall the algorithm performs well in all major states with large number of eligible districts.

To provide intuition for our identification strategy, we first motivate an empirical discussion on a hypothetical setting where we assume that the districts' program assignment mechanism was perfectly executed. In such a "clean" setting with perfect compliance to program assignment status, RSVY would have been assigned to the most backward districts with non-missing data according to the Planning Commission's Backwardness Index. Under the identification assumption that the expected level of the districts' outcome variables is continuous in the index in the absence of program intervention, we can estimate the Local Average Treatment Effect of RSVY using a Sharp Regression Discontinuity Design. We would regress our outcome variables on an indicator variable for belonging to the RSVY treated group and a polynomial function in the index ranking. The regression coefficient on the indicator variable would provide a consistent estimate of RSVY's effect on a district ranked right at the cutoff value.

However, as shown above, the implementation of RSVY deviated from this clean setting. Given that there was some slippage in the treatment assignment, actual program receipt did not completely follow the program assignment. Therefore, the empirical identification strategy we follow is a Fuzzy RD (FRD) design. We adopt a similar approach to that of (Khanna & Zimmermann, 2017) and (Klonner & Oldiges, 2014) for constructing a within-state district normalized ranking that is constructed from the Backwardness Index. More precisely, we follow a two-step process.[13] First, for each of the 17 States with available district-wise index data, we rank districts in descending order of their backwardness index's position, and assign to each of them an associated state-specific rank x_{ds}. Subscript d denotes "district" and s denotes "state". x_{ds} is a positive integer between 1 and n_s, where n_s is the total number of districts in

[11] This high accuracy is distinctly different from random drawing of district from the pool (21.48%) and thus lends confidence to our approach. Randomly drawing 96 districts from the pool of 447 index-available districts results in a prediction accuracy of 21.48%.

[12] There were 4 left-wing districts newly created (due to boundary separations) from the 1990s when Backwardness Index was constructed to 2003-04 when RSVY was introduced. Since these 4 districts also did not have Backwardness Index information, we drop them from our calculation.

[13] This reconstruction of the exact assignment formula has been adopted in several papers which study the impacts of NREGA – a different Central Government's sponsored program – which adopted similar assignment methodology. See (Bhargava (2014), (Khanna & Zimmermann (2017), (Klonner & Oldiges (2014), (Zimmermann (2012).

the state *s*. Second, we use the available number of districts entitled for RSVY cash transfer that the Central Government *a priori* delegated to state *s* to construct the districts' state-specific normalized ranking $nrank_{ds}$. Specifically, denoting the state's delegated number of RSVY-eligible districts as k_s, we re-center the sequence of $\{x_{ds}\}$ so that the k_s^{th} district in the sequence would receive a normalized ranking of 0. That is:

$$nrank_{ds} = x_{ds} - k_s \qquad (1)$$

The district's $nrank_{ds}$ derived from equation (1) thus serves as the running variable in our subsequent FRD regressions. Equation (1) also allows for the "cutoff" district to be assigned a normalized value of 0, which is standard in the RD literature. Districts to the left of the cutoff – those with non-positive normalized values – are backward enough to be entitled to RSVY cash transfer, according the RSVY program's assignment rule. Figure 1b graphically shows the 96 districts selected strictly under the described assignment mechanism. These districts serve as the instruments for actual RSVY assignment in the second stage of the 2SLS analysis under FRD design.[14]

The fundamental assumption of an RD design is that districts that were close enough to the cutoff, i.e. those which have the absolute values of their normalized ranks close enough to 0, are otherwise identical, except for the RSVY treatment status. That is, districts lying immediately to the left of the cutoff, i.e. the treated districts, and districts lying immediately to the right of the cutoff, i.e. the comparison districts, have similar unobserved characteristics. This way, one can solely attribute any observed outcome differences between treated and comparison districts to the introduction of RSVY. Another RD's validity assumption is that districts cannot manipulate their treatment status. This implies that states and districts should not have been able to take purposeful actions in ways which would have influenced the RSVY assignment. That is, there should not be unobserved differences on characteristics such as perceived benefit from the program or political influence. It is very unlikely that states or districts were able to manipulate Central Government's Backwardness Index. As discussed, the index was constructed based on strictly historical available information: Planning Commission used data from the early to mid-1990s for the ranking of districts. This limits the possibility to strategically misreport information.

To further examine the validity of our FRD design, we utilize the ranking index to construct state-specific cutoff ranks following RSVY program's assignment algorithm. The first stage of our 2SLS approach requires that there is a discontinuity in the probability of receiving RSVY at the cutoff values.

[14] One can think of our ranking process which is manually reconstructed following the Planning Commission's assignment mechanism as a replacement for the usual first-stage regression under a conventional 2SLS approach.

Figure 2 shows this discontinuity graphically for the normalized state-specific cutoff rank. It plots the probability of receiving RSVY for each ranking bin. The graph also provides linear fitted curves and corresponding 95 percent Confidence Intervals on both sides of the cutoff. It is visually clear that the average probability of receiving RSVY decreases discretely at the cutoff. This suggests that there is a discontinuity in the districts' probability of being treated if the Planning Commission's assignment mechanism was strictly binding.

The above result lends support to our main empirical specification of a FRD approach. That is, we suspect that actual treatment assignment to be endogenous, especially to the non-compliance if treatments were strictly assigned following the assignment guideline. We thus propose an instrumental treatment assignment variable based strictly on Central Government's guidelines. Our most flexible estimating equation thus takes the following form:

$$y_{dst} = \alpha_0 + \alpha_1 RSVY_{ds} + \delta(nrank_{ds}, RSVY_{ds}) + \alpha_2 y_{ds}^{baseline} + \pi_s + \varepsilon_{dst} \qquad (2)$$

where the subscripts refer to an observation in district *d* of state *s* in year *t*. y_{dst} is the district-level outcome variables of interest, $RSVY_d$ is a dummy variable equals one if the district is chosen to receive RSVY grant. $nrank_d$ refers to the district's within-state normalized ranking we discussed in the previous section, and serves as the running variable in our RD design. $\delta(nrank_{ds}, RSVY_{ds})$ is a polynomial function of the ranking variable and treatment status for which we vary the degree of flexibility in our regression analysis. Since cut-offs are state-specific, we control for π_s, the state fixed effects. ε_{dst} is a stochastic error term in our regression specification.

We account for the potential endogeneity in actual treatment status by treating $RSVY_d$ as an endogenous regressor. We introduce dummy treatment variable $1\{nrank_d \leq 0\}$ which serves crucially as our identifying instrument. This dummy variable is strictly derived from the Planning Commission's Backwardness Index and was argued previously to be exogenous to the movements in outcome variables at RSVY assignment periods. It is assigned the value of one to a district with state-specific ranking below the normalized cutoff of 0, hence "backward" enough to be eligible for RSVY under the assignment guideline. Instrumenting $1\{nrank_d \leq 0\}$ for $RSVY_d$, the estimating equation adopted in our analysis is given in equation (3):

$$y_{dst} = \beta_0 + \beta_1 1\{nrank_d \leq 0\} + \delta(nrank_{ds}, RSVY_{ds}) + \beta_2 y_{ds}^{baseline} + \pi_s + \varepsilon_{dst} \qquad (3)$$

Equation (3) represents a typical FRD approach. Our main coefficient of interest is β_1, which estimates the magnitude of the Local Average Treatment Effect. In our regressions, we investigate the sensitivity of our RD estimates by varying the functional form specifications for $\delta(nrank_{ds}, RSVY_{ds})$,

and report results for both the linear quadratic forms. In all of the regressions, we provide three alternative parametric specifications to the polynomial function of the running variable (district' state-specific rank): (i) linear; (ii) linear with varying slopes of the polynomial function on each side of the cutoff, i.e. "linear flexible"; and (iii) quadratic. According to Lee and Lemieux (2010), baseline controls are not necessary in a typical RD regression, as long as all identification assumptions are satisfied. However, depending on the availability of baseline information for different outcome variables, we further control for the outcomes' baseline values $y_d^{baseline}$, which are values during pre-treatment period. This exercise helps minimize any potential effect of confounding factors.

In our main regressions, we restrict observations to districts within 15 state-specific normalized ranks below and above the cutoffs. This bandwidth size is halfway between the size of 20 (Khanna & Zimmermann, 2017) and 10 (Klonner & Oldiges, 2014). On the one hand, (Zimmermann, 2012) and (Khanna & Zimmermann, 2017) evaluate NREGA – the public work program discussed in section 2 – also adopting an FRD approach, in which they use a bandwidth size of 20. This chosen size essentially includes the entire sample of treated districts. Figure 3 provides visual interpretation to this discussion, which graphs the distribution of districts over districts' state-specific ranks. (Zimmermann, 2012) and (Khanna & Zimmermann, 2017) argue that the inclusion of all treated districts, hence a larger bandwidth around the cutoff, will improve estimation precision due to an increased sample size. On the other hand, (Klonner & Oldiges, 2014) suggest that a large bandwidth would introduce bias, since observations far away from the cutoff can influence the estimates. They thus carry out their FRD using the bandwidth of 10. However, this reduction in bandwidth size significantly reduces the number of observations, since our data is at the district level. To prevent the empirical tradeoff between estimation precision and bias, we subsequently choose to report our main results using the bandwidth size of 15 in our FRD regressions. We also report results obtained from varying the bandwidth sizes in the robustness checks section.

The key identification assumption underlying our RD strategy is that polynomial function of our running variable is a "smooth", or continuous, function. That is, the level of districts' outcome variables y_{dst} conditional on the Backwardness Index is continuous in this index ranking in the absence of RSVY program. Put differently, this assumption requires that RSVY eligibility is the only source of discontinuity in outcomes around the program's cutoff, based on the ranking mechanism. We believe this assumption is valid for at least two fundamental reasons. First, the ranking was constructed using historical development parameters collected in the early 1990s, roughly a decade before the introduction of RSVY program. In addition, all the surveys and census were conducted at the household and individual levels, and not at the district level. Therefore, it is unlikely that districts would have known about the existence of RSVY assignment mechanism using Backwardness Index information ten-or-so years ahead

of time. Another potential threat to identification, which would invalidate the identification assumption, is if there were any other contemporaneous public program/intervention with the same development focus which also differentially affected the outcome variables in the same treatment districts as under RSVY. It is inconceivable that such a case exists. The RSVY program was the first national public development initiative that the Central Government introduced, adopting a transparent assignment formula under the basis of backwardness ranking index. To the best of our knowledge, the only two other large-scale public/development projects of which districts' eligibility was determined using the Backwardness Index is the Backward Regional Grant Fund (BRGF), and the relatively more famous National Rural Employment Guarantee Act (NREGA). BRGF was, in fact, the successor of RSVY, which was introduced in 2007. It extended the total number of eligible districts for cash-grants to 250 districts. NREGA implemented its first Phase in April 2006, covering the most backward 200 districts. Both programs started at least two years after the introduction of RSVY, and also did not assign treatment status to the exact same treated districts in our analysis. Therefore, it is safe to conclude that these programs did not differentially impact the treatment group's outcome variables in our RD design, and thus cannot contaminate our results.

V. Data and Variable Formations

This paper explores two main sources of data: Round 56 (2000-01) and 62 (2005-06) of the National Sample Survey – Manufacturing Enterprises Schedule (Schedule 2.2) and the 1998 and 2005 Economic Censuses, both aggregated to the district level. Since our identification relies on changes at the district level, we also utilize district-level information on the 2001 Population to observe the baseline characteristics. Because we study the impact of RSVY on micro manufacturing firm establishment and business activities for the rural sector in India, we only keep rural observations in our analysis for all data sources. We discuss in detail each of the sources below.

1. National Sample Survey – Manufacturing Enterprises Schedule (Schedule 2.2)

Our main analyses rely on the data collected from the National Sample Survey (NSS) Round 62 (2005-06, i.e. post-policy period) and Round 56 (2000-01, i.e. pre-policy period). To capture the detailed RSVY impacts on business activities and performance, we focus on Schedule 2.2 in each NSS Round. This schedule surveys manufacturing enterprises with all-inclusive questions regarding the firms' business operating measures and investments such as sales, expenditures, gross value added, fixed assets owned/added/hired/rented. Questions related to the overall business environment and firms' subjective growth perception are also asked, for example, the types of problems encountered, government and other

administrative support they received, firms' self-assessment on whether they are expanding or contracting, etc. Given that RSVY was introduced in June 2004, information from Round 62 perfectly captures the short-run, post-treatment effects of this policy. The survey is stratified by urban and rural areas of each district, and is representative of the Indian population.

Manufacturing Enterprises' data from Round 56 serves two purposes. First, this baseline period is approximately three years prior to the implementation of RSVY, and should reflect the conditions before the introduction of RSVY. We control for baseline values in separate set of regressions for all results as additional checks for robustness. The baseline information allows us to perform falsification/placebo tests on policy impacts, where there should be no effects during the pre-treatment phase.

2. Economic Censuses

This paper also explores the enterprise data from the 5th Economic Census conducted by the Indian Ministry of Statistics and Programme Implementation (MoSPI) in 2005. The Economic Census is a complete enumeration of all economic establishments except those engaged in crop production and plantation. Unlike the enterprise censuses from other developing countries which often only include all large firms and a representative subset of micro and small firms, there is no inclusion criteria on firm size. The census includes all establishments, regardless of the levels of formality. It records information on the location of the establishment to the village-level, the 4-digit National Industrial Classification (NIC), ownership status, the power sources used for production, the caste/social group to which the owners belong, source of financing, and information on the number of hired and non-hired staff broken down by gender. More detailed information on income or capital is not included. For analysis, we specifically take advantage of the Economic Census' comprehensive firms' information regarding their district locations, production industries, number of workers and owner's social classes. Because we are interested in observing the potential spillover impact of RSVY on entrepreneurship to rural manufacturing micro-enterprises, we adopt the government's technical classification of Own Account Enterprises (OAMEs): manufacturing firms that do not hire regular workers. By definitions, OAMEs mainly consist of the micro/informal manufacturing enterprises which usually employ only the owners and their family members/relatives who do not receive regular, official salaries. According to Table 3, the baseline (1998) average staff size of an OAE in both treated and comparison groups is approximately 1.5.

3. Summary Statistics

Table 3 presents the baseline summary statistics of the main socio-economic measures separately for treated and comparison districts. The table uses information from the 4th Economic Census 1998,

approximately five years before the introduction of RSVY. Since RSVY was directed to rural areas of the districts, we restrict our analysis to the rural sector. We consider treated districts to be those with available Backwardness Index information and eligible for RSVY under the Planning Commission's proposed RSVY assignment mechanism, i.e. those with $nrank_{ds} < 0$. Comparison districts are districts with available Backwardness Index information and ineligible for RSVY under the Planning Commission's proposed RSVY assignment mechanism. Our main regressions are restricted to observations within 15 state-specific normalized ranks below and above the cutoffs. Panel A compares the district means for the baseline (i.e. pre-intervention) of the main variables used in regressions: number of Manufacturing enterprises and OAMEs, district's share OAMEs, as well as important measures of firms' business status, activities, performance, and investment. The t-test's clear rejections of null hypothesis for significant differences in means indicate that groups are highly balanced at the baseline. The statistics show that OAMEs accounted for over 75% of total rural manufacturing enterprises, with mean OAME's staff size of approx. 1.75 workers. In terms of industry size, manufacturing firms account for over one-fifth of total rural economic establishments, second to only retail industry (approx. 30%).[15] Our analysis then chooses to focus on analyzing RSVY policy impact to manufacturing micro enterprises due to two reasons. First, this group of firms dominantly represent the entire industry (75% of manufacturing firms are Own Account). Second, compared to retail industry, manufacturing activities are well-known to generate greater economic added value. Thus, any policy impact found within this sector would be influential to the overall district's economic growth.

To further check for the baseline balances, Panel B presents summaries of selected important observed, non-outcome means such as district's average number of firms, years of operation, staff characteristics, types of ownership, share of backward (SC/ST) population, and other socio-demographic as well as the status-quo provisions of certain public goods and physical infrastructures. Mean-difference tests are performed for each pair of baseline variables. The two-sided p-scores continue to indicate that the differences in baseline means of these observed variables are statistically insignificant. These consistently balanced statistics across all baseline outcome and non-outcome variables of interest suggest that the rural regions on the two sides of cutoff were highly similar in characteristics relevant to our analysis at the baseline, at least at our chosen bandwidth. This solidifies the identification assumption which our empirical approach relies on, showing that districts on the two sides of the cutoff are systematically comparable. The two groups should only differ on the outcome variables as the result of the introduction of the program. To further explore the preliminary findings, we perform our main methodological tests in the next sub-section.

VI. Results

In this section, first, exploiting detailed information provided in NSS survey data, we focus on the impacts of RSVY on rural OAMEs' business activities and performance. We then perform a series of empirical tests to check whether the results are robust across multiple specifications. Second, we exploit the census' complete enumeration of firms to analyze structural changes in the distribution of micro enterprises within the manufacturing industry. Finally, we focus on the changes within OAMEs, where we analyze the impact of RSVY among firms owned by backward classes (Schedule Caste/Scheduled Tribe - SC/ST).

1. NSS results

In, tables 4 to 8, we present regression results using information from the NSS Manufacturing Enterprises Survey, Round 62.[16] This survey covers the period between July 2005 and June 2006, and hence provides evidence for the potential short-run impacts of RSVY on OAME's business activities and performance. We analyze the policy impact of RSVY by using the FRD model of equation (3). For all regressions, we empirically test for the robustness of our results with three different parametric specifications (linear, linear with flexible slope of regression line on two sides of the cutoff, quadratic). We also check for the sensitivity of the estimates to different specifications by running regressions with and without controlling for district's baseline values. The estimated coefficients $\hat{\beta}_1$, estimates the impact of RSVY, is reported in the tables. It represents the Local Average Treatment Effects (LATEs) of RSVY on the different outcomes of interest.

i. OAME's Business Status: Expanding/Contracting

In order to study the policy impact of RSVY on firm's performance, we first examine OAME's self-reported business status for the period following the introduction of RSVY: 2005-06. In Table 4, we test whether investments in social and infrastructural projects through RSVY led to an increase in business activity for microenterprises. The infrastructure investments made as a result of RSVY were mostly small in nature and hence most likely to affect small manufacturing firms. Table 4 shows the impact of RSVY on the average firms' probability of being in an expanding or contracting phase in their business. Each

[16] Round 56 data is also used as part of the regressions controlling for baseline values.

individual firm owner was surveyed for whether they perceive the status of their business to be expanding or contracting during the one-year preceding the survey date. We collapse the outcome values to district-level means and adopt the FRD approach. As mentioned, since most RSVY transfers did not finish until at least 3 years after the introduction, we mainly focus on observing the short-run impact of the program. Panel A presents the estimated coefficients $\hat{\beta}_1$, with the probability of expanding or contracting in business as the dependent variables. We replicate the exercise in Panel B, but add baseline outcome values as additional control variables. On average, an OAME in a RSVY district experienced a higher probability of business expansion, with the coefficient for "*status: expanding*" regressions being positive, although not statistically significant at the conventional levels. However, we observe statistical significant differences for firms in treated and control districts for the "*status: contracting*" estimations. We find that firms in RSVY treated districts are more likely to self-report that their business is not declining as compared to control districts. Results from Table 4 indicate a significant and robust decrease in business contracting probability for the micro manufacturing establishments in the treated group, with impact magnitudes ranging from 4.7% to 5.4%, depending on the specifications. Compared to the mean probability of entire sample (16.2%), this effect amounts to almost a one-third reduction from the baseline period.

One can also visually observe the effects of RSVY by looking at Figure 4. This figure plots districts' contracting probabilities as a function of the running variable (state-specific standardized rank), with RSVY districts receiving standardized ranks of non-positive values (i.e. locating on the left side of the cutoff). The graph also separately plots Linear Fitted Curves and corresponding 95% Confidence Intervals for treated and comparison groups. Recall that in our FRD framework, $\hat{\beta}_1$ represents the estimated discontinuity between districts locating right above (i.e. non-treated) versus below (i.e. treated) the cutoff. This is illustrated by a discrete jump in contracting probability at the cutoff (vertical dash line at rank 0). This discontinuous increase is consistent with the regressions' estimated magnitudes found previously, and is distinctly visible even when accounting for the confidence interval bands. The fact that fitted curves behave differently in trends demonstrates the appropriateness of our inclusion for the "linear flexible slopes" specification in the regression specifications.[17]

ii. OAME's Operating Activities

In table 4, we find that OAMEs in districts entitled to RSVY funding experienced a greater probability of expanding and lower probability of contracting, on average. Next, we check whether this

[17] Plots with quadratic fitted curves are also available upon request.

potential increase in perceived business activity translated into real economic values and operating performance for this group of firms. The regression results in table 5 provide strong corroborative evidence. Specifically, we find significant and robust increases for both sales and expenditures measures, for firms operating in treated districts.

First, in terms of operating inflows, the FRD results show that an average OAME in a RSVY district generated larger sales values compared to a firm operating in a comparison district. In table 5, we find that monthly total receipts[18] are positive and statistically significant for all specifications (with and without controls), representing an increase of close to 20% from the baseline mean.[19] Looking at the other side of the balance sheet, business expenditures are also found to be significantly higher for informal manufacturing firms in RSVY districts relative to control districts. We find a positive and significant increase in the mean monthly total expenditure per district of roughly 400 to 430 Rupees, an amount equivalent to almost one-third of the sample mean.[20] Similar to measures on sales, estimates for the impact on firm's expenditures are robust across choices of specifications and controls.[21]

The first row of figure 5 visually illustrates the effect of the policy on firm's receipts and expenses. In both graphs, there is a discontinuous decrease at the cutoff, moving from the left (i.e. treated) to the right (i.e. comparison) of standardized rank 0. Overall, our analysis provides evidence indicating that RSVY firms are significantly more active, engaging in greater level of both sales and spending. We next analyze the impact of RSVY on OAME's profit. The NSS survey identifies Gross Value Added as the difference between Total Receipts and Total Expenditure net any other distributive expenses. In table 5, we look at the impact of RSVY on firms' gross value added. We find that the estimated impact is positive, although not statistically significant. Since funds from RSVY were supposed to be transferred to recipient districts over the course of three years, we do not expect any drastic change to firms' level of profitability right after the program's introduction. To the extent that our paper evaluates the short-run effects of RSVY on firms, the results make intuitive sense. Overall, our results suggest that improvements in the overall social and infrastructure environment through the RSVY helped small business ownerships to substantially increase their business activities.

iii. OAME's Investment in Long-term (Fixed) Assets

[18] Total Receipt is measured in Rs and is the value of the sum of all receipts an OAME received in the one-month preceding the survey date, including receipts from production and sales of manufactured products and by-products, trading, and other activities.

[19] The sample mean of Total Receipt is 2,874.93 Rs.

[20] Total expenditures are measured in Rs and is the value of the sum of all expenditures an OAME generated in the one-month preceding survey date, including spending for manufacturing activities (raw material consumption), trading, and other business-related activities – excluding investment in fixed assets.

[21] The

With greater public-sector investments in infrastructure, one can also possibly envision potential long-run economic effects of RSVY, with firms committing in greater degree to both current and future investments. In attempting to evaluate the long-term impact of RSVY, our analysis encounters a potential obstacle. First, the NSS Round 62 only provides manufacturing firm's data in 2005-06, which is one to one-and-a-half years after the introduction of RSVY. Since the government started to roll out more public development programs focusing on the promotion of economic growth to backward regions with similar assignment mechanism (e.g. NREGA in 2006-07), it would be hard to discern RSVY impact from the confounding effects of the new projects. However, one can still gauge certain long-run effects when examining firms' investment in fixed assets. We test this hypothesis and provide empirical evidence in table 6.

In Table 6, we find that informal firms invest more in both the acquisition and rental of fixed assets. Specifically, the mean value of an average OAME's total addition to fixed assets (defined as the value of fixed assets acquired during the last 365 days preceding survey period) is significantly higher in RSVY districts. This directly indicates that firms in RSVY districts were willing to commit more by investing greater in permanent assets, compared to firms in non-treated districts in the sample. Table 6 also provides evidence that micro manufacturing enterprises in RSVY districts paid significantly greater in monthly rentals on hired fixed assets, suggesting higher short/medium-run investments.[22] The corresponding RD graphs are shown in the second row of figure 5, showing discrete decreases at the cutoffs for both measures of fixed assets' investments.

iv. OAME's Probability of Receiving Assistance

Up to this point, we have provided evidence of reduced-form effects of RSVY on micro manufacturing establishments. Informal firms experience lower probability of contracting, and are shown to be more engaged in business activities, as well as more committed to long-term investments. Next, we provide a direct test for one potential mechanism driving our main results. To be specific, we expect that an important ingredient of a favorable business environment pertaining to micro manufacturing firms is the level of government assistance that they receive. The NSS questionnaire asks firm owners whether they received assistance of any kind during the reference month preceding survey date. Given that part of the RSVY cash transfers were directed toward improving social capacity of the backward districts, it is reasonable to believe that the micro enterprises would receive greater public assistance when conducting their business.

[22] Estimated coefficients of RSVY impacts are positive for both the regressions with Added Fixed Assets and Rent Paid for Hired Fixed Assets, even though are not statistically significant for all three specifications on the polynomial's functional forms.

Table 8 and the corresponding figure 6 shows the effect of RSVY on firms' probability of receiving assistance. On average, an OAME in RSVY district experienced a 2.5% increase in the probability of being assisted at least once during the reference year. The magnitude of the impact amounts to over one-third of the sample's mean probability. This policy effect is associated with the discrete reduction at the cutoff in figure 6.

v. Robustness Checks and Falsification Tests on Main Outcomes

In this subsection, we perform a comprehensive exercise detailing a series of robustness checks and placebo tests in order to ensure that our regression results are robust to variations in bandwidth sizes, observation values, and dependent variables' functional forms. Regression results are documented in table 8.

First, it is worth reiterating that our FRD's bandwidth size was manually chosen to balance the tradeoff between estimating precision and bias. In table 8, the first two rows of each regression panel provide estimates for $\widehat{\beta}_1$ with other bandwidth sizes. Specifically, we replicate all regressions from table 4 to 7 with two new bandwidths. At the size of $|nrank_{ds}| \leq 20$, we essentially include all treated districts, which maximizes the number of observations and increases estimation's precision.[23] At the bandwidth size of $|nrank_{ds}| \leq 10$, we restrict observations to be closer to the cutoff, which could eliminate concerns regarding the potential biases introduced by districts placed far away from the cutoff.[24] [25]

The next set of robustness checks include "Doughnut Hole" and "Equal Sample Size" FRD regressions. We perform the former by eliminating the "fuzzy" observations located right at the cutoff, i.e. those with standardized ranking equals to 0.[26] To further check for the sensitivity of our estimates to groups' sizes, we use "Equal Sample Size" regressions, essentially restricting the number of districts included in the comparison group to be closest to the number of districts included in the treated group. Finally, table 8 also reports empirical outcomes from FRD regressions using log-transformed values of the dependent variables. All estimates for the main variables across specifications remain highly consistent in magnitudes as well as in the level of statistical significance found in Table 4-7.

[23] (Zimmermann, 2012) and (Khanna & Zimmermann, 2017) adopt this bandwidth size in their analysis on the economic impact of NREGA, a public work program with assignment mechanism also based on district's backwardness ranking.

[24] (Klonner & Oldiges, 2014) also evaluate the economic impact of NREGA and use this bandwidth size for their analysis.

[25] More detailed regression results for specifications using these bandwidth sizes, including reports on estimated standard errors and goodness-of-fits (R-squares), are shown in Appendices 3 to 6.

[26] According to figure 2, the probability of receiving RSVY treatment for districts with standardized rank of 0, i.e. the districts locating right at the cutoff, is only approx. 50%.

The robustness checks add credibility to our main findings on the impact of RSVY to informal firms' business activities. As an additional test, we replicate all regressions in Table 4-7, using the baseline data from NSS Round 56 (2000-01) survey – the last NSS Round with available Manufacturing Enterprises Schedule that precedes RSVY introduction. This is similar to a falsification test, since before RSVY there should not have been any significant differences between the treated and control districts. The last rows of each panel of Table 8 provide estimates. In essence, we test for a hypothetical impact on rural OAMEs roughly three years before the actual introduction of RSVY. It is expected that there should be no impact, since none of the RSVY-sponsored developments had taken place in 2000-01. Results from Table 8 confirm this. There is no statistically significant regression estimate for any outcomes of interest before the introduction of RSVY.

2. Economic Census Results

i. Economic Census: Structural Change in OAME share

Up to this point, we have provided evidence indicating qualitative effects of RSVY on informal manufacturing firms' business activities. Our new goal is to evaluate the quantitative impact of the program for this group of micro firms by addressing the structure changes in districts' share of own account manufacturing firms. For this purpose, we utilize information from the 4th (1998) and 5th (2005) Economic Censuses.

At the industry-disaggregated level, the impact is noticeable for micro-enterprises operating in the manufacturing sector. The result illustrates a significant and robust rise in the share of OAMEs of between 3.6% and 4.4% for RSVY districts, depending on the specifications and the presence of baseline controls. With the mean share of 72.2%, this value represents an approx. 6% increase from the baseline. Figure 7 corresponds to the above regression, providing collaborated evidence for the impact of RSVY on district's share of OAMEs within the manufacturing industry. There is a significant discontinuity at the cutoff for the district's share of OAMEs in manufacturing sector, even after accounting for the standard deviation in means.

Taken all together, within the Economic Census setting, our results suggest that RSVY produced a positive effect on the level of RSVY district's percentage of rural micro manufacturing enterprises. We interpret this result as an indication for a higher aspiration to micro-entrepreneurship, with potential low-waged rural workers in the most backward districts discovering the benefit of self-employment when their districts experience development in social and infrastructural conditions. That is, following the

introduction of RSVY. the intrinsic costs of being entrepreneurial is perhaps significantly lower for rural citizens, providing them with a more conducive business environment.

ii. Extensions

Thus far, the results imply a potential spillover impact of RSVY on to rural entrepreneurship. Next, we investigate whether there is an impact of the program on the backward classes of India's society: the Scheduled Caste and Scheduled Tribe (SC/ST). These marginalized and historically disadvantaged group of citizens, formerly restricted from any modern economic integration to the mainstream, often have the highest percentage of people living in poverty (Ministry of Statistics and Programme Implementation, 2011). (Klonner & Oldiges, 2014) show that SC/STs account for a large percentage of India's rural population (29.8%), with this group's poverty measures close to three times the figure of non-SC/ST groups. Given that one of the three parameters used by the Central Government to construct the Backwardness Index was the district's percentage of SC/ST population, we expect the assignment of RSVY to have an impact on this group.

Table 10 provides some suggestive evidence. The table reports estimated coefficients using our baseline FRD technique. The outcome variable is the district's share of rural OAEs owned by SC/ST groups[27]. The result indicates a significant increase of 4 to 4.7% in the share of micro firms owned by SC/STs in RSVY districts. This is an increase of almost 25 percent from the baseline mean share of SC/ST micro businesses. In addition, disaggregating micro enterprises by owners' gender allows us to observe another interesting finding. We discover that it is predominantly the female SC/ST group in RSVY districts that experienced the most robust rise in self-employment activity. In fact, controlling for the baseline values, the impact estimates for female SC/ST remain statistically significant.

Our results on the increase in the economic activity and integration for SC/STs, contributes to the sparse literature that finds improved economic outcomes for this group. (Klonner & Oldiges, 2014) look at welfare outcomes for SC/ST groups following the introduction of NREGA –a public work program introduced by Central Government. They find positive effects on monthly per-capita expenditure at the district-level for SC/ST households. Our result suggests greater social inclusion of this backward group in rural micro business and production activities, as measured by the increased share of OAEs owned by SC/ST individuals.

[27] In this subsection, we choose to analyze RSVY impact on backward social groups (SC/STs) of all Own Account Enterprises as opposed to only those in manufacturing sector due to sparse observations in the latter.

VII. Conclusions

This paper studies the short-run impact to rural economic activities of an infrastructure development scheme introduced by the India's Central Government (Rashtriya Sam Vikas Yojana - RSVY) in 2004. We exploit RSVY's unique characteristics, including the program's focus on improving the backward regions' social and physical infrastructures, and its transparent assignment mechanism. We adopt a Fuzzy Regression-Discontinuity Design to study the effects of RSVY development scheme. We find significant effects of RSVY on multiple firm's business status, activities, investments, and probability of receiving assistance. We also discover positive RSVY effects on changes in district' structures of rural micro-enterprises. In the first stage, we construct an exogenous state-specific ranking based on the Government's Backwardness Index that is transparent and publicly available. We then use this constructed ranking to instrument for the potentially endogenous actual assignment. In the second stage, we utilize data from the National Sample Survey – Manufacturing Enterprises Round 62, as well as the 4th and 5th Economic Censuses. Specifically, we find that OAMEs locating in RSVY districts report lower probability of contracting, greater sales, expenditures, fixed asset investments, and greater probability of receiving assistance. Adopting EC's information, we observe a discontinuous increase in districts' share of Own Account Manufacturing Enterprises (OAMEs) at the cutoff that were used to determine program eligibility, favoring RSVY recipients. We further show that this effect is highly concentrated among the society's backward social classes (Scheduled Caste/ Scheduled Tribe – SC/ST), with Female SC/ST group in RSVY districts experiencing significant and robust rise in self-employment activity. Our finding contributes to the expanding literature on the impacts of economic development programs. Specifically, this paper is the first to indicate a potential short-run effect of such program to rural entrepreneurial activities and business performance. The result also indicates a positive impact on socio-economic integration of the society's backward social classes – the Scheduled Caste/Scheduled Tribe (SC/ST).

Our findings offer some avenues to future research on the economic impacts of RSVY and similar social and infrastructural development programs. For instance, related but unreported in this paper, we have found evidence suggesting direct welfare impact of RSVY. Specifically, we estimate the effect of RSVY introduction to overall growth of district's economic activities – proxied by satellite-imaged nightlight luminosities.[28] The nature of this panel dataset also allows us to observe RSVY effect

[28] There is an expanding research body which utilizes nightlight as a credible proxy of economic growth, especially for regions with missing or unreliable conventional economic growth measures. For example, there is currently no reliable regional GDP information at India's district-level. See (Henderson & Adam Storeygard, 2012) for a more detailed discussion.

over time. One could also attempt to study the medium- and long-term economic impacts of infrastructure investments. Pertaining to RSVY, a crucial technical requirement would be finding way to dis-entangle the impact of this program from other development schemes introduced subsequently by the Central Government.[29] Regardless, the initial evidence indicating certain economic effects of this economic development scheme should provide insights to policy-makers' attempts in addressing the issues of India's regional economic imbalance, as well as their constant promotion to greater economic integration and performance for micro, informal enterprises – those influential to India's rural economy.

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Table 1a: Assignment's Prediction Accuracy for 96 "normal" RSVY districts with Backwardness Ranking

	Non-RSVY Actual	RSVY Actual	Total
Non-RSVY Predicted	325	19	344
%	94.48	5.52	100

RSVY Predicted	19	77	96
%	19.79	80.21	100
Total	38	402	440
%	8.64	91.36	100

Table 1b: Assignment's Prediction Accuracy for 124 RSVY districts with Backwardness Ranking (Maoist districts included)

	Non-RSVY Actual	RSVY Actual	Total
Non-RSVY Predicted	286	30	316
%	90.51	9.49	100
RSVY Predicted	30	94	124
%	24.19	75.81	100
Total	60	380	440
%	13.64	86.36	100

Note: The table illustrates RSVY assignment's prediction accuracy for whole sample of districts with available Backwardness Ranking, utilizing the Planning Commission's proposed mechanism as detailed in the RSVY guidelines.

Table 2: State-wise Assignment's Prediction Accuracy

State	Total # District with Poverty Index	# Districts actually received RSVY	# Districts correctly predicted from assignment rule	Prediction Accuracy
ANDHRA PRADESH	21	4	3	75.00%

ASSAM	24	5	5	100.00%
BIHAR	37	14	12	85.71%
CHATTISGARH	11	3	2	66.67%
GUJARAT	20	3	3	100.00%
HARYANA	18	1	0	0.00%
JHARKHAND	14	3	2	66.67%
KARNATAKA	26	4	4	100.00%
KERALA	13	2	1	50.00%
MADHYA PRADESH	46	10	7	70.00%
MAHARASTRA	29	9	9	100.00%
ORISSA	30	2	0	0.00%
PUNJAB	15	1	1	100.00%
RAJASTHAN	31	3	2	66.67%
TAMIL NADU	26	5	3	60.00%
UTTAR PRADESH	63	19	16	84.21%
WEST BENGAL	16	8	7	87.50%
Total	440[30]	96	77	80.21%

Note: The table illustrates RSVY assignment's prediction accuracy at the state-level for 17 States with available Backwardness Ranking, utilizing the Planning Commission's proposed mechanism as detailed in the RSVY guidelines.

Table 3: Summary Statistics for Baseline Variables - Pre- Intervention

	Comparison Group	Treated Group	Difference	p-score	Source
Panel A: District Means of OAME Outcome Variables					
Manufacturing Firm count	8,353.91	7,345.67	1,008.24	0.4993	Economic Census 1998
OAME count	6,447.60	5,652.96	794.64	0.3763	Economic Census 1998

[30] Note: 7 districts have either merged or changed location boundaries between the index construction period and the period of analysis (2004-05).

OAME Share (% Total Manufacturing Enterprises)	0.7718	0.7696	0.0022	0.8872	Economic Census 1998
Receive Assistance (%)	0.074	0.067	0.007	0.1267	NSS-Sch 2.2 (2000-01)
status: contracting (%)	0.139	0.153	-0.014	0.4319	NSS-Sch 2.2 (2000-01)
status: expanding (%)	0.161	0.159	0.002	0.9232	NSS-Sch 2.2 (2000-01)
Total Expenses (Rs)	1020.940	553.599	467.342	0.3106	NSS-Sch 2.2 (2000-01)
Total Receipts (Rs)	4091.536	3197.283	894.253	0.1394	NSS-Sch 2.2 (2000-01)
Gross Value Added (Rs)	4107.073	3197.861	909.212	0.1338	NSS-Sch 2.2 (2000-01)
Fixed Asset Added (Rs)	1819.275	1001.257	818.018	0.2070	NSS-Sch 2.2 (2000-01)
Fixed Asset Rented (Rs)	661.953	546.125	115.829	0.2822	NSS-Sch 2.2 (2000-01)
Panel B: District Means of other Observed Variables					
Total Firm count	40,400.01	33,359.10	7,040.91	0.1708	Economic Census 1998
Years of Operation	6.34	6.31	0.03	0.8472	Economic Census 1998
OAME average staff	1.76	1.74	0.02	0.5956	Economic Census 1998
By Ownership					
Private	37,510.43	30,362.53	7,147.90	0.1514	Economic Census 1998
Cooperative	337.38	277.53	59.85	0.2194	Economic Census 1998
Government	2,552.20	2,719.03	-166.83	0.4360	Economic Census 1998
ST/SC (count)	5,183.16	6,451.13	-1,267.97	0.2394	Economic Census 1998
Observations	228.00	88.00			
Socio-demographic					
Population	1,567,296.40	1,669,127.70	-101,831.30	0.1897	Population Census 2001
Male percentage	0.51	0.51	0.00	0.6858	Population Census 2001
Female percentage	0.49	0.49	0.00	0.6858	Population Census 2001
Physical Infrastructures					
Education facilities	1,299.61	1,519.95	-220.33	0.1456	Population Census 2001
Hospitals	18.36	20.88	-2.52	0.3713	Population Census 2001
Post offices	283.17	282.73	0.44	0.9845	Population Census 2001
Banking facilities	2,085.61	2,471.37	-385.76	0.0714	Population Census 2001
Observations (NSS2000)	218	81			
Observations (EC1998)	228	88			
Observations (PC2001)	226	91			

Note: This table shows baseline mean district outcomes and controls for 2 separate groups: treated districts and comparison districts. The table also provides the mean-difference test to check for differences in outcome means. Treated districts are districts with available Backwardness Index information and eligible for RSVY under the Planning Commission's proposed RSVY assignment mechanism, i.e. those with $nrank_{ds} < 0$. Comparison districts are districts with available Backwardness Index information and ineligible for RSVY under the Planning Commission's proposed RSVY assignment mechanism, i.e. those with $nrank_{ds} > 0$. We restrict observations to districts within 15 state-specific standardized ranks below and above the cutoffs. Panel A reports mean outcomes as well as differences in means for main and control variables used for regressions. Panel B reports means, and differences in means, for observed non-outcomes.

Table 4: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Business Statuses

	Linear	Linear Flexible	Quadratic	Sample Mean
Panel A: No control				
Status: Expanding	-0.00422	0.00463	0.0118	0.174

	$\hat{\beta}_1$				
	S.E.	(0.0299)	(0.0300)	(0.0310)	
	R-squared	0.164	0.172	0.171	
Status: Contracting					
	$\hat{\beta}_1$	-0.0480**	-0.0504**	-0.0542**	0.162
	S.E.	(0.0234)	(0.0230)	(0.0238)	
	R-squared	0.262	0.262	0.263	
Panel B: with Controls					
Status: Expanding					
	$\hat{\beta}_1$	-0.00291	0.00545	0.0125	0.174
	S.E.	(0.0299)	(0.0299)	(0.0308)	
	R-squared	0.168	0.176	0.176	
Status: Contracting					
	$\hat{\beta}_1$	-0.0479**	-0.0494**	-0.0522**	0.162
	S.E.	(0.0233)	(0.0229)	(0.0236)	
	R-squared	0.273	0.274	0.274	
Observation		299	299	299	
State FE		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on the reported probabilities of business expanding and contracting of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Observations include all districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Table 5: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Business Operations

	Linear	Linear Flexible	Quadratic	Sample Mean
Panel A: No controls				
Total Receipts				
$\hat{\beta}_1$	600.2**	545.2*	571.4*	2874.93
S.E.	(282.4)	(294.7)	(305.7)	

	R-squared	0.316	0.318	0.316	
Total Expenses					
$\hat{\beta}_1$		432.8**	399.1*	428.8**	1283.83
	S.E.	(197.2)	(208.0)	(217.1)	
	R-squared	0.251	0.253	0.251	
Gross Value Added					
$\hat{\beta}_1$		175.7	154.3	150.8	1595.30
	S.E.	(119.3)	(119.5)	(122.3)	
	R-squared	0.379	0.382	0.380	
Panel B: with Controls					
Total Receipts					
$\hat{\beta}_1$		623.6**	568.7*	596.2*	2874.93
	S.E.	(280.3)	(293.8)	(305.5)	
	R-squared	0.317	0.319	0.317	
Total Expenses					
$\hat{\beta}_1$		427.6**	393.9*	424.3*	1283.83
	S.E.	(198.2)	(209.4)	(218.0)	
	R-squared	0.251	0.253	0.251	
Net Value Added		183.6	162.2	158.9	1595.30
	S.E.	(118.3)	(118.5)	(121.5)	
	R-squared	0.380	0.382	0.381	
Observation		299	299	299	
State FE		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on measures of business operations of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Observations include all districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Table 6: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Firms' Fixed Assets Investments

		Linear	Linear Flexible	Quadratic	Sample Mean
Panel A: No Control					
Added Fixed Assets	$\hat{\beta}_1$	268.7**	230.8*	220.8	370.87
	S.E.	(133.0)	(131.6)	(135.7)	
	R-squared	0.096	0.101	0.098	
Rent Paid	$\hat{\beta}_1$	14.27**	12.17*	11.03	33.22
	S.E.	(7.021)	(7.278)	(7.527)	
	R-squared	0.441	0.447	0.445	
Panel B: With Control					
Added Fixed Assets	$\hat{\beta}_1$	265.0**	229.0*	218.8	370.87
	S.E.	(134.7)	(133.7)	(138.0)	
	R-squared	0.096	0.102	0.098	
Rent Paid	$\hat{\beta}_1$	14.48**	12.37*	11.25	33.22
	S.E.	(7.109)	(7.360)	(7.611)	
	R-squared	0.455	0.460	0.459	
Observation		299	299	299	
State FE		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on firms' fixed assets investment of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Observations include all districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Table 7: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Firms' Probabilities of Receiving Assistance

		Linear	Linear Flexible	Quadratic	Observation	Sample Mean
Probablity of Receving Assistance						
No Controls	$\widehat{\beta}_1$	0.0283**	0.0246*	0.0235	299	0.06083
	S.E.	(0.0138)	(0.0141)	(0.0143)		
	R-squared	0.143	0.147	0.147		
With Controls	$\widehat{\beta}_1$	0.0272**	0.0244*	0.0231	299	0.06083
	S.E.	(0.0135)	(0.0138)	(0.0141)		
	R-squared	0.151	0.155	0.154		
State FE		Yes	Yes	Yes		

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on firms' reported probability of receiving at least one type of assistance during the referenced year 2004-05 of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). The table reports results for the regressions restricting observations to districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff, with and without baseline controls. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Table 8: Own Account Manufacturing Enterprises (OAMEs): Robustness Checks for Main Results

	Linear	Linear Flexible	Quadratic	Linear	Linear Flexible	Quadratic	Obs.
Panel A: Business Statuses							
	Status: Contracting			*Status: Expanding*			
$/nrank_{ds}/\leq 20$	-0.0484**	-0.0582***	-0.0693***	0.0103	0.00429	0.0132	348
$/nrank_{ds}/\leq 10$	-0.0803***	-0.0789***	-0.0755***	0.0311	0.0322	0.0336	226
Doughnut Hole RD	-0.0452*	-0.0487*	-0.0520*	-0.0284	-0.0154	-0.0109	284
Equal Sample Size	-0.0618**	-0.0745**	-0.0811**	0.0283	0.0333	0.0458	173
Log Value	-0.249*	-0.286*	-0.358**	0.131	0.179	0.218	260
Placebo Test: R56	-0.000506	-0.00793	-0.0158	-0.0150	-0.0101	-0.00936	299
Panel B: Operating Activites							
	Total Receipts			*Total Expenses*			
$/nrank_{ds}/\leq 20$	512.4*	494.0*	607.3**	403.3**	389.4**	466.7**	348
$/nrank_{ds}/\leq 10$	1,026***	970.4***	854.7**	821.5***	789.5***	719.3***	226
Doughnut Hole RD	536.1*	376.7*	482.4	394.1**	299.0	385.9*	284
Equal Sample Size	630.4*	891.8**	877.3**	486.0**	663.4***	662.1***	173
Log Value	0.203**	0.183*	0.182*	0.350**	0.305*	0.296	299
Placebo Test: R56	-1,608	-1,677	-1,718	-720.0*	-718.9	-622.5	299
Panel C: Fixed Asset Investments							
	Added Fixed Assets			*Rent Paid*			
$/nrank_{ds}/\leq 20$	227.3*	196.4	224.6*	16.93**	14.24*	13.04*	348
$/nrank_{ds}/\leq 10$	225.0	206.6	176.1	20.81**	19.74**	17.44**	226
Doughnut Hole RD	416.2**	375.8**	389.7**	14.56**	9.264	21.78*	284
Equal Sample Size	198.5	440.3**	375.0*	19.90**	21.39**	27.09*	173
Log Value	0.966**	0.985**	1.025**	0.172	0.104	0.0324	259
Placebo Test: R56	-1,765	-1,554	-1,363	-34.05	-33.17	-35.68	299
Panel D: Probability of Receiving Assistance							
$/nrank_{ds}/\leq 20$	0.0317**	0.0282**	0.0266**				
$/nrank_{ds}/\leq 10$	0.0330**	0.0321**	0.0309**				
Doughnut Hole RD	0.0258*	0.0183	0.0192				
Equal Sample Size	0.0233	0.0397**	0.0421**				
Log Value	0.373**	0.372*	0.360*				
Placebo Test: R56	-0.0366	-0.0361	-0.0354				
Controls*	Yes	Yes	Yes	Yes	Yes	Yes	
State FE	Yes	Yes	Yes	Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table reports estimated coefficients $\widehat{\beta}_1$ from various specifications to check for the robustness of the main results in this paper. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Observations include all districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1. "$/nrank_{ds}/\leq 20$" and "$/nrank_{ds}/\leq 10$" refer to regressions using observations with absolute state-specific standardized ranking value of no greater than 20 and 10 ranks from the cutoff. "Doughnut Hole RD" refers to regressions omitting "fuzzy" observations locating right at the cutoff, i.e. those with standardized rank equals 0. "Equal Sample Size" refers to regressions restricting the number of districts included in the comparison group to be closest to the number of districts included in the treated group. "Log value" refers to regressions using logarithm values of the dependent variables. "Placebo Test: R56" refers to regressions using Round 56 (2000-01)'s values, i.e. pre-policy values, of the dependent variables. All regressions include the baseline control values, except "Placebo Test: R56", where no baseline control is available. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Table 9: RSVY Impacts on District's Share of Manufacturing Micro-Enterprises (OAMEs)

		Linear	Linear Flexible	Quadratic	Outcome Mean
Panel A: no baseline controls					
Manufacturing	$\hat{\beta}_1$	0.0442***	0.0436*	0.0432*	0.722
Micro-Enterprises	S.E.	(0.0151)	(0.0239)	(0.0247)	
(OAMEs)	R-squared	0.420	0.420	0.420	
Observation		320	320	320	
State FE		Yes	Yes	Yes	
Panel B: with baseline Controls					
Manufacturing	$\hat{\beta}_1$	0.0369**	0.0395*	0.0385	0.722
Micro-Enterprises	S.E.	(0.0148)	(0.0233)	(0.0240)	
(OAMEs)	R-squared	0.446	0.446	0.446	
Observation		316	316	316	
State FE		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on district' share of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household establishment. Data is collected from the 4th and 5th Economic Censuses in 1998 and 2005, respectively. Observations include all districts with absolute state-specific standardized ranking value of no greater than 15 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline controls. Panel B reports regressions controlling for district's baseline (1998) value of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects. Manufacturing enterprises are defined using National Industrial Classification NIC-2004.

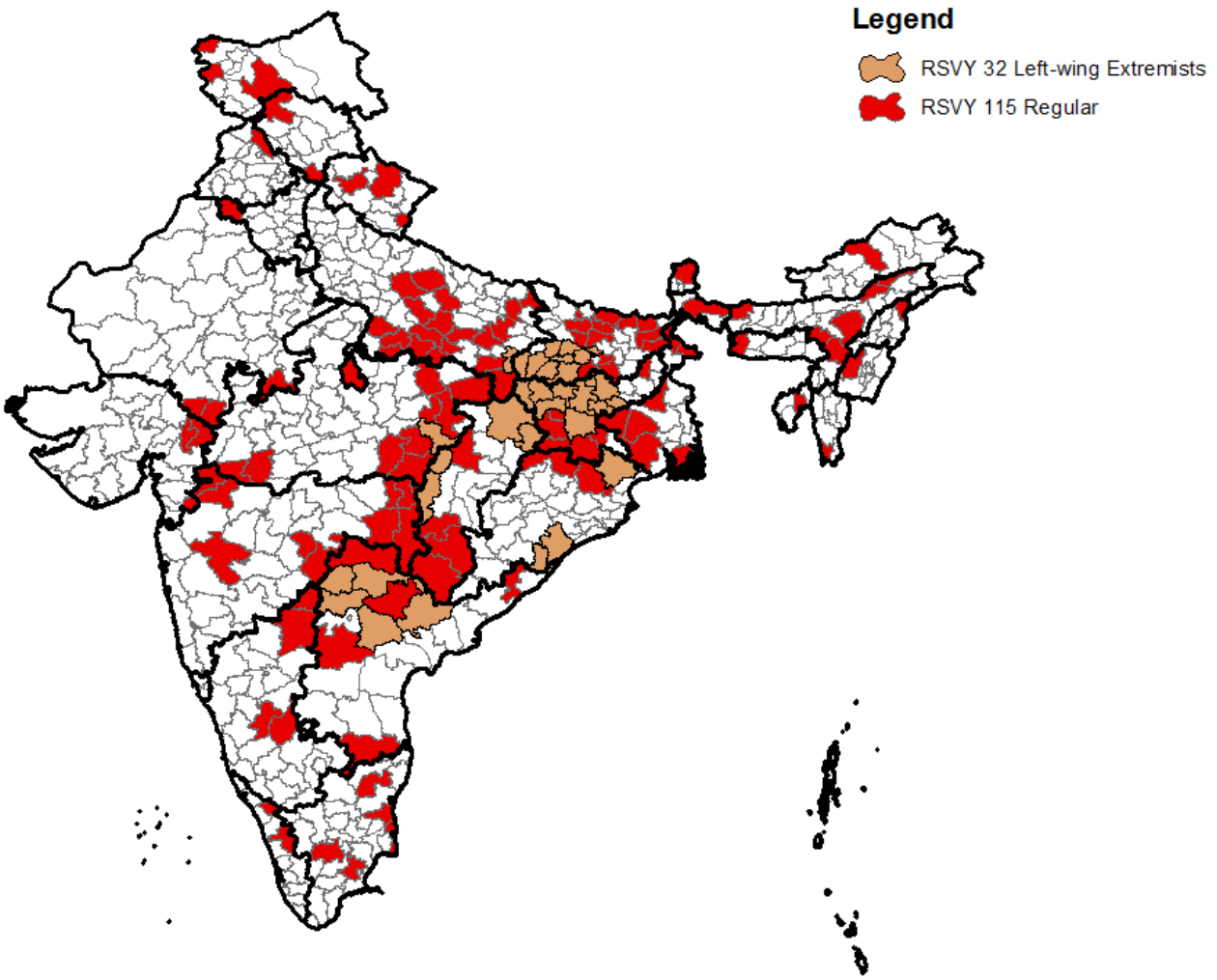
Table 10: Own Account Enterprises - RSVY Impacts by Social Groups

		Panel A: no baseline controls				*Panel B: with baseline controls*		
		Linear	Linear Flexible	Quadratic	Outcome Mean	Linear	Linear Flexible	Quadratic
All SC/ST	$\hat{\beta}_1$	0.0396*	0.0447**	0.0470**	0.192	0.0136	0.0203	0.0280*
(Male + Female)	S.E.	(0.0208)	(0.0211)	(0.0219)		(0.0168)	(0.0164)	(0.0163)
	R-squared	0.596	0.600	0.598		0.797	0.801	0.802
Male SC/ST	$\hat{\beta}_1$	0.0329	0.0382*	0.0405*	0.183	0.00961	0.0160	0.0234
	S.E.	(0.0207)	(0.0209)	(0.0217)		(0.0168)	(0.0164)	(0.0163)
	R-squared	0.577	0.581	0.579		0.796	0.800	0.801
Female SC/ST	$\hat{\beta}_1$	0.0458*	0.0520**	0.0558**	0.363	0.0271	0.0319*	0.0374**
	S.E.	(0.0253)	(0.0262)	(0.0274)		(0.0191)	(0.0189)	(0.0188)
	R-squared	0.633	0.636	0.635		0.715	0.717	0.717
Observation		325	325	325	325	314	314	314
State FE		Yes	Yes	Yes	Yes	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

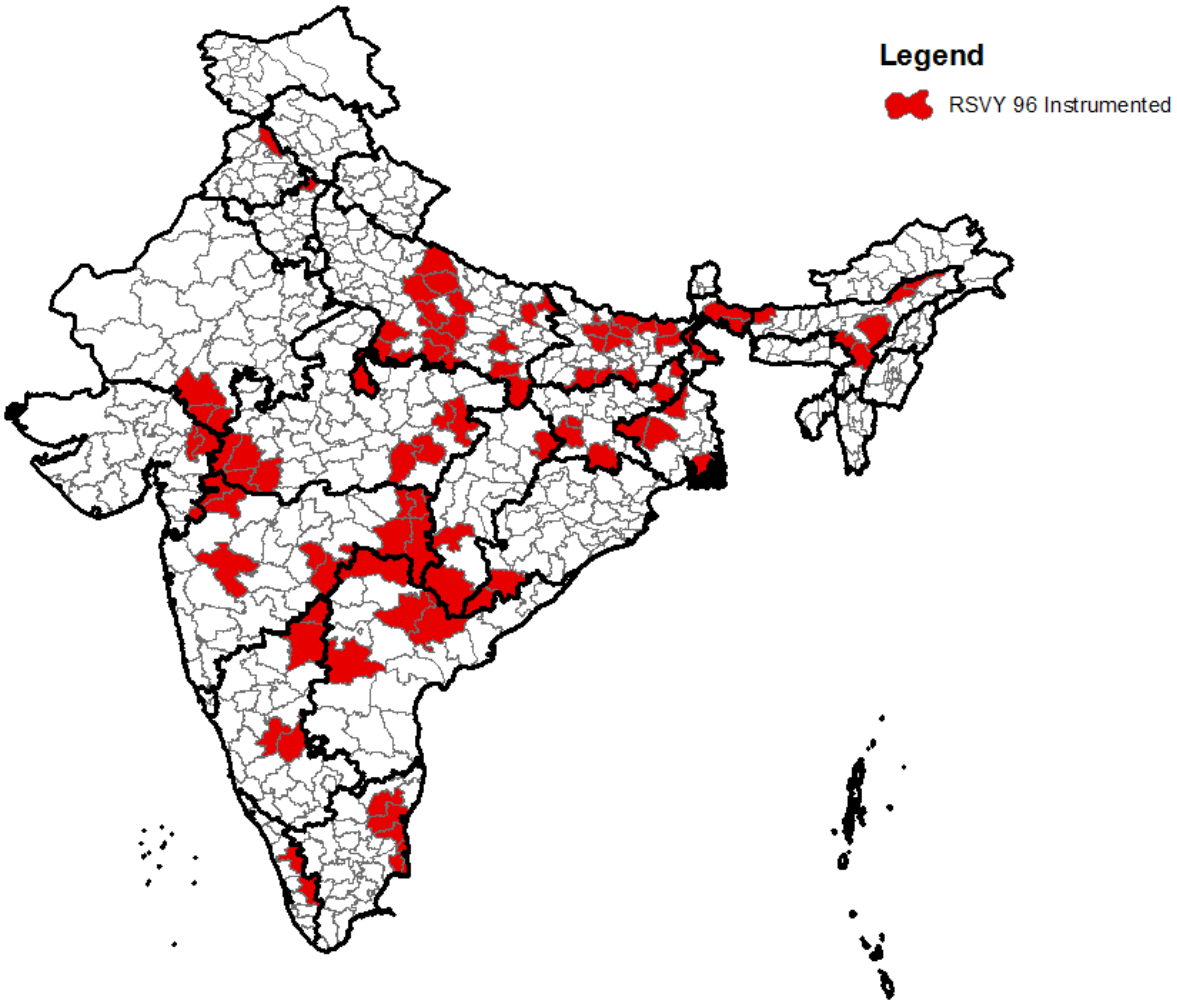
Note: The table illustrates the impacts of RSVY to the Backward-classed (Scheduled Cast/Schedule Tribe – SC/ST) owners of Own Account Enterprises (OAEs) for districts within 15 normalized ranks to the left and right of the cutoff. Reported coefficients are estimands of equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking Panel A reports results of regressions with no baseline controls. Panel B reports regressions controlling for district's baseline (1998) value of the dependent variable. Data is collected from the 5th and 6th Economic Censuses in 1998 and 2005, respectively. zThe unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Figure 1a: 147 RSVY recipient districts



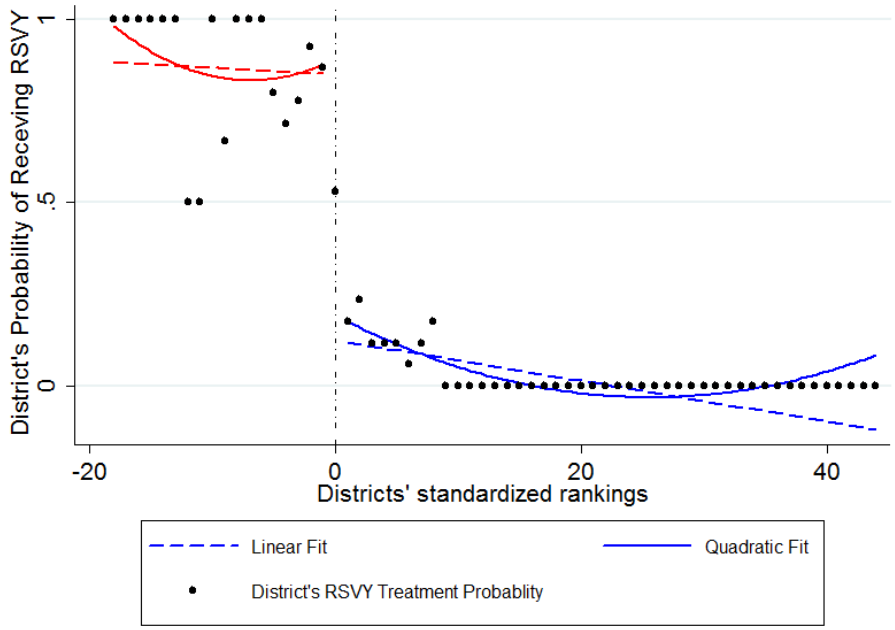
Note: The graph shows visually 147 districts who were chosen to receive RSVY program. Out of 147 districts, 115 were supposedly chosen based upon the Central Government's assignment mechanism using the Backwardness Ranking. 32 other districts, those who were affected by Naxalite movement (left-wing extremists), were automatically included in the list, bypassing the assignment mechanism. Thick lines represent State boundaries. Thin lines represent District boundaries.

Figure 1b: 96 instrumented districts



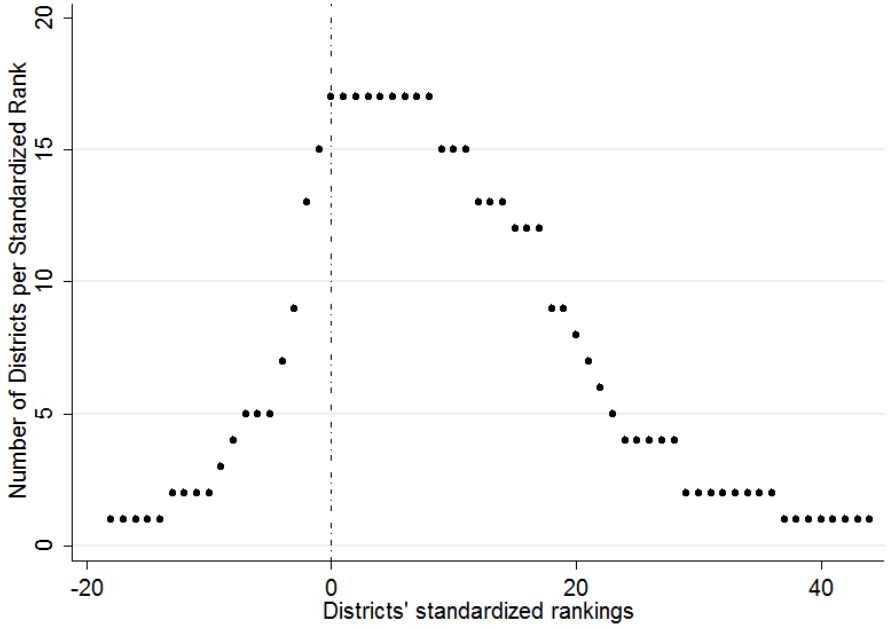
Note: The graph shows visually 96 districts selected as exogenous instruments for actual assignment in the first stage of 2SLS analysis (Fuzzy Regression Discontinuity Design). Selection criteria are as discussed in section 4. Thick lines represent State boundaries. Thin lines represent District boundaries.

Figure 2: Discontinuity of the probability of RSVY treatment assignment



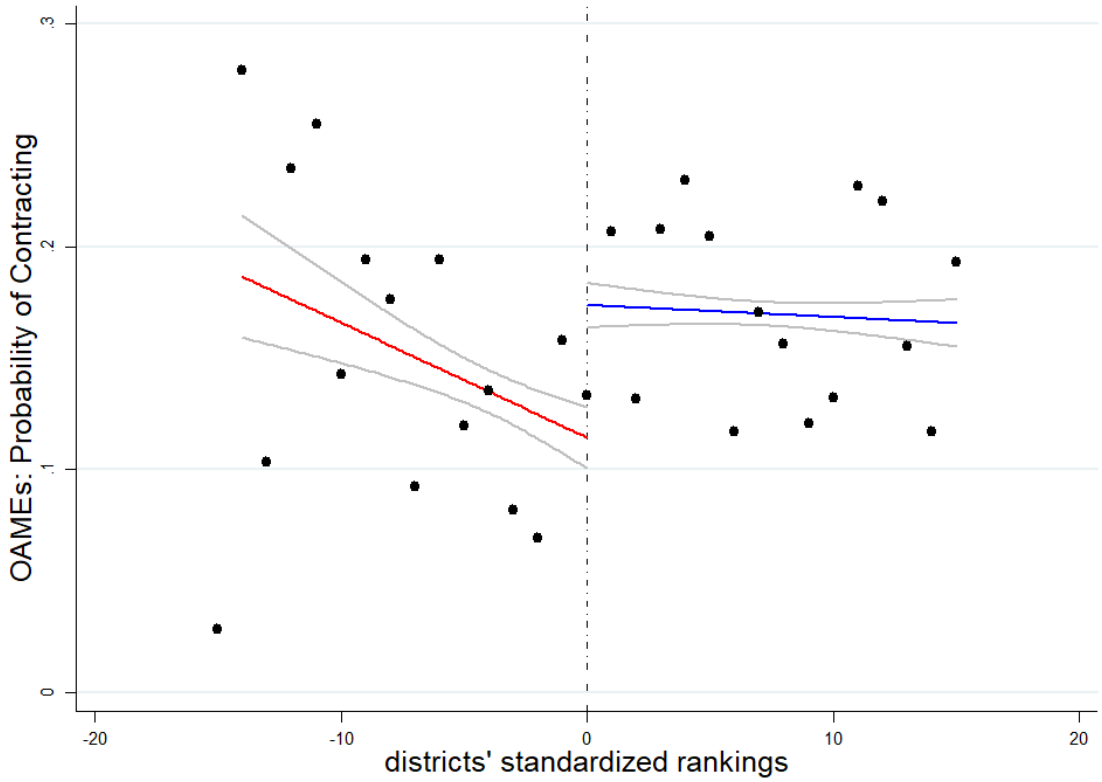
Note: The graph shows cutoff discontinuity on district's probability of receiving RSVY treatment based on the districts' state-specific standardized backwardness rankings. Linear and Quadratic Fitted curves on each side of the cutoff are also included.

Figure 3: Discontinuity of the probability of RSVY treatment assignment



Note: The graph shows the distribution of districts over districts' state-specific standardized backwardness rankings

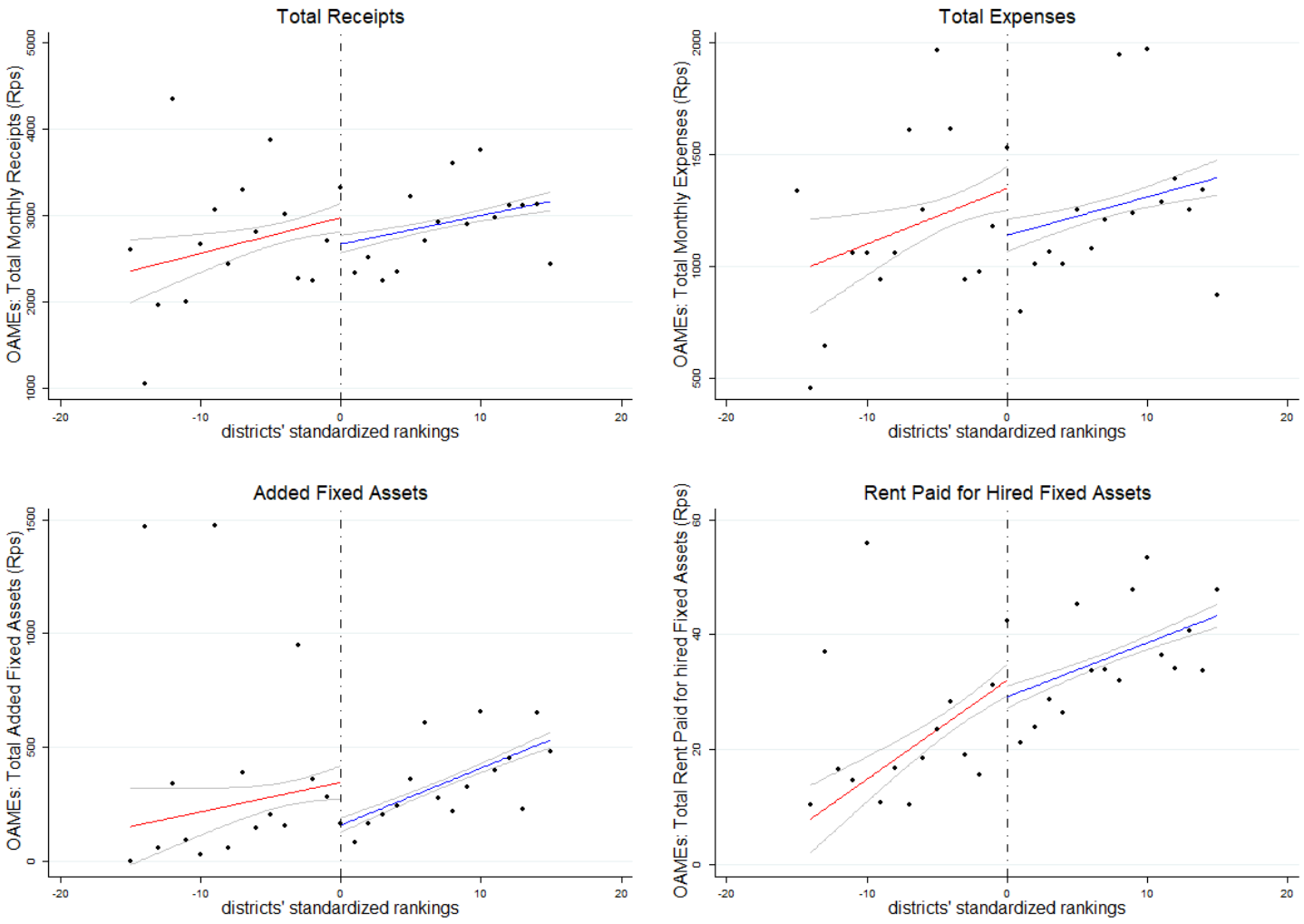
Figure 4: Own Account Manufacturing Enterprises (OAMEs): RSVY Impact – Discontinuity in Firm's Probability of Contracting



Note: The graph shows treatment cutoff discontinuity for Own Account Manufacturing Enterprises (OAMEs)'s probability of contracting (shrinking). The graph plots districts' contracting probabilities as a function of the running variable (state-specific standardized rank). Ranks are restricted to [-15 , +15] to be consistent with the main regressions. Linear Fitted Curves and 95% Confidence Intervals are presented.

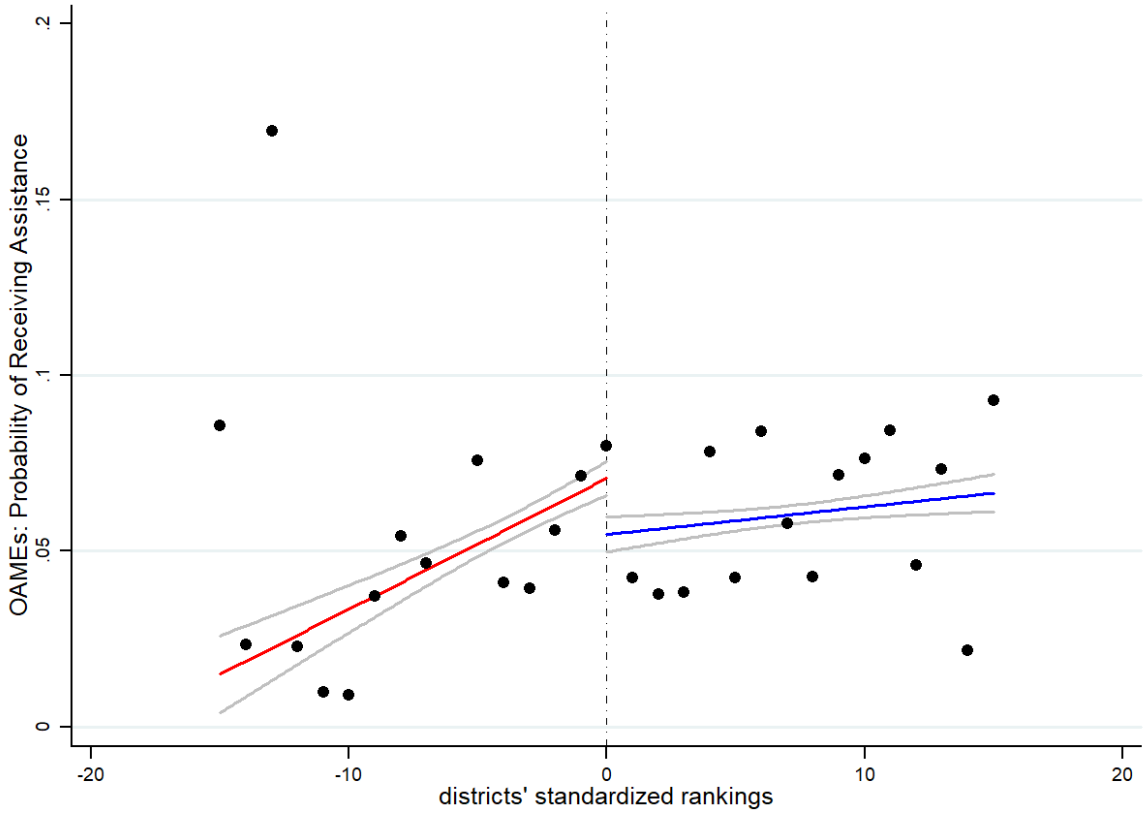
<u>Figure 5:</u> Own Account Manufacturing Enterprises (OAMEs):

RSVY Impact – Discontinuities in Firm's Business Operations and Fixed Asset Investments



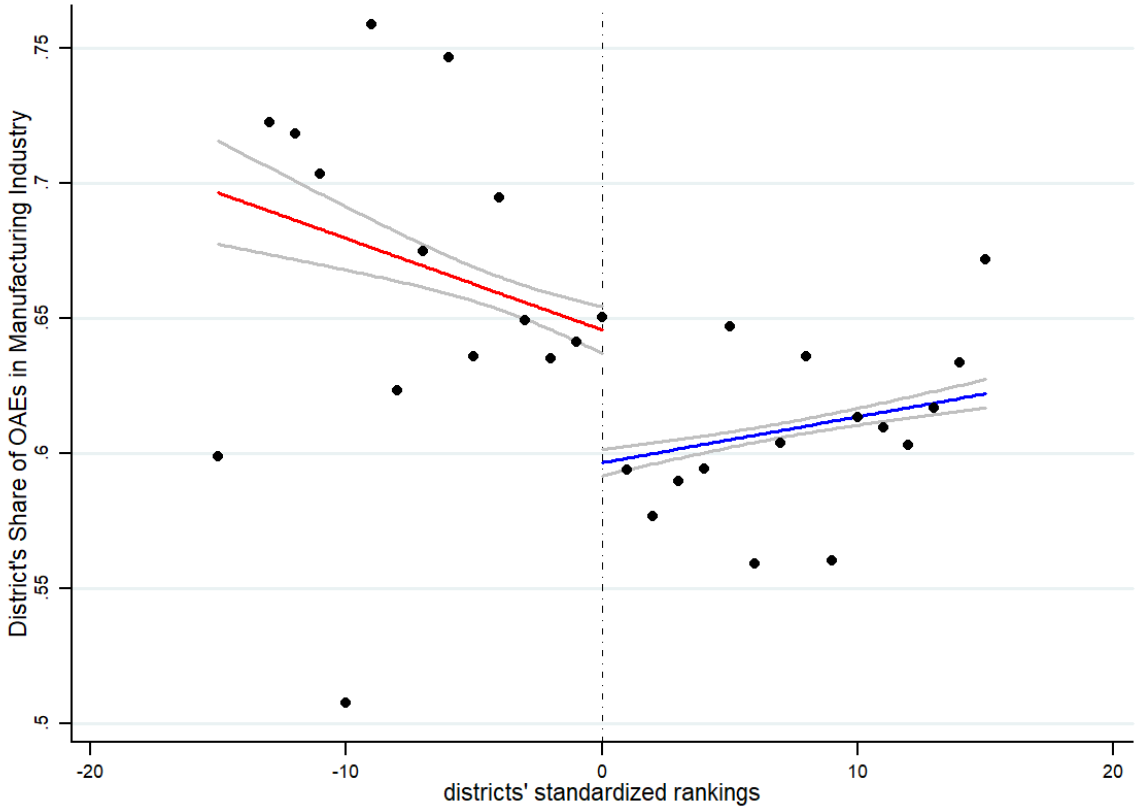
Note: The graph shows treatment cutoff discontinuities for Own Account Manufacturing Enterprises (OAMEs)'s Business Operations and Fixed Asset Investments. [Row 1, Column 1] plots districts' Total Monthly Receipts as a function of the running variable (state-specific standardized rank). [Row 1, Column 2] plots districts' Total Monthly Expenses as a function of the running variable (state-specific standardized rank). [Row 2, Column 1] plots districts' Added Fixed Assets as a function of the running variable (state-specific standardized rank). [Row 2, Column 2] plots districts' Rent Paid for hired Fixed Assets as a function of the running variable (state-specific standardized rank). Ranks are restricted to [-15 , +15] to be consistent with the main regressions. Linear Fitted Curves and 95% Confidence Intervals are presented.

<u>Figure 6:</u> Own Account Manufacturing Enterprises (OAMEs): RSVY Impact – Discontinuity in Firm's Probability of Receiving Assistance



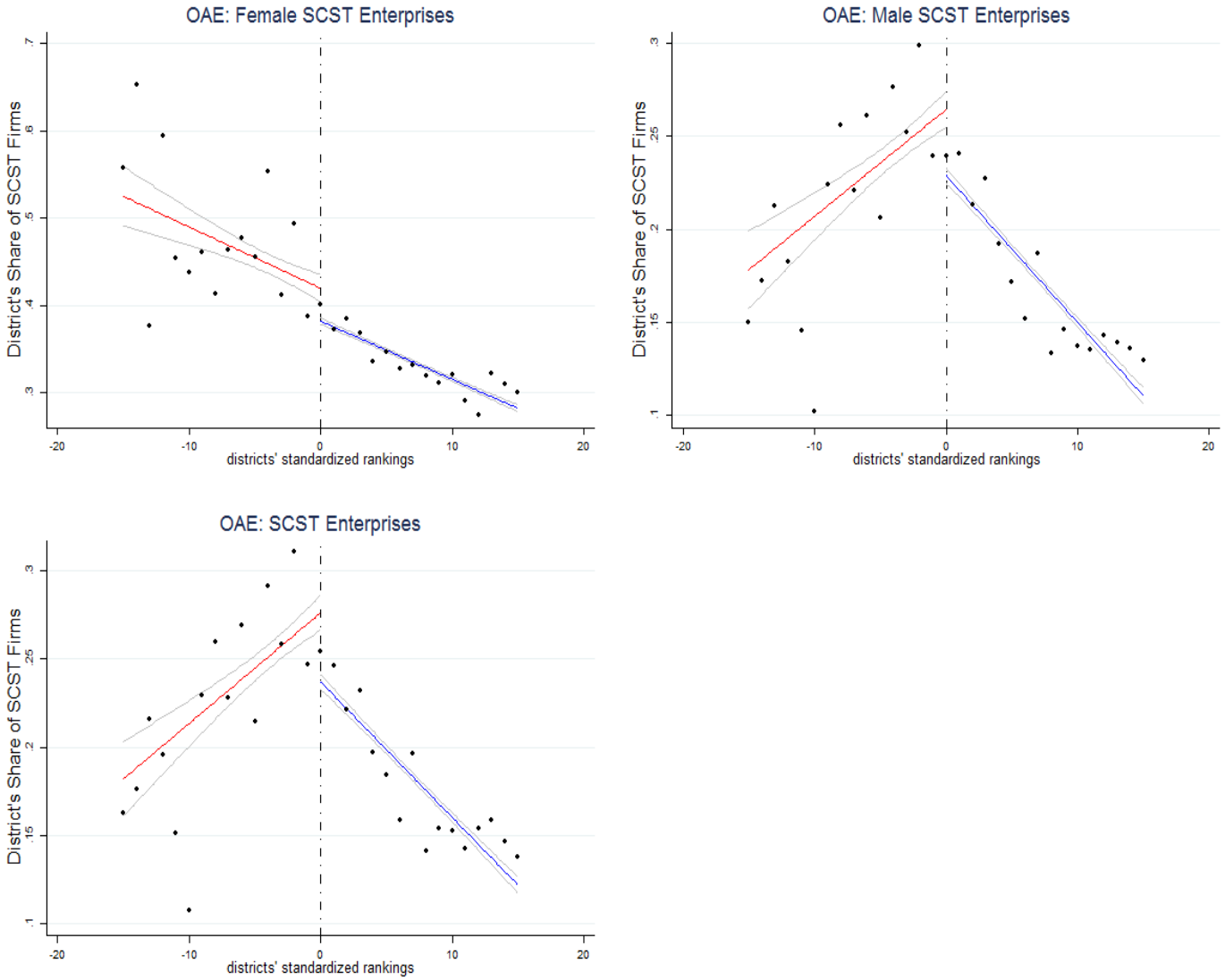
Note: The graph shows treatment cutoff discontinuity for the probability of receiving assistance of Own Account Manufacturing Enterprises (OAMEs). Firms self-reported whether they received any kind of business assistance during previous one year from survey date. The graph plots districts' probabilities of receiving assistance as a function of the running variable (state-specific standardized rank). Ranks are restricted to [-15 , +15] to be consistent with the main regressions. Linear Fitted Curves and 95% Confidence Intervals are presented.

<u>Figure 7:</u> RSVY Impact - Discontinuities in district' share of Micro-Enterprises (OAEs) in Manufacturing Industry



Note: The graphs show treatment cutoff discontinuities for the percentages of micro enterprises (OAE) for India's rural Manufacturing Industry, i.e. OAMEs percentage. The graph plots the District' share of OAMEs as a function on the running variable (state-specific standardized rank). Ranks are restricted to [-15 , +15]. Linear Fitted Curves and 95% Confidence Intervals are presented for each graph.

<u>Figure 8:</u> RSVY Impact - Discontinuities in the share of Micro Enterprises (OAEs) owned by SC/STs



Note: The graphs show treatment cutoff discontinuities in the share of OAEs owned by Backward Classes (Scheduled Caste/ Scheduled Tribe -- SC/ST), disaggregated by Genders. All three graphs plot the District' share of OAEs owned by SCSTs as a function on the running variable (state-specific standardized rank). Consistent with the table 5, ranks are restricted to [-15 , +15]. Linear Fitted Curves and 95% Confidence Intervals are presented for each graph.

1. Appendix

Appendix 1: Detailed breakdown of district-wise program characteristics – PEO's sample survey

	Improving Agriculture	Improving Irrigation	Addressing Unemployment	Health	Education	Rural Connectivity	Water - Sanitation	Electrification	Others
Sitapur	4%	11%	5%	4%	15%	37%	0%	9%	15%
Chandauli	1%	39%	2%	7%	1%	21%	5%	18%	6%
Banswara	7%	59%	1%	0%	1%	15%	11%	0%	6%
Chatra	8%	51%	5%	6%	0%	30%	0%	0%	0%
Saraikela	3%	61%	0%	6%	10%	19%	0%	0%	0%
Lohardaga	7%	41%	14%	3%	0%	34%	0%	0%	0%
Chamba	14%	13%	8%	17%	3%	35%	2%	4%	4%
Dangs	24%	30%	34%	3%	1%	5%	0%	0%	3%
Palakkad	37%	41%	4%	10%	7%	0%	0%	0%	1%
Warangal	12%	12%	8%	0%	21%	28%	0%	0%	18%
Mon	19%	0%	7%	10%	10%	42%	12%	0%	0%
Ganjam	0%	27%	2%	10%	15%	35%	7%	0%	4%
Bastar	1%	23%	13%	7%	5%	40%	0%	1%	9%
Mayurbhanj	11%	1%	2%	12%	16%	44%	0%	0%	14%
Dhindori	2%	32%	1%	17%	22%	25%	0%	0%	1%
Whole Sample	10%	29%	7%	7%	8%	27%	2%	2%	5%

Note: the table shows detailed district's program characteristics from a representative sample survey covering 15 RSVY-eligible districts form 11 States.

**Source: Program Evaluation Organization, 2010*. Percentage computation done by author.

Appendix 2: Details on the construction of the Planning Commission's Backwardness Index

I. Data Collection

The Backwardness Index is constructed by adopting historical parameters with equal weights: (i) value of output per agricultural worker (1990-1993); (ii) agriculture wage rate (1996-1997); and (iii) districts' percentage of low-caste populations – Scheduled Castes/ Scheduled Tribes (1991 Census). This backwardness index ranks a total of 447 districts in 17 major states with available data for the parameters above. Data on agricultural productivity per worker was available for only 17 States. As a result, the state of Goa, all special category states except Assam were excluded from the analysis. There is, thus, available information for 482 of the 17 States. In addition, the Task Force Department further decided to exclude districts with urban agglomerates of over one million population as per 2001 census. The state capitals were also excluded. The reason for these exclusions is that urban centers would almost always generate economic activates that would obviate the need for public works programs. Consequently, 35 additional districts were further excluded from the analysis. This leaves the backwardness ranking index being confined to 447 districts.

It is also noted that in most States, the number of districts has increased since 1991 due to bifurcation incidences. In those cases, the Scheduled Caste and Scheduled Tribe (SC/ST) pollution proportion for the original district in 1991 would be applied to the new districts created by the division of the district. This imputed process is done similarly for the references to agricultural wages and agricultural productivity per worker.

II. Ranking Computation

In the exercise for ranking districts, both distributional and economic parameters have been used. SC/ST population is a distributional parameter, while output per agricultural workers and agricultural wages represent average income level parameters. The index was computed for each variable. For agricultural productivity per worker and agricultural wages, the index was computed as follow:

$$\frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

The lower the index value, the more backward would be the district. In case of the parameter for SC/ST population, it is presumed *a priori* that districts with higher proportion of SC/ST population would be more backward. To ensure that the index values in the three variables moved in the same direction, the index for SC/ST population is calculated as under:

$$\frac{\text{Maximum Value} - \text{Actual Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

The districts with higher percentage of SC/ST population will have a lower index value.

Next, the three parameters' sub-indices were aggregated with equal weights of one-thirds distributed to each, which results in a composite index. This composite index is what the Planning Commission used as the final product to rank districts on their level of backwardness. The districts with low wages, low productivity and high SC/ST population would be ranked as more backward on the index, i.e. getting a lower rank value. The discrete ranking, thus, ranges from 1 for the most backward district, to 447 for the least backward, subjecting to data availability.

**Source: Planning Commission (2003b).*

Appendix 3: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Business Statuses
Robustness Checks for different Bandwidths

		$/nrank_{ds}/\leq 20$				$/nrank_{ds}/\leq 10$		
		Linear	Linear Flexible	Quadratic	Sample Mean	Linear	Linear Flexible	Quadratic
Panel A: No controls								
Status: Expanding	$\hat{\beta}_1$	-0.00789	0.00471	0.0130	0.170	0.0197	0.0204	0.0211
	S.E.	(0.0283)	(0.0281)	(0.0286)		(0.0317)	(0.0317)	(0.0319)
	R-squared	0.144	0.152	0.152		0.253	0.253	0.253
Status: Contracting	$\hat{\beta}_1$	-0.0482**	-0.0590***	-0.0707***	0.163	-0.0798***	-0.0784***	-0.0750***
	S.E.	(0.0210)	(0.0214)	(0.0230)		(0.0281)	(0.0277)	(0.0275)
	R-squared	0.236	0.243	0.246		0.312	0.314	0.314
Panel B: with Controls								
Status: Expanding	$\hat{\beta}_1$	0.0103	0.00429	0.0132	0.170	0.0311	0.0322	0.0336
	S.E.	(0.0192)	(0.0278)	(0.0283)		(0.0342)	(0.0341)	(0.0344)
	R-squared	0.150	0.160	0.160		0.278	0.279	0.278
Status: Contracting	$\hat{\beta}_1$	-0.0484**	-0.0582***	-0.0693***	0.163	-0.0803***	-0.0789***	-0.0755***
	S.E.	(0.0209)	(0.0213)	(0.0228)		(0.0278)	(0.0275)	(0.0274)
	R-squared	0.248	0.254	0.257		0.332	0.334	0.334
Observation		348	348	348		226	226	226
State FE		Yes	Yes	Yes		Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on reported probabilities of business expanding and contracting of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Columns 1-3 include all districts with absolute state-specific standardized ranking value of no greater than 20 ranks from the cutoff. Columns 5-7 include all districts with absolute state-specific standardized ranking value of no greater than 10 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Appendix 4: Own Account Manufacturing Enterprises (OAMEs): RSVY Impacts on Business Operations

		$/nrank_{ds}/\leq 20$				$/nrank_{ds}/\leq 10$			
		Linear	Linear Flexible	Quadratic	Sample Mean	Linear	Linear Flexible	Quadratic	Sample Mean
Panel A: No control									
Total Receipts	$\hat{\beta}_1$	505.2*	485.6*	594.2**	2858.23	1,011***	960.9***	847.2**	2860.98
	S.E.	(262.5)	(273.7)	(281.6)		(352.3)	(352.8)	(357.8)	
	R-squared	0.259	0.259	0.260		0.327	0.339	0.341	
Total Expenses	$\hat{\beta}_1$	406.2**	393.5**	471.3**	1281.39	820.9***	789.9***	723.1***	1291.95
	S.E.	(185.8)	(194.6)	(199.6)		(257.3)	(256.1)	(256.6)	
	R-squared	0.199	0.199	0.200		0.285	0.294	0.294	
Net Value Added	$\hat{\beta}_1$	104.7	98.16	129.8	1580.42	200.3	181.2	134.1	1573.29
	S.E.	(111.5)	(112.9)	(118.5)		(137.9)	(139.2)	(143.7)	
	R-squared	0.352	0.352	0.352		0.353	0.365	0.368	
Observation		348	348	348		226	226	226	
State FE		Yes	Yes	Yes		Yes	Yes	Yes	
Panel B: with Control									
Total Receipts	$\hat{\beta}_1$	512.4*	494.0*	607.3**	2858.23	1,026***	970.4***	854.7**	2860.98
	S.E.	(262.1)	(274.1)	(282.3)		(346.2)	(348.5)	(354.9)	
	R-squared	0.259	0.259	0.260		0.327	0.340	0.341	
Total Expenses	$\hat{\beta}_1$	403.3**	389.4**	466.7**	1281.39	821.5***	789.5***	719.3***	1291.95
	S.E.	(186.5)	(195.7)	(200.7)		(258.8)	(257.4)	(257.5)	
	R-squared	0.199	0.199	0.200		0.287	0.296	0.297	
Net Value Added	$\hat{\beta}_1$	102.0	94.54	126.5	1580.42	209.3	188.3	140.7	1573.29
	S.E.	(111.3)	(112.5)	(118.2)		(138.4)	(139.5)	(143.7)	
	R-squared	0.352	0.352	0.352		0.354	0.366	0.368	
Observation		348	348	348		226	226	226	
State FE		Yes	Yes	Yes		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on measures of business operations of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Columns 1-3 include all districts with absolute state-specific standardized ranking value of no greater than 20 ranks from the cutoff. Columns 5-7 include all districts with absolute state-specific standardized ranking value of no greater than 10 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Appendix 5: Own Account Manufacturing Enterprises (OAMEs):

RSVY Impacts on Firms' Fixed Assets Investments

		$/nrank_{ds}/\leq 20$				$/nrank_{ds}/\leq 10$			
		Linear	Linear Flexible	Quadratic	Sample Mean	Linear	Linear Flexible	Quadratic	Sample Mean
Panel A: No Controls									
Added Fixed Assets	$\hat{\beta}_1$	226.4*	195.0	223.8*	365.8845	226.5	207.0	176.7	351.0296
	S.E.	(122.2)	(120.9)	(125.8)		(146.6)	(147.6)	(165.5)	
	R-squared	0.099	0.101	0.099		0.108	0.118	0.115	
Rent Paid	$\hat{\beta}_1$	16.83**	14.12*	12.96*	34.10937	20.97**	19.85**	17.35**	31.94139
	S.E.	(7.480)	(7.467)	(7.307)		(8.884)	(8.775)	(8.725)	
	R-squared	0.330	0.334	0.333		0.444	0.454	0.455	
Panel B: With Controls									
Added Fixed Assets	$\hat{\beta}_1$	227.3*	196.4	224.6*	365.8845	225.0*	206.6	176.1	351.0296
	S.E.	(125.1)	(123.7)	(128.3)		(147.2)	(148.4)	(166.9)	
	R-squared	0.099	0.101	0.099		0.108	0.118	0.115	
Rent Paid	$\hat{\beta}_1$	16.93**	14.24*	13.04*	34.10937	20.81**	19.74**	17.44**	31.94139
	S.E.	(7.551)	(7.530)	(7.367)		(8.865)	(8.768)	(8.751)	
	R-squared	0.338	0.343	0.341		0.457	0.466	0.466	
Observation		348	348	348		226	226	226	
State FE		Yes	Yes	Yes		Yes	Yes	Yes	

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on firms' fixed assets investment of Own Account Manufacturing Enterprises (OAMEs). An OAME is a micro manufacturing firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data collected from the National Sample Survey – Manufacturing Enterprises Schedules Round 56_2.2 (2000-01) and Round 62_2.2 (2005-06). Columns 1-3 include all districts with absolute state-specific standardized ranking value of no greater than 20 ranks from the cutoff. Columns 5-7 include all districts with absolute state-specific standardized ranking value of no greater than 10 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline control. Panel B reports regressions controlling for district's baseline (2000-01) values of the dependent variables. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects.

Appendix 6: Robustness Check - RSVY Impacts on District's share of Micro-Enterprises (OAEs and OAMEs)

		$\|nrank_{ds}\| \leq 20$			$\|nrank_{ds}\| \leq 10$		
		Linear	Linear Flexible	Quadratic	Linear	Linear Flexible	Quadratic
Panel A: No controls							
Manufacturing	$\hat{\beta}_1$	0.0455***	0.0366*	0.0379*	0.0451***	0.0273	0.0276
Micro-Enterprises	S.E.	(0.0143)	(0.0220)	(0.0226)	(0.0169)	(0.0276)	(0.0274)
(OAMEs)	R-squared	0.421	0.422	0.422	0.418	0.419	0.419
Observation		371	371	371	246	246	246
State FE		Yes	Yes	Yes	Yes	Yes	Yes
Panel B: with Controls							
Manufacturing	$\hat{\beta}_1$	0.0384***	0.0360**	0.0309	0.0399**	0.0211	0.0209
Micro-Enterprises	S.E.	(0.0139)	(0.0214)	(0.0220)	(0.0166)	(0.0268)	(0.0267)
(OAMEs)	R-squared	0.451	0.451	0.451	0.436	0.438	0.438
Observation		365	365	365	242	242	242
State FE		Yes	Yes	Yes	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: The table illustrates the impact of RSVY on the district' share of Own Account Enterprises (OAEs) and Own Account Manufacturing Enterprises (OAMEs). An OAE is a micro firm which does not hire any official worker, i.e. generally is a micro, household self-establishment. Data is collected from the 5th and 6th Economic Censuses in 1998 and 2005, respectively. Columns 1-3 include all districts with absolute state-specific standardized ranking value of no greater than 20 ranks from the cutoff. Columns 5-7 include all districts with absolute state-specific standardized ranking value of no greater than 10 ranks from the cutoff. Reported coefficients are estimands of the equation (3)'s β_1, representing the Local Average Treatment Effects using Regression-Discontinuity Design with three parametric specifications assuming different forms of the polynomial functions on the running variable (state-specific normalized ranking). Panel A reports results of regressions with no baseline controls. Panel B reports regressions controlling for district's baseline (1998) value of the dependent variable. The unit of observation is a district. Standard Errors are clustered at the district level. Since RSVY district assignments were executed by State Governments, all specifications include State Fixed-Effects. Industries are defined using National Industrial Classification NIC-2004.