Product Scope and Productivity: Evidence from India's Product Reservation Policy

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Abstract

Special protections and favorable policies towards small enterprises are commonplace in developing countries. How do these policies affect overall industrial performance? We explore this question by analyzing productivity growth in the Indian manufacturing sector following an Indian policy reform that removed favorable treatment for small and micro enterprises. Using plausibly exogenous variation in the timing of this important regulatory change -- the dismantling of laws that "reserved" hundreds of products for exclusive manufacture by small firms -- we can identify the effect of adding and dropping products on size and productivity. Following the removal of these protections, product line dynamics rise, boosting total factor productivity. New entrants to the formerly restricted product space, particularly multiproduct firms, drive this increase, suggesting that the reservation policy had previously constrained their ability to achieve the optimal product mix. Our findings underscore the importance of incorporating intra-firm heterogeneity when assessing the impact of size-contingent regulations as firms' product line dynamics can be an important dimension of productivity growth.

JEL codes: O1, O25, O4, L5

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1 Introduction

Policies and institutions favoring small firms are pervasive throughout the developing world. Support like subsidized credit, tax breaks, or favorable regulatory requirements, is often put in place with the goal of enhancing aggregate growth, based on the idea that small firms can be engines of growth, but only if barriers to accessing resources are removed. However, as a mounting body of theoretical and empirical work shows, these types of programs may be potentially distortionary, lowering overall productivity and output (Restuccia and Rogerson 2008; Guner, Ventura and Yi 2008; Garcia-Santana and Pijoan-Mas 2014; Garicano, Lelarge and Van Reenen 2012; Rotemberg 2014). An important feature in this literature is firm heterogeneity. Unlike the standard neoclassical model where identical firms use a constant returns to scale aggregate production function, recent work shows that in the presence of heterogeneous firms, size-dependent policies -- like the one discussed in this paper -- can lead to a misallocation of resources, dampening economic growth.

Further, heterogeneity may be present not just *across* firms but *within* firms as well, such as through the choice of product mix (i.e. heterogeneity in the product line). A growing stream of literature shows that changes in the product mix contributes substantially to overall output growth. In the U.S., Bernard et al. (2010) find that product churning accounts for a third of U.S output growth between 1972 and 1997. Goldberg et al. (2010) in a study on Indian multiproduct firms find that changes in product mix contributes 25% of the increase in manufacturing output between 1989 and 2003. In the presence of this product-level heterogeneity, responses to policy changes manifest themselves not just at the inter-firm but also at the intra-firm margin. The

most commonly studied policy in this context are trade liberalizations. In this area, scholars have found that in the face of increased competition, multi-product firms reduce their product scope by dropping their least efficient products and focus production on their "core competence" (Bernard et al. 2011, Eckel and Neary 2010, Mayer et al. 2011, Iacovone and Javorcik 2010, Baldwin and Gu 2009).

Outside the trade literature, we know little about whether product scope dynamics are an important margin of adjustment following domestic policy reforms. Further, a challenge facing any empirical analysis studying the relationship between productadding/dropping and firm performance is that unobserved firm characteristics (like the ability to select new products, or cost of producing certain products) may be driving both higher productivity and probability of product switching. This would confound a causal link between product scope and productivity.

In this paper, we investigate the intra-firm reallocation channel underlying productivity growth. In addition, we produce evidence for a causal link between a firm's product scope and productivity. Our focus is on product scope changes as a driver of productivity during the unraveling of an important domestic Indian regulation—product reservation. For decades, the Indian government mandated that certain products, ranging from food items to chemicals, would be reserved for exclusive manufacture by small-scale enterprises. These items numbered over 800 and constituted almost 25 percent of manufacturing output. Starting in 1997, this regulation has been dismantled gradually, with different products being taken off the "reserved list" or being "dereserved" at different times. Dereservation was part of the "troika" of major Indian industrial policies along with trade tariffs and industrial licensing, and played a very

important role in shaping Indian manufacturing. Dereservation heavily influenced the evolution of the small-scale sector (Little et al. 1987; Mohan 2002). While the impact of other policies like tariffs, licensing, and FDI reform on growth and productivity have been studied extensively in the growth and development literature, this paper is among the first to rigorously study product reservations[1]. Moreover, the evidence here is the first to support product line dynamics as a margin of intra-firm reallocative activity in the aftermath of Indian industrial reform.

Leveraging plausibly exogenous variation generated by this policy change, we attempt to forge a causal connection between product scope dynamics and increases in productivity. Our empirical strategy relies on exploiting the timing of changes in the fraction of output produced in unreserved goods across different industries. Using this approach, we assess whether product scope dynamics are an important margin of adjustment following the dereservation policy. Using a difference-in-differences framework, we document the overall reduced-form impact of the policy on firm size and productivity. Then, an instrumental variables strategy is used to estimate the effect of product scope changes induced by dereservation on firms' productivity.

We find that dereservation of products increased the size and productivity of firms in the range of 5-8% from 2000-2010. The changes were largest for multi-product producers, and especially for those who were never previously in the reserved product space. As an industry's fraction of unreserved output increases, the average number of previously-reserved products increases but the average number

[1] Other papers contemporaneous to ours are García-Santana, M., & Pijoan-Mas, J. (2014) and Martin, L., Nataraj, S., & Harrison, A. (2014)

of “regular” or never-reserved products decreases. The propensity to drop never-reserved products is larger than the addition of previously-reserved products—thus average product scope decreases overall. The switching of products is driven by multi-producer firms who add previously reserved products to their mix, leading to increases in productivity. This evidence suggests that product reservation constrained the ability of multiproduct firms to achieve their optimal product mix, and once the policy was removed, these firms were able boost productivity through product switching. Our findings also support the “core competency” firm models such as Eckel and Neary (2010) who find that a reduction in product scope in the aftermath of policy reform. Also, consistent with the theoretical model of Mayer, Melitz and Ottiviano (2013), changes in product mix spurred by competition have important implications for firm productivity. Focusing on the extensive margin, we show that an increase in the number of “regular” products leads to a decrease in productivity overall. But, the addition of newly-available, previously reserved products, particularly by multi-product firms, leads to productivity increases. Specifically, an additional previously reserved product boosts productivity by almost 30%, suggesting that product line dynamics is an important margin of adjustment following the policy reform.

The above findings complement and augment existing work in development, macroeconomics and trade. First, as we discussed above, there is a growing theoretical and empirical literature which stresses the importance of incorporating within-firm activity into traditional theories of firm productivity and industry dynamics. Goldberg et al. (2010) find that Indian multiproduct firms are very similar to U.S

multiproduct firms (as studied in Bernard, Redding and Schott 2010) in that they are larger and more productive than their single-product counterparts. Unlike the U.S, though, product additions but *not* product churning (product addition and dropping or creative destruction) is far more pervasive in India. The authors also try to link trade policy to the intra-firm channel, but are unable to find a connection. In contrast, we do find product switching in the aftermath of a separate, domestic policy change. Navarro (2008) conducts a similar analysis for Chilean plants, also finding that three-quarters of plants were involved in product churning and had a large role in aggregate sales growth. Navarro et al. (2012) estimate the causal impact of product mix changes on plant outcomes using matching techniques. They, like us, find that product mix changes have a positive and significant effect of plants' TFP and size.

A second line of related work is the body of literature linking manufacturing productivity and growth to policies, and in particular to policies that restrict the size of firms. Recent work, for example by Guner, Ventura, and Yi (2008), Restuccia and Rogerson (2008), Hsieh and Klenow (2009), Garcia-Santana and Pijoan-Mas (2014) and Garicano, Lelarge and Van Reenen (2012) measure the aggregate productivity cost of distortions from the misallocation of capital, labor and managerial talent. Quantitative results show a large impact of size dependent policies, accounting for up to 50 percent of the productivity gap between some developing economies and the US. Garcia-Santana and Pijoan-Mas (2014) specifically examine dereservation in a Lucas span-of-control type model where the policy results in a misallocation of talent. Calibration results show dereservation boots output by 6.8% in manufacturing and 2% in the overall economy, and TFP by 2% and 0.75% respectively—quantitatively

similar to our findings. Bollard et al. (2013) do not find evidence of increases in productivity after dereservation.[2] In recent work, Martin et al. (2014) find a positive impact of dereservation on firm and district output growth. While all of these papers either feature no heterogeneity or heterogeneity at the firm level only, we underscore the importance of another dimension—heterogeneity at the product-firm level—in assessing the impact of size-contingent regulation.

We are also motivated by empirical and theoretical work that assesses the impact of globalization on the nature of product scope dynamics and its relation to firm productivity and size. Many of these models predict changes in product mix and reduction in product scope when competition pushes firms towards their "core competencies" -- inducing them to shed their least productive products (Bernard et al. 2011, Eckel and Neary 2010, Mayer et al. 2011). Iacovone and Javorcik (2010) find firms drop their fringe varieties in the aftermath of NAFTA. Similarly, Baldwin and Gu (2009) find bilateral trade liberalization reduces the number of products supplied by Canadian plants, and the rate of decline is smaller for larger and exporting plants.

The paper is organized as follows: Section 2 provides a brief background on product reservation; Section 3 describes the empirical approach, data, and descriptive data patterns. Section 4 presents the results and explores some robustness checks. Section 5 concludes.

2 Institutional Details on India's Product Reservation Policy

The Indian government has a long history of promoting small-scale industries. Post-independence, policymakers viewed small industry as a means of generating

[2] Some of this may be in part due to their measure of dereservation which is not based on product-level information.

employment and achieving social equity. Conceived in of the Industries (Development and Regulation) Act in 1951, the industrial agenda emphasized the need to encourage new ventures by individuals from classes, castes and communities that had historically contributed poorly to the nation's entrepreneurial activity. Small scale industries have historically formed a large component of the Indian manufacturing sector, accounting for 40% of industrial production and 35% of total employment over the last three decades, with an overall contribution to GDP of approximately 6%.

SSI enterprises were beneficiaries of substantial institutional and financial assistance. Among the myriad protectionist measures benefiting SSIs, arguably the most extreme was product reservation, which was introduced in the Third Five Year Plan (1961-1966). Hundreds of products across the manufacturing sector were only allowed to be produced by small scale firms, insulating them from competition.[3] A firm was defined to be "small" if the (historical) value of plants and machinery was less than Rs. 10 million.[4] The types of products on the reserved list were varied, spanning many industrial sectors such as food, chemicals, electronics and textiles. Within the small-scale sector, the output share of reserved products was approximately 30% in 1987. Overall, reserved products constituted about 12% of Indian manufacturing output. There is considerable heterogeneity within industry sectors, with reserved products forming 80% of output in hosiery and garments, 57% in certain wood products, and a negligible

[3] Existing large enterprises that had been producing the products were allowed to continue production without being allowed to expand. If they wanted to expand, 75% of the output had to be exported (Mohan 2002).
[4] Prior to the current 1999 definition, the investment ceiling has changed over time: http://www.dcmsme.gov.in/publications/circulars/circularmay1994.html#icoty

fraction in textiles. The last dereservation episode took place in April 2014 with twenty remaining items being dereserved[5].

There is no official documentation that describes how the reservation policy was formulated. An expert committee constituted in 1997 to review small scale industry in India's post-liberalization period states, “the choice of products for reservation was necessarily arbitrary." Some observers think that the government's goal in early decades following independence was to create a labor intensive sector that would absorb abundant labor. However, there is no technical criterion for reserving specific goods say, based on optimal capital to labor ratios (which are difficult to ascertain in the first place). Since 1967, the "reserved" list has evolved, with a few more items being mostly added prior to 1997, at which point there were 821 products on the list. Starting in 1997, products were gradually removed from the reserved list. Figure 1(a) shows the change in the reservation policy over the sample period. We plot the proportion of products in the economy that are unreserved by year from 2000-2010. We see that the policy started off gradually and accelerated greatly in the mid-2000s. Our sample ends in 2010 when 21 items remained on the dereserved list (Appendix B). The change varied not only across time but also across industries. Figure 1(b) gives a cross-sectoral snapshot of the average proportion of products unreserved in 2000-2010. Reserved products are present in all two-digit sectors with the exception of tobacco products. Around 20% of products in apparel manufacturing are reserved while less than 5% in food and beverages.

[5] http://www.dcmsme.gov.in/publications/reserveditems/Gazette_india-15.pdf

Conversations with ministry officials, and reading government documents, reports and media provide some insight into the process of dereservation. In 1997, a special panel comprised of academics, bankers, politicians and bureaucrats recommended dereservation of all products as they felt the small-scale sector would be better benefitted by financial assistance, tax breaks, and technological transfer rather than protection. These recommendations were not immediately accepted given the strength of the SSI lobby but eventually phasing out of reservation in a gradual manner was accepted.[6] The process of determining the products chosen for dereservation at a given time consisted of several lengthy and circuitous steps. A product was identified as a dereservation candidate by ministry or industry players (including manufacturers of reserved products themselves who find the investment ceiling constraining). Reasons could range from competition from imports, technology requirements, needs to comply with regulation, no benefit to small producers or availability of unreserved substitute products. Once identified, a series of meetings between "stakeholders" (such as trade associations or small firm groups and officials) takes place. After review up a chain of bureaucrats, the dereservation of a product is signed into law by the central government minister. Qualitative support for the “random” nature of reservation and dereservation is reflected in the extent of reservation/dereservation both across and within product categories. The schematic in Appendix B shows how even within a relatively narrowly defined industry like “vegetable oils,” we have many oils that were never reserved, and several (like sesame oil, mustard oil and rapeseed oil) which were. Among the latter,

[6]Newspaper articles discussing these topics: http://www.business-standard.com/article/specials/house-committees-divided-over-ssi-dereservation-list-197050501007_1.html
http://www.business-standard.com/article/specials/abid-hussain-panel-report-on-ssis-favours-dereservation-of-ssi-197010701089_1.html

there is even variation regarding when they were dereserved. As we discuss later, plausibly exogenous timing and coverage of the reforms across industries is important to our identification strategy. We provide some tests from our data arguing against potential endogeneity of the policy.

Efforts to promote SSEs may have impeded overall manufacturing growth. Between 1980 and 1998, the small-scale sector grew at a slower pace than the large sector (a 6% annual growth rate as compared to 9%, Mohan 2002). The limit on capital accumulation may have forced firms to under-invest in machinery or technology. For example, a shirt producer's minimum efficient scale is five hundred sewing machines, and factories of this size are common in countries like China and Sri Lanka. However, in India, the average non-exporting factory has only twenty machines (Garcia-Santana and Pijoan-Mas 2014). Our goal in this paper is to forge a causal connection between dereservation and industry outcomes by exploiting the pseudo-experimental features of this policy change.

3 Methodology, Data and Descriptive Statistics

3.1 Methodology: Difference-in-Difference and Instrumental Variable Specifications

To estimate the reduced-form, causal link between the dereservation policy and firm productivity and size, we use a difference-in-differences specification that exploits the plausibly exogenous changes to the reserved product output over time. Specifically, we estimate β in the following regression:

$$Y_{ist} = \alpha_s + \gamma_t + \beta D_{s,t-1} + \varepsilon_{ist} \qquad (1)$$

Y_{ist} is the economic outcome of interest: (log) gross value-added, employment, capital and productivity of firm *i* of industry *s* in year *t*. The main independent variable,

$D_{s,t-1}$, is the percentage of output within the 3-digit industry that is accounted for by unreserved products (newly dereserved or never reserved). We include industry fixed effects, α_s, to control for any industry-specific factors (such as common technologies used), and a year fixed effect, γ_t to control for any year-specific shocks common to all industries. In an augmented specification, we also include interaction terms ---(i) $D_{s,t-1}$ and a dummy variable for whether a firm is multi-product producer or not and (ii) $D_{s,t-1}$ and a dummy for whether a firm has ever produced reserved products---to test for heterogeneous effects (i.e. whether the effects of dereservation on size and productivity are different for multi-product producers over single-product firms).

To dig deeper into the channels behind the reduced-form effects above, we implement a second empirical strategy. Since, the particular mechanism that we have in mind is changes in product scope, we use a two-stage instrumental variables specification to trace the causal effect of product scope changes on productivity. Specifically, we use an industry's unreserved output as an instrument for a firm's number of products.

Specifically, in the first stage equation we have:

$$P_{ist} = \theta_i + \rho_t + \delta D_{s,t-1} + \mu_{ist} \qquad (2)$$

where P_{ist} is the number of products of a given firm *i* in industry *s* in year *t*, and θ_i and ρ_t are firm and year fixed effects respectively. The predicted values of P_{ist}, $\hat{P}_{ist}$, are then used to identify the causal effect of product additions on our variables of interest in the second stage regression equation:

$$Y_{ist} = \alpha_i + \gamma_t + \beta\hat{P}_{ist} + \varepsilon_{ist} \qquad (3)$$

which is similar to (1), except now our variable of interest is $\hat{P}_{ist}$.

To glean more insight from the specifications above, we examine a couple different variations. First, we define P_{ist} as not just the number of all products produced by a firm, but also as (a) the number of reserved products produced or (b) the number of unreserved products produced. Second, we run (3) in different sub-samples described above (multiproduct producer or reserved sector producers) to test for heterogenous effects.

3.2 Data and Variables

The main dataset we use is the Annual Survey of Industries (ASI), the principal source of industrial statistics in India for the years 2000 to 2010. The ASI is an annual census of all registered manufacturing plants in India with more than one hundred workers, and a random sample of firms registered with less[7]. Only the census firms appear in the sample for all 11 years, while other firms rotate in and out depending on the sample design (their sampling probability depends on the state and industry). In the past few years, panel identifiers for factories have become available to researchers, enabling tracking changes in factories over time. The data is collected for the financial year, which runs from April 1st-March 31st. In our analysis, we assign each plant-year observation the year which corresponds with the end of the financial year. For example, data for ASI 2007-2008 is given a year value of 2008. Sampling weights are used to provide a nationally representative picture of industrial activity in India. The ASI contains information on a variety of plant characteristics, such as industrial sector, items produced, total output, wages, workers, investment, and value added, among others. Industries are classified using the Indian National Industry Classification system (NIC).

[7] The definition has changed slightly over time with large firms being defined as those with 200+ workers before the 2003-04 wave. More details are at http://www.mospi.nic.in/stat_act_t3.htm

This classification system has been modified periodically, and so we used an official concordance to convert all industry codes to the NIC-2004 version. We assume a firm in our analysis is equivalent to an observation in our data. The observations in the data are at the factory or plant level (the dereservation policy defined the capital threshold at the plant level). While it is possible for a firm to have multiple factories, 95% of the observations represent single-factory firms.

Our main variables of interest from the ASI are those related to a firm's size, productivity, and product scope. For size, we use output (gross value-added)[8], employment and capital. Output is deflated by creating an index using the Wholesale Price Index (WPI) from the Handbook of Industrial Statistics. Labor is defined as the total number of employees, while capital is measured by deflating the book value of capital by the WPI for machinery. We drop closed firms and firms with missing, negative or zero values for any of the main variables of interest. In addition, we drop firms in three-digit industries which are not present for the entire duration of the sample. Productivity is constructed using the TFP method as in Levinsohn and Petrin (2003) where unobserved productivity is proxied using the firm's material inputs. Central to our analysis are the variables measuring a firm's product scope. Product scope is measured as the total number of products produced. We also identify the products that are reserved and unreserved.

[8]Gross output is defined to include the ex-factory value, (i.e., exclusive of taxes, duties, etc. on sale and inclusive of subsidies etc., if any) of products and by-products manufactured during the accounting year, and the net value of the semi-finished goods, work-in-process, (represents the excess/deficit of value of semi-finished goods or work-in-process at the end of the accounting year over that of the beginning of the year plus net balance of semi-finished fixed assets on factory's capital account) and also the receipts for industrial and non-industrial services rendered to others, value of semi-finished goods of last year sold in the current year and sale value of goods sold in the same condition as purchased. Gross value added is gross output minus material inputs.

To construct our main independent variable of interest—the percentage of output unreserved in an industry-- we use information on the reserved list and timing of dereservations since 1997 from the Ministry of Small Scale Industries. Whenever dereservation occurs, an official government notification is issued providing the description and nine-digit ASICC product code of the item. Since the ASI also provides ASICC information on what items a plant produces, we can link the government dereservation order to the ASI to calculate which plants produce reserved items in each year.[9] Since the ASI data collection ends on March 31st of a given year, any product dereserved after this date is treated as reserved for the ASI financial year but dereserved for the following. We exclude observations where all product codes are missing or all of them are lumped in uninformative categories such as "other" that do not give any information about the reservation status of the product.

The simplest way to calculate the percentage of output unreserved in an industry would be to calculate the fraction of output produced by all firms in a given industry and year which was never reserved or has been dereserved since the last period. However, since product dereservation itself may affect the composition of products firms produce, this method may introduce endogeneity between our variables of interest and the fraction of unreserved output. Optimally, our independent variable would capture only the changes in reservation status, not changes in industry-product composition induced by dereservation. To solve this, we choose a base year to fix the distribution of output across products in a given firm, and hold this fixed over time. As products

[9] Making this link was not immediately straightforward since product codes used by the ASI and the government are not always the same. A key challenge was to make the full and correct concordance between ASI and government notification product codes, which we have been able to do with detailed scrutiny of each product and helpful input from the MSME ministry. We are happy to share the concordance on request.

are dereserved, we then take the portion of output corresponding to production by that firm in the base year, and count it as unreserved. As a result, our measure only changes over time due to the dereservation policy. We use the first year in our sample (2000) as the base year, but the results are robust to using different base years.

3.3 Summary and Descriptive Statistics

Summary statistics are shown in Table 1. In addition to the overall mean and standard deviation of the key variables in the sample, we show these statistics for single-product firms, multi-product firms, firms that have produced products from the reserved list and firms that have never produced reserved list products. Multi-product firms, about 43% of the sample, are larger in terms of GVA, capital and employment and are also more productive. This is consistent with empirical evidence from India (Goldberg et al. 2010) as well as other countries. Reserved sector firms (or those that produce reserved products) are also smaller, which is unsurprising since size is a criterion for qualifying to produce reserved list products. Further, they are also less productive and produced fewer products. These summary statistics give us some initial evidence that there may be a positive correlation between dereservation and productivity. To probe this further, the scatter plots of Figure 2 depict the correlation of average industry-year productivity, employment capital, GVA and the share of output which is not reserved (unreserved or dereserved). There is a strong and positive correlation (p-values < .01) suggesting that in industries with less output subject to the manufacturing constraints, firms tend to be more productive and larger on average. However, these are simply correlations and do not imply causality -- we cannot conclude that producing reserved products causes a firm to be less productive, or that

an industry with more unreserved output is more productive. It could be the case that other observed or unobserved factors cause a factory to both produce a certain type of good as well as affect its performance. For example, low ability entrepreneurs may decide to produce a reserved good to avoid competition, in addition to being more likely to produce it less productively. To establish causality, we test the relationship using the difference-in-difference and instrumental variable methodologies described previously and discuss the results in the next section.

3.4 Endogeneity Concerns

One potential concern for our analysis is the endogeneity of the reforms. If certain products were systematically chosen for dereservation based on industry characteristics such as export potential, employment, or productivity, this could bias our estimates. Luckily for our analysis, the fact that essentially all products (except for 20) were dereserved by 2008 implies that products were, for the most part, not systematically excluded from dereservation based on industry characteristics -- because virtually all products were dereserved. In addition, since our baseline specification includes industry fixed effects, any fixed industry-wide differences in observed or unobserved characteristics are being controlled for.

However, it may still be the case that the timing of dereservation was endogenous. Any time-variant change in industry characteristics could have prompted dereservation to happen sooner or later. For example, if industries which had slowly growing productivity lobbied harder to keep the reservation policy for their products in place, then our difference-in-differences specification would inaccurately estimate that dereservation had a positive effect on productivity In other words. an important

assumption for our differences in differences specification is that the trends in observable and unobservable characteristics were parallel before dereservation. (

To check whether certain observable characteristics predict changes in a firm's unreserved status, we regress unreserved status on lagged (2 periods) values of size and productivity. As we see in Table 2, the lack of statistical significance on the coefficients of lagged GVA, employment, capital or productivity suggest that there were no pre-existing trends in the outcomes of interest prior to the policy. In Panel B we include an interaction between the firm's lagged characteristic and reserved production status. The coefficient on this interaction is not significant, implying that the lagged size and productivity of this particular sub-set of firms—non-reserved good producers—does not predict dereservation either[10]. Unobservable, time-varying trends are still a concern, so we run additional robustness checks which are described later in Section 4. It should also be noted that Martin (2014), who analyze the effect of dereservation on employment, firm size and exit behavior, also provide evidence for the exogeneity of the dereservation policy, finding similar results to ours.

4 Results

4.1 Difference-in-Difference Estimates

In Table 3 we estimate our difference-in-differences equation (1) to find the causal effect of dereservation on a series of size and productivity measures. For each variable, we show the results for the entire sample in Panel A. The bottom two panels show results for heterogeneous effects by including interactions for unreserved production status (Panel B) and multi-product status (Panel C). We find that the

[10] In the appendix we run this analysis at the industry-level instead of the firm level and the results are similar.

dereservation policy led to increases in GVA, employment and overall productivity. For example, given that from 2000 and 2010 the fraction of unreserved output rose from 93.6% to 99.3%, we estimate from the regression in Panel A, column 1 that dereservation increased firm-level gross value added by 5.7%*0.701, or 4.0%. Similarly, we find that the policy increased firm-level employment by 4.8% and productivity by 2.9% over the sample period. We do not find that dereservation led to increases in capital on average, but it does for particular types of firms. As the results in the other two panels show, dereservation appears to have larger changes in size and productivity for firms that were never in the reserved sector as well as multi-product firms. For firms that never produced the protected products, we find that from 2000-2010, the policy change resulted in a 6.7% higher increase in GVA, 7.1% higher increase in capital, and a 4.4% higher increase in firm-level total factor productivity compared to those firms that produced reserved goods. These results suggest that the drivers of the overall size and productivity increases were not the “incumbent” firms i.e. those that were previously producing reserved goods, but rather new entrants into the product space. Further results in Panel C show that multi-product were also more likely to increase size and productivity as a result of the policy. For example, increases in GVA, employment, capital and productivity are higher by 4.6%, 4.5%, 7.8% and 1.8% respectively in multi-product firms than single-product firms.

4.2 Instrumental Variables

The results above suggest that the impact of dereservation was not on the expansion of the incumbent reserved sector firms, but possibly from the entry of firms that had never produced reserved goods at all as well as multi-product producers. In Table 4 and

5, we explore one particular channel that may be underlying these changes in size and productivity—changes in product scope. That is, we test whether the policy is responsible for the non-reserved good producers expanding their product lines by starting production of the previously restricted items.

The first column in Panel A of Table 4 shows that overall, the average effect of dereservation was a decrease in the number of products. In the next two columns, we separately look at the change in number of formerly reserved and non-reserved products. The significance of the coefficients indicates that this overall effect is actually coming from a decrease in non-reserved products and an increase in the number of reserved products (the former being greater than the latter). The increase in the addition of formerly reserved products is larger for multi-product firms. To get a better sense of whether the reserved sector incumbents or new entrants are responsible for this product churning, we examine product scope changes in individual sub-samples in the bottom two panels. We find that both types of firms—reserved-sector producers (Panel B) and non-reserved sector producers (Panel C)-- increase their production of newly reserved products and decrease that of unreserved products after dereservation, but these effects are disproportionately larger for the “entrants” or those firms who were never in the reserved sector, especially the multi-product producers among them.

The results described above represents the “first-stage” of our instrumental variables specification. Next, we assess the effect of product scope changes (stemming from dereservation) on productivity. The results, in Table 5, are as follows. In general, an increase in the number of products leads to a decrease in productivity. However, this is only true for increases in the number of unreserved or “regular” products. When a firm

increases its production of newly unreserved products following the policy, there is a boost in productivity. For example, the addition of one formerly reserved product increases productivity by 11%. In Panel B and Panel C, we redo the IV separately in sub-samples of reserved (Panel B) and non-reserved producers (Panel C). From the estimates, it is clear that the latter are responsible for the product scope-driven changes in productivity. For these producers, an addition of a reserved product increases productivity by 29%.[11]

In sum, the impact of dereservation on productivity is not driven by the growth of small reserved firms which are no longer capital constrained by the policy. These results are consistent with the story of large multiproduct firms (which previously could not produce reserved goods due to the policy) expanding into the production of formerly reserved goods after the policy is lifted. These highlight results point to product mix changes on the extensive margin as an important source of productivity change.

4.3 Robustness Checks

To provide more evidence in support of our identification assumption, we run two robustness checks. In the first, we assign a "fake" dereservation variable to industries. To do this, we assign random amounts of "percent dereserved output" to different industries at different times, and then run the benchmark difference-in-difference specification for productivity for the placebo policy variable. The procedure is repeated one hundred times. The distribution of the resulting one hundred t-statistics on the dereservation coefficient is plotted in Figure 3. The histogram shows that the mass of the t-statistics are below the

[11] In the appendix, we also show the IV regression in sub-samples of reserved-multiproduct and unreserved-multiproduct producers.

level of statistical significance. That is, in more of the cases where a false dereservation variable is assigned, there is no effect on productivity and other outcomes.

In Table 2, we checked whether pre-existing levels of observable characteristics such as size and productivity predict an industry's dereservation patterns. Further, industry fixed effects absorb any time-invariant characteristics. Since time-varying unobserved factors could also threaten out identification strategy, we also include linear trends at the industry level as part of the main specifications to absorb any unobserved characteristics of an industry that evolve in a linear fashion over time. As we see in Table 5, inclusion of linear trends decreases the magnitude of some of the coefficient slightly, but the results remain statistically significant and qualitatively the same as those in the earlier tables.

5 Conclusion

In this paper, we assessed the relationship between product scope and productivity changes following domestic policy reform. To do so, we exploited a potentially exogenous policy change which removed the restrictions on the production of certain products solely to SSEs – Indian product dereservation. Using data from the ASI to estimate both difference-in-differences and instrumental variables models, we found that the dereservation policy increased firm-level output and productivity by 5-8% over ten years -- particularly for multiproduct firms and newcomers into the formerly reserved product space. On average, dereservation decreases the overall number of unreserved products a firm produces, but increases the number of previously reserved products in firms' product mix, particularly multi-product producers. Using this variation

in product scope, we also estimate that adding a previously reserved product can boost a non-reserved sector firm's productivity by almost 30%.

Our evidence that dereservation increased product churning by multiproduct firms supports the idea that product adding and dropping is an important margin of within-firm reallocative activity following policy reform. Much of the current literature focuses on this mechanism in the context of globalization, but we provide novel evidence for product churning outside this typical trade setting in the aftermath of a policy that increased competitive dynamics. We hope this empirical evidence leads to incorporation of product scope dynamics in analyses of size-dependent policies which are widespread throughout the developed and developing world, and have sizable effects on productivity and growth.

References

Alvarez, Roberto, Claudio Bravo-Ortega, and Lucas Navarro. *Product Mix Changes and Performance in Chilean Plants*. No. wp366. 2012.

Baldwin, J., & Gu, W. (2009). The impact of trade on plant scale, production-run length and diversification. In producer dynamics: New Evidence from micro data (pp. 557-592). University of Chicago Press.

Bernard, Andrew, Stephen Redding, and Peter Schott. 2011. "Multiproduct Firms and Trade Liberalization." *The Quarterly Journal of Economics,* 126(3): 1271-1318.

Bernard, Andrew, Stephen Redding, and Peter Schott. 2010. "Multiple-Product Firms and Product Switching." *American Economic Review*, 100(1): 70-97.

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2012). The Empirics of Firm Heterogeneity and International Trade. *Annu. Rev. Econ.*, *4*(1), 283-313.

Bollard, Albert, Peter Klenow, and Gunjan Sharma. 2013. "India's Mysterious Manufacturing Miracle." *Review of Economic Dynamics*, 16(1): 59-85.

Eckel, C., & Neary, J. P. (2010). Multi-product firms and flexible manufacturing in the global economy. *The Review of Economic Studies*, *77*(1), 188-217.

García-Santana, M., & Pijoan-Mas, J. (2014). The reservation laws in india and the misallocation of production factors. *Journal of Monetary Economics*, *66*, 193-209.

Garicano, Luis, Claire Lelarge, and John Van Reenen. (2012). "Firm Size Distortions and the Productivity Distribution: Evidence from France." CEP Discussion Papers dp1128, Centre for Economic Performance, LSE.

Goldberg, Pinelopi, Amit Khandelwal, Nina Pavcnik, and Petia Topalova. 2010. "Multiproduct Firms and Product Turnover in the Developing World: Evidence from India." *The Review of Economics and Statistics*, 92(4): 1042-1049.

Guner, Nezih, Gustavo Ventura, and Xu Yi. 2008. "Macroeconomic Implications of Size-Dependent Policies." *Review of Economic Dynamics*, 11(4): 721-744.

Hsieh, Chang-Tai and Peter J. Klenow. 2009. “Misallocation and manufacturing TFP in China and India.” *Quarterly Journal of Economics,* 124(4): 1403-1448.

Iacovone, L., & Javorcik, B. S. (2010). Multi- Product Exporters: Product Churning, Uncertainty and Export Discoveries. *The Economic Journal*, *120* (544), 481-499.

Levinsohn, James, and Amil Petrin. "Estimating production functions using inputs to control for unobservables." *The Review of Economic Studies* 70, no. 2 (2003): 317-341.

Little, Ian. 1987. “Small Manufacturing Enterprises in Developing Countries.” *World Bank Economic Review,* 1(2): 203-236.

Martin, L., Nataraj, S., & Harrison, A. (2014). In with the Big, Out with the Small: Removing Small-Scale Reservations in India (No. w19942). National Bureau of Economic Research.

Mayer, T., Melitz, M. J., & Ottaviano, G. I. (2011). Market size, competition, and the product mix of exporters (No. w16959). National Bureau of Economic Research.

Mohan, Rakesh. (2002). “Small-Scale Industry Policy in India: a Critical Evaluation.” In: Krueger, A. O. (Ed.), *Economic Policy Reforms and the Indian Economy*. Chicago: University of Chicago Press.

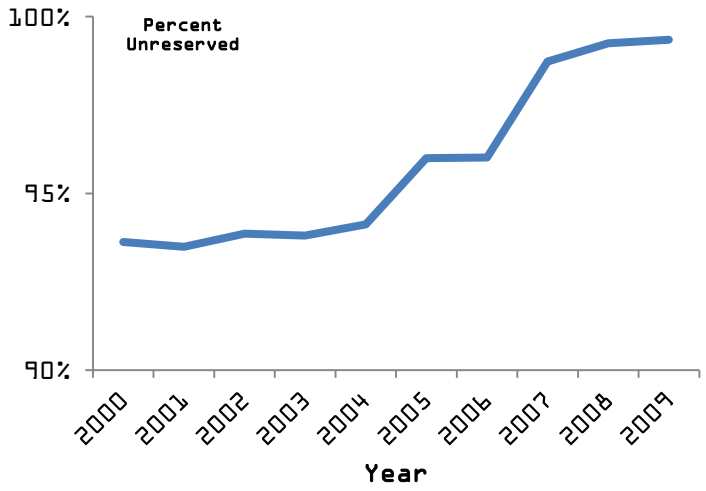
Navarro, Lucas. "Plant level evidence on product mix changes in Chilean manufacturing." *The Journal of International Trade & Economic Development*21, no. 2 (2012): 165-195.

Nocke, V., & Yeaple, S. (2006). Globalization and endogenous firm scope (No. w12322). National Bureau of Economic Research.

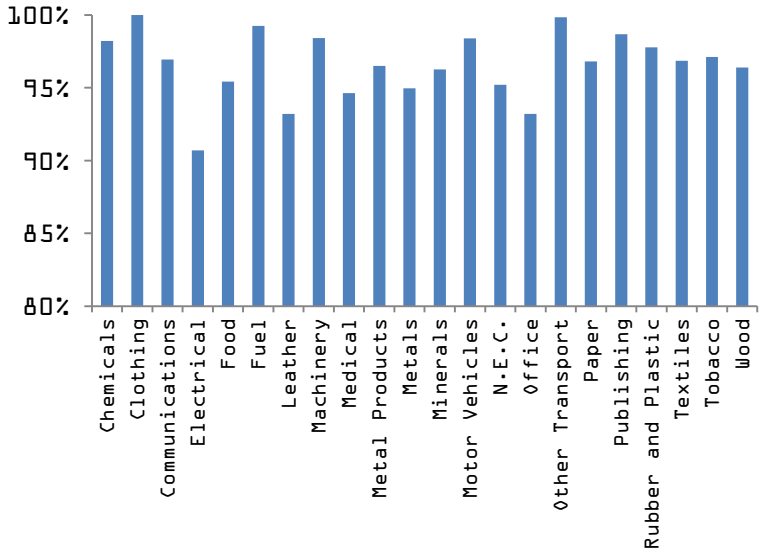
Rotemberg, Martin (2014). "Equilibrium Effects of Firm Subsidies." Working paper

Figure 1: Fraction of Output Unreserved

(a) by Year

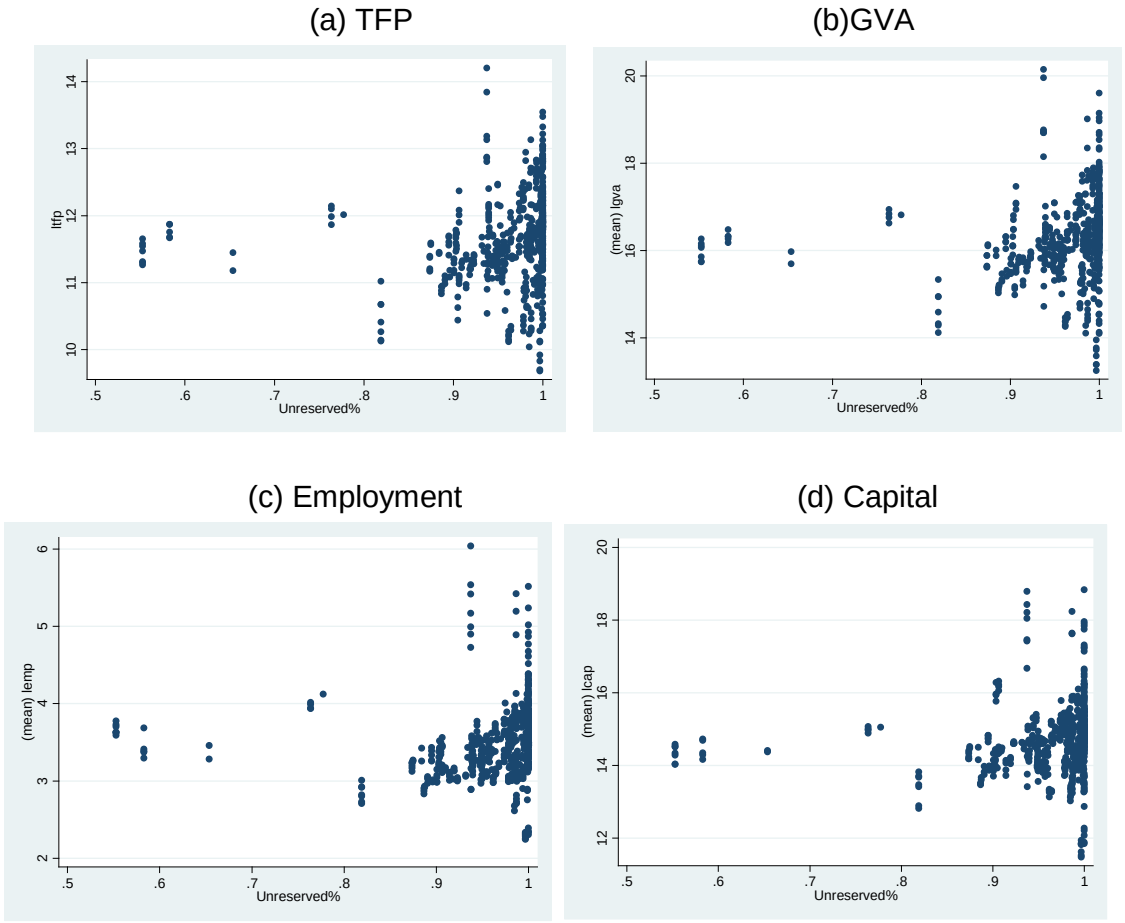


(b) by Industry



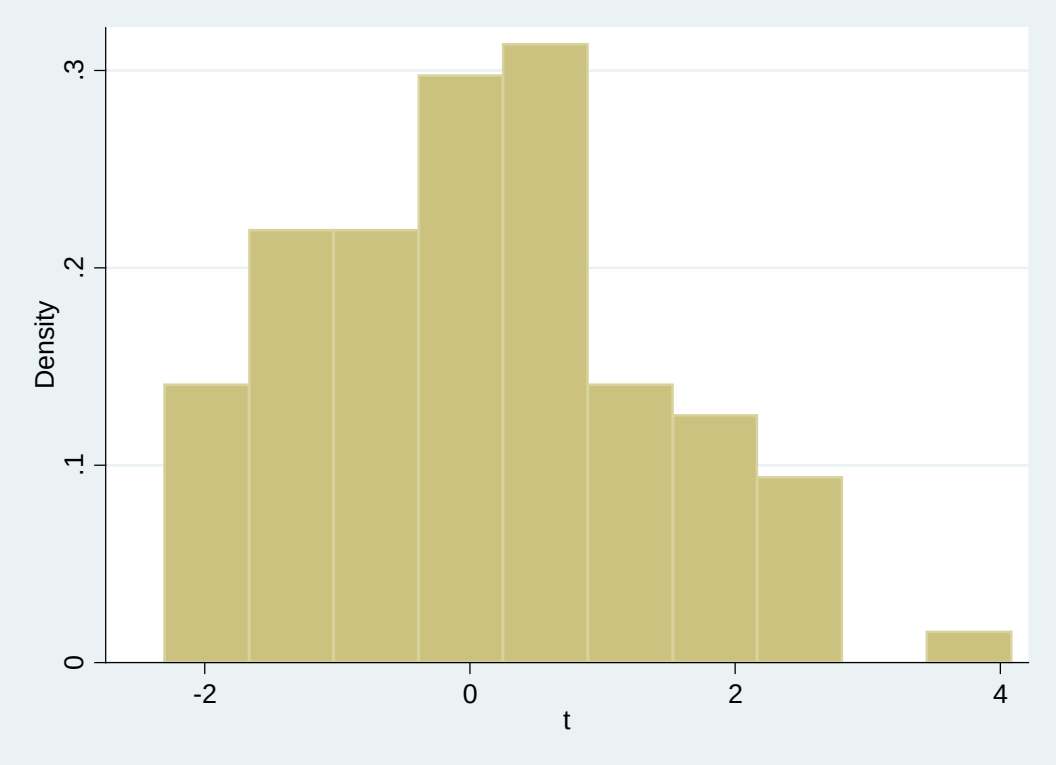
Note: The top figure shows the share of output constituted of products that were never under reservation or products that became dereserved across years. The bottom figure shows this cross-sectionally over the sample period in a two-digit industry

Figure 2: Correlation: Industry Characteristics and Unreserved Share



Note: The scatter plot shows the correlation between an industry's unreserved output share and average firm logs of productivity, gross value added, employment and capital across the sample period. The correlations are .147, 145, .126 and .09 respectively and significant at the <1% level.

Figure 3: Distribution of t-statistics from "fake" placebo regressions



Note: The above figure plots the t-statistics obtained from assigning a random dereservation measure to an industry-year and running our benchmark specification. We repeat this 100 times

Table 1: Summary Statistics

	All	Product Scope		Reserved good production	
		Single	Multi	Yes	No
N	331,194	189,737	141,457	50,664	280,530
%	100%	57.3%	42.7%	15.3%	84.7%
Gross Value Added	84.9	50.2	131.4	35.8	93.5
Added (Millions)	(1,111.4)	(435.2)	(1,622.2)	(158.2)	(1,203.2)
Employment	78.3	64.1	97.3	55.1	82.4
	(437.6)	(401.6)	(481.0)	(145.7)	(470.5)
Fixed Capital	39.1	19.8	64.9	12.3	43.8
(Millions)	(787.7)	(272.4)	(1,162.2)	(94.2)	(853.2)
Gross Value Added	788	691	917	535	832
per Worker (Thousands)	(8,961)	(11,680)	(2,257)	(1,197)	(9,704)
Fixed Capital per	221	200	250	147	234
Worker (Thousands)	(853)	(672)	(1,046)	(472)	(903)
Productivity (LP method)	11.83	11.56	12.24	11.47	11.92
	(1.58)	(1.58)	(1.53)	(1.47)	(1.61)
Number of Products	1.74	1.00	2.92	1.22	1.83
	(1.23)	(0.00)	(1.29)	(0.65)	(1.29)

Notes: Standard deviation in parentheses. All means weighted using ASI weights. Fixed Capital and Gross Value added measured in Rupees. Productivity refers to TFP constructed as in Levinsohn and Petrin (2003)

Table 2: Dereservation and Pre-Reform Characteristics

Panel A: All Firms				
DV: Unreserved %	(1)	(2)	(3)	(4)
(log) GVA_{t-2}	7.96e-05			
	(8.47e-05)			
(log)Emp_{t-2}		0.000321**		
		(0.000162)		
(log)Cap_{t-2}			6.03e-06	
			(7.03e-05)	
(log)TFP_{t-2}				0.000119
				(0.000121)
Observations	100,926	100,926	100,926	100,926
Panel B: Interaction with Unreserved Good Production Status				
DV: Unreserved %	(1)	(2)	(3)	(4)
(log) GVA_{t-2}*Unres. Firm	0.000331			
	(0.000380)			
(log)Emp_{t-2}*Unres. Firm		-0.000446		
		(0.000400)		
(log)Cap_{t-2}*Unres. Firm			0.000269	
			(0.000290)	
(log)TFP_{t-2}*Unres. Firm				0.000491
				(0.000530)
Observations	100,926	100,926	100,926	100,926

Note: The dependent variable Unreserved % is the fraction of output which is unreserved in a 3-digit industry-year. The independent variables are lagged two periods Productivity refers to a measure of productivity measure as in Levinsohn and Petrin (2003). All regressions include year and 3-digit industry fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Effect of Dereservation on Size and Productivity

Panel A: All Firms

	(1)	(2)	(3)	(4)
	(log) GVA	(log) Emp	(log) Cap	(log) TFP
Unreserved %	0.701***	0.837***	0.281	0.515***
	(0.201)	(0.130)	(0.184)	(0.170)
Observations	299,362	299,362	299,362	299,362

Panel B: By Reserved Good Production Status

	(1)	(2)	(3)	(4)
	(log) GVA	(log) Emp	(log) Cap	(log) TFP
Unreserved %	-0.276	0.539***	-0.929***	-0.0803
	(0.284)	(0.196)	(0.317)	(0.213)
Unreserved %*Unres. Firm	1.167***	0.365	1.241***	0.767***
	(0.317)	(0.235)	(0.399)	(0.214)
Observations	299,362	299,362	299,362	299,362

Panel C: By Multi-product Status

	(1)	(2)	(3)	(4)
	(log) GVA	(log) Emp	(log) Cap	(log) TFP
Unreserved %	0.448*	0.598***	-0.134	0.410**
	(0.238)	(0.148)	(0.210)	(0.195)
Unreserved %*Multiproduct	0.803***	0.786***	1.360***	0.316*
	(0.300)	(0.256)	(0.408)	(0.183)
Observations	299,362	299,362	299,362	299,362

Notes: All panels shows the effect of dereservation on logs of gross value added, employment, capital and productivity as indicated in the headings. Unreserved % refers to the fraction of output which is unreserved in a 3-digit industry-year. Panel B interacts Unreserved% with a dummy for whether a firm ever was in the reserved sector (=0) or not (=1). Panel C interacts Unreserved % with a dummy for whether the firm produces multiple products (=1) or a single product (=0). Specifications in Panel A and Panel B also contain main effects for both dummies. Productivity refers to a measure of TFP as in Levinsohn and Petrin (2003). ASI sampling weights are used. All regressions include year and industry fixed effects. Standard errors are in parentheses, and are clustered at the 3-digit industry-year. *** p<0.01, ** p<0.05, * p<.1.

Table 4: Effect of Dereservation on Product Scope (First-Stage)

Panel A: All Firms

	(1)	(2)	(3)	(4)	(5)	(6)
DV:	# Products		# Unres. Products		# Res. Products	
Unres %	-0.341***	-0.129*	-1.333***	-1.349***	1.006***	0.736***
	(0.117)	(0.0741)	(0.197)	(0.223)	(0.140)	(0.139)
Unres% * Multiproduct		-0.355*		0.387		0.711***
		(0.211)		(0.339)		(0.0862)
Observations	314,923	314,923	326,297	326,297	326,297	326,297

Panel B: Firms Producing Reserved Goods

	(1)	(2)	(3)	(4)	(5)	(6)
	# Products		# Unres. Products		# Res. Products	
Unres %	0.139	-0.0367	-0.656***	-0.968***	0.722***	0.548***
	(0.124)	(0.0664)	(0.194)	(0.214)	(0.162)	(0.160)
Unres% * Multiproduct		0.0713		0.596		0.589***
		(0.233)		(0.401)		(0.0997)
Observations	50,661	50,661	50,661	50,661	50,661	50,661

Panel C: Firms Never Producing Reserved Goods

	(1)	(2)	(3)	(4)	(5)	(6)
	# Products		# Unres. Products		# Res. Products	
Unres %	-0.870***	-0.0778	-1.606***	-0.945***	0.928***	0.403***
	(0.152)	(0.102)	(0.227)	(0.236)	(0.125)	(0.121)
Unres% * Multiproduct		-0.720***		-0.327		1.112***
		(0.231)		(0.367)		(0.125)
Observations	275,636	275,636	275,636	275,636	275,636	275,636

Notes: All panels shows the effect of dereservation on number of all products, number of previously-reserved products and number of unreserved products as indicated in the headings. Panel A uses all firms, B used the sub-sample of firms that ever produced reserve goods and C the sub-sample that never produced a reserved good. Unres % refers to the fraction of output which is Unres in a 3-digit industry-year. There is an interaction of Unreserved % with a dummy for whether the firm produces multiple products (=1) or a single product (=0). The main effect of multi-product is also estimated. ASI sampling weights are used. All regressions include year and firm fixed effects. Standard errors are in parentheses, and are clustered at the firm level. *** p<0.01, ** p<0.05, * p<.1.

Table 5: Effect of Product Scope on Productivity (IV)

Panel A: All Firms			
	(1)	(2)	(3)
Number of Products	-0.457*		
	(0.247)		
#of Previously Reserved Products		0.107*	
		(0.0586)	
#of Unreserved Products			-0.0844*
			(0.0466)
Observations	271,203	271,203	271,203
Panel B: Firms Producing Reserved Goods			
DV: Productivity	(1)	(2)	(3)
Number of Products	-1.552		
	(1.677)		
#of Previously Reserved Products		-0.221	
		(0.138)	
#of Unreserved Products			0.230
			(0.145)
Observations	45,666	45,666	45,666
Panel C: Firms Never Producing Reserved Goods			
DV: Productivity	(1)	(2)	(3)
Number of Products	-0.410***		
	(0.116)		
#of Previously Reserved Products		0.290***	
		(0.0808)	
#of Unreserved Products			-0.182***
			(0.0518)
Observations	225,535	225,535	225,535

Notes: All panels shows the effect of number products, previously reserved products and unreserved products on productivity using an instrumental variables specification where the first-stage estimates the effect of unreserved % on number of products as in the previous table. Panel A uses all firms, Panel B used the sub-sample of firms that produce reserved goods and C the sub-sample that never produced a reserved good. ASI sampling weights are used. All regressions include year and firm fixed effects. Standard errors are in parentheses, and are clustered at the factory level. *** p<0.01, ** p<0.05, * p<.1.

Table 6: Base Specifications with industry-year linear trends

Panel A: Size and Productivity regressions

	(1)	(2)	(3)	(4)
DV:	(log) GVA	(log) Emp	(log) Cap	(log) TFP
Unreserved %	0.643**	0.568***	0.451**	0.443*
	(0.285)	(0.156)	(0.225)	(0.236)
Industry linear trend	yes	yes	yes	yes
Observations	326,308	326,308	326,308	326,308

Panel B: Product Scope regressions

	(1)	(2)	(3)	(4)	(5)	(6)
DV:	# Prdcts		# Unres. Prdcts		# Res. Prdcts	
Unres %	-0.221	0.0218	-3.170***	-4.250***	0.986***	0.707**
	(0.151)	(0.0721)	(0.801)	(0.938)	(0.300)	(0.292)
Unres % * Multiproduct		-0.329		1.719***		0.770***
		(0.209)		(0.590)		(0.0992)
Industry linear trend	yes	yes	yes	yes	yes	yes
Observations	326,308	326,308	326,308	326,308	326,297	326,297

Notes: Panel A is the same specification as in Table 2 and Panel B in Table 3 but including a linearly increasing trend at the three-digit industry level*** p<0.01, ** p<0.05, * p<.1.

Appendix A

A1: Pre-Existing Trends at Industry Level

DV: Unreserved %	(1)	(2)	(3)	(4)
(log) GVA_{t-2}	-23.5			
	(17.86)			
(log)Emp_{t-2}		16.56		
		(34.92)		
(log)Cap_{t-2}			-22.17*	
			(13.27)	
(log)TFP_{t-2}				-22.69
				(22.57)
Observations	477	477	477	477

Note: The dependent variable Unreserved % refers to the fraction of output which is unreserved in a 3-digit industry-year. Productivity refers to a measure of productivity measure as in Levinsohn and Petrin (2003). All regressions include year and 3-digit industry fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A2: IV Regressions—Sub-Samples of Multiproduct Firms

Panel A: MP Firms

	(1)	(2)	(3)
Number of Products	-1.032***		
	(0.33)		
# of Reserved Products		0.301***	
		(0.06)	
# of Unreserved Products			-0.285***
			(0.06)
Observations	100579	105988	105988

Panel B: MP Firms Producing Reserved Goods

DV: Productivity	(1)	(2)	(3)
Number of Products	-2.098		
	(2.27)		
# of Reserved Products		-0.523**	
		(0.26)	
# of Unreserved Products			0.486*
			(0.26)
Observations	6719	7275	7275

Panel C: MP Firms Never Producing Reserved Goods

DV: Productivity	(1)	(2)	(3)
Number of Products	-0.982***		
	(0.25)		
# of Reserved Products		0.423***	
		(0.07)	
# of Unreserved Products			-0.384***
			(0.07)
Observations	93860	98713	98713

Note: The tables above show estimates from the same specifications as Table 4 but in sub-sample of multiproduct (Panel A), multiproduct firms producing reserved goods (Panel B) and multiproduct firms never producing reserved goods.

Appendix B

Figure B1: Currently reserved products

LIST OF ITEMS RESERVED FOR EXCLUSIVE MANUFACTURE BY MICRO AND SMALL ENTERPRISE SECTOR
(As on 30 July 2010)

S.No.	S.No. (As per Gazette Notification)	Product Code	Name of the Product
		20-21	FOOD AND ALLIED INDUSTRIES
1.	3	202501	Pickles & chutneys
2.	7	205101	Bread
3.	11	21100102	Mustard Oil (except solvent extracted)
4.	13	21100104	Ground nut oil (except solvent extracted)
		27	WOOD AND WOOD PRODUCTS
5.	47	276001	Wooden furniture and fixtures
		28	PAPER PRODUCTS
6.	79	285002	Exercise books and registers
			OTHER CHEMICALS AND CHEMICAL PRODUCTS
7.	253	305301	Wax candles
8.	308	314201	Laundry soap
9.	313	317001	Safety matches
10.	314	318401	Fire works
11.	319	319902	Agarbatties
			GLASS AND CERAMICS
12.	335	321701	Glass bangles
		33-35	MECHANICAL ENGG. EXCLUDING TRANSPORT EQUIPMENT
13.	364	340101	Steel almirah
14.	394	341004	Rolling shutters
15.	402	34200602	Steel chairs-All types
16.	404	34200702	Steel tables-All other types
17.	409	342099	Steel furniture-All other types
18.	428	343302	Padlocks
19.	447A	345207	Stainless steel utensils
20.	474	345202	Domestic utensils-Aluminium

Note: The above official “notification from the Small Scale ministry shows the list of dereserved products as of 2010 (the end of our sample).

Figure B2: Dereservation of the oil category

- 15: Food Products & Beverages
    - 151: Production, processing and preservation of meat, fish, fruit vegetables, oils and fats.
        - 1514: Vegetable and animal oils and fat
            - 15142: Vegetable oils and fats (excluding corn oil)
                - 12501 Oil, Chili
                - 12502 Oil, Rice bran
                - 12503 Oil, Castor
                - 12504 Oil, Coconut
                - 12505 Oil, Cotton
                - 12506 Oil, Sesame ***Dereserved 2008***
                - 12507 Oil, Ground nut (except solvent extracted)
                - 12508 Oil, Kardi
                - 12511 Oil, Linseed
                - 12512 Oil, Mahua
                - 12513 Oil, Maize
                - 12514 Oil, Mowrah
                - 12515 Oil, Mustard (except solvent extracted) ***Reserved***
                - 12516 Oil, Neem
                - 12517 Oil, Palm
                - 12518 Oil, Rapeseed (except solvent extracted) ***Dereserved 2008***
                - 12519 Palm fatty oil
                - 12521 Oil, Soyabeans
                - 12525 Oil, Cashew kernel ***Dereserved 2008***

- Hair oils dereserved 2003, essential oils dereserved in 2004

Note: The above schematic shows the staggered nature of dereservation dates in the “Oil” category