When Protection Ends: Evidence from Differentiated Product Markets *

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Abstract

We study how the removal of size-based industrial protection affects competition and consumer welfare in differentiated product markets. Using the phased dismantling of India's Small Scale Industries (SSI) product reservation policy between 2000 and 2007, we examine how increased competition influenced product quality, prices, variety, and welfare. Exploiting product-level variation in the timing of dereservation, we implement a staggered difference-in-differences design using firm-product data from the Annual Survey of Industries. We find that dereservation induced significant quality upgrading, particularly among larger and more productive firms, alongside increases in capital and skill intensity. Product variety expanded through entry into previously reserved markets. While average prices did not decline, quality-adjusted prices fell significantly, indicating improved consumer value. Firms in industries with greater scope for differentiation competed through quality upgrading, whereas those in industries with limited differentiation competed through lower prices. Welfare decomposition shows substantial gains, driven primarily by higher quality and expanded variety rather than lower prices. These findings highlight how removing size-based distortions reshapes competition and generates consumer welfare gains in differentiated product markets.

Keywords: Industrial Policy; Product Differentiation; Product Quality; Product Variety; Competition; Consumer Welfare; Firm Dynamics; India.

JEL Codes: D12, L11, L15, L25, L52

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1 Introduction

Competition and market liberalization offer gains from multiple sources. A sizeable literature has emphasized that welfare gains from competition may arise not only through cheaper goods, but also through improvements in product quality and expanded consumer choice (Krugman (1979); Broda et al. (2006); Khandelwal (2010)). Yet in many countries, domestic industrial policies continue to shield selected firms from competitive pressures, potentially limiting these channels of welfare improvement. Policies aimed at supporting small businesses are a prominent example, often relying on entry restrictions, preferential treatment, or product reservations for smaller firms, thereby distorting market competition and firm incentives (Martin et al. (2017)). The removal of such preferential policies may intensify competition and generate welfare gains through changes in prices, quality, and product variety. While the impact of withdrawing protectionist industrial policies on firms' outcomes has been studied, there is limited empirical evidence on how they shape the full set of outcomes in markets for differentiated products.

We study the staggered dismantling of a domestic, size-based, product-specific industrial policy in India. Under the Small Scale Industries (SSI) reservation policy introduced in 1967, the production of selected products was reserved for small-scale firms. We focus on the main phase of dereservation between 2000 and 2007, when most reserved products were gradually opened to firms of all sizes. Exploiting the plausibly exogenous timing of product-level dereservation, we implement a staggered difference-in-differences design to estimate the impact of intensified competition on prices, product quality, and variety.

Our results show that SSI dereservation led to significant improvements in product quality. The quality gains increase monotonically with firm size and are primarily driven by large, highly productive firms. These firms also exhibit increases in capital intensity, skill intensity, and wage, following the reform, suggesting that capital deepening and skill upgrading are key mechanisms behind quality improvements. Notably, even firms just below the SSI threshold also experience improvements, consistent with the relaxation of size constraints enabling expansion and upgrading post-reform.

Despite intensified competition, we find no decline in prices; if anything, prices rise modestly, particularly among larger firms. This likely reflects the higher marginal costs associated with producing higher-quality goods. However, quality-adjusted prices decline, indicating that consumers obtain better quality for a given price or paying lower effective price than earlier. Heterogeneity analysis further shows that firms respond differently depending on market conditions: in industries with greater scope for differentiation, firms compete by upgrading quality, whereas in industries with limited differentiation, competition primarily manifests through price reductions. Dereservation also increases product variety by inducing entry into previously reserved product markets, leading to a larger number of firms producing each product. While incumbent firms reduce their product scope following dereservation, entrant firms more than offset this decline by expanding their product lines to include previously reserved products, resulting in an overall increase in variety.

We estimate product quality following Khandelwal et al. (2013) using a demand-residual approach, where quality is inferred from the residual demand for a product after controlling for prices. For both the quality estimation and the difference-in-differences analysis, we use factory-level panel data from the Annual Survey of Industries (ASI) spanning 2000 to 2007. The availability of detailed firm-product level production data is central to our analysis, allowing us both to identify treated firms producing dereserved products (following Martin et al., 2017) and to estimate product quality at the firm-product level.

We quantify the welfare gains from SSI product dereservation using the price index decomposition framework of Feenstra (1994); Sheu (2014). Using a two-tier utility framework, we estimate a composite price index and decompose welfare gains into price, quality, and variety components. We find that baseline prices would have to fall by 78.3 percent for consumers to be as well off as they were post-dereservation. These gains are driven primarily by quality upgrading and increased product variety: baseline prices would have to fall by 60.6 percent to compensate for new varieties and by 58.8 percent to compensate for improved quality. However, the price channel offsets part of these gains, with baseline prices needing to rise by 33.7 percent to compensate for the higher product prices. Our equivalent variation estimates imply that consumers would need to spend 3.6 times more at baseline prices to attain post-dereservation utility. We also estimate the counterfactual price index for never-reserved products. Baseline prices for these products would have to fall by 27.6 percent for consumers to attain post-dereservation utility, likely reflecting broader factors such as technological change affecting both treated and untreated products. This implies an additional 50.7 percent decline attributable specifically to welfare gains from SSI product dereservation.

These decomposition results are broadly consistent with our regression findings. In particular, the welfare decomposition reveals positive contributions from both the quality and variety channels, consistent with the positive effects on quality and product variety estimated in the regressions. The weakening effect of the price channel in the decomposition also aligns with the increase in prices observed in the regressions. Importantly, the variety component in the decomposition may reflect not only the introduction of new varieties, but also changes in prices and quality, since it is constructed from changes in expenditure shares across varieties between the baseline and end periods. However, our regression results suggest that the welfare gains attributed to the variety channel are driven predominantly by the expansion in product variety itself.

We contribute to multiple strands of literature. First, we directly speak to the literature on size-based policies. The size-dependent policies are of various types, including labor regulations, capital grants and subsidies, tax incentives, etc., targeted to firms of a certain size. A large literature shows that size-dependent labor regulations distort firm growth and resource allocation, reducing aggregate productivity and output (Gourio and Roys, 2014; Garicano et al., 2016; Braguinsky et al., 2011; Besley and Burgess, 2004).[1] Similar concerns arise for financial policies aimed at supporting small

[1] Garicano et al. (2016) shows that size-based labor laws in France constrain productive firms from reaching their optimal size and distort the firm size distribution. Gourio and Roys (2014) estimate

firms: Bhue et al. (2022) shows that size-based credit programs in India can slow real growth among targeted firms, while capital grants have, at best, modest and temporary effects on employment (De Mel et al., 2019). More broadly, size-based distortions also arise through regulatory thresholds and tax incentives, which induce firms to remain small and misallocate resources (e.g., Almunia and Lopez-Rodriguez, 2018; Kleven and Waseem, 2013).

Studies examining the Indian Small Scale Industry (SSI) dereservation policy show that removing size-based protection increased output, investment, and employment (Garcia-Santana and Pijoan-Mas, 2014; Martin et al., 2017). Our finding that quality improvements are concentrated among large firms is consistent with Martin et al. (2017), who show that large, previously constrained incumbents drive post-dereservation expansion. Evidence on product choices further suggests that firms reoptimize their product mix, becoming more likely to adopt products linked to their input structure while shifting toward previously reserved products (Boehm et al., 2016; Chiplunkar, 2019).

Second, more broadly, our paper also relates to the literature on industrial policy, which studies how government interventions, including subsidies, directed credit, trade protection, industrial licenses, and product market restrictions shape firm behavior and industrial development (Juhász et al., 2024; Aghion et al., 2008). Studies in this literature show that industrial policies largely help targeted firms, areas, or industries. For example, an increase in financial incentives to firms increases innovation (Barwick et al. (2025)), the provision of a bundle of targeted support to selected industries increased and promoted their expansion (Lane (2025)), and higher investment and employment in areas that were eligible for higher subsidies (Criscuolo et al. (2019)). Taken together, while this literature documents important real-side responses to industrial policies and the removal of size-based distortions, it leaves largely unexplored how such reforms affect differentiated product markets, particularly through changes in prices, product

that such regulations impose sizable implicit costs and that removing them would improve labor allocation and raise output per worker. Braguinsky et al. (2011) find similar distortions in Portugal, with substantial potential gains from relaxing these constraints.

quality, and variety, which are the key channels through which consumer welfare gains are realized.

Understanding these margins is important because producer-side outcomes such as output, employment, and productivity need not map directly into consumer welfare in differentiated product markets. A reform may increase productivity while reducing variety, or raise prices while simultaneously improving quality. Conversely, liberalization may generate substantial welfare gains even without large output effects if consumers gain access to higher-quality or more diverse products. This insight is central to the trade and industrial organization literature, which emphasizes that gains from liberalization arise not only through lower prices, but also through quality upgrading and expanded product variety (Krugman, 1979; Feenstra, 1994; Broda et al., 2006; Khandelwal, 2010).

Third, and related to the above, our paper contributes to the empirical trade and industrial organization literature studying welfare changes in differentiated product markets. A large literature in trade and IO examines how changes in prices, product quality, and variety affect consumer welfare (Feenstra, 1994; Berry et al., 1995; Petrin, 2002; Broda et al., 2006; Khandelwal, 2010; Sheu, 2014). While much of this work studies trade liberalization and gains from imported varieties, we examine these channels in the context of a domestic industrial policy reform. The SSI dereservation policy altered the set of firms and products competing in the market, making it a useful setting to study how the removal of production restrictions reshapes prices, quality, and variety, and thereby consumer welfare. Our paper further contributes by estimating these effects using detailed firm-product level production data for domestic manufacturing firms.

Finally, we contribute by quantifying product quality for Indian manufacturing firms using the demand-residual approach of Khandelwal et al. (2013), where quality is inferred from residual demand after controlling for prices. Product quality is a central dimension of firm heterogeneity and an important source of growth (Garcia-Macia et al., 2019; Grossman and Helpman, 1991), yet empirical work on industrial policies has largely focused on price-based or producer-side outcomes, with relatively limited evidence on how policy changes affect quality. Much of the existing literature estimates quality using trade data and demand elasticities calibrated from other contexts (e.g., Broda et al., 2006; Bas and Strauss-Kahn, 2015; Hu et al., 2021).[2] Applying such elasticities to domestic markets may be inappropriate given differences in market structure, consumer preferences, and competition. Moreover, earlier approaches rely on the independence of demand and supply shocks, an assumption that may fail when quality is costly to produce and jointly affects both demand and costs (c.f. Piveteau and Smagghue, 2019). We therefore estimate the demand function in our setting using an instrumental variables strategy and recover quality from the estimated residuals.[3] Specifically, we instrument product prices using firm-level electricity prices, which, conditional on firm activity, are plausibly exogenous (Fontagné et al., 2018).[4] Unlike most existing work, we estimate quality for domestic products using detailed firm-product level production data.

The paper is organized as follows. Section 2 provides the background and context; Section 3 describes the data sources and quality estimation methods (Section 3.1) and the difference-in-difference methodology (Section 3.2) to estimate the impact of SSI dereservation on product quality; Section 4 presents the results, both for demand function and quality estimation (Section 4.1) and the impact of SSI dereservation policy including the discussions on mechanisms (Section 4.2); Section 5 quantify the welfare gains; Section 6 deals with robustness checks; Section 7 concludes.

[2]Past studies have used several proxies for product quality, including prices and price indices (Hallak, 2006; Bastos and Silva, 2010; Eckel et al., 2015) as well as product features or certification measures (Medina, 2022; Hallak and Sivadasan, 2009). Prices are widely used because higher quality is generally more costly to produce and associated with higher prices. However, prices are imperfect proxies since they also reflect productivity, input costs, and, in trade settings, exchange rate movements (Hallak and Schott, 2011). Moreover, prices may not capture quality differences well in markets with limited differentiation (Khandelwal, 2010), while alternative measures are often unavailable or industry-specific.

[3]Related approaches include Khandelwal, 2010; Piveteau and Smagghue, 2019.

[4]We also implement alternative approaches using elasticities from Broda et al. (2006) and an alternative instrumental variables strategy following Abeberese (2017).

2 Background and Context

Before the 1991 liberalization reforms, India adopted protective measures aimed at fostering growth and employment in its small and medium-scale industries, safeguarding them from intense competition. These sectors benefited from various supportive policies, including tax concessions, subsidized loans, and technological assistance. The cornerstone of this approach was the Small Scale Industries (SSI) Product Reservation Policy, introduced in 1967. Under this policy, some products were exclusively reserved for production by small-scale firms. The main argument for this reservation was the protection of these small firms from the competition of large-scale firms. Small Scale Industries (SSIs) were initially defined as industrial undertakings with fixed assets not exceeding Rs 500,000 and employing fewer than 50 employees. The employment restriction was dropped in 1960, and by 1999, industrial enterprises with up to Rs 10 million in plant and machinery (based on historical cost) were designated as Small Scale Industries (SSIs). The changes in the SSI limits are reported Table A1 in Appendix A. At the time of the reservation, the existing large-scale firms producing these reserved products were permitted to continue their operations indefinitely. However, their production capacity was limited to the present levels and could not be increased. Some large firms were allowed to expand capacity on the condition that they export at least 75 percent of their production (Mohan, 2002).

There were no concrete criteria for selecting products to be reserved; they were reserved based on their feasibility for production by small-scale firms and the labor-intensive nature of the manufacturing process (Mohan, 2002). In 1967, the reservation policy began with 47 products, but over time, the number increased considerably. In 1997, 1045 reserved products were listed (Martin et al., 2017)[5]. However, in the 90s, there was a consensus that the policy failed to deliver the desired results (Subrahmanya, 1995). The policy has stalled production growth and capacity utilization in SSI-reserved products. A major criticism of the policy was its failure to account for

[5] Table A2 in Appendix A reports the number of products that were reserved and dereserved over time.

product quality differentiation and its lack of incentives for technological upgrading to these firms (Mohan, 2002).

After the liberalization policy of 1991, SSIs had to face competition from imports and large firms. With advancements in technology and rising demand for high-quality products, the viability of SSIs was called into question. This prompted the formation of a special committee (Hussain, 1997) to reassess the SSI reservation policy. The committee has recommended that the policy should focus on growth and market competitiveness. Following this committee's recommendations, the government started the gradual dereservation of the products, which began in 1997 and continued until the end of 2015. Between 2003 and 2008, around 100 to 250 products were dereserved annually, leaving only 22 products still under reservation by the end of that period.

3 Data Sources and Methodology

3.1 Data Sources

Our primary dataset is the Annual Survey of Industries (ASI) for the years 2000-2007. This is the annual survey of all registered manufacturing establishments in India.[6] The data includes the census and sample scheme; all manufacturing plants with > 100 workers come under a census frame. A sample frame comprises the plants with 10 or more workers with electricity and plants with 20 or more workers without electricity. All plants under the census frame are sampled every year, whereas those under the sample frame are sampled using the ASI sampling strategy.

Estimating quality at the firm-product level requires data on firms' product-level sales quantity and value. ASI reports firms' sales and revenue information at the 5-digit ASICC (Annual Survey of Industries Commodity Classification) product level. From this, we calculate the price as the unit value of a product.[7]

[6] The words establishment(plant) and firm are used interchangeably in the paper.

[7] We also dropped the "other products/by-products" corresponding to ASICC code "99211" from our analysis. The nature and scope of by-products and other products vary by firm; therefore, we believe that one firm's by-product cannot be compared to another's or classified as a different variety within the same product category.

To estimate the impact of SSI dereservation on firm-product-level outcomes, we first obtained a list of dereserved products from the Indian government portal (`https://msme.gov.in/`). We then mapped these official product codes to the ASICC product code, as the ASI reports products using the latter codification. For the crosswalk between the official product list and ASICC codes, we used the concordance by Martin et al. (2017). The concordance is based on both 5-digit ASICC (Annual Survey of Industries Commodity Classification) codes and 5-digit NIC industry code descriptions (see Table A3 in Appendix A). While some official product descriptions perfectly matched the ASICC codes product description, the remaining products were aligned with matched with the help of industry code descriptions. In these cases, the products were partially matched with ASICC codes (see Table A4 in Appendix A). This allows us to create a panel of ASI manufacturing firms with the status of their products being reserved or dereserved over time. Our sample consists of 207 official products mapped to 279 ASICC products from 2000 to 2007. Table 1 reports the descriptive statistics of the estimation sample corresponding to the baseline regression (10).

3.2 Quality Estimation

Following Khandelwal et al. (2013), we used the constant elasticity of substitution (CES) utility-based demand residual approach to estimate the quality of Indian manufacturing products. Quality is defined as unobserved attributes that raise the consumer's valuation and their demand beyond price. The representative consumer's utility is described by the CES utility function, where quality is a utility and demand shifter, as follows:[8]

$$U = \left[\int_{j \in \Omega} (\lambda_j q_j)^{\alpha} \delta_j \right]^{\frac{1}{\alpha}} \tag{1}$$

[8]Due to the constant elasticity of substitution, it assumes markup is constant across the firms. Note that the nested logit-based demand system of Khandelwal (2010) also assumes a constant price elasticity of substitution across varieties within a nest, thereby ignoring price variation due to markups.

The elasticity of substitution, $\sigma = 1/(1-\alpha) > 1$ and $0 < \alpha < 1$. The demand function for product j derived from the utility function is defined as:

$$q_j = P^{\sigma-1} \lambda_j^{\sigma-1} p_j^{-\sigma} E \tag{2}$$

Where P is the price index and E is the total expenditure in the market. λ_j and p_j are the quality and price of product j respectively. In the logarithmic form, it will be,

$$\log q_j + \sigma \log p_j = \log E + (\sigma - 1) \log P + (\sigma - 1) \log \lambda_j \tag{3}$$

In our data, product prices and quantities vary across firms and over time. The market expenditure and price index vary over time. The demand specification can be rewritten as:

$$\log q_{ijt} + \sigma \log p_{ijt} = \log E_t + (\sigma - 1) \log P_t + (\sigma - 1) \log \lambda_{ijt} \tag{4}$$

Where "ijt" is for firm-product-year combination. We estimate quality at the firm-product level, treating each firm's product as a distinct variety. The time-varying components of demand such as, price index and market expenditure, can be captured by the time-fixed effects (δ_t), and adding product fixed effects (δ_j) to account for across-product heterogeneity in prices and quantities gives:

$$\log q_{ijt} + \sigma \log p_{ijt} = \delta_t + \delta_j + \mu_{ijt} \tag{5}$$

After estimating the value of σ, the left-hand side can be regressed on the time and product fixed effects to obtain the demand residuals. The quality measure is defined as:

$$\widehat{\log \lambda}_{ijt} = \frac{\widehat{\mu_{ijt}}}{\sigma - 1} \tag{6}$$

Identification Strategy

A key challenge in estimating the demand equation is that price is endogenous, as it is correlated with unobserved demand and supply shocks. One important source of endogeneity is simultaneity bias arising from the correlation between prices and product quality. Because higher quality is typically more costly to produce, it is reflected in higher prices; at the same time, higher quality also increases demand, thereby confounding the true effect of prices on demand. The other source of endogeneity is the measurement error in prices. We do not observe market prices directly in the data; instead, we use unit values calculated as the ratio of revenue to quantity sold for a variety.

Various studies have used the elasticity of substitution (σ) estimated by Broda et al. (2006) (Copestake and Zhang, 2023; Stiebale and Vencappa, 2018; Hu et al., 2021; Bas and Strauss-Kahn, 2015).[9] The concern using elasticities by Broda et al. (2006) is that it is estimated using import data, using these elasticities to the domestic markets may be inappropriate given differences in market structure, consumer preferences, and competition. Further, the methods used by Broda et al. (2006) assume that demand and supply shocks are independent, an assumption that may be violated because quality is costly to produce and jointly affects both demand and production costs (Piveteau and Smagghue, 2019).

To address the endogeneity issue, we estimate σ in equation (5) using an instrumental variable approach (Piveteau and Smagghue, 2019; Gervais, 2015). The demand specification, in this case, changes to:

$$logq_{ijt} = -\sigma \log p_{ijt} + \delta_t + \delta_j + \mu_{ijt} \tag{7}$$

In the literature, average price (Bernini and Tomasi, 2015), import-weighted real exchange rate (Piveteau and Smagghue, 2019), electricity price shocks (Fontagné et al., 2018), physical labor productivity (Gervais, 2015), and average price of the same in-

[9] Broda et al. (2006) uses HS6 product-level COMTRADE data for years 1994-2003 and estimates the import demand elasticity of substitution for 73 countries.

puts in other output markets (Orr, 2022) have been used as instruments for prices for demand system estimation.

We use electricity prices paid by firms to purchase electricity from the market as an instrument for output prices. Electricity is an essential input for production, and its cost is reflected in the prices as a component of production cost. Fontagné et al. (2018) used electricity prices as an instrument to estimate the price elasticity of French firms' exports. Our identification strategy relies on features of the electricity market in India, such as the reforms under the Electricity Act of 2003, which led to independent state electricity regulatory commissions (SERCs) at the state level, and tariff rationalization[10], allowing for independent power producers and private participation in distribution (Sen and Jamasb, 2012). In India, firms face tariffs based on electricity usage, so firms in a 10KW slab face different tariffs than those in a 50KW slab. This incremental tariff structure creates across-firm heterogeneity in the tariffs firms pay. Given the market structure for electricity in India, the electricity price is not identical across locations, seasons, firm size, and also over time. Jain and Nandan (2019) in their study showed that institutional and political factors such as the number of power distribution companies, the presence of SERC, political competition, and center-sate government relations significantly affected the tariff for the small (5KW & 10KW) and medium (50KW) industrial slab whereas the economic factors such as industrial demand do not influence the electricity tariff. We can see that firm-level variation in electricity prices stems from exogenous factors (such as regulatory changes, location, seasons, political factors, and market competition) as well as endogenous factors (such as the firm's electricity usage). We account for the impact of firms' electricity usage by controlling for firm size, proxied by employment.

The rationale for using firm-level electricity prices as an instrument for product prices is that, conditional on firm activity, electricity prices affect product demand only through their effect on product prices (exclusion restriction). We control for firm size, proxied by firm-level employment, in our demand specification. We also control for the

[10] It refers to reforms aimed at removing or reducing cross-subsidization in electricity tariffs.

proportion of self-generated electricity in the firm's total electricity consumption in our demand specification. In our sample, some firms generate their own electricity, which can weaken the instrument. However, only 37 percent of firms in our sample generate some portion of their total electricity usage in-house, whereas 0.3 percent depend solely on self-generated electricity. We estimate the following system of equations:

$$\begin{aligned}\log q_{ijt} = \alpha_1 + \sigma \log\left(Price_{ijt}\right) + \alpha_2 \log(Firm\ size_{it}) + \alpha_3(Own\ electricity\ share_{it}) \\ + \delta_t + \delta_j + \mu_{ijt} \qquad (8)\end{aligned}$$

$$\begin{aligned}\log\left(Price_{ijt}\right) = \beta_1 + \beta_2 \log(Electricity\ price_{it}) + \beta_3 \log(Firm\ size_{it}) \\ + \beta_4(Own\ electricity\ share_{it}) + \delta_t + \delta_j + \epsilon_{ijt} \qquad (9)\end{aligned}$$

Equation (8) represents the structural demand equation, where quantity is a function of prices. Equation (9) presents first first-stage equation for identifying the relationship between output prices and the firm's electricity prices.

3.3 Effect of Dereservation on Differenciated Products

Our estimation strategy leverages the variation in the timing of product dereservation. We use the difference-in-differences (DiD) setup to estimate the impact of product dereservation on product quality, variety, and prices. The treatment is defined as the change in status of a product from reserved to dereserved. All the varieties, i.e., firm-product, belong to the dereserved products are in the treated group, and others are in the control group. Our baseline DiD specification is as follows.

$$y_{ijt} = \beta_0 + \beta_1 De\text{-}reserved_{jt} + \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt} \qquad (10)$$

Here, y_{ijt} denotes the firm-product-level outcome variables, namely product quality or product price. $De\text{-}reserved_{jt}$ is the treatment status dummy, which is 1 in the year the product is dereserved and in subsequent years, and 0 otherwise. The average treatment effect on treated (β) is identified from the within-firm-product variation due to the product being dereserved. Since our estimation strategy exploits variation in the timing of dereservation, any endogeneity arising from strategic dereservation of products in certain years will bias our results (Martin et al., 2017). To address this concern, following Martin et al. (2017), we control for the event-time variable τ_{jt}, which is equal to the current year minus the year of de-reservation. For example, τ_{jt} is equal to 1 for the year after dereservation, 0 in the year of dereservation, and -1 before dereservation, and so on. Further, τ is equal to 0 for firms that do not produce reserved products. The event-time variable allows us to account for any potential preexisting linear trend in the outcome of interest in the years preceding dereservation. The γ_{ij}, and γ_t are the firm-product (variety) and year-fixed effects, respectively. We cluster the standard errors at the product level.

Next, we examine the impact on product variety using the following two equations:

$$y_{jt} = \beta_0 + \beta_1 \textit{De-reserved}_{jt} + \tau_{jt} + \gamma_j + \gamma_t + \mu_{ijt} \tag{11}$$

$$y_{it} = \beta_0 + \beta_1 \textit{De-reserved}_{it} + \tau_{jt} + \gamma_i + \gamma_t + \mu_{ijt} \tag{12}$$

The equation (11) looks at the impact of dereservation on the number of firms producing a product j, and the equation (12) looks at the impact of the number on products produced by a firm (product scope) that produces a product undergoing dereservation. For the firm-level outcomes, we define the treatment status variable, $\textit{De-reserved}_{it}$, to equal 1 in the year a firm's first product got dereserved and in subsequent years, and 0 otherwise (Martin et al., 2017).

Next, we explore heterogeneity in the effects of dereservation across the firm-size distribution. Firms of different sizes differ in their ability and scope to absorb economic shocks.

$$Quality_{ijt} = \beta_0 + \sum_{q=1}^{4} \beta_1^q De\text{-}reserved_{jt} \times \sum_{q=1}^{4} Q_i^q + \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt} \tag{13}$$

where Q_i^q is the indicator variable that takes the value 1 for the firm in firm-size quartile q, and 0 otherwise. We proxied firm size using the value of plant and machinery in the baseline year and defined quartiles based on this measure. The baseline year is the initial year in which the firm is observed in the baseline quality regression estimation sample (equation (10)). Each coefficient on the interaction terms (β_1^q) captures the impact of dereservation on product quality for firms in the corresponding quartile of the size distribution. We also analyze heterogeneity using total employees and by firm productivity using labor productivity (output per unit of labor) as a measure of firm productivity. Firms are categorized into four quartiles based on the distribution of labor productivity in their initial year in the estimation sample. To obtain the impact of dereservation across the firms with differential productivity levels, similar to equation (13), we interact product dereservation treatment with the dummies of productivity quartiles.

We also examine the impact across firms above and below the SSI limit of 10 million rupees of investment in plant and machinery.

$$\begin{aligned} Quality_{ijt} = \beta_0 + \beta_1\, De\text{-}reserved_{jt} \times OverSSI_i + \beta_2\, De\text{-}reserved_{jt} \times WithinSSI_i \\ + \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt} \end{aligned} \tag{14}$$

We have used the firm's pretreatment average investment in plant and machinery to define its over- and within-SSI status. In equation (15), $OverSSI_i$ and $WithinSSI_i$ are the dummies for the firms above the SSI limit and below the SSI limit, respectively.

Further, we estimate the impact of dereservation based on pre-treatment buckets where the firms' average investment in plant and machinery lay. We hypothesize that the reservation policy has constrained firms from investing more, from accruing the benefits of economies of scale, and from investing in advancing their production processes. We categorize the firms into 6 categories with different investment ranges in plant and machinery (in millions), and estimate the following specification:

$$
\begin{aligned}
Quality_{ijt} = \beta_0 &+ \beta_1\, De\text{-}reserved_{jt} \times P\&M < 0.1 \\
&+ \beta_2\, De\text{-}reserved_{jt} \times P\&M < 0.1 - 0.5 \\
&+ \beta_2\, De\text{-}reserved_{jt} \times P\&M < 0.5 - 1.5 \\
&+ \beta_2\, De\text{-}reserved_{jt} \times P\&M < 1.5 - 5 \\
&+ \beta_2\, De\text{-}reserved_{jt} \times P\&M < 5 - 10 \\
&+ \beta_2\, De\text{-}reserved_{jt} \times P\&M > 10 + \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt}
\end{aligned}
\tag{15}
$$

Our objective is to examine whether the constraint firms within the SSI limit behaved differently than other smaller firms.

Our sample includes both incumbent and entrant firms. Incumbents are those who produce dereserved products before dereservation. Entrants are those firms that started producing a dereserved product only after the dereservation. To assess whether the observed quality effects are driven by incumbent or entrant firms, we estimate separate impacts for each group. We interact our treatment variable with the dummies for incumbent and entrant firms.

$$
\begin{aligned}
Quality_{ijt} = \beta_0 &+ \beta_1 De\text{-}reserved_{jt} \times Incumbent_i + \beta_2\, De\text{-}reserved_{jt} \times Entrant_i \\
&+ \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt}
\end{aligned}
\tag{16}
$$

In equation (16), $Incumbent_i$ and $Entrant_i$ are the dummies for the incumbent and entrant firms into the product space. We also examine if the results vary by incumbent and entrants' size. The estimates from equation (17) capture the heterogeneous quality effects of dereservation across incumbent and entrant firms operating within and above the SSI investment limit.

$$
\begin{aligned}
Quality_{ijt} = \beta_0 &+ \beta_1 De\text{-}reserved_{jt} \times WithinSSI_i \times Incumbent_i \\
&+ \beta_2 De\text{-}reserved_{jt} \times OverSSI_i \times Incumbent_i \\
&+ \beta_3\, De\text{-}reserved_{jt} \times WithinSSI_i \times Entrant_i \\
&+ \beta_4\, De\text{-}reserved_{jt} \times OverSSI_i \times Entrant_i \\
&+ \tau_{jt} + \gamma_{ij} + \gamma_t + \mu_{ijt}
\end{aligned} \tag{17}
$$

The $Incumbent$, $Entrant$, $WithinSSI$, and $OverSSI$ dummies, along with their lower-order interactions, are omitted because they are perfectly collinear with the fixed effects.

Quality upgrading is not feasible across all markets. The literature suggests that quality upgrading is feasible only when there is enough scope for quality differentiation in the market (Khandelwal, 2010). The scope of quality differentiation indicates opportunities for firms to innovate and differentiate their products from competitors. In markets with little scope for differentiation, firms may not be able to adjust quality but instead adjust price. On the other hand, in markets with greater scope for differentiation, firms can compete by improving their product quality (Fan et al., 2015). To test this, we construct the 5-digit industry-level quality ladder as the difference between the maximum and minimum quality within an industry, fixed at the base year 2000. We construct a dummy for the short and long quality ladders based on the industry-level median of the quality ladder.

$$
\begin{aligned}
y_{ijt} = \alpha &+ \beta_1 De\text{-}reserved_{jt} \times Short\ Ladder_d + \beta_2 De\text{-}reserved_{jt} \times Long\ Ladder_d \\
&+ \tau_{jt} + \gamma_{ij} + \mu_{ijt}
\end{aligned} \tag{18}
$$

Industries with values above the median are classified as having a long quality ladder, while those below the median are classified as having a short ladder. The long quality ladder indicates a greater scope for quality differentiation, and vice versa. We estimate the impact of dereservation on product quality, prices, and variety across the short and long quality ladder.

4 Results

4.1 Demand Function and Quality Estimation

Panel A of Table 2 reports the results from the OLS estimation of the demand equation (7). As discussed earlier, the estimated price elasticity of demand (σ) is likely to be biased due to endogeneity arising from a correlation between prices and unobserved demand.

Columns (2) and (3) in Panel A of Table 2 report the results from the IV estimation. The first-stage regression highlights that the electricity price instrument has a positive, statistically significant impact on output prices. The first-stage F-statistic of 35.07 exceeds the conventional threshold of 10, indicating strong instrument relevance and alleviating concerns about weak instruments. The IV estimate of price elasticity is substantially larger in magnitude than the OLS estimate, indicating that OLS considerably understates price sensitivity due to endogeneity.

Next, to capture granular and tailored pricing behavior within each industry, we estimate industry-specific elasticities of substitution. Following Piveteau and Smagghue (2019), we first obtain predicted log prices from a pooled first-stage regression and then interact these predicted prices with industry dummies in the second stage to estimate industry-specific price elasticities. The summary of these industry-specific elasticities is reported in panel B of Table 2.

After obtaining industry-specific price elasticity estimates, we measured quality using the demand residuals from the regression in equation (5). In panel C of Table 2, we report the summary statistics of our estimated quality measure. The mean price elasticity of demand (σ) across 130 industries is equal to -1.46. Our estimated σ is comparable with the σ of Gervais (2015), who estimated the quality of domestic sales of US manufacturing firms for each of 149 product categories and reported the mean of -1.97 for price elasticity of demand. Foster et al. (2008) has estimated quality for 11 homogeneous products of the US and obtained a mean of price elasticity of demand equal to -2.41. Piveteau and Smagghue (2019) estimated the quality of French firms' exports and obtained a price elasticity of demand equal to -4.26.

As a robustness check, we used another instrument to estimate the demand function. Following Abeberese (2017), we used the initial coal-based thermal share of a state's installed electricity generation capacity times the coal prices paid by power utilities in a respective year as an instrument for prices. This instrument leverages exogenous variation in a firm's electricity cost of production, impacting its output prices.[11] We also estimated quality using the elasticity of substitution (σ) borrowed from Broda et al. (2006) (Hu et al., 2021; Stiebale and Vencappa, 2018; Khandelwal et al., 2013).

4.2 Impact of SSI Product dereservation

The findings of the baseline specification (10) of the impact of dereservation on quality are reported in Table 3. We can see that dereservation has a positive, statistically significant impact on the quality of dereserved products. This suggests that the dereservation policy improved the quality of products previously subject to reservation. To account for industry- and state-specific unobserved factors and trends, we include industry–year and state–year fixed effects, as well as industry- and state-specific time trends, in our regression specifications (columns 2 to 5). The quality effect of dereservation is robust across all specifications.

We expect that, following dereservation, prices will decline due to increased competition. New entrants can put competitive pressure on incumbent firms, leading to a decline in the prices of dereserved products. Table 4 presents the results on the impact of dereservation on product prices. Surprisingly, we found no statistically significant impact on prices. The null effect on prices may be due to firms' quality upgrading. How-

[11] The identification strategy relies on the fact that the electricity used by firms is largely produced and sold by the state's power utilities, so any changes in their production costs (coal prices) affect the market prices of electricity for firms. Coal is the major source of energy for thermal power plants in India, accounting for about 83 percent of the installed thermal generation capacity. The coal prices set by coal companies differ between power utilities and others. See Abeberese (2017) for the detailed discussion on the exogeneity of the instrument.

ever, the quality-adjusted prices have declined significantly. The quality-adjusted price is measured as the difference between log price and log quality, i.e., $ln(price_{ijt}) - ln\lambda_{ijt}$ (Khandelwal et al., 2013; Fan et al., 2015; Stiebale and Vencappa, 2018). The decline in quality-adjusted prices suggests a potential welfare gain, as consumers can obtain higher-quality products at the same price or pay a lower effective price than earlier.

Next, we look at the impact on variety. Table 5 shows that the varieties of a product have increased post-dereservation significantly. In the first two columns, we estimate the impact on the number of firms within a product space. In the last two columns, we estimate the impact on new entrants into the product space. We found that both of them have increased significantly, suggesting that the removal of reservations causes a new entry of firms in dereserved product space, leading to an overall increase in varieties.

Recent studies have emphasized that the two-way fixed effects (TWFE) estimates may be biased due to heterogeneous treatment adoption and the comparison between early- and late-treated units (so-called "forbidden comparisons")[12] (Sun and Abraham, 2021; Borusyak et al., 2024; De Chaisemartin and d'Haultfoeuille, 2020; Callaway and Sant'Anna, 2021). Given the large universe of untreated (control) groups, our TWFE estimates are less likely to be biased. Nevertheless, we also employ the estimator proposed by Sun and Abraham (2021), Callaway and Sant'Anna (2021) ,De Chaisemartin and d'Haultfoeuille (2020), Borusyak et al. (2024). Figure 1 presents the DiD event-study plot of the effect of dereservation on product quality using all these estimators. The event-study estimates reveal a noticeable increase in the estimated effect following the dereservation policy, indicating a positive post-treatment impact on the product quality. In contrast, the coefficients in the pre-treatment periods are close to zero and statistically insignificant, suggesting the absence of any discernible pre-trend. All estimators produce similar estimates and exhibit comparable trends. The DiD event study plot for price and variety is presented by Figure 2 and Figure 3, respectively. The positive and significant price effect may reflect quality upgrading by firms, since producing

[12] See Borusyak et al. (2024) for more detailed discussion on "forbidden comparisons".

higher-quality goods typically involves higher production costs. The variety effect is also positive and significant. Owing to the large number of untreated observations, the estimated effects are broadly consistent with our two-way fixed-effects OLS results. Accordingly, we employ the TWFE OLS specification in the subsequent analysis.

Next, we estimate the impact of dereservation on quality across the firms' size distribution (Equation 13). We hypothesize that the quality effect of the dereservation increases in firm size. We define the firm size distribution using the firm's investment in plant and machinery in the initial year. The results presented in Table 6 show that the quality effect of dereservation increases monotonically in firm size in most specifications. However, the effect is only significant for firms in the 2^{nd}, 3^{rd} and 4^{th} quartile. The firms in the 4^{th} quartile observed an approximately 100% increase in product quality after dereservation. Large firms are the primary drivers of the quality effect of dereservation, while the effect is not statistically significant for firms in the lowest quartiles. Next, we used a firm's total employees as a measure of firm size and re-estimated the quality effect across the quartiles of the firm size distribution. The heterogeneity results based on this measure are reported in Table B1 in Appendix B. The results are consistent with the idea that large firms are the main drivers of improvements in product quality. Large firms are relatively better able to withstand competition from new entrants in the dereserved product market. This could be due to their ability to invest more in high-quality inputs, R & D, and technologies to improve quality compared to smaller firms. Compared with small firms, large firms can use higher-quality inputs because they can spread the fixed cost of quality across more production units (Kugler and Verhoogen, 2012; Antoniades, 2015). Our findings are consistent with Martin et al. (2017), which has shown that removing SSI dereservation increases investment, employment, and output for large incumbent firms.

We also analyze whether the quality effects of dereservation vary with firm productivity. We measured labor productivity and classified firms into four quartiles based on their base-year values. To assess how the impact of dereservation varies across productivity levels, we interact the treatment variable with dummy indicators for each productivity quartile. The findings are reported in Table B2 of Appendix B. It shows that firms in the highest quartiles have significantly improved the quality of dereserved products, suggesting highly productive firms adapt to the competition and environment after dereservation and successfully improve their product quality. In contrast, less productive firms could not increase the quality of their products. In the literature, the relationship between quality and productivity is inconclusive. However, our objective here is to examine the heterogeneity in the effect of dereservation across high- and low-productive firms. The results are consistent with those of firm-size heterogeneity.

Table 6 also reports the findings for firms above and within the SSI limit of 10 million investment in plant and machinery.[13] As mentioned earlier, firms with a historic value of plant and machinery above this SSI limit at the time of reservation were allowed to continue without further expansion. However, the large firms above the SSI limit were also allowed to produce, provided they export the majority of their output. We found that large firms above the SSI limit have substantially increased product quality; however, there is no statistically significant increase in product quality among firms within the SSI limit. This is consistent with the above results, which show that firms in the highest quartile of firm size increased product quality. Further, we estimate the effect of dereservation across firms with different pretreatment average plant and machinery categories following . We find that not only did firms above the SSI threshold ($>$ 10 million) improve product quality, but even firms constrained within the SSI limit (5–10 million) also showed quality gains. The findings suggest that improvements in product quality are driven not only by increased competition but also by firm expansion. Removing size-based constraints facilitates investment and capacity growth, enabling firms to improve product quality. Martin et al. (2017) shows that constrained incumbent firms significantly increased their investment in plant and machinery following dereservation.

We also did the size-based heterogeneity analysis for the price and product scope of the firms. Table 7 shows that the large size firms have also increased their product

[13] We took the pretreatment average value of gross investment in plant and machinery.

prices; notably, the percentage increase in prices is less than the percentage increase in quality. As argued by Kugler and Verhoogen (2012), high-quality goods require high-quality inputs, and both the output and input quality differences across plant size bring in a positive relationship between both input and output prices and plant size. In other words, large plants use high-quality, high-price inputs, produce high-quality products, and charge higher prices. Since quality is costly to produce, some of the cost will be passed on to the output prices. Table 8 reports the results on firms' product scope. We find a negative but insignificant impact on the product scope of a firm.

So far, we have not distinguished effects across the incumbent and entrant that produce a dereserved product. We examine whether the effects of dereservation differ between incumbent and entrant firms. Columns 1 and 2 of Table 9 report how the quality effects differ between incumbent and entrant firms. We find that the quality effect is statistically significant only for incumbent firms, but not for entrant firms. Columns 3 and 4 report the quality effects separately for incumbents and entrants, distinguishing between firms within and over the SSI threshold. It shows that the effect is largely driven by the overs SSI incumbent firms. These findings reiterate the role of firm size as a key determinant of a firm's capacity to improve product quality (Kugler and Verhoogen, 2012). The price effect is also significant for the overs SSI incumbent firms (columns 7 and 8). Interestingly, the incumbent firms that faced dereservation have reduced their product scope, whereas the entrant firms have increased their product scope by adding dereserved products to their product line. Notably, the increase in product scope for entrants exceeds the decrease experienced by incumbents, resulting in an overall increase in varieties in the market.[14] The entrant firms can be fundamentally different from the incumbent firms. To account for this potential selection, we control for the firm's entry year times year fixed effects in our regressions. This creates a nonparametric control for unobserved, time-varying characteristics for firms that entered into new product spaces in each year (Martin et al., 2017). The findings are reported in Table B3 in Appendix B. The results remain robust across all outcomes

[14]The results on the increase in overall varieties in dereserved markets are reported in columns (1) and (2) of Table 5.

and alternative specifications.[15]

How firms respond to the competitive or policy shocks also depends on the market's scope for differentiation (Amiti and Khandelwal, 2013; Fan et al., 2015). Firms operating in markets with greater differentiation potential have more scope for quality upgrading compared to others. We used the industry quality ladder as an indicator for the industry's scope for differentiation. The quality ladder is defined as the distance between the maximum and minimum quality within an industry. The findings are reported in Table 10. We find the impact on quality is significant for firms operating under the long quality ladder; in contrast, the quality upgrading is not feasible in the industries with a short quality ladder. In other words, firms with a large scope for quality differentiation have increased product quality after dereservation. We also estimate the impact on prices across the short and long quality ladder. We can see a statistically significant negative impact on prices for products within a short quality ladder. This implies that firms operating in a market with lower scope for quality differentiation compete on prices. We also find greater entry of new firms in industries characterized by a short quality ladder. This pattern is likely driven by differences in the nature of competition across industries. Industries with short quality ladders are characterized by relatively low fixed entry costs and limited scope for quality differentiation, causing competition to occur primarily along price margins. By contrast, long quality ladder industries require substantial sunk investments in quality upgrading, which raise entry barriers and limit firm entry (Sutton, 1991). In short-ladder industries, low entry costs and limited scope for differentiation therefore intensify price competition. The broader picture suggests that firms compete on both quality and price. Firms with greater scope for differentiation compete on quality, whereas those with less scope compete on price after dereservation.

[15] Our baseline quality results are also robust after controlling for entry year times year fixed effects. Table B4 in Appendix B reports the results.

4.2.1 Mechanisms

Capital-Intensity

How did large firms upgrade quality? To upgrade quality, firms need to invest more in upgrading production technology, capital deepening, and improved production capabilities (Verhoogen, 2008; Hallak and Sivadasan, 2013). The reservation policy has frozen the capitalization of firms by setting a cap on investment in plant and machinery as an eligibility threshold; as a result, technological progress has stalled. These firms were also under-utilizing their capacities, partly due to a lack of competitive pressure (Subrahmanya, 1995). By relaxing investment constraints, dereservation may induce capital deepening, capacity utilization, and facilitate investment in more mechanized production processes. To examine this mechanism, we analyze the impact of dereservation on firms' capital intensity.

$$
\begin{aligned}
Log(K/L)_{it} = \beta_0 &+ \beta_1\, \textit{De-reserved}_{it} \times P\&M < 0.1 \\
&+ \beta_2\, \textit{De-reserved}_{it} \times P\&M < 0.1 - 0.5 \\
&+ \beta_2\, \textit{De-reserved}_{it} \times P\&M < 0.5 - 1.5 \\
&+ \beta_2\, \textit{De-reserved}_{it} \times P\&M < 1.5 - 5 \\
&+ \beta_2\, \textit{De-reserved}_{it} \times P\&M < 5 - 10 \\
&+ \beta_2\, \textit{De-reserved}_{it} \times P\&M > 10 + \tau_{jt} + \gamma_i + \gamma_t + \mu_{ijt} \qquad (19)
\end{aligned}
$$

We estimate specification (19) at the firm level, where capital intensity is the ratio of gross capital (closing) to total employees (K/L). The treatment in this case is assigned at the firm level, unlike the product-level treatment used in previous estimations. The variable $\textit{De-reserved}_{it}$ is a treatment-status dummy that equals 1 in the year a firm's first product is dereserved and thereafter, and 0 otherwise. $P\&M$ categories are based on firm's pre-treatment average investment in plant and machinery.

The findings are reported in Table 11. We find a significant increase in the capital intensity of large-sized firms. We can see that the large firms withe greater than 10 million $P\&M$ investment have significantly increased their capital intensity. On the other hand, small firms had reduced the capital intensity. This is consistent with the findings of Martin et al. (2017), which shows that the small firms shrink in response to increased competition post dereservation. The quality upgrading following the removal of reservations can be attributed to the heightened capital intensity of these firms.

Skill-Intensity

High-skilled labor is another source for improving product quality. Quality upgrading may increase firms' demand for skilled labor through technology adoption and production upgrading. Firms producing higher-quality products employ more skilled workers and pay them higher wages (Verhoogen, 2008). In our data, we do not have any observable measure of firms' skill intensity. We use the share of real wages paid to regular workers in the firm's total real wage bill as a proxy for firm skill intensity. In the ASI data, firms report the employment and wages for regular and contract workers. Regular workers are full-time, more skilled, and generally paid more than contractual workers. The findings on skill intensity are reported in Table 11. We can see that the firms in the higher categories of P&M investment have experienced a significant increase in the ratio of regular wages with respect to total wages after dereservation. Whereas the small firms experienced a fall in the ratio of regular workers' wages to the total wage. Verhoogen (2008) shows that firms employ skilled labor and pay them higher wages to produce higher-quality products. We also find an increase in the wages for the large firms, indicating a skill premium paid by the firms in order to hire skilled labor.

These results are consistent with Kapoor (2020), who document complementarity between capital and skill intensity in India, with firms having higher capital-labor ratios allocating a larger share of wages to skilled workers. Taken together, our findings suggest that dereservation facilitated capital deepening and increased the skill intensity of production, consistent with firms advancing production technologies and moving toward higher-quality manufacturing.

5 Quantifying welfare gains

Our objective is to quantify the total consumer welfare gains from the dereservation of SSI products. Product quality not only matters for firms but also for consumers. Quality brings higher utility to consumers. The trade literature suggests that ignoring the quality channel can lead to an underestimation of welfare gains (Breinlich et al., 2016). Following Feenstra (1994) and Sheu (2014), we construct the price index and decompose the gains into price, quality, and variety parts. We applied a two-tier utility aggregator, where the upper tier follows Cobb-Douglas preferences across industries, while the lower tier aggregates preferences across varieties (firm products) within each industry using constant-utility-of-substitution (CES) aggregation.

Let varieties be indexed by firm i and product j. In period t, the available set is $\mathcal{J}_t \subseteq \{ij\}$. Let $p_{ij,t} > 0$ be price, $q_{ij,t} \geq 0$ quantity, and $\lambda_{ij,t} > 0$ a quality for variety (ij). Preferences are CES over quality–adjusted quantities with the elasticity of substitution within industry, $\sigma_{\mathcal{J}} > 1$ and $\theta_{\mathcal{J}}$ is the elasticity of substitution across industries $\mathcal{J}$:

$$U_t = \prod_{\mathcal{J}=1}^{N} \left[\left(\sum_{(ij)\in\mathcal{J}_t} (\lambda_{ij,t}\, q_{ij,t})^{\frac{\sigma_{\mathcal{J}}-1}{\sigma_{\mathcal{J}}}} \right)^{\frac{\sigma_{\mathcal{J}}}{\sigma_{\mathcal{J}}-1}} \right]^{\theta_{\mathcal{J}}}, \qquad \sigma_{\mathcal{J}} > 1\,;\, \sigma_{\mathcal{J}} > \theta_{\mathcal{J}}. \tag{20}$$

The corresponding (unit–expenditure) CES price index is given by

$$\tau_{t+1}^{\text{CES}} = \frac{P_{t+1}}{P_t} = \frac{\prod_{\mathcal{J}=1}^{N} \left[\left(\sum_{(ij)\in\mathcal{J}_{t+1}} \lambda_{ij,t+1}^{\sigma_{\mathcal{J}}-1}\, p_{ij,t+1}^{1-\sigma_{\mathcal{J}}} \right)^{\frac{1}{1-\sigma_{\mathcal{J}}}} \right]^{\theta_{\mathcal{J}}}}{\prod_{\mathcal{J}=1}^{N} \left[\left(\sum_{(ij)\in\mathcal{J}_{t}} \lambda_{ij,t}^{\sigma_{\mathcal{J}}-1}\, p_{ij,t}^{1-\sigma_{\mathcal{J}}} \right)^{\frac{1}{1-\sigma_{\mathcal{J}}}} \right]^{\theta_{\mathcal{J}}}} \tag{21}$$

If $\mathcal{J}_{t+1} \neq \mathcal{J}_t$ and $\lambda_{ij,t+1}\, p_{ij,t+1} \neq \lambda_{ij,t}\, p_{ij,t}$, we can decompose the price index $(\tau_{t+1}^{\text{CES}})$ into a price, quality, and variety parts. Let the common set be $C_{\mathcal{J}} \equiv \mathcal{J}_t \cap \mathcal{J}_{t+1}$ (varieties present in both periods).

$$\frac{P_{t+1}}{P_t} = \prod_{\mathcal{J}=1}^{N} \left[\underbrace{\prod_{(ij)\in C_{\mathcal{J}}} \left(\frac{p_{ij,t+1}}{p_{ij,t}}\right)^{\tilde{w}_{ij}}}_{\text{Price}} \times \underbrace{\prod_{(ij)\in C_{\mathcal{J}}} \left(\frac{\lambda_{ij,t}}{\lambda_{ij,t+1}}\right)^{\frac{\tilde{w}_{ij}}{\sigma_{\mathcal{J}}-1}}}_{\text{Quality}} \times \underbrace{\left(\frac{\gamma_{t+1}^{\mathcal{J}}}{\gamma_t^{\mathcal{J}}}\right)^{\frac{1}{\sigma_{\mathcal{J}}-1}}}_{\text{Variety}} \right]^{\theta_{\mathcal{J}}} \tag{22}$$

Where $\tilde{w}_{ij}$ is the sato-vartia weights,

$$\tilde{w}_{ij} = \frac{\dfrac{\alpha_{ij,t+1} - \alpha_{ij,t}}{\ln \alpha_{ij,t+1} - \ln \alpha_{ij,t}}}{\sum_{(ij)\in\mathcal{C}_{\mathcal{J}}} \dfrac{\alpha_{ij,t+1} - \alpha_{ij,t}}{\ln \alpha_{ij,t+1} - \ln \alpha_{ij,t}}}, \qquad \sum_{(ij)\in\mathcal{C}_{\mathcal{J}}} \tilde{w}_{ij} = 1. \tag{23}$$

and common–set α–shares $\alpha_{ij,s} = p_{ij,s}q_{ij,s} \big/ \sum_{(ij)\in\mathcal{C}_{\mathcal{J}}} p_{ij,s}q_{ij,s} \quad ; \quad s \in (t, t+1)$.

$$\gamma_s^{\mathcal{J}} \equiv \frac{\sum_{(ij)\in\mathcal{C}_{\mathcal{J}}} p_{ij,s}q_{ij,s}}{\sum_{(ij)\in\mathcal{J}_s} p_{ij,s}q_{ij,s}} \tag{24}$$

The variety part captures the change in expenditure share arising from new and disappearing varieties. The $\gamma_s^{\mathcal{J}}$ is the share of expenditure on varieties that are common across both periods relative to all the varieties that are available in period $s \in (t, t+1)$. The price index represents the compensating factor by which pre-dereservation prices must be multiplied to achieve the same level of welfare as that generated by the goods available post-dereservation. Our sample consists of the products that got dereserved over time. We considered three years (1998, 1999, 2000) before the dereservation as a pre-policy period (t) and three years post-dereservation (2007, 2008, 2009) as a post-policy period ($t + 1$). We averaged the price and quality across three years.

The results of the price index decomposition are reported in Table 12. The 0.217 aggregate index (τ_{t+1}^{CES}) implies that the pre-dereservation prices (baseline prices) would have to decline by 78.3 percent to make consumers as well off as they were with the post-dereservation choice set. The value of 0.394 for variety means the baseline prices have to fall by 60.6 percent to compensate for the new varieties available post-dereservation. The value of 0.412 for quality means the baseline prices have to fall by 58.8 percent to compensate for the better quality of products available post-dereservation. However, we don't find any welfare gains from the price channel. In contrast, prices are rising, possibly due to higher-quality products that are costly to produce. The welfare gains from the dereservation of previously reserved products are driven exclusively by the availability of new varieties and the quality upgrading of existing varieties.[16] Next, we quantify each component's contribution to the total change in the price index as follows,

$$Share_{k \in (p,\lambda,\gamma)} = \frac{\ln factor_k}{ln(\tau_{t+1})} \times 100 \tag{25}$$

About 61 percent of the welfare improvement is due to the increased varieties. Product quality accounts for around 58 percent of the welfare gains from dereservation. However, the price increase offset about 7 percent of these gains.

Next, we measured consumer gain using the equivalent variation (EV), defined as the additional expenditure the consumer would have to incur to maintain the same utility at time $t+1$ if prices remained at their level at time t. Under homothetic CES preferences, the consumer surplus is a monotonic transformation of the equivalent variation, which equals the cost of reaching utility U_{t+1} at old prices minus the actual spending at time $t+1$.

$$\Delta C = \left(\frac{1}{\tau_{t+1}^{\text{CES}}} - 1 \right) E_{t+1}, \quad \text{where } \tau_{t+1}^{\text{CES}} = \frac{P_{t+1}}{P_t} \tag{26}$$

The results show that consumers would need to spend around 3.6 times their actual post-policy expenditure in period $t+1$ at pre-policy prices from period t to achieve the same level of utility they enjoy in period $t+1$. This implies that post-dereservation market conditions are so much better that, at pre-dereservation prices, consumers would have had to spend 3.6 E_{t+1} to be equally well off. In other words, post-dereservation, there is a significant increase in real income.

We measured the counterfactual price index for products that were never reserved. The price index for never-reserved products helps us control for changes in overall

[16] Sheu (2014) find that the welfare gain due to trade liberalization is largely driven by the quality channel, followed by prices and variety.

technological advancement and other common factors that change over time. The never reserved product markets had no firm size and entry restrictions. The results are reported in Panel B of Table 12. The price index for never-reserved products is 0.724, which means that if the reserved products had been unreserved, they would have experienced a gain in 2007-2009 equivalent to a 27.6 percent decrease in their 1998-2000 prices, all due to common factors such as technological advancement. The price index of 0.217 for the dereserved products implies that dereservation generated a welfare gain on top of the gains that would have occurred over time. The difference between counterfactual and treatment price index is 0.507, which means the baseline prices would have to drop by an additional 50.7 percent to offset the welfare gains from dereservation reform. We also measured a counterfactual price index for a restricted control sample. We only keep those 4-digit products that were unreserved but belong to the same industry where some products were dereserved. The price index values and the welfare gains are reported in panel B of Table 12. The findings remain consistent. We re-estimate our quality effects using a difference-in-differences specification with a restricted control group; the results remain robust (Table B5 in Appendix B).

6 Robustness checks

6.1 Alternative quality measures

To validate the effect of dereservation on product quality and the methodology for quality estimation, we conducted multiple robustness checks. We used variants of our primary quality measure to estimate the impact of dereservation on product quality. Table B6 in Appendix B reports the findings using these quality measures as an outcome variable. Column 1 contains the outcome variable, which is our primary quality measure. In Column 2, we use product quality estimates from an alternative price instrument for demand estimation. We used the initial coal-based thermal share of a state's installed electricity generation capacity, multiplied by the coal prices paid by power utilities in the respective year, as an instrument for output prices (Abeberese, 2017). The identification strategy is grounded in the fact that the electricity used by firms is largely produced and sold by the state's power utilities, so any changes in their production costs (coal prices) affect the market prices of electricity for firms.

In columns 3 and 4, we used the quality estimate based on the elasticity of substitution (σ) from Broda et al. (2006) in the demand estimation. In column 3, we used a single value of elasticity of substitution, i.e., the median value of sigma ($\sigma = 3.7$) for India. In column 4, we used the industry-specific sigma values. Column 5 represents the results based on quality estimated from a demand equation (5), where we have controlled for firm fixed effects, along with year and product fixed effects (Hu et al., 2021). In other words, we purged out the firm-specific, time-invariant, unobserved heterogeneity from the demand. In column 6, we used a quality measure based on the approach described in Forlani et al. (2023).[17] This measure is based on the variable markups across firms.[18] The estimated effect using this measure is relatively higher because firm-product-specific markups introduce richer variation than specifications based on common or industry-level elasticities of substitution (Stiebale and Vencappa, 2018). We can see that, except for column 3, all estimates are statistically significant, indicating that the effect is not an artifact of our estimation method or driven by factors other than quality.

6.2 Placebo test

We also performed the placebo test in the spirit of Martin et al. (2017). We randomly assigned the dummy treatment to different products from our sample. We repeat this exercise 100 times and estimate the impact of dereservation on product quality. Due to random assignment of a placebo treatment, some of the truly dereserved products may also end up in the placebo treatment group. To mitigate the confounding effect, we control for a true dereservation in our regression. Table B7 in Appendix B shows the results from one of 100 placebo regressions. We can see that the placebo effect is

[17]The Forlani et al. (2023) measured quality as a markup-weighted log revenue adjusted for the log quantity demanded.

[18]We estimate the firm-product level markups following De Loecker et al. (2016).

statistically insignificant; however, the effect of true dereservation is significant. Table B8 in Appendix B reports the summary of estimates from 100 iterations of placebo regression. As expected, 92 out of 100 regression runs are insignificant. Figure B2 in Appendix B shows the cumulative distribution function (CDF) of estimates from 100 regression runs for quality and price. All the placebo estimates fall away, leaving the true coefficient indicated by a vertical dotted line. The null placebo effect provides validity to our results on de-reservation.

7 Conclusion

This paper examines how the removal of a size-based industrial policy affects competition and consumer welfare in differentiated product markets. We study the phased dismantling of India's Small Scale Industries (SSI) product reservation policy, which had restricted the production of selected products to small firms and limited competition from larger producers. Exploiting the staggered timing of product-level dereservation, we analyze how the reform affected product quality, prices, variety, and welfare.

Our results show that removing product reservations substantially altered firms' competitive strategies. Firms responded to intensified competition by upgrading product quality, particularly in industries where there was greater scope for differentiation. At the same time, the reform increased product variety through entry into previously reserved product markets. The effects on prices were more nuanced. While average prices did not decline, quality-adjusted prices fell significantly, indicating that consumers received higher-quality products for a given expenditure. In industries with limited scope for quality differentiation, competition manifested primarily through lower prices rather than quality upgrading.

The responses were highly heterogeneous across firms. Quality upgrading was concentrated among larger, more productive, and previously constrained firms, suggesting that the removal of size restrictions allowed firms to exploit economies of scale, invest in production capabilities, and compete more effectively. We show that these firms increased both capital intensity and skill intensity following dereservation, consistent with quality upgrading through technological and organizational improvements.

To quantify the broader consumer benefits of the reform, we estimate welfare gains using a decomposition of changes in prices, quality, and variety. We find substantial welfare improvements following dereservation. Importantly, these gains are driven overwhelmingly by quality upgrading and the expansion of product variety, while the price channel contributes little and, if anything, partially offsets the gains because higher-quality products are more costly to produce. These findings underscore the importance of looking beyond prices when evaluating the consequences of industrial policy reforms in differentiated product markets.

More broadly, our results suggest that size-based protection can distort not only production and firm growth but also the dimensions along which firms compete. By restricting entry and limiting expansion, such policies may reduce incentives for innovation, quality improvement, and product differentiation. The removal of these distortions allows competition to operate through multiple margins, namely, quality, price, and variety, ultimately generating substantial gains for consumers. Evaluations of industrial policies should therefore account not only for their effects on producer outcomes such as output, employment, and productivity, but also for how they shape differentiated product markets and consumer welfare.

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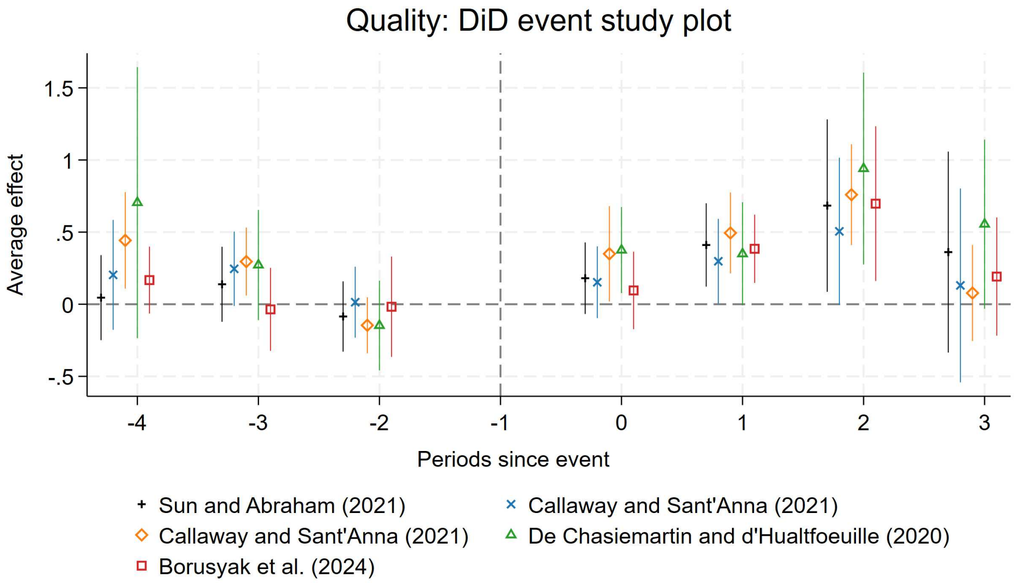


Figure 1: The figure plots dynamic difference-in-differences estimates of the *quality effect* relative to one year before dereservation (treatment). The coefficients are normalized to zero in the year before dereservation. Due to a smaller number of observations, periods ≤ t-4 and ≥ t+3 are binned. Vertical bars represent 90 percent confidence intervals. Estimates are obtained using alternative estimators: two-way fixed effects (TWFE), Sun and Abraham (2021), Callaway and Sant'Anna (2021), De Chaisemartin and d'Haultfoeuille (2020), and Borusyak et al. (2024). We have controlled for the base-year total employees, gross value of plant and machinery, capital-labor ratio, firm's market share, and the number of products by firm, interacted with time dummies, across all specifications.

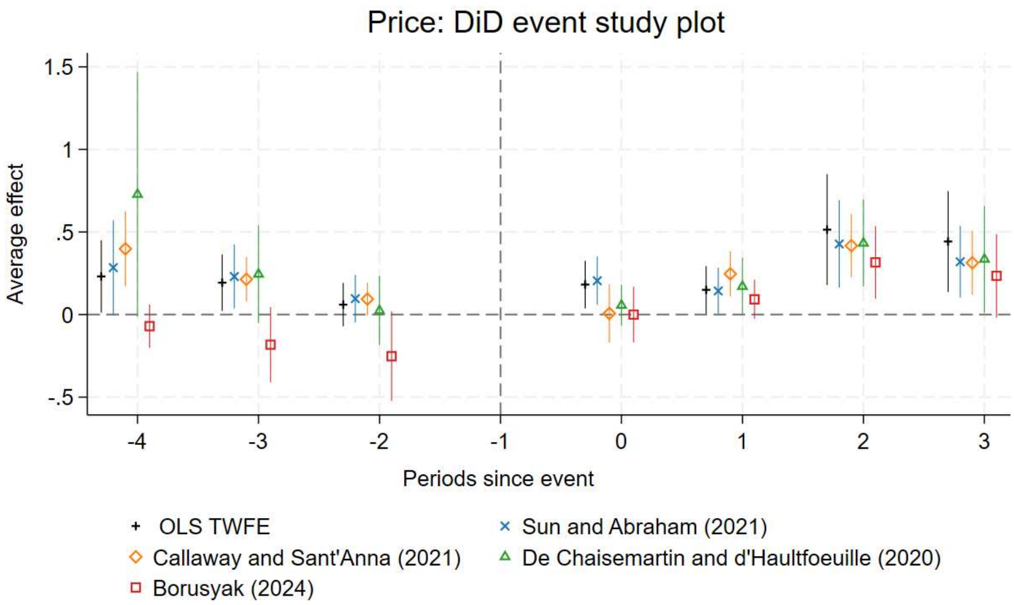


Figure 2: The figure plots dynamic difference-in-differences estimates of the *price effect* relative to one year before dereservation (treatment). The outcome variable is the log of prices. The coefficients are normalized to zero in the year before dereservation. Due to a smaller number of observations, periods $\leq$ t-4 and $\geq$ t+3 are binned. Vertical bars represent 90 percent confidence intervals. Estimates are obtained using alternative estimators: two-way fixed effects (TWFE), Sun and Abraham (2021), Callaway and Sant'Anna (2021), De Chaisemartin and d'Haultfoeuille (2020), and Borusyak et al. (2024). We have controlled for the base-year total employees, gross value of plant and machinery, capital-labor ratio, firm's market share, and the number of products by firm, interacted with time dummies, across all specifications.

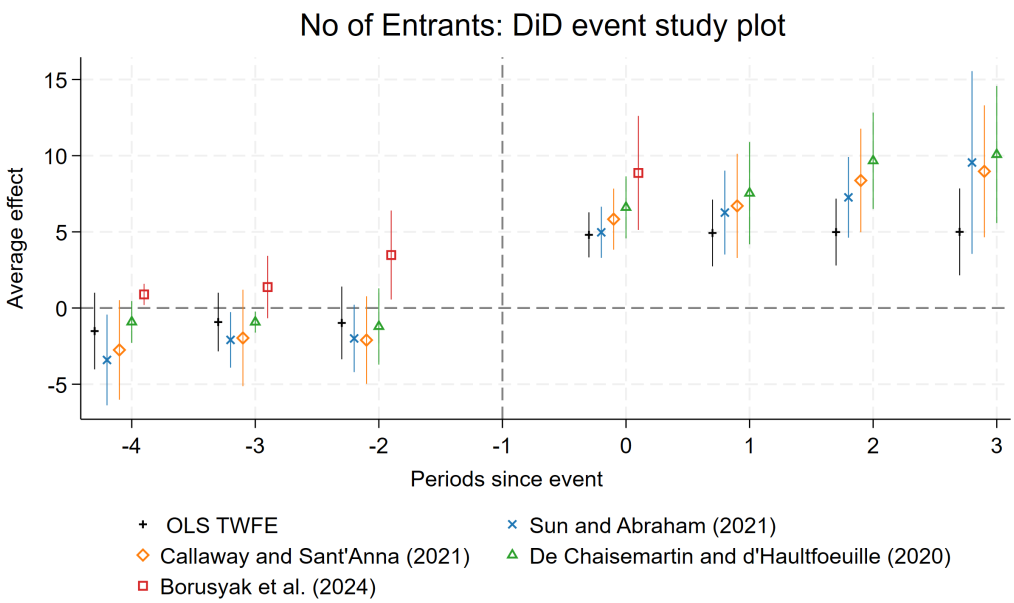


Figure 3: The figure plots dynamic difference-in-differences estimates of the *variety effect* relative to one year before dereservation (treatment). The outcome variable is no of entrants to the product space. The coefficients are normalized to zero in the year before dereservation. Due to a smaller number of observations, periods $\leq$ t-4 and $\geq$ t+3 are binned. Vertical bars represent 90 percent confidence intervals. Estimates are obtained using alternative estimators: two-way fixed effects (TWFE), Sun and Abraham (2021), Callaway and Sant'Anna (2021), De Chaisemartin and d'Haultfoeuille (2020), and Borusyak et al. (2024).

Table 1: Descriptive Statistics

Item	**Statistic**
No of Observations	233,423
No of Firms	42,868
No of ASICC Products	3,899
No of Treated/Dereserved Products	279 (7.1%)
No of Firm-Products (Varieties)	76,931
No of Treated Firm-Products (Varieties)	9448 (11.6%)
No of Incumbent Firms	11,931 (27.8%)
No of Entrants Firms	5,198 (12.1%)
No of Firms Within SSI threshold (Rupees 10 mill.)	30,319 (70.7%)
No of Firms Over SSI threshold (Rupees 10 mill.)	12,549 (29.2%)
No of Incumbent Firms Within the SSI threshold (Rupees 10 mill.)	9,011 (21%)
No of Incumbent Firms Over SSI (Rupees 10 mill.)	2,920 (6.8%)

Notes: The table represents the summary statistics from our estimation sample. The incumbents are those firms that were producing dereserved products before dereservation. The entrants are the firms that began producing a dereserved product only after it became dereserved. Over and Within SSI refers to the firms above and below the 10 million investment limit in plant and machinery.

Table 2: Demand Estimation and Industry-level Price Elasticity Summary

Panel A: Demand Estimation

	(1) **OLS** Log (Quantity)	(2) **IV (1st Stage)** Log (Price)	(3) **IV (2nd Stage)** Log (Quantity)
Log (Electricity Price)		0.112***	
		(0.0189)	
Log (Price)	-0.842***		-1.954***
	(0.00245)		(0.248)
First stage F Stat		35.07	
R-squared	0.369		
Observations	429,103	411,290	411,290
Product and Year FE	Yes	Yes	Yes

Panel B: Industry-level Summary

Remark	Statistic
Total Industries	130
Industries with negative price coefficient	130
Negative & significant estimates	130
IV price coefficient (σ)	-1.46 (mean)
Total number of products	5,132
Total number of varieties	272,942

Panel C: Quality Distribution

Variable	Mean	SD	p25	p50	p75	N
Quality ($\log \hat{\lambda}_{ijt}$)	-0.05	5.73	-3.16	0.34	3.40	421,449

Notes: We have controlled for the log of firm size using total employees as a proxy for size and the firm's self-generated electricity share in total electricity consumption. Standard errors in parentheses are clustered at the firm-product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. The Panel B reports the summary of 4-digit industry-specific price-elasticities estimated using the interaction of predicted log prices from the first stage of the pooled sample with industry-specific dummies.

Table 3: The Impact of De-reservation on Product Quality

VARIABLES	(1) Quality	(2) Quality	(3) Quality	(4) Quality	(5) Quality
De-reserved$_{\mathrm{jt}}$	0.334*	0.293**	0.306**	0.336	0.337*
	(0.199)	(0.149)	(0.152)	(0.205)	(0.203)
Observations	233,423	233,422	233,423	233,423	233,423
R-squared	0.855	0.867	0.865	0.856	0.856
Year FE	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	-	Yes	-	-	-
Industry-time trend	-	-	Yes	-	-
State $\times$ Year FE	-	-	-	Yes	-
State-time trend	-	-	-	-	Yes

Notes: Quality is estimated for each firm-product using Khandelwal et al. (2013). De-reserved$_{\mathrm{jt}}$ takes the value 1 starting the year a product is de-reserved and each year after. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Impact of De-reservation of Prices

	Log(Price)		Log(Price-λadj)	
VARIABLES	(1)	(2)	(3)	(4)
De-reserved$_{\mathrm{jt}}$	0.032	0.089	-0.183**	-0.142
	(0.081)	(0.087)	(0.093)	(0.087)
Observations	227,743	227,744	227,743	227,744
R-squared	0.912	0.909	0.913	0.912
Year FE	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes

Notes: The outcome variable is the log of output prices. The quality-adjusted price (Price-λadj) is measured as the difference between log price and log quality, i.e., $ln(price_{ijt}) - ln\lambda_{ijt}$. De-reserved$_{\mathrm{jt}}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Entry of New Firms into Product Space

	Log (Firms)		Log (Entrants)	
VARIABLES	(1)	(2)	(3)	(4)
De-reserved$_{\mathrm{jt}}$	0.116**	0.100*	0.563***	0.537***
	(0.046)	(0.052)	(0.094)	(0.099)
Observations	30,303	30,325	30,305	30,325
R-squared	0.891	0.0875	0.802	0.763
Year FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes

Notes: The outcome variable is the number of new firms into product space. Entrants refers to the number of firms that newly entered into the dereserved product space. De-reserved$_{\mathrm{jt}}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: The Impact of De-reservation on Product Quality across Firm Size

VARIABLES	Dependent variable: Quality					
	(1)	(2)	(3)	(4)	(5)	(6)
De-reserved$_{jt}$ × Q^1	0.132	0.148				
	(0.205)	(0.188)				
De-reserved$_{jt}$ × Q^2	0.033	0.094				
	(0.153)	(0.172)				
De-reserved$_{jt}$ × Q^3	0.600***	0.630***				
	(0.220)	(0.225)				
De-reserved$_{jt}$ × Q^4	1.035***	1.037***				
	(0.370)	(0.357)				
De-reserved$_{jt}$ × Over-SSI (P&M > 10)			0.630**	0.639***		
			(0.257)	(0.247)		
De-reserved$_{jt}$ × Within-SSI (P&M < 10)			0.200	0.223		
			(0.153)	(0.159)		
De-reserved$_{jt}$ × P&M < 0.1					0.004	0.041
					(0.217)	(0.197)
De-reserved$_{jt}$ × P&M 0.1 - 0.5					0.146	0.231
					(0.304)	(0.346)
De-reserved$_{jt}$ × P&M 0.5 - 1.5					0.204	0.270
					(0.289)	(0.293)
De-reserved$_{jt}$ × P&M 1.5 - 5					0.207	0.314
					(0.393)	(0.404)
De-reserved$_{jt}$ × P&M 5 - 10					0.726**	0.755**
					(0.370)	(0.374)
De-reserved$_{jt}$ × P&M > 10					0.602**	0.623**
					(0.257)	(0.244)
Observations	228,172	228,173	233,422	233,423	209,721	209,722
R-squared	0.867	0.864	0.867	0.865	0.869	0.866
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	-	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes	-	Yes

Notes: The outcome variable is the quality estimated for each firm-product combination using the approach of Khandelwal et al. (2013). De-reserved$_{jt}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. **The firm size quartiles (Q) are measured using plant and machinery** at base year. Over and Within SSI refers to the firms above and below the 10 million investment in plant and machinery (P&M). P&M (classified) is the pretreatment average investment in plant and machinery measured in INR millions. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, ***

Table 7: The Impact of De-reservation on Price across Firm Size

VARIABLES	Dependent variable: Log(Price)					
	(1)	(2)	(3)	(4)	(5)	(6)
De-reserved$_{jt}$ $\times$ Q^1	-0.061	0.022				
	(0.126)	(0.115)				
De-reserved$_{jt}$ $\times$ Q^2	-0.057	0.026				
	(0.089)	(0.112)				
De-reserved$_{jt}$ $\times$ Q^3	0.148	0.180*				
	(0.097)	(0.101)				
De-reserved$_{jt}$ $\times$ Q^4	0.404***	0.428***				
	(0.152)	(0.148)				
De-reserved$_{jt}$ $\times$ Over-SSI (P&M $>$ 10)			0.168	0.200*		
			(0.115)	(0.109)		
De-reserved$_{jt}$ $\times$ Within-SSI (P&M $<$ 10)			-0.002	0.063		
			(0.087)	(0.096)		
De-reserved$_{jt}$ $\times$ P&M $<$ 0.1					-0.048	0.044
					(0.139)	(0.127)
De-reserved$_{jt}$ $\times$ P&M 0.1 - 0.5					0.017	0.107
					(0.153)	(0.203)
De-reserved$_{jt}$ $\times$ P&M 0.5 - 1.5					-0.022	0.044
					(0.206)	(0.221)
De-reserved$_{jt}$ $\times$ P&M 1.5 - 5					-0.025	0.052
					(0.155)	(0.182)
De-reserved$_{jt}$ $\times$ P&M 5 - 10					0.334**	0.333**
					(0.159)	(0.147)
De-reserved$_{jt}$ $\times$ P&M $>$ 10					0.168	0.197*
					(0.116)	(0.110)
Observations	222,520	222,521	227,743	227,744	204,127	204,128
R-squared	0.911	0.908	0.912	0.909	0.912	0.908
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	-	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes	-	Yes

Notes: The outcome variable is the log of output prices. De-reserved$_{jt}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. **The firm size quartiles (Q) are measured using plant and machinery** at base year. Over and Within SSI refers to the firms above and below the 10 million investment in plant and machinery (P&M). P&M (classified) is the pretreatment average investment in plant and machinery measured in INR millions. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, ***

Table 8: The Impact of De-reservation on Product Scope across Firm Size

VARIABLES	Dependent variable: Log(Product Scope)					
	(1)	(2)	(3)	(4)	(5)	(6)
De-reserved$_{it}$ × Q^1	-0.025	-0.013				
	(0.016)	(0.013)				
De-reserved$_{it}$ × Q^2	-0.012	-0.008				
	(0.019)	(0.018)				
De-reserved$_{it}$ × Q^3	-0.000	0.002				
	(0.020)	(0.019)				
De-reserved$_{it}$ × Q^4	-0.014	-0.010				
	(0.016)	(0.016)				
De-reserved$_{it}$ × Over-SSI (P&M > 10)			-0.000	0.003		
			(0.014)	(0.013)		
De-reserved$_{it}$ × Within-SSI (P&M < 10)			-0.019	-0.012		
			(0.013)	(0.011)		
De-reserved$_{it}$ × P&M < 0.1					-0.023	-0.013
					(0.016)	(0.013)
De-reserved$_{it}$ × P&M 0.1 - 0.5					0.034	0.037
					(0.029)	(0.030)
De-reserved$_{it}$ × P&M 0.5 - 1.5					-0.064*	-0.059
					(0.038)	(0.038)
De-reserved$_{it}$ × P&M 1.5 - 5					0.017	0.017
					(0.028)	(0.028)
De-reserved$_{it}$ × P&M 5 - 10					-0.035	-0.034
					(0.040)	(0.041)
De-reserved$_{it}$ × P&M > 10					0.002	0.005
					(0.014)	(0.013)
Observations	144,316	144,321	148,111	148,116	134,753	134,758
R-squared	0.846	0.843	0.849	0.846	0.836	0.833
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	-	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes	-	Yes

Notes: The outcome variable is the log of the number of products by firms (product scope). *De-reserved$_{it}$* takes a value of 1 for the year a firm's first product got dereserved and in subsequent years, and 0 otherwise. **The firm size quartiles (Q) are measured using plant and machinery** at the base year. Over and Within SSI refers to the firms above and below the 10 million investment in plant and machinery (P&M). P&M (classified) is the pretreatment average investment in plant and machinery measured in INR millions. Standard errors in parentheses are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, ***

Table 9: The Impact of De-reservation: Incumbents v. Entrants

	Quality				Price				Product scope			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
De-reserved$_{jt}$ × Incumbent	0.328*	0.332*			-0.110	-0.082			-0.036***	-0.025***		
	(0.184)	(0.178)			(0.098)	(0.100)			(0.011)	(0.009)		
De-reserved$_{jt}$ × Entrant	0.183	0.199			-0.110	-0.082			0.169***	0.166***		
	(0.178)	(0.184)			(0.082)	(0.088)			(0.023)	(0.023)		
De-reserved$_{jt}$ × Within-SSI (P&M $<$ 10) × Incumbent			0.206	0.226			0.044	0.108			-0.037***	-0.024**
			(0.191)	(0.188)			(0.110)	(0.115)			(0.014)	(0.011)
De-reserved$_{jt}$ × Within-SSI (P&M $<$ 10) × Entrant			0.189	0.217			-0.110	-0.078			0.147***	0.146***
			(0.184)	(0.189)			(0.084)	(0.090)			(0.032)	(0.032)
De-reserved$_{jt}$ × Over-SSI (P&M $>$ 10) × Incumbent			0.665**	0.681***			0.191	0.220**			-0.035**	-0.028**
			(0.270)	(0.257)			(0.118)	(0.111)			(0.014)	(0.013)
De-reserved$_{jt}$ × Over-SSI (P&M $>$ 10) × Entrant			0.054	-0.069			-0.120	-0.130			0.199***	0.193***
			(0.571)	(0.592)			(0.208)	(0.239)			(0.032)	(0.031)
Observations	233,422	233,423	233,422	233,423	227,743	227,744	227,743	227,744	148,111	148,116	148,111	148,116
R-squared	0.867	0.865	0.867	0.865	0.912	0.909	0.912	0.909	0.849	0.846	0.849	0.846
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
Industry-time trend		Yes		Yes		Yes		Yes		Yes		Yes

Notes: All outcome variables are in logarithmic form. De-reserved$_{jt}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. Over and Within SSI refers to the firms above and below the 10 million investment in plant and machinery. An Incumbent is a dummy for the firms that produce a dereserved product before it is dereserved. Entrants are firms that entered the dereserved product space after dereservation. For the outcome variable product scope, the treatment status is defined at the firm level, i.e., *De-reserved$_{it}$*, which takes a value of 1 in the year a firm's first product is dereserved and in all subsequent years, and 0 otherwise. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: The Impact of Product De-reservation: Role of Quality Ladder

	Quality		Log(Price)		Log(Entrants)		Log(Product scope)	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
De-reserved$_{\mathrm{jt}}$ $\times$ Short Ladder	-0.099	0.082	-0.200**	-0.090	0.604***	0.711***	-0.012	-0.017
	(0.191)	(0.179)	(0.078)	(0.078)	(0.137)	(0.139)	(0.018)	(0.015)
De-reserved$_{\mathrm{jt}}$ $\times$ Long Ladder	0.769**	0.859**	0.181	0.245	0.553***	0.602***	-0.007	-0.004
	(0.343)	(0.330)	(0.164)	(0.176)	(0.076)	(0.092)	(0.020)	(0.017)
Observations	91,407	91,422	89,441	89,456	30,313	30,325	83,096	83,102
R-squared	0.856	0.850	0.923	0.918	0.805	0.768	0.789	0.784
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	-	-	-	-
Product FE	-	-	-	-	Yes	Yes	-	-
Firm FE	-	-	-	-	-	-	Yes	Yes
Industry $\times$ Year FE	Yes	-	Yes	-	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes	-	Yes	-	Yes

Notes: The outcome variable is the quality estimate for each firm-product combination using the approach of Khandelwal et al. (2013). De-reserved$_{\mathrm{jt}}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. The long and short ladder is a dummy for the above- and below-median quality ladder, where the quality ladder is the distance between the maximum and minimum quality within a 4-digit industry. We have fixed the quality ladder to the base year, i.e., 2000. *Entrants* are the new firms in the product space. *No of Products* is the total number of products produced by the firms. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: The Impact of De-reservation on firm level outcomes

	Log(K/L)		Skill-intensity		Log(Wage)	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
De-reserved$_{\text{it}}$ × P&M < 0.1	-0.004	-0.024	0.002	-0.016**	-0.023*	-0.020**
	(0.034)	(0.029)	(0.009)	(0.008)	(0.013)	(0.010)
De-reserved$_{\text{it}}$ × P&M 0.1 - 0.5	0.058	0.066	0.012	0.005	-0.019	-0.018
	(0.055)	(0.054)	(0.014)	(0.014)	(0.021)	(0.020)
De-reserved$_{\text{it}}$ × P&M 0.5 - 1.5	-0.040	-0.023	0.004	0.002	0.023	0.027
	(0.055)	(0.054)	(0.018)	(0.017)	(0.023)	(0.023)
De-reserved$_{\text{it}}$ × P&M 1.5 - 5	0.051	0.063*	0.000	0.001	-0.001	0.000
	(0.035)	(0.034)	(0.012)	(0.012)	(0.020)	(0.020)
De-reserved$_{\text{it}}$ × P&M 5 - 10	0.028	0.036	0.030**	0.027*	-0.031	-0.030
	(0.045)	(0.045)	(0.015)	(0.014)	(0.023)	(0.023)
De-reserved$_{\text{it}}$ × P&M > 10	0.036*	0.042**	0.006	0.007	0.029**	0.031**
	(0.020)	(0.018)	(0.007)	(0.006)	(0.013)	(0.012)
Observations	171,668	171,670	135,354	135,354	170,881	170,883
R-squared	0.907	0.906	0.799	0.797	0.872	0.871
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	-	Yes	-	Yes	-
Industry-time trend	-	Yes	-	Yes	-	Yes

Notes: The K/L represents the capital-labor ratio, defined as the ratio of gross capital (closing) to total employees. The "Skill-intensity" is the ratio of regular workers' real wages to a firm's total real wages. De-reserved$_{\text{jt}}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. P&M (classified) is the pretreatment average investment in Plant and machinery measured in INR millions. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Welfare Gains from Product De-reservation

	Aggregate	Price (p)	Quality (λ)	Variety (γ)
Panel A: Treated				
τ^{CES}_{t+1}	0.217	1.337	0.412	0.394
$1-\tau^{\text{CES}}_{t+1}$	78.3%	-33.7%	58.8%	60.6%
$\text{Share}_{k\in(p,\lambda,\gamma)}$	100%	-19.0%	58.0%	60.9%
Δ Consumer Surplus	3.60 E_{t+1}	-0.25 E_{t+1}	1.42 E_{t+1}	1.53 E_{t+1}
Panel B: Control				
Full control				
τ^{CES}_{t+1}	0.724	1.376	0.801	0.656
$1-\tau^{\text{CES}}_{t+1}$	27.6%	-37.6%	19.9%	34.4%
$\text{Share}_{k\in(p,\lambda,\gamma)}$	100%	-98.8%	68.7%	1.30%
Δ Consumer Surplus	0.38 E_{t+1}	-0.27 E_{t+1}	0.24 E_{t+1}	0.52 E_{t+1}
Restricted control				
τ^{CES}_{t+1}	0.630	1.501	0.622	0.675
$1-\tau^{\text{CES}}_{t+1}$	37.0%	-50.1%	37.8%	32.5%
$\text{Share}_{k\in(p,\lambda,\gamma)}$	100%	-87.9%	1.02%	85.0%
Δ Consumer Surplus	0.58 E_{t+1}	-0.33 E_{t+1}	0.60 E_{t+1}	0.48 E_{t+1}

Notes: This table presents the aggregate welfare gains and their decomposition into price, quality, and variety channels. $\tau^{\text{CES}}_{\mathcal{J},t+1}$ is the price index based on CES preferences. $1-\tau^{\text{CES}}_{\mathcal{J},t+1}$ represents the percentage change in base prices required to make consumers as well off as they are in the post-period. $share_k$ is the contribution of each component to the total change in price index. We also measured a counterfactual price index for a restricted control sample, where we kept those 4-digit products that were unreserved but belonged to an industry (3-digit ASICC codes) where at least one product was reserved.

Appendix A

Figure A1: Number of 5-digit ASICC Products Dereserved over the Years in our Estimation Sample

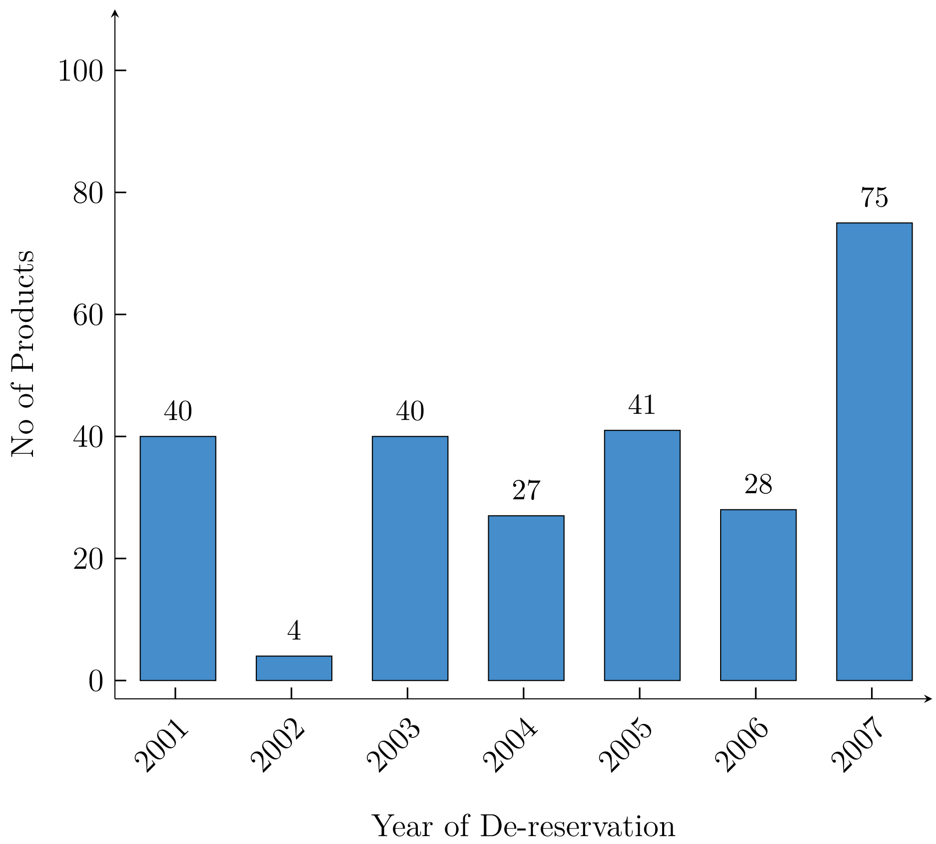


Table A1: Evolution of Investment limit of SSI Industries

Year	Investment Limits	Additional Condition
1950	Up to Rs. 0.5 million in fixed assets	Less than 50/100 persons with or without power
1960	Up to Rs. 0.5 million in fixed assets	No condition
1966	Up to Rs. 0.75 million in plant and machinery	No condition
1975	Up to Rs. 1 million in plant and machinery	No condition
1980	Up to Rs. 2 million in plant and machinery	No condition
1985	Up to Rs. 3.5 million in plant and machinery	No condition
1991	Up to Rs. 6 million in plant and machinery	No condition
1997	Up to Rs. 30 million in plant and machinery	No condition
1999	Up to Rs. 10 million in plant and machinery	No condition

Source: Mohan (2002)

Table A2: Number of SSI Products Reserved and Dereserved Under SSI Reservation Policy

Year	Number Products Reserved At Beginning of Year	Number Products De-Reserved During the Year	Number of Products Still Reserved at End of Year
1997	1045	15	1030
1998	1030	0	1030
1999	1030	9	1021
2000	1021	0	1021
2001	1021	15	1006
2002	1006	51	955
2003	955	75	880
2004	880	85	795
2005	795	108	687
2006	687	187	500
2007	500	253	247
2008	247	225	22
2009	22	0	22
2010	22	2	20
2015	20	20	0

Note: This table reports all SSI products that were reserved and then gradually dereserved from 1997 to 2015.
Source: Martin et al. (2017)

Table A3: SSI and ASI Product Classification

SSI Product Code	SSI Product Description	ASI Product Code	ASI Product Description
202501	Pickles & chutneys	13532	Chutneys
20530101	Biscuits	13401	Biscuit, cookies
271001	Sawn timber	51105 51107	Timber/wooden planks, sawn/resawn Sawn timber posts / squares
292001	Leather garments	44202	Garments, leather
30350101	Polyethylene films with thickness less than 0.10 mm except co-extruded film cross linked polymer films and high density molecular films	42405	Film, polythene
315102	Cashew shell oil	12114	Cashewnut shell liquid
31922030	Sodium nitrate-lab.	31331	Sodium nitrate
340101	Steel almirah	71501	Almirah, steel
340403	Cocks and valves–water pipe fittings	71362	Sanitary fittings, iron/steel
353134	Rice and dal mill machinery	76235	Rice mill machinery
36420101	Radio/car radio–low cost up to Rs. 250 each	78237	Radio

Source: Martin et al. (2017)

Table A4: SSI, Industry, and ASI Product Classification

SSI Code	SSI Description	Industry Code	Industry Description	ASI Code	ASI Description
204200	Rice milling	15312	Rice milling	12311 12312 12315 12317 15312	Rice, par-boiled Rice raw excl. basmati Rice, basmati Rice, broken Bran, rice
224302	Synthetic syrups	15542	Manufacture of synthetic flavored concentrates and syrups	13971 13977	Essence/flavour used in food products Concentrates/emulsion used in food products
260101 260102 260103 260104 260106 260199	Cotton cloth knitted Cotton vests knitted Cotton socks knitted Cotton undergarments knitted Cotton shawls knitted Other cotton knitted wears	17301	Manufacture of knitted and crocheted cotton textile products	63323 63348 63437	Knitted fabrics, cloth, cotton Hosiery knitted cloth, cotton Garments, knitted-cotton

Source: Martin et al. (2017)

Appendix B

Table B1: The Impact of De-reservation on Product Quality across Firm Size (Employment)

VARIABLES	(1) Quality	(2) Quality
De-reserved$_{\mathrm{jt}}$ × Q^1	0.129	0.197
	(0.206)	(0.227)
De-reserved$_{\mathrm{jt}}$ × Q^2	0.311*	0.262
	(0.165)	(0.163)
De-reserved$_{\mathrm{jt}}$ × Q^3	0.445**	0.385**
	(0.204)	(0.191)
De-reserved$_{\mathrm{jt}}$ × Q^4	0.639**	0.644**
	(0.301)	(0.295)
Observations	233,362	233,363
R-squared	0.867	0.864
Year FE	Yes	Yes
Firm-Product FE	Yes	Yes
Industry × Year FE	Yes	-
Industry-time trend	-	Yes

Notes: The outcome variable is the quality estimated for each firm-product combination using Khandelwal et al. (2013). De-reserved$_{jt}$ takes the value 1 in the year a product is de-reserved and all subsequent years, and 0 otherwise. **The firm size quartiles (Q) are measured using total employees** at the base year. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B2: The Impact of De-reservation on Product Quality across Firm Productivity

VARIABLES	(1) Quality	(2) Quality
De-reserved$_{\text{it}}$ × Q^1	0.164	0.135
	(0.218)	(0.215)
De-reserved$_{\text{it}}$ × Q^2	-0.152	-0.087
	(0.188)	(0.193)
De-reserved$_{\text{it}}$ × Q^3	0.515***	0.607***
	(0.195)	(0.198)
De-reserved$_{\text{it}}$ × Q^4	0.859**	0.839**
	(0.357)	(0.353)
Observations	233,350	233,351
R-squared	0.867	0.865
Year FE	Yes	Yes
Firm-Product FE	Yes	Yes
Industry × Year FE	Yes	-
Industry-time trend	-	Yes

Notes: The outcome variable is the quality estimated for each firm-product combination. De-reserved$_{jt}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. **The firm size quartiles (Q) are measured using labor productivity** at base year. Standard errors in parentheses are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B3: The Impact of De-reservation: Incumbents v. Entrants (controlling for entry year)

	Quality				Price				Product scope			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
De-reserved$_{\mathrm{jt}}$ × Incumbent	0.325*	0.329*			0.080	0.132			-0.043***	-0.031***		
	(0.184)	(0.178)			(0.098)	(0.100)			(0.011)	(0.009)		
De-reserved$_{\mathrm{jt}}$ × Entrant	0.183	0.199			-0.110	-0.082			0.169***	0.167***		
	(0.178)	(0.184)			(0.082)	(0.088)			(0.023)	(0.023)		
De-reserved$_{\mathrm{jt}}$ × Within-SSI (P&M $<$ 10) × Incumbent			0.203	0.223			0.044	0.108			-0.045***	-0.030***
			(0.191)	(0.188)			(0.110)	(0.115)			(0.014)	(0.011)
De-reserved$_{\mathrm{jt}}$ × Within-SSI (P&M $<$ 10) × Entrant			0.189	0.217			-0.110	-0.079			0.147***	0.148***
			(0.184)	(0.190)			(0.084)	(0.090)			(0.031)	(0.032)
De-reserved$_{\mathrm{jt}}$ × Over-SSI (P&M $>$ 10) × Incumbent			0.663**	0.680***			0.190	0.219**			-0.039***	-0.032**
			(0.270)	(0.257)			(0.117)	(0.111)			(0.014)	(0.013)
De-reserved$_{\mathrm{jt}}$ × Over-SSI (P&M $>$ 10) × Entrant			0.051	-0.072			-0.121	-0.131			0.200***	0.194***
			(0.570)	(0.592)			(0.208)	(0.239)			(0.032)	(0.031)
Observations	233,422	233,423	233,422	233,423	227,743	227,744	227,743	227,744	148,111	148,116	148,111	148,116
R-squared	0.867	0.865	0.867	0.865	0.912	0.909	0.912	0.909	0.849	0.847	0.850	0.847
Entry Year × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes		Yes		Yes		Yes		Yes		Yes	
Industry-time trend		Yes		Yes		Yes		Yes		Yes		Yes

Notes: All outcome variables are in logarithmic form. De-reserved$_{\mathrm{jt}}$ takes a value of 1 for the year product dereserved and all subsequent years, and 0 otherwise. Over and Within SSI refers to the firms above and below the 10 million investment in plant and machinery. An Incumbent is a dummy for the firms that produce a dereserved product before it is dereserved. Entrants are firms that entered the dereserved product space after dereservation. For the outcome variable product scope, the treatment status is defined at the firm level, i.e., $De\text{-}reserved_{it}$, which takes a value of 1 in the year a firm's first product is dereserved and in all subsequent years, and 0 otherwise. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B4: The Impact of De-reservation on Product Quality (controlling for entry year)

VARIABLES	(1) Quality	(2) Quality	(3) Quality	(4) Quality	(5) Quality
$\text{De-reserved}_{\text{jt}}$	0.334*	0.293**	0.306**	0.336	0.337*
	(0.199)	(0.149)	(0.152)	(0.205)	(0.203)
Observations	233,423	233,422	233,423	233,423	233,423
R-squared	0.839	0.850	0.847	0.845	0.845
Entry Year × Year FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	-	Yes	-	-	-
Industry-time trend	-	-	Yes	-	-
State × Year FE	-	-	-	Yes	-
State-time trend	-	-	-	-	Yes

Notes: Quality is estimated for each firm-product using Khandelwal et al. (2013). $\text{De-reserved}_{\text{jt}}$ takes the value 1 starting the year a product is de-reserved and each year after. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B5: The Impact of De-reservation on Product Quality (restricted control group)

VARIABLES	(1) Quality	(2) Quality	(3) Quality	(4) Quality	(5) Quality
$\text{De-reserved}_{\text{jt}}$	0.328	0.323*	0.325*	0.332	0.328
	(0.219)	(0.166)	(0.170)	(0.225)	(0.223)
Observations	145,317	145,299	145,316	145,317	145,317
R-squared	0.858	0.871	0.866	0.859	0.858
Year FE	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	-	Yes	-	-	-
Industry-time trend	-	-	Yes	-	-
State × Year FE	-	-	-	Yes	-
State-time trend	-	-	-	-	Yes

Notes: Quality is estimated for each firm-product using Khandelwal et al. (2013). $\text{De-reserved}_{\text{jt}}$ takes the value 1 starting the year a product is de-reserved and each year after. We have controlled for the event-time variable (τ_{jt}) in all specifications. Following a counterfactual price index calculation using a restricted control sample, we restrict the sample to those 3-digit ASICC groups where some products were underserved. Standard errors in parentheses are clustered at the product level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B6: Robustness to Alternative Quality Measures

VARIABLES	(1) Quality $\sigma = \sigma_k$	(2) Quality $\sigma = \sigma_k$	(3) Quality $\sigma = 3.7$	(4) Quality $\sigma = \sigma_k$	(5) Quality $\sigma = \sigma_k$	(6) Quality $\sigma = \sigma_{ijt}$ Forlani et al. 2023
			Khandelwal et al. (2013)			
De-reserved$_{\mathrm{jt}}$	0.293**	0.392*	0.117	0.678***	0.267*	4.996**
	(0.149)	(0.205)	(0.100)	(0.149)	(0.148)	(2.405)
Observations	2,33,422	2,33,422	2,33,422	2,29,411	2,33,422	80,302
R-squared	0.855	0.878	0.724	0.920	0.635	0.667
Details	Original	Alternate IV	σ from Broda et. 2006		Year, Firm, Product FE	Variable markups
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the firm level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B7: Placebo Test: Impact of Product De-reservation on Product Quality

VARIABLES	(1) Quality
De-reserved$_{\mathrm{jt}}$	0.290*
	(0.147)
De-reserved$_{\mathrm{jt}}$ (placebo)	0.347
	(0.249)
Observations	233,422
R-squared	0.867
Year FE	Yes
Firm x Product FE	Yes
Industry × Year FE	Yes

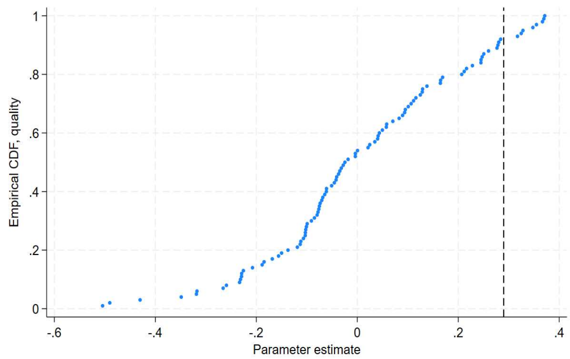
Notes: De-reserved$_{jt}$ takes a value of 1 for the year a product is dereserved and all subsequent years, and 0 otherwise. "De-reserved$_{jt}$ (placebo)" identifies the impact of randomly assigned dereservation across the available set of products. We have controlled for the event-time variable (τ_{jt}) in all specifications. Standard errors in parentheses are clustered at the product level. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table B8: Summary of 100 Placebo Runs

Variables	Insignificant	+ Significant	- Significant
Quality	92	5	3

Notes: The above table reports the number of significant and insignificant estimates at a 5 percent significance level, based on 100 iterations of placebo regressions

Figure B2: CDF of Quality Effect from Placebo Runs



Notes: The cumulative distribution function (CDF) of 100 iterations of placebo. The vertical dotted lines represent the true estimate of the impact of dereservation on product quality.