Globalization and Corporate Succession: Evidence from Dismantling India's Import License Raj*

Ananya Kotia†

February 10, 2025

Abstract

I explore how a previously unstudied, product-specific import competition shock, affecting over a third of Indian manufacturing, impacted the management structures of exposed firms. The shock followed a WTO ruling mandating India to remove quantitative restrictions (import bans) on imports from over 3,000 HS 8-digit products between 1998 and 2001. This paper examines how import competition drives firms to make changes in their top management that enhance within-firm productivity, providing a complementary perspective to studies focused on the reallocation of resources from less to more productive firms. Specifically, I examine management turnover within family firms in India, which represents the predominant form of corporate governance in many developing countries. Leveraging novel manager-firm matched data from 1.3 million Indian firms and 6.5 million top managers, I employ an event study design to examine how import competition affects top management appointments. Preliminary findings indicate that exposed firms are more likely to replace family managers with professionals, leading to increased productivity. These findings also shed light on the broader question of X-efficiencywhy firms in more competitive markets exhibit higher productivity. Understanding the mechanisms behind the relationship between competition and firm productivity has implications across various economic applications.

Keywords:
JEL Codes:

*I am deeply grateful to my advisors, Clare Balboni, Oriana Bandiera, Robin Burgess, and Ben Moll for their unwavering guidance and support throughout this project. A special thanks to Utkarsh Saxena for his constant feedback and encouragement throughout the project. For very helpful discussions and suggestions, I would also like to thank Daron Acemoglu, Treb Allen, David Atkin, Nick Bloom, Dave Donaldson, Teresa Fort, Amit Khandelwal, Isabela Manelici, Adrien Matray, Dmitry Mukhin, Vishan Nigam, Raffaella Sadun, Thomas Sampson, Jose Vasquez, and participants at the Globalization Seminar at Dartmouth College, Economic Growth and Development Conference at the Indian Statistical Institute, LSE development, macro, and international seminars for valuable suggestions and comments. Naila Fatima and Bharat Singhal provided excellent research assistance. I gratefully acknowledge financial support from the International Growth Centre (IGC) and Private Enterprise Development in Low Income Countries (PEDL).

†Department of Economics, London School of Economics. a.kotia1@lse.ac.uk.

1 Introduction

Globalization and import competition have long been recognized as powerful forces that enhance firms' productivity. As Marshall (1926) observed, many firms delay productivity improvements until external pressures compel them *"to exert themselves to the utmost to invent improved methods and to avail themselves of the improvements made by others."* A key channel through which firms can achieve higher productivity is managerial innovation and organizational change. Yet, in the absence of competitive pressures, the incentive to pursue such changes may wane. For instance, Adam Smith's observation that *"monopoly... is a great enemy to good management,"* highlights how the lack of competition can foster managerial complacency (Smith, 1776). Given today's global context– marked by a retreat from free trade and an increased emphasis on protection and industrial policy– these issues remain particularly relevant.

In this paper, I examine how globalization and import competition influence within-firm productivity. In particular, I explore how trade affects the organization and management of firms in developing countries and investigate the aggregate consequences of these trade-induced productivity changes. In particular, I focus on the management structures of family-managed firms, the predominant form of corporate governance in much of the developing world.

Existing research has not yet provided a conclusive answer to these questions, largely due to a mix of data limitations, empirical challenges, and theoretical constraints. A primary obstacle is the need for detailed data on a firm's *internal organization*; most firm-level datasets concentrate on balance sheet and financial variables, leaving information on organizational structure and management composition scarce. Moreover, identifying exogenous variation in competitive pressures across product markets is challenging. Even policies like trade liberalizations often generate export opportunities for domestic firms or occur alongside domestic reforms, thereby complicating efforts to isolate the impact of competition. In addition, the literature on trade-induced productivity improvements has predominantly focused on production-side adjustments– such as changes in imported inputs (Amiti and Konings, 2007; Topalova and Khandelwal, 2011) or shifts in product scope (Bernard et al., 2011)– while, with the notable exception of Chen and Steinwender (2021), relatively little attention has been devoted to how managerial incentives and organizational structures respond to trade shocks. Finally, on the theoretical side, classical price theory leaves no room for competition-induced improvements in productivity: there is no possibility for internal reallocation of resources within a firm that is already operating optimally (Stigler, 1976).

I address these challenges by exploiting a previously unstudied product-level import shock in India. By combining it with a newly assembled, rich manager-firm matched microdata, I estimate event studies to provide a direct assessment of how trade shocks affect firms' production, organization, and productivity. I then develop a simple model that explains the mechanisms through which import competition may lead to reorganization, and hence productivity improvements within the firm. The theoretical framework also enables me to quantify the impact of within-firm productivity changes on aggregate TFP.

The foundation of my empirical analysis is a natural experiment stemming from the dismantling of India's Import License Raj in the late 1990s and early 2000s. This regime

was among the most extensive protectionist policies ever implemented, effectively banning imports of consumer goods since the mid-1950s. Although the 1991 reforms significantly reduced tariff and non-tariff barriers for intermediate goods, non-tariff measuresin the form of quantitative restrictions (QRs)remained on virtually all final consumer goods, accounting for roughly 30 percent of all tariff lines until 2001.

These protections were enabled by specific provisions in the GATT Articles that permitted developing countries to impose QRs to safeguard their external financial stability. For nearly half a century, these QRs insulated Indian manufacturing firms from foreign competition. However, in the late 1990s, the United States challenged India's continued use of these provisions by approaching the WTO, arguing that India's growing foreign reserves no longer justified such measures. Joined by several other countries, this challenge culminated in a WTO rulingbased on an independent IMF assessment affirming India's robust external positionthat required the removal of QRs on balance-of-payments grounds across all goods. Consequently, nearly 3,000 goods at the HS 8-digit level, primarily final consumer goods, were liberalized.

Several features make this policy ideal for analysis. First, the QR removal was externally imposed, with its timing and scope determined by the WTO and supported by an independent IMF assessment, minimizing domestic political or strategic influences. Second, unlike the comprehensive domestic reforms of 1991, the late-1990s QR removal occurred in relative isolation, reducing confounding effects and strengthening causal attribution to the policy change. Third, by targeting final consumer goods, the reform generates quasi-experimental variation in import competition, enabling the use of an event study design. The focus on consumer goods also ensures that the primary mechanism at work is a demand shock stemming from heightened import competition in consumer goods markets rather than cost reductions from cheaper intermediate inputs. Finally, as a unilateral trade liberalization measure, it enhanced foreign access to the Indian market without concurrently improving export conditions for domestic firms, further isolating the impact of increased import competition.

The data construction for this paper is built on three novel sources that are integrated with CMIE Prowess– a comprehensive database covering large and medium-sized listed and unlisted Indian firms, with detailed firm-level data such as balance sheets and product information. In the first step, I digitized archival documents from the Ministry of Commerce to create a detailed dataset of products subject to quantitative restrictions (QRs), capturing the exact dates of their removal. This process enabled me to construct a novel HS 8-digit product-level database that chronicles QRs in India during the 1990s and their subsequent removal in the late 1990s and early 2000s.

A critical challenge arose from the fact that government notifications on QRs use HS product codes, which differ from the product nomenclature in CMIE Prowess. To address this, in the second step I developed a novel concordance linking almost 3000 HS 8-digit codes to over 6,000 product categories in Prowess, thereby providing a precise measure of a firm's exposure to import competition– determining whether a firm produces an affected product. Unlike previous studies that typically define exposure at broad industry levels– largely due to data constraints and the lack of detailed concordances– this approach identifies which firms produce the affected products directly, offering a much more granular and accurate measure of the import competition they face.

Finally, I obtained access to unique administrative data from the Ministry of Corporate Affairs (MCA), which includes records on over 6 million board of directors with complete tenure histories dating back to the 1970s. Notably, while researchers studying family firms often rely on last-name matching to infer family ties–a method that can be imprecise in the Indian context, where last names may signal caste rather than familial relationships–this dataset includes managers' fathers' names, enabling a more accurate identification of family connections within firm boards. By merging these administrative records with the Prowess data, I build a comprehensive dataset that captures firm production, product scope, and internal organizational structures– paving the way for a rigorous analysis of how the trade shock impacted firm operations, size, and most significantly their internal organization and management structures.

The empirical analysis proceeds in three steps. First, I study aggregate HS-6 digit import and export data from the Indian customs to estimate the direct impact of QR removal on import competition in India. The event-study analysis reveals that, following the reform, treated products experienced a dramatic and persistent surge in imports– both in value and quantity. By the third year, the import value for products affected by the policy exceeded that of the control group by over 50 percent, while import quantities increased by roughly 1 log point, equivalent to over 150 percent. Notably, these changes were observed only for imports, as export outcomes remained largely unaffected, underscoring the unilateral nature of the reform.

At the firm level, the intensified import competition precipitated significant contractions in domestic firms' financial performance and scale. Firms producing QR-affected goods experienced sharp declines in total revenues relative to firms in the control group– about 20 percent by the third year and nearly 50 percent by the eighth year post-reform– accompanied by substantial reductions in operating profit margins. The shock also triggered a persistent decline in cost components, including labor and raw materials expenses, reflecting a systematic cutback in operations. These reductions translated into notable contractions in firm size, with treated firms' total assets falling by approximately 10 percent initially and nearly 30 percent over time. Importantly, these financial and scale adjustments were not solely driven by firm exit, as similar patterns emerge even when analyses are restricted to surviving firms.

Beyond the measurable contractions in firm scale and financial performance, the QR removal catalyzed a marked transformation in managerial turnover and corporate governance of family-managed firms who were exposed to import competition. Faced with deteriorating financial performance, these firms began to reconfigure their top management structures. The evidence shows a clear reduction in the share of family members on executive boardsdropping by almost 10 percentage points within a few years– with a corresponding increase in non-family professional managers. This managerial turnover was especially pronounced among firms that were less productive prior to the reform, indicating a selective move towards professionalization where it was most needed. Furthermore, firms that replaced family managers with external professionals experienced significant improvements in productivity, with revenue and quantity productivity measures diverging positively from those that retained family-dominated management. This correlation between professionalizing management and productivity enhancements is *suggestive* of the role that external managerial talent may play in enabling firms to effectively respond to heightened import competition, unlocking latent efficiencies and driving long-term performance improvements. Concurrently,

these professionalizing firms also reduced their average output prices, suggesting that the adoption of external expertise was correlated with cost-cutting.

These results sheds light on the broader question of "X-efficiency"– why firms in more competitive markets exhibit higher productivity. The mechanisms behind the correlation between productivity and competition, called "X-efficiency;; by Leibenstein (1966), are poorly understood (Backus, 2020). Understanding the mechanisms behind the relationship between competition and firm productivity has implications across various economic applications.

To interpret these empirical findings and quantify the impact of these micro-firm adjustments, I develop a simple model of industrial equilibrium in which managerial delegation to external professionals takes center stage. I consider a closed economy operating under monopolistic competition, where firms produce differentiated products that together form a composite final good. Each firm begins as a family firm, with entrepreneurs enjoying non-monetary private benefits from retaining family control over management. For example, an entrepreneur may derive pleasure if their children or siblings run the firm. Such amenity potential of family control of firm management has a long tradition in the corporate finance literature (Demsetz and Lehn, 1985; Burkart et al., 2003; Bertrand and Schoar, 2006). Naturally, the firm mat only enjoy such private benefits as long as the firm is alive. IF the firm exits, the firm's owner looses any private benefits associated with running a family firm. A firm can choose to delegate its management to external professionals– a decision that boosts its productivity by some constant multiplier. However, delegation comes at a cost: the firm's owner looses all private benefits associated with running the family as a family firm. Delegation is also irreversible: once a firm professionalized, it cannmot go back to being a family firm.

The model predicts a dual selection mechanism into delegation that hinges on the firm's baseline productivity. Specifically, ex-ante low-productivity firms– hereafter referred to as *laggards*– delegate management primarily as a *survival mechanism*, because their weak performance might otherwise force them to exit the market. This form of negative selection arises when the urgency to remain viable outweighs the benefits of retaining family control. In contrast, ex-ante high-productivity firms–termed *frontier firms*– find delegation attractive through an *efficiency-boosting mechanism*, whereby the gains from professional management further enhance their already high level of productivity, as in Bustos (2011). Firms with intermediate productivity levels, however, tend to retain family management since the incremental benefits of delegation do not fully compensate for the loss of valuable non-monetary private benefits.

Import competition alters firms' incentives to delegate in a heterogeneous manner. For laggard firms, survival becomes even more challenging as increased competition erodes profits, prompting them to cede managerial control to professional managers to avoid complete failure. Although this shift entails the loss of cherished family benefits, it is essential for preserving the firm. Conversely, for frontier firms, delegation becomes less appealing under the trade shock, as lower profits make it difficult to justify the fixed costs associated with professional management. Thus, the model predicts that the least productive family firms are most likely to delegate management in response to the trade shock– a pattern that is precisely mirrored in the empirical data.

Contribution to the Literature: The remainder of the paper is organized as follows. Sections 2 and 3 provide the details o the policy setting and data construction, setting the stage for the event study analysis. Section 4 lays out the empirical strategy and Section 5 presents event study results. Section **??** introduces the theoretical framework. Section **??** concludes.

1. within firm trade impact
2. org/productivity literature on management slack and x-efficiency
3. management literature on high returns to management practices
4. family firms — trade (Atkin and Khandelwal, 2020)
5. family firms in general – check finance

2 Policy Background

In 1947, following independence from British rule, Indias economic planning was characterized by a strong desire for self-reliance and minimal dependence on the West for its development objectives. A key outcome of this strategy was the implementation of a comprehensive import substitution and licensing regime, which involved direct control over foreign exchange utilization by Indian firms and households. A balance of payments (BOP) crisis in 1957 further intensified these import controls. Instead of relying on price controls such as tariffs, the Indian government employed quantitative restrictions (QRs) as its main policy instrument. A small group of bureaucrats in Delhi was responsible for allocating scarce foreign exchange across different sectors of the economy and among firms within each industry.[1] Imports of consumer goods were even more heavily regulated and virtually eliminated (Bhagwati and Srinivasan, 1975; Krueger, 2010). A complex web of overlapping agencies responsible for certifications and license issuance managed this process. During this period, there was a lucrative premium on import licenses, and foreign consumer goods were essentially absent from the market.

The framework of India's restrictive trade practices, particularly the use of QRs, was facilitated by specific exceptions within international trade agreements. Although the General Agreement on Tariffs and Trade (GATT) fundamentally prohibited QRs under Article XI, it provided crucial exceptions that India utilized. Article XVIII:B of the GATT allowed countries in the "early" stages of development to impose QRs to *"safeguard [their] external financial position and ensure a level of reserves adequate for the implementation of their program of economic development"*.[2] India utilized this provision of Article XVIII:B to support its QR regime since 1957 (Pursell and Sattar, 2004).

2.1 India's First Generation Trade Reform (1991)

By the 1980s, it was evident that Indias regime of import-substituting industrialization had failed, yielding a per capita economic growth rate of only 1.7 percent. Although growth accelerated in the 1980s, India's public debt steadily increased throughout the decade, rendering its macro-fiscal situation vulnerable. The rising debt was exacerbated by a spike in oil prices during the Gulf War and a decline in remittances from workers in the Middle East, leading to a downgrade in India's credit rating. By 1991, India was on the brink of default. Consequently, India approached the International Monetary Fund (IMF) for emergency financing and agreed to implement macroeconomic stabilization and structural reforms.

The structural reforms of the early 1990s extended well beyond the scope of the IMF program (Krueger, 2010; Ahluwalia, 2019) and impacted several spheres of the economy. Revisions to the industrial licensing regime facilitated firm entry and capacity expansion, private firms were permitted to enter sectors previously reserved for state-owned enterprises, and foreign direct investment was eased in several industries.

[1] For instance, firms could only obtain an import license if they demonstrated that their imports were essential for production and that the imported product was not manufactured domestically (Bhagwati and Srinivasan, 1975; Pursell and Sattar, 2004).

[2] For details, see https://www.wto.org/english/tratop_e/bop_e/bop_e.htm, accessed July 30, 2024.

In terms of trade policy, the exchange rate was devalued by over 20 percent, and both quantitative restrictions and tariffs were eased on *intermediate and capital goods*. With the removal of quantitative restrictions, tariffs became the primary restrictions on imports of these goods. Average tariffs were reduced from over 80 percent in 1990 to 36 percent by 1996 (Topalova, 2010). Several papers have studied the various impacts of these tariff reductions (Hasan et al., 2007; Topalova, 2010; Goldberg et al., 2010b; Topalova and Khandelwal, 2011).

Despite these reforms, India continued to impose stringent QRs on almost all consumer goods and a small number of intermediate products– almost 3000 products at the 8-digit HS level or 30 percent of all tariff lines (Panagariya, 2004). India justified these QRs under Article XVIII:B of the GATT, asserting that they were necessary to safeguard its external financial position due to inadequate foreign exchange reserves. QRs on consumer products were lifted a decade later and are the focus of this paper. One of the challenges in evaluating the impact of the 1991 trade reforms is precisely that they were implemented as part of a broad-based structural reform package. This makes it difficult to attribute post-policy changes in data to trade policy. While tariff changes were product-specific, as Topalova and Khandelwal (2011) note, there may be considerable complementarity between sectors that saw the highest tariff reductions and industries that benefited from other industrial reforms such as those mentioned above. This concern is less relevant to the removal of QRs during Indias second generation of reforms in the late 1990s and early 2000s, as I will argue in the next section

2.2 Second Generation Trade Reform (1998-2001): Removal of Quantitative Restrictions (QRs)

While there are many studies on how India's 1991 liberalization affected various aspects of the Indian economy, there is virtually no work on the impact of continuing QRs on over 30 percent of tariff lies and the impact of their eventual removal a decade later. This is surprising given that even after the 1991 reforms, over two-thirds of India's tradable GDP remained protected by some kind of non-tariff import restrictions, most commonly QRs (Pursell and Sattar, 2004).

From 1998-2001, these remaining QRs were also removed. The impulse of this policy was external to India. In July 1997, the United States requested consultations with India under the World Trade Organization's (WTO) Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU) to challenge India's QRs as being inconsistent with WTO obligations. In the following months, the US was joined by the European Communities, Switzerland, Australia, Canada, and New Zealand, leading the WTO Dispute Settlement Body to set up a panel to examine the validity of India's QRs in November 1997.The panel submitted its report a year later in December 1998. The panel ruled that India's foreign exchange reserves are adequate and "not facing a serious decline or threat" and concluded that India's QRs therefore do not constitute permissible "necessary" measures to address a weak BOP situation under Article XVIII:B.It further recommended that India remove *all* QRs that it maintains under Article VIII:B. Subsequently, India and the US mutually agreed for a phase-out plan where India agreed to remove all its outstanding BOP-related QRs by April 1, 2001.

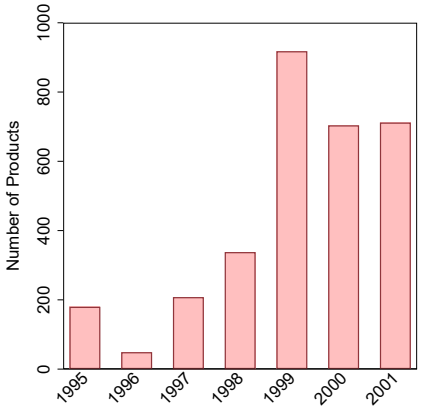
Two features of the institutional procedure leading to the removal of India's QRs have

important implications for the empirical strategy outlined in Section 4. First, India's case for maintaining QRs under Article XVIII:B largely hinged on showing that its BOP situation was vulnerable. For such an assessment, instead of relying on materials submitted by the disputing countries, the WTO relies almost exclusively on the independent determination of the International Monetary Fund (IMF), which is a permanent invitee in all Article XVIII consultations.[3] The IMF held that India is well placed to manage its external financial situation and that its reserves are adequate to remove all existing QRs over a relatively short period. Because the IMF was called upon to conduct this technical assessment, it is unlikely that this externally imposed policy reform was influenced by politicians or policymakers in either India or any of the disputing countries.

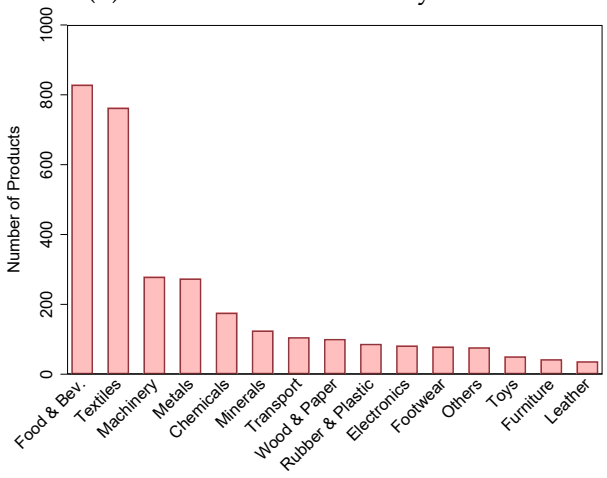
The second noteworthy feature of this policy is that the single technical assessment by the IMF applied uniformly to almost 3000 products on which India maintained QRs based on India's aggregate BOP position. It was an all-or-nothing approach. Neither the United States could selectively target certain products for the removal of QRs, nor could India selectively retain QRs on specific products. The policy did not allow for any selective application or exemptions. Consequently, India's loss in this dispute resulted in the removal of QRs on almost 3000 products across the board.

Figure 1: Composition of Liberalised Products By Year and Sector

(a) Liberalised Products by Year



(b) Liberalised Products by Sector



Notes: The figure displays the number of products that were liberalized over time (panel a) and across different sectors (panel b), based on a dataset created by digitizing archival policy documents from the Ministry of Commerce, Government of India, as outlined in Section 3. *Source:* Ministry of Commerce, Government of India.

[3]According to Article XV:2 of the GATT, *"... the contracting parties shall accept all findings of statistical and other facts presented by the IMF relating to foreign exchange, monetary reserves and balances of payments, and shall accept the determination of the Fund as to whether action by a contracting party in exchange matters is in accordance with the Articles of Agreement of the International Monetary Fund, or with the terms of a special exchange agreement between that contracting party and the contracting parties. The contracting parties in reaching their final decision in cases involving the criteria set forth in paragraph 2 (a) of Article XII or in paragraph 9 of Article XVIII, shall accept the determination of the Fund as to what constitutes a serious decline in the contracting party's monetary reserves, a very low level of its monetary reserves or a reasonable rate of increase in its monetary reserves, and as to the financial aspects of other matters covered in consultation in such cases."*

3 Data

The primary data source is the CMIE Prowess, which covers a substantial portion of Indias formal economic activity and includes detailed firm data, such as balance sheets and product information. A unique feature of Prowess is that it provides data on each firm's board of directors, including their names, a unique registration number, designation, and tenure. This dataset is enriched with three novel datasets:

Novel Dataset on Product-level Quantitative Restrictions in India. I digitized archival documents from the Ministry of Commerce, Government of India to create a detailed dataset of products under QRs, including the exact removal dates. Figure A1 in Appendix A.2 shows an example of such a policy document.

Trade Dx Data.

Novel Product Concordances. The government notifications on QRs use product codes according to the HS product nomenclature. Unfortunately, CMIE Prowess does not use the same product codes. To identify firms in Prowess that produce liberalized consumer goods, I construct a novel concordance of detailed HS-8 digit products to the product nomenclature followed by CMIE Prowess.

Administrative Data on Manager Family Ties. Finally, I obtained access to novel administrative data from the Ministry of Corporate Affairs (MCA), Government of India, on over 6 million managers in formal Indian firms. Crucially, this dataset features managers' fathers' names, facilitating the identification of family ties within firm boards. For example, the board of directors of Cosco India Ltd., depicted in Table 1[4], includes directors A Jain, M Jain, and P Jain, who are confirmed as brothers through their father DK Jain, who is also on the board. Alongside them are NK Jain, DK's brother, and N Jain, DK's nephew. This data allows the analysis of family presence on firm boards and the extent of familial relationships among board members.

[4]The initial and middle names have been abbreviated to be concise.

Table 1: Family Ties Among the Board Members and Top Managers of an Indian Firm

Name	Executive Member	Sex	Father's Name
A Jain	Yes	M	D K Jain
M Jain	Yes	M	D K Jain
P Jain	Yes	M	D K Jain
V K Sood	No	M	H R Sood
D K Jain	Yes	M	K L Jain
N K Jain	Yes	M	K L Jain
N Jain	Yes	M	N K Jain
M P Gupta	No	M	P D Gupta
S Sharma	No	M	R K Sharma
R Jain	No	F	S Raj
M L Mangla	No	M	T Chand

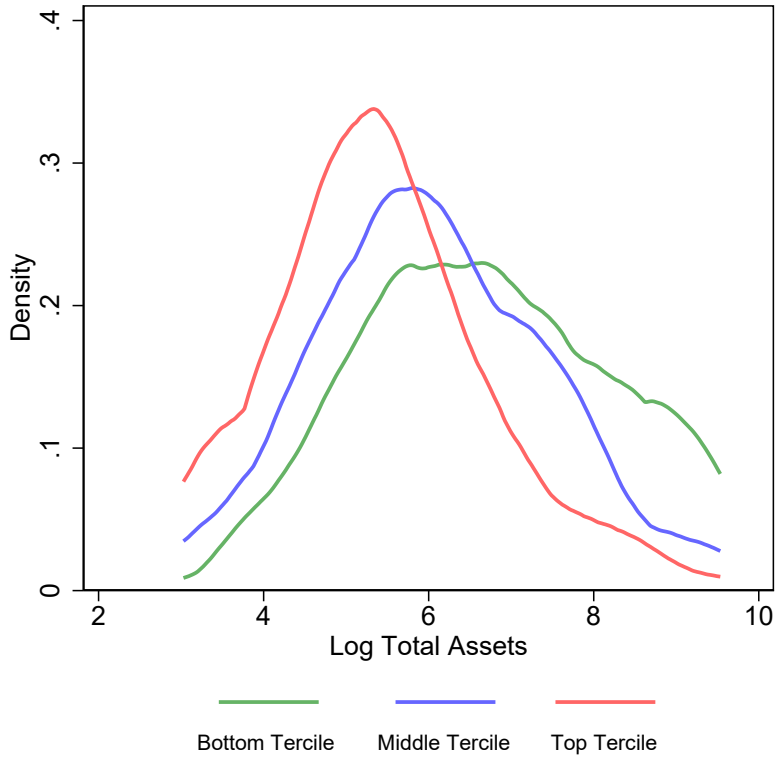
Notes: The table shows the directors of an example Indian firm, Cosco (India) Ltd, a sports goods producer. It lists all board members of Cosco from 2000 to 2010, illustrating the board's domination by the Jain family. The second column presents the name of each director (with first and middle names abbreviated for brevity), and the third column indicates whether the individual is on the executive board, i.e., top management positions like CEO, CFO, MD, etc. The final column includes the father's name of each person, allowing the identification of family ties among board members within the same firm. *Source:* CMIE Prowess and Ministry of Corporate Affairs, Government of India.

Table 2: Summary Statistics

	Obs	Mean	p10	p50	p90
Treated Firms (%)	83,715	0.50	0	0	1
Company Age	83,715	26.99	7	21	56
Wages	82,734	209.50	0	21	310
Gross Fixed Assets	82,056	2307.04	20	213	2618
Revenues	82,734	3431.10	1	365	4473
Expenses on Raw Materials	82,734	1400.09	0	137	1822
Family Firms (%)	82,114	0.44	0	0	1
Share of Board that is Family	82,749	0.18	0	0	1

Notes: This table presents summary statistics for firms included in our analysis, using data from CMIE Prowess and the Ministry of Corporate Affairs, Government of India. "Treated Firms (%)" represents the proportion of firms in the treatment group. "Company Age" is measured in years since incorporation. "Wages" denotes the total wage bill of the firm. "Gross Fixed Assets" refers to the book value of fixed assets. "Revenues" indicate total firm revenue, while "Expenses on Raw Materials" reflect expenditures on material inputs. "Family Firms (%)" represents the proportion of firms identified as family-owned. "Share of Board that is Family" denotes the proportion of board members who belong to the controlling family. Columns represent the total observations, mean, 10th percentile, median, and 90th percentile of each variable at the firm level. *Source:* CMIE Prowess and Ministry of Corporate Affairs, Government of India.

Figure 2: Firm Size by Share of Family Members on Board

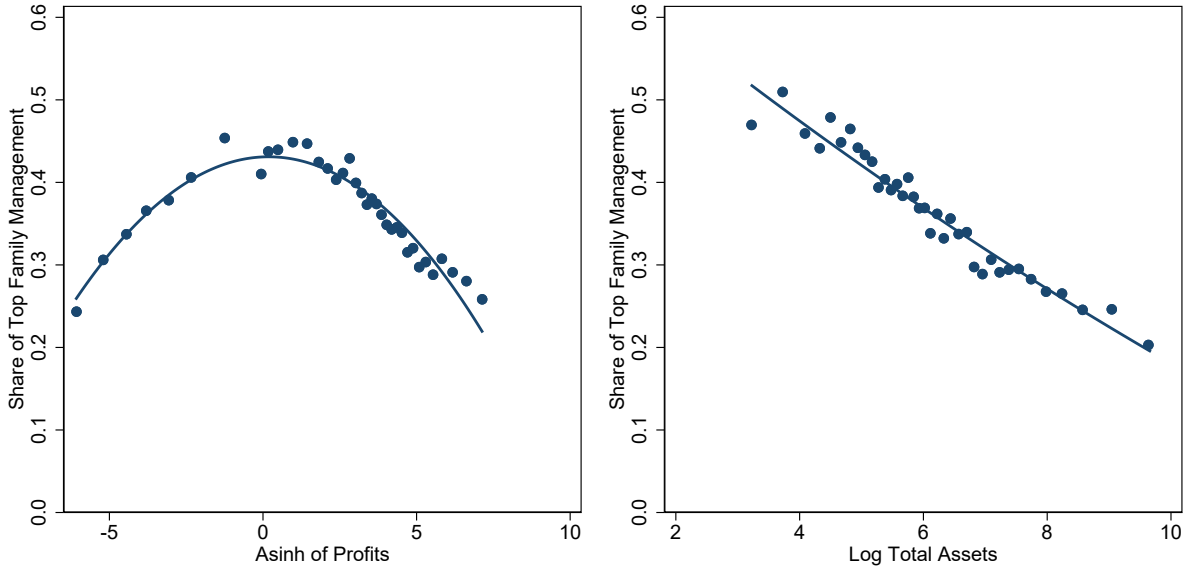


Notes: This figure depicts the distribution of firm size (log of total assets) with varying levels of share of family directors on the board of firms during the pre-policy period. Firms are grouped into terciles based on the share of family members on the board: the bottom tercile (green), middle tercile (blue), and top tercile (red). *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

Figure 3: Share of Family Members on Board by Profitability and Firm Size

(a) Firms Profits

(b) Firms Size



Notes: The figure depicts the relationship between the share of family members on a firm's board and key firm characteristics. Panel (a) plots family representation against the asinh of profits, while panel (b) plots it against the log of total assets. All regressions include industry, year, state, and listing status fixed effects. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

4 Empirical Strategy

The removal of QRs from consumer goods in 1998-2001 offers a unique opportunity to analyze the impact of import competition on firm behavior. First, the reform was product-specific, with India removing QRs on about 3000 products at the 8-digit HS level. The 8-digit HS classification provides a detailed breakdown of traded goods (about 10,000 goods in total). This quasi-experimental variation in exposure to import competition across the product space offers a natural setting for a difference-in-difference identification strategy.

Second, this policy is unusual in its primary focus on final consumer goods. Trade reforms typically affect product markets throughout the production network, influencing both intermediate inputs and final goods. Lowering import costs for intermediate goods directly reduces firm costs and may enhance firm productivity (Amiti and Konings, 2007; Goldberg et al., 2010a; Topalova and Khandelwal, 2011). However, this mechanism plays a limited role in the present case, as the QR removal primarily targeted final consumer goods. This narrower scope of the policy provides a unique opportunity to isolate and identify the impact of a specific *demand* shock– heightened import competition in consumer goods markets– on firm outcomes.

Third, the QR removal was a unilateral trade liberalization policy, granting foreign firms access to the Indian market without reducing export costs for Indian firms. Thus, the policy mainly reflects the effects of import competition, not export incentives.

Fourth, similar to the 1991 trade reform, and as discussed earlier, India's removal of QRs was externally imposed. The timing and scope of this liberalization were determined by the WTO, and critically, the IMF played a decisive role in the process. The IMFs decision to no longer allow India to rely on Article XVIII:B of the GATT was based on a technical assessment of India's external financial position. This assessment concluded that Indias foreign exchange reserves were adequate, and the decision was made independently of political or other policy considerations. This externally driven process underscores that the QR removal was not influenced by domestic policy preferences or strategic interests, providing a uniquely exogenous shock for empirical analysis.

Finally, unlike the 1991 trade reforms, which coincided with widespread domestic liberalization, the removal of QRs in the late 1990s and early 2000s occurred in relative isolation, unaccompanied by other major domestic or trade policy changes. This limited scope reduces the likelihood of confounding effects, making it easier to attribute observed changes in firm behavior to the QR removal policy.

To analyze the effects of QR removal, I employ an event study framework at two levels:

1. **Aggregate product level:** To examine how the policy influenced aggregate imports.
2. **Firm level:** To assess how firms adjusted in response to increased import competition.

The aggregate product-level analysis allows me to quantify the policy's direct effect on trade flows. The firm-level analysis investigates its implications for the financial and managerial outcomes of exposed firms. Below, I outline the empirical specifications for

each level of analysis.

Product-Level Event Studies To estimate the effect of QR removal on aggregate imports, I use the following event study specification at the product level:

$$y_{pt} = \sum_{k=\underline{T}}^{\bar{T}} \beta_k D_{pt}^k + \delta_p + \lambda_{qt} + \varepsilon_{pt} \tag{1}$$

where y_{pt} is the log import or export value or quantity of an 6-digit HS product p in year t, δ_p are HS-6 digit product fixed effects, and λ_{qt} are 4- digit HS product $\times$ year fixed effects.[5] The inclusion of λ_{qt} means that the β_k coefficients are identified using liberalized and unaffected HS-6 products within HS 4-digit product $\times$ time. Event time dummies D_{pt}^k are defined as $D_{pt}^k := 1\left[t = \tau_p + k\right] \forall k \in (\underline{T}, \overline{T})$ where τ_p is the year in which QRs were removed for product p. The coefficient for the event year $(k = 0)$ is normalized to zero. I set $\underline{T} = -5$ and $\overline{T} = +8$. Standard errors are clustered at the HS-6 digit product level.

The key identification assumption is that, in the absence of the QR removal, products affected by the policy would have followed similar import trends as unaffected products, after accounting for time-invariant differences between 6-digit products and common 4-digit product $\times$ year shocks.

Firm-Level Event Studies. To estimate the impact of the QR-removal policy on firm outcomes, I use an event study approach. The policy was implemented in a staggered manner from 1997 to 2001. All results presented in the next section rely on the estimator of Sun and Abraham (2021). For robustness, I also estimate the event study using a two-way fixed effects specification, which yields similar results (see Appendix A.3.2). The event study specification is as follows:

$$y_{it} = \sum_{k=\underline{T}}^{\overline{T}} \theta_k D_{it}^k + \delta_i + \lambda_{jt} + \varepsilon_{it}, \tag{2}$$

where y_{it} is an outcome of firm i in accounting year t, α_i is a firm fixed effect, and λ_{jt} are three-digit industry $\times$ year fixed effects. Therefore, θ_k coefficients are estimated comparing treated and untreated firms within sector $\times$ time.[6] In robustness analysis, I show that the results are similar after controlling for location (state or district) $\times$ year fixed effects and firm size $\times$ year fixed effects. Event time dummies D_{it}^k are defined as follows. $D_{it}^k := \mathbb{1}[t = \tau_i + k] \forall k \in (\underline{T}, \overline{T}), D_{it}^{\overline{T}} = \mathbb{1}\left[t \geqslant \tau_i + \overline{T}\right]$, and $D_{it}^T = \mathbb{1}\left[t \leqslant \tau_i + \underline{T}\right]$, where $\mathbb{1}[.]$ is the indicator function and τ_i is the year in which QRs are removed on

[5] I currently have access to annual trade flow data for India at the 6-digit HS level. a 6-digit HS product is classified as treated if any of its constituent 8-digit products are affected by QR-removal. I am in the process of procuring monthly trade flow data at the 8-digit HS level and plan to update these event studies once the new data becomes available.

[6] I am able to include three-digit sector $\times$ year fixed effects because the QR-removal policy was implemented at the more granular 8-digit HS code level. This ensures that within each three-digit sector, exposure to the policy varies across products, allowing for the inclusion of sector-level time controls without absorbing the treatment effect.

the highest-revenue product of firm i. ε_{it} is an error term. I normalize $\theta_0 = 0$ and set $\underline{T} = -5$ and $\overline{T} = +8$. Standard errors are clustered at the three-digit industry $\times$ year level.

The key identification assumption for estimating θ_k is that, in the absence of the QR removal, firms operating in product markets exposed to import competition would have followed similar trends in outcome variables as firms in unaffected sectors. This implies that the latter serve as a reasonable counterfactual for the treated firms after accounting for time-invariant differences between firms and common 3-digit industry $\times$ year shocks.

5 Results

In this section, I first examine the impact of the QR-removal policy on product-level trade flows into India. After establishing that the policy significantly increased imports of liberalized products, I then analyze its effects on the financial and managerial behavior of manufacturing firms in India.

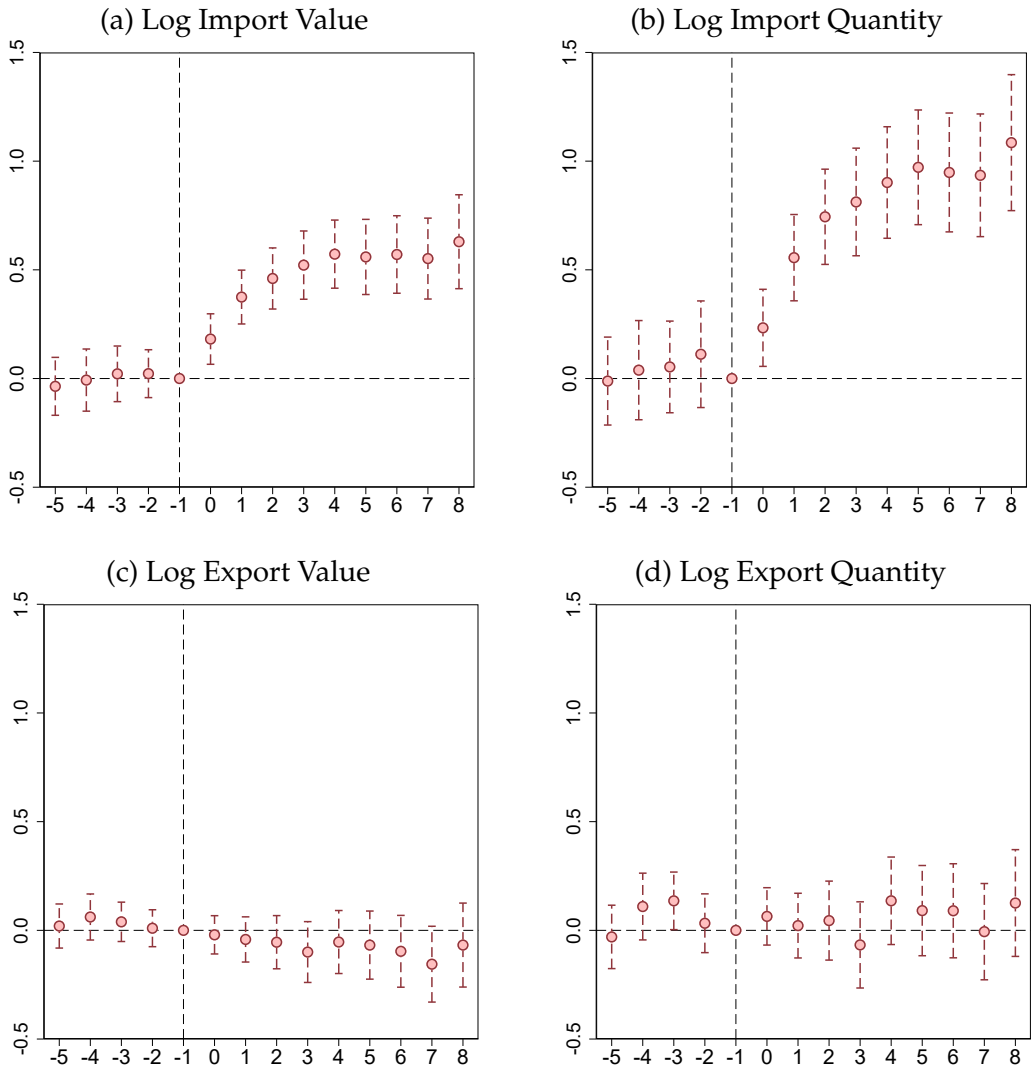
5.1 Impact of QR Removal on Aggregate Imports

Figure 4 presents event-study estimates from Equation (1), capturing how products exposed to the removal of QRs differed from unaffected products in terms of import and export outcomes. Panels (a) and (b) illustrate a substantial and persistent increase in both the value and the quantity of imports for the treated products. Notably, by the third year following QR removal, the import value of these products exceeds that of the control group by over 50 percent (panel (a)). The import value of treated products remains high through the eighth year after the reform, highlighting the persistence of the policys effect. The impact on import quantities (panel (b)) follows a similar trajectory but is even more pronounced in magnitude, with the treated products reaching an increase of roughly 1 log point (over 150 percent) compared to the control group.

The stability of pre-trend coefficients suggests that treated and untreated products followed comparable trajectories before the reform. Moreover, the inclusion of HS-4 digit product $\times$ year fixed effects (where HS-4 is a broader product classification than HS-6) ensures that any time-varying shocks at the HS-4 digit level do not drive the results. Thus, the post-reform divergence in imports can be credibly attributed to the removal of quantitative restrictions.

The bottom panels confirm that the policy had little to no discernible effect on exports of the same set of products. This is precisely what one would expect from a reform that exclusively liberalized India's domestic market for foreign producers without granting any reciprocal benefits to Indian exporters. The absence of a parallel export response underscores the unilateral nature of the policy: it primarily heightened competition from foreign producers for Indian firms, without materially altering Indian firms' own access to foreign markets. The divergence between imports (which rise sharply and persist) and exports (which remain unchanged) helps rule out alternative explanations related to changes in export opportunities.

Figure 4: Value and Quantity of Imports Increase after QR Removal with No Impact on Exports



Notes: The figure presents β_k event study coefficients from Equation (1) using the Sun and Abraham (2021) estimator on annual HS-6 digit product-level panel data on imports and exports. The coefficients plotted correspond to Table A2, columns (1)-(4). The dependent variables are log import value (panel (a)), log import quantity (panel (b)), log export value (panel (c)), and log export quantity (panel (d)). An HS-6 digit product is identified as treated if QRs were removed from any of its constituent HS-8 digit products. β_{-1}, the coefficient prior to the year in which QRs were removed, is normalized to zero. The policy is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include HS-6 digit product fixed effects and HS-4 digit product $\times$ year fixed effects. Standard errors are clustered by HS-6 digit product. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Trade$_{dx}$.

These findings confirm that the removal of QRs substantially intensified import competition in India. Having established the surge in imports at the product level, I now turn to examining how firms responded to this heightened competition. Specifically, I employ an event-study framework comparing firms that produce goods affected by QR removal against firms whose product portfolio remained unaffected, enabling me to isolate the causal impact of import competition on firms financial and managerial outcomes.

5.2 Impact on Firm Size and Financial Performance

Figure 5 presents event-study estimates from Equation (2), offering a 360-degree view of how intensified import competition influences key dimensions of firm size and financial performance. The panels cover firm revenues, costs, and capital structure, allowing us to trace the broad impact of foreign competition on domestic firms. Table A3 in a

This first panel shows a substantial decline in total revenue for firms exposed to QR removal, relative to unaffected firms. By the third year following the policy change, treated firms revenues fell by approximately 20 percent compared with the control-group firms. The gap widens further in subsequent years: by the eighth year, revenues of treated firms are almost 50 percent lower than those of the control group. This pronounced and persistent decrease underscores the depth of the import-competition shock. In panel (b), I examine the operating profit-to-revenue ratio, which captures how effectively firms convert sales into operating profits. This ratio declines by about 0.04 for treated firms– equivalent to nearly halving the pre-policy average among control group firms of 0.09. Such a drop highlights that competitive pressures not only reduce overall revenue but also compress margins.

Turning to labor-related expenditures, panel (c) shows that the total wage bill experiences a decline comparable in magnitude to the drop in total sales. The effects manifest soon after the policy takes effect and persist through the eighth year. The protracted nature of this decline suggests that firms engage in sustained cost-cutting on labor, likely in response to shrinking market share and profitability. Expenditure on raw materials (panel (d)) also follows a downward trajectory, decreasing by as much as 30 percent by the eighth year. This reduction is consistent with firms scaling back production and operations in the face of heightened import competition, using fewer inputs in line with reduced output and sales.

The bottom two panels show changes in firms' capital structure. Panel (e) illustrates a substantial and growing decline in the total assets of treated firms. By the third year, assets are around 10 percent lower relative to the control group, and this disparity accelerates over time. By year eight, the total assets of treated firms have fallen by almost 30 percent compared with their unaffected counterparts. This pattern points to a long-term contraction in capacity, possibly due to underutilized assets, disinvestment, or an inability to generate sufficient cash flow to sustain capital stocks. Finally, panel (f) examines total firm borrowings. Unlike other indicators, borrowing remains relatively stable in the early years post-reform but eventually declines to around 25 percent below the level of control-group firms.

Figure 5 also helps confirm the lack of pre-trends in the outcome variables. Pre-policy event-study coefficients are insignificant and close to zero

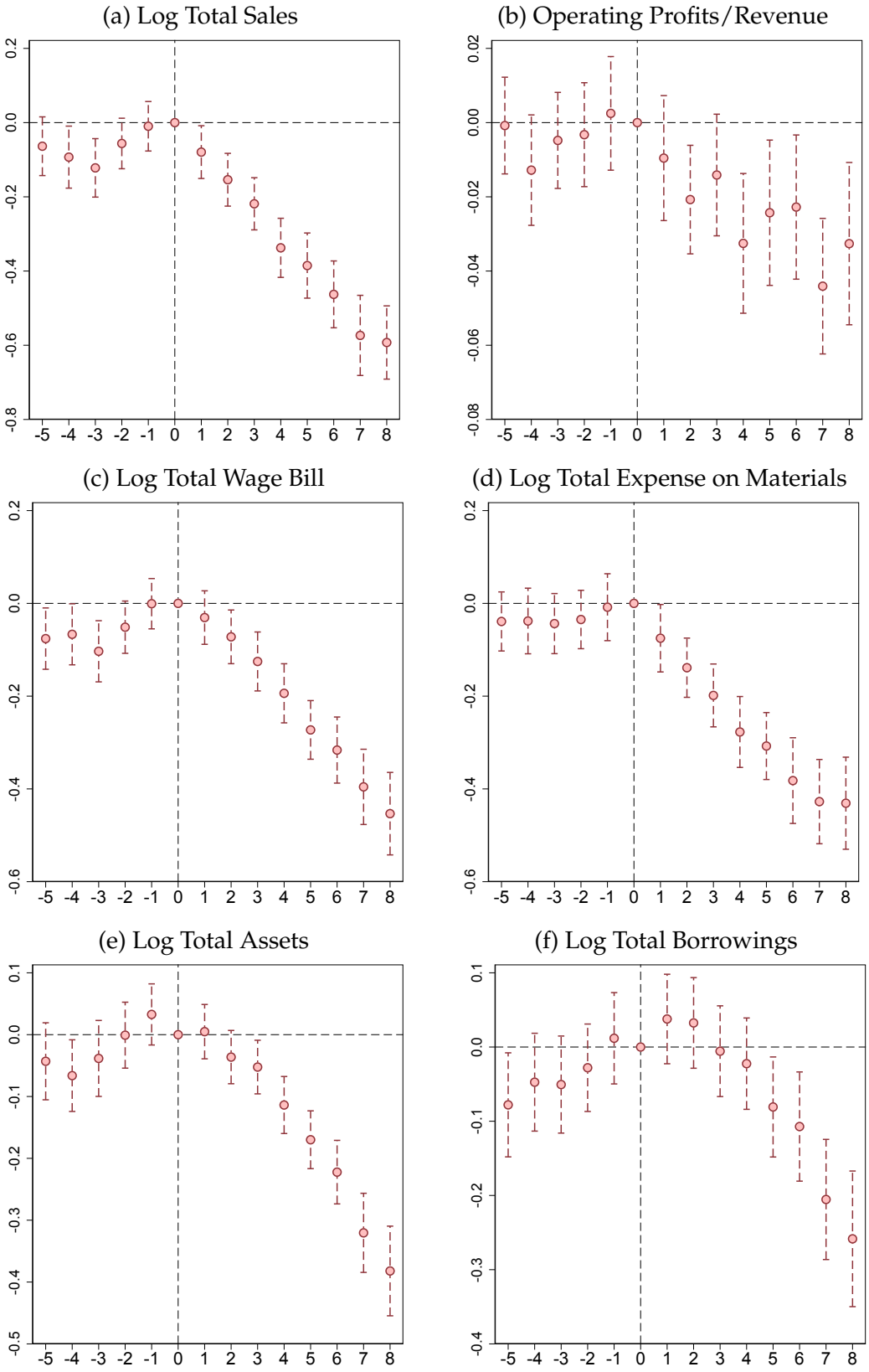
Overall, these results demonstrate that the QR-removal policy delivered a substantial negative shock to Indian firms operations and balance sheets. As foreign products entered the domestic market at scale, many Indian firms struggled to protect their revenue base and profit margins, leading to cutbacks in labor, materials, and capital. These results are not driven by firm exit, although some firm exit does happen seen around the policy. Figure A5 in Appendix A.3.2 reproduces the event study estimates in Figure 5 conditioning on surviving firms. Out of 4994 total firms in the sample, 4147 firms

survive till the end of the sample. The results are qualitatively similar to unconditional results presented in Figure 5.

In the next section, I explore how firms adapt organizationally in the face of this heightened competition, focusing on the turnover of top managerial positions– particularly among family-run firms that opt to bring in professional outside managers.[7]

[7]Figure A4 in Appendix A.3.2 reproduces the event study estimates in Figure 5 for family firms (i.e. firms that have at least board member from the founder's family). Out of XXXX total firms in the sample, XXXX firms meet this criteria. The results are qualitatively similar to results presented for the whole sample in Figure 5.

Figure 5: Domestic Firms Contract after QR Removal



Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2), corresponding to coefficients in Table A3, columns (1)-(6). The dependent variables are: log total sales (panel (a)), operating profits/revenue (panel (b)), log total compensation (panel (c)), log total expense on raw materials (panel (d)), log total assets (panel (e)), and log total borrowings (panel (f)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at three-digit industry $\times$ year level. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$.

5.3 Impact of QR Removal on Firm Management

As established in the previous section, the removal of QRs imposed a significant negative shock on the financial health of exposed firms. A natural question follows: what organizational actions did these firms undertake to mitigate the shock? In this paper, I focus specifically on top-management changes, motivated by both theoretical considerations and the empirical regularities documented in the corporate governance and organizational economics literatures.

A large body of research demonstrates that negative shocks to profitability and poor firm performance often precipitate forced or voluntary departures of top executives (Jenter and Kanaan, 2015; Kaplan and Minton, 2011; Parrino, 1997). However, the mechanism of managerial restructuring in the context of family-owned or family-controlled firms differs in a critical way from standard CEO or executive turnover models. In many developing economies, including India, family members frequently occupy the most senior rolespositions such as CEO, CFO, or Managing Director– irrespective of whether they are the best-qualified individuals to navigate competitive challenges. Such arrangements may be beneficial when family managers possess significant firm-specific knowledge or when they help maintain continuity and trust. Yet, when adverse market shocks arisein this case, heightened import competitionthese same family-oriented hiring practices can become a liability.

Faced with a substantial erosion of profitability and revenue, domestically owned family firms may find themselves compelled to reassess the merit of keeping family members in top-level posts. Replacing family managers with external professionals can bring fresh expertise, more experience, access to wider networks, strategic thinking, and managerial skills that are often critical for adapting to intensified competitive pressures. In this study, I capture this phenomenon by looking beyond the traditional turnover measures (e.g., whether the CEO or CFO changes) and instead examining the extent of family involvement in senior management positions and the executive board of directors.

Figures 6 illustrates these organizational responses and shows how family firms respond to increased import competition by altering the composition of their executive boards. In panel (a), the dependent variable is the *share* of family members on the board, which has a pre-shock control-group mean of 0.60. By the third year after QR removal, this share declines by about 5 to 6 percentage points, widening to roughly 8 percentage points by the eighth year. In relative terms, these coefficients represent a substantial reduction of about 15 percent in the fraction of family executives at the top.

Panel (b) zooms in on which firms are *most likely* to shed family managers by comparing the bottom tercile of pre-policy productivity (red circles) to the rest of the sample (gray triangles).[8] The figure reveals that *almost all* of the reduction in the share of family members in top managerial roles is driven by firms that were relatively *less productive* before the QR removal. Indeed, these bottom-tercile firms show a pronounced and persistent decline in family share, while higher-productivity firms display little to no change. By the fourth year after QR removal, the share of top family managers in ex-ante declined by about 15 percentage points– almost three times as high as the overall impact for all firms in panel (a). Higher productivity firms showed no such change in

[8] Firm productivity is estimated using the method proposed in Petrin and Levinsohn (2012).

their management structure. This pattern implies that the decision to replace family managers with external professionals is more prevalent—and more extensive—among firms that were initially weaker performers. Such selection into professionalization highlights a mechanism through which less-competitive firms may attempt to bolster their managerial capabilities when faced with heightened import competition. As elaborated in Section **??**, this finding forms a core basis of my theoretical framework: those firms most in need of improving their productivity are the ones most likely to seek outside talent.

Panels (c) and (d) split the churn in top management into family and non-family managers. Prior to the shock, the average family firm in the control group had 1.3 family members on its executive board, compared to 0.5 non-family managers. After QR removal, the number of family managers steadily drops, culminating in a decrease of roughly 0.2 by the end of the sample window. Notably, panel (d) shows a nearly mirror-image increase in non-family professionals over the same horizon, pointing to a one-to-one replacement effect. In other words, for every family manager who exits, there is almost exactly one external professional joining the board.

Taken together, these event-study results suggest that, under heightened competitive pressure, family-controlled firms do not simply shed family executives. Rather, they actively seek outside managerial talent to fill vacated positions, reconfiguring the firms top hierarchy. To the best of my knowledge, this is the first study to show that globalization can trigger deeper changes in organizational structure within firms. An important point of comparison is Chen and Steinwender (2021), which studies how managers, particularly in family firms exert more effort in response to import competition. My focus is different in that I link a negative trade shock to the *composition* of senior management within the firm.

Such trade-induced change in corporate culture can be important, particularly in the context of developing countries where family-run firms and business groups are pervasive. As highlighted by recent work (Bloom and Van Reenen, 2007; Caliendo and Rossi-Hansberg, 2012; Akcigit et al., 2021), tight family control can constrain a firms ability to adjust organizational layers or recruit external talent, potentially limiting the firms capacity to respond effectively to competitive pressures. Bloom et al. (2013) identify weak competitive pressure (for instance, due to protection from imports) and the predominance of family members in top management as major impediments to adopting effective management practicespractices that, in turn, can substantially boost firm performance. By showing that intensified import competition motivates family-owned firms to replace family managers with outside professionals, this paper offers fresh insights into how greater trade openness can reshape a firms internal governance structure.

These results also speak to broader debates on whether business groups and family ownership in emerging markets facilitate or hinder growth. While such organizational forms may help mitigate imperfect capital markets or reputational frictions (Khanna and Yafeh, 2007), they can also exhibit weaker corporate governance, such as tunneling or underinvestment (Bertrand et al., 2002; Bertrand and Schoar, 2006). The evidence presented here suggests that, when faced with an exogenous shock such as the removal of QRs, family-controlled firms do not necessarily remain locked into potentially suboptimal leadership arrangements. Instead, they appear capable of adopting

Figure 6: Firms Reduce Family Members on the Executive Board of Directors after the QR Shock

Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2), corresponding to coefficients in Table A4 where (column (1)) corresponds to panel (a), (column (2)) corresponds to panel (c) and (column (3)) corresponds to panel (d). The the dependent variables are: the share of family members on the executive board of directors of a firm (i.e., top management positions like CEO, CFO, MD, etc.) in panel (a), share of top family managers dropped from the board while transitioning toward professional management in panel (b), the number of family members on the executive board of directors in panel (c) and the number of non-family professionals on the executive board of directors in panel (d). In panel (b), we examine selection into professionalizing by comparing firms based on their pre-policy productivity. Firms are divided into two groups: those in the bottom tertile of pre-policy productivity and the remaining firms. A firm is identified as treated in a year if QRs are removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis labels denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

professional management structures to enhance competitiveness. Thus, the dismantling of protective barriers in India reveals how trade liberalization can catalyze deeper organizational changes, prompting even family-based firms to reconfigure their top management in pursuit of higher productivity and improved performance.

A natural question arising from the preceding analysis is: what are the implications of this push toward professionalization for firm productivity? In the following section, I explore this issue in greater detail.

5.4 The Impact of Professionalizing Management: Suggestive Evidence

Figure 7 offers indicative evidence that family-controlled firms that *professionalized* their top management—by reducing the share of family members in senior executive roles—enjoyed a greater post-reform boost in productivity relative to those that did not. I classify a firm as having professionalized if its share of family top managers declined between the pre-policy period and the end of the sample window (i.e., by $t = 8$ for the last-treated cohort). Figure 7 presents the event-study estimates from equation 2 separately for each group, focusing on productivity and prices.

Panels (a) and (b) in Figure 7 depict the evolution of two productivity measures—TFPR and TFPQ (both estimated following Petrin and Levinsohn 2012). For *professionalizing* firms (in red), both TFPR and TFPQ begin to diverge positively from zero in the first or second year following the policy and continue rising thereafter. By contrast, firms that retain family managers (in gray) show little change in either TFPR or TFPQ. Within about five to six years post-reform, TFPR for professionalizing firms lies roughly 20–30 percentage points above that of firms retaining family-dominated management, suggesting that the decision to bring in non-family managers may have facilitated substantial efficiency gains. The gap for TFPQ is over twice as large. These results are not driven by the fact that the least productive firms had a higher family share family managers before the policy. The mean share of family top managers for ex-ante low productivity firms is 0.62 (SD = 0.42) and 0.65 (SD = 0.41) for ex-ante high productivity firms.

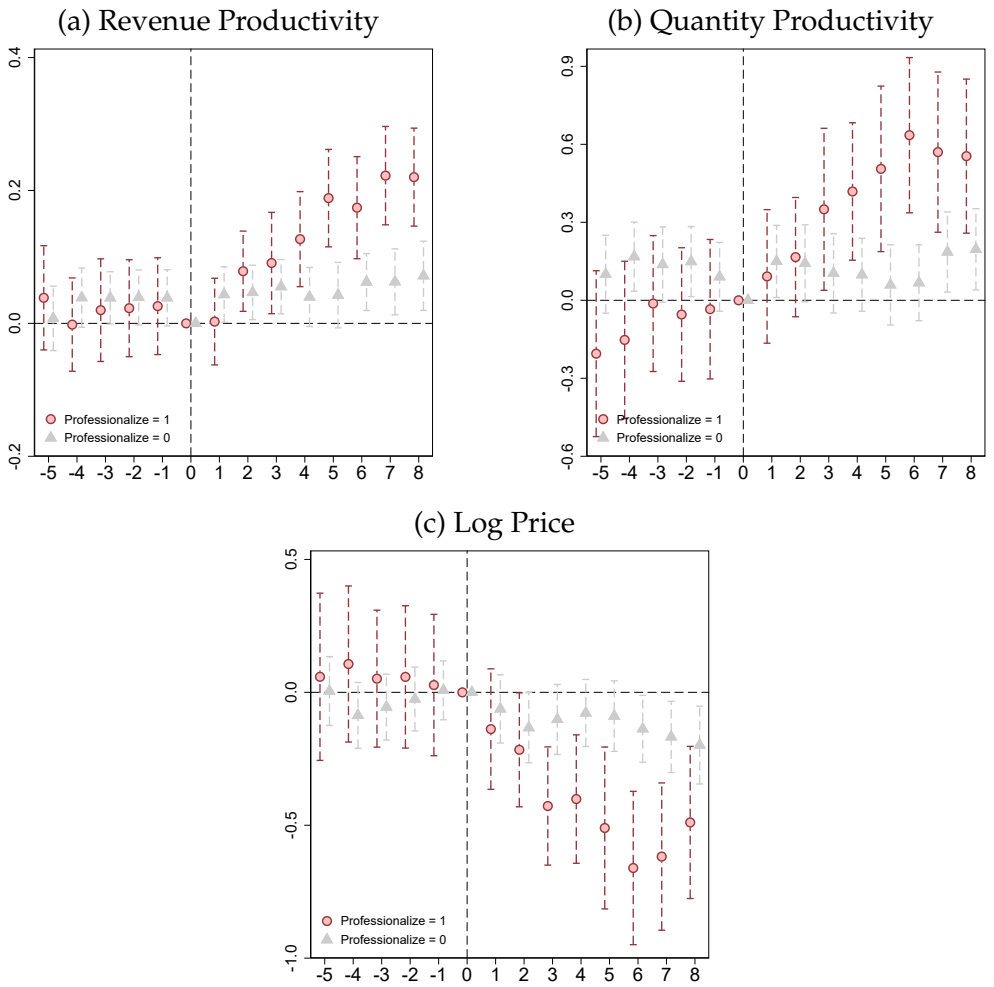
Panel (c) shows the trajectory of average log prices, defined as the total value of a firms output divided by the total quantity produced. Among professionalizing firms, prices drop notably after the reform, stabilizing at about 0.3 to 0.4 log points below pre-policy levels. By contrast, the non-professionalizing group exhibits minimal price adjustment. One interpretation is that firms with new (outside) management either implemented efficiency and cost-cutting measures that enabled price reductions or shifted toward lower-price varieties. This differential change in prices is a key reason for the much larger impact on TFPQ as compared to TFPR in the preceding two panels.

Overall, these patterns are consistent with the notion that heightened import competition catalyzes a deeper reorganization in firms that actively replace family managers with professional outsiders. Although the evidence in Figure 7 is inherently suggestive—firms self-select into professionalization, and not all organizational changes are captured. Some firms may have other unobserved advantages (e.g., more liquid credit lines, and stronger networks) that facilitate the hiring of external managers. These hidden characteristics could shape both the likelihood of professionalizing and

subsequent performance improvements. Firms may also adapt in ways other than changing their top management, e.g., changes in mid-level managerial layers, shifts in organizational culture, etc. The evidence here is therefore *suggestive* rather than definitive.

Nevertheless, the event study results highlight two important themes. First, top-management turnover can be a critical margin of adjustment in response to negative trade shocks. Second, in family-run firms, bringing in external managerial talent appears to correlate with enhanced productivity performance.

Figure 7: Increase in Productivity as Firms Shed Family Members after QR Removal



Notes: This figure presents the estimated θ_k event study coefficients from a regression specified in equation (2). Event studies are conducted separately for firms that professionalized their management after QR removal (in red) and those that did not (in grey). A firm is classified as treated in a year if QRs are removed on its highest-revenue product. A firm is considered to have professionalized if the share of family members on the executive board of directors declined in the post-policy period. The dependent variables are revenue productivity (TFPR) (panel (a)), quantity productivity (TFPQ) (panel (b)), and log price (panel (c)). TFPR and TFPQ are estimated using the method proposed in Petrin and Levinsohn (2012). Log price is defined as the ratio of a firms total value of products produced and the total quantity of products produced. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis indicating years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at three-digit industry $\times$ year level. The vertical lines represent 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

In this model, productivity scales by γ like in Bustos. Like in Chen, firms delegate to avoid exit. There's both positive and negative selection into delegation then.

Simulate the model and see what relationships emerge for productivity and productivity/size before and after the shock. If its U-shaped this is tough to replicate in data.

6 Theoretical Framework

I consider a closed economy with one sector with monopolistic competition. Firms are heterogeneous in productivity and produce a unique variety indexed by i. The final good output, Y, is a CES aggregate of all intermediate varieties:

$$Y = \left(\sum_{i=1}^{N} y_i^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}.$$

where $\sigma > 1$ is the elasticity of substitution and N is the total number of varieties.

The aggregate price index is defined as $P \equiv \left(\sum_{i=1}^{N} p_i^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$, where p_i is the price charged by the firm producing variety i. Cost minimization implies that the demand for variety i is given by

$$y_i = Y P^{\sigma} p_i^{-\sigma}. \tag{3}$$

Management and Firm Productivity. In this economy all firms start as family firms[9]. Each firm has the choice to delegate firm management to outside professionals. The trade-offs associated with this choice are discussed below. Entrepreneurs enjoy a non-monetary private benefit, $\mathcal{B}$, which is common for all firms.

Private benefits measure the non-pecuniary utility that an entrepreneur enjoys from running a firm as a family firm and holding the firm's management within the family. For example, an entrepreneur may derive pleasure if their children or siblings run the firm. Such amenity potential of family control of firm management has a long tradition in the corporate finance literature (Demsetz and Lehn, 1985; Burkart et al., 2003; Bertrand and Schoar, 2006). Private benefits accrue to the entrepreneur *in each period* that the firm is active. If the firm exits, the entrepreneur loses all private benefits associated with running the firm. Note also that entrepreneurs know their private benefit draw, $\mathcal{B}$, before paying the fixed entry cost and entering the market.

Firms pay a fixed cost wf_e, paid in labour units, to enter the market and produce. After paying the fixed entry cost, the firm draws a productivity parameter $\varphi \geq 1$ from a Pareto distribution $G(\varphi) = 1 - \varphi^{-k}$ with $k > 1$ and $k > \sigma - 1$. φ is the firm's productivity, if it decides to operate as a family firm. The firm can however, choose to delegate management to more productive professional managers. If the firm decides to do so, it loses its private benefit, $\mathcal{B}$, but at the same time, delegation raises the productivity of the firm to $\gamma\varphi$, $\gamma > 1$.

[9]While incorporating a firm, entrepreneurs, particularly in developing countries, often rely on social networks such as family, religion, caste, and geography, to manage their firm. There are many reasons for this, for e.g., trust amongst family members may substitute for weak legal institutions and contract enforcement in developing countries (Bertrand and Schoar, 2006; Burkart et al., 2003).

Technology. The production function for each intermediate variety is as follows, where I have omitted the i subscript for notational simplicity:

$$y = z\ell.$$

where ℓ is labour employed, w is the wage rate, and z is the firm's *realized* productivity. $z = \varphi$ if the firm chooses to retain family management; $z = \gamma\varphi$, if the firm chooses to delegate management to professionals. To produce, the firm incurs a per-period fixed cost, f, which is paid in labor units.

The firm maximizes profits subject demand for its product (3), leading to the usual expression of equilibrium prices being a constant markup over marginal cost:

$$p^* = \frac{\sigma}{\sigma - 1}\left(\frac{w}{z}\right) = \frac{w}{\rho z}.$$

where $\rho = \frac{\sigma-1}{\sigma}$. This implies that firm profits are given by:

$$\begin{aligned}\pi &= \frac{1}{\sigma} Y(\rho z)^{\sigma-1} - fw \\ &= Az^{\sigma-1} - fw,\end{aligned}$$

where $A = \frac{1}{\sigma}\rho^{\sigma-1} Y P^{\sigma} w^{1-\sigma}$ is a constant.

Every period, there is an exogenous probability, δ of exit. In this setup, the total *per-period* payoff to the entrepreneur from an active firm is the sum of monetary profits, π, and non-monetary private benefits, $\mathcal{B}$, that the entrepreneur enjoys only if management is held within the family. Firms maximize their per-period payoff which is given by:

$$\text{Firm's payoff} = \begin{cases} \pi(\varphi) + \mathcal{B} - wf_e & \text{if firm does not delegate} \\ \pi(\gamma\varphi) - wf_e & \text{if firm delegates} \end{cases}$$

Firm Exit. A firm exits if it does not make sufficient monetary profits, $\pi(z)$, to cover the per-period fixed cost of production, wf. Note that only monetary profits matter for the firm's decision to exit. This yields a survival productivity threshold z^*:

$$\begin{aligned}\pi(z) &= 0 \\ z^* &= \left(\frac{wf}{A}\right)^{\frac{1}{\sigma-1}}\end{aligned} \tag{4}$$

For family firms, with $z = \varphi$ the exit threshold, denoted φ_f^* is given by

$$\varphi_f^* = \left(\frac{wf}{A}\right)^{\frac{1}{\sigma-1}} \tag{5}$$

For firms that have delegated management to outside professionals, with $z = \gamma\varphi$ the exit threshold, denoted φ_{d1}^*, is given by

$$\varphi_{d1}^* = \frac{1}{\gamma}\left(\frac{wf}{A}\right)^{\frac{1}{\sigma-1}} = \frac{\varphi_f^*}{\gamma} \tag{6}$$

Delegation Decision. If both $\pi(\varphi)$ nd $\pi(\gamma\varphi)$ are positive, a firm chooses to delegate its management, if its payoffs from delegating are greater than those from staying a family firm. Since the firm gives up private benefits if it delegates, $\pi(\gamma\varphi)$ must be sufficiently larger than $\pi(\varphi)$ to compensate the firm for the loss of private benefits. Thus, the delegation decision rests on the trade-off between retaining private benefits associated with running the firm as a family firm and higher profits associated with delegation. This decision yields another productivity threshold, φ_{d2}^*, at which the firm is indifferent between remaining a family firm and delegating to professionals:

$$\begin{aligned} \pi(\varphi) + \mathcal{B} &= \pi(\gamma\varphi) \\ \varphi_{d2}^* &= \left(\frac{\mathcal{B}}{A(\gamma^{\sigma-1}-1)}\right)^{\frac{1}{\sigma-1}} \\ &= \varphi_f^* \cdot \left(\frac{\mathcal{B}}{wf(\gamma^{\sigma-1}-1)}\right)^{\frac{1}{\sigma-1}} \end{aligned} \tag{7}$$

Firms delegate management if their initial productivity $\varphi > \varphi_{d2}^*$, i.e. we have more productive firms delegating— there is positive selection into delegation. The following proposition summarizes the delegaiton decision of firms:

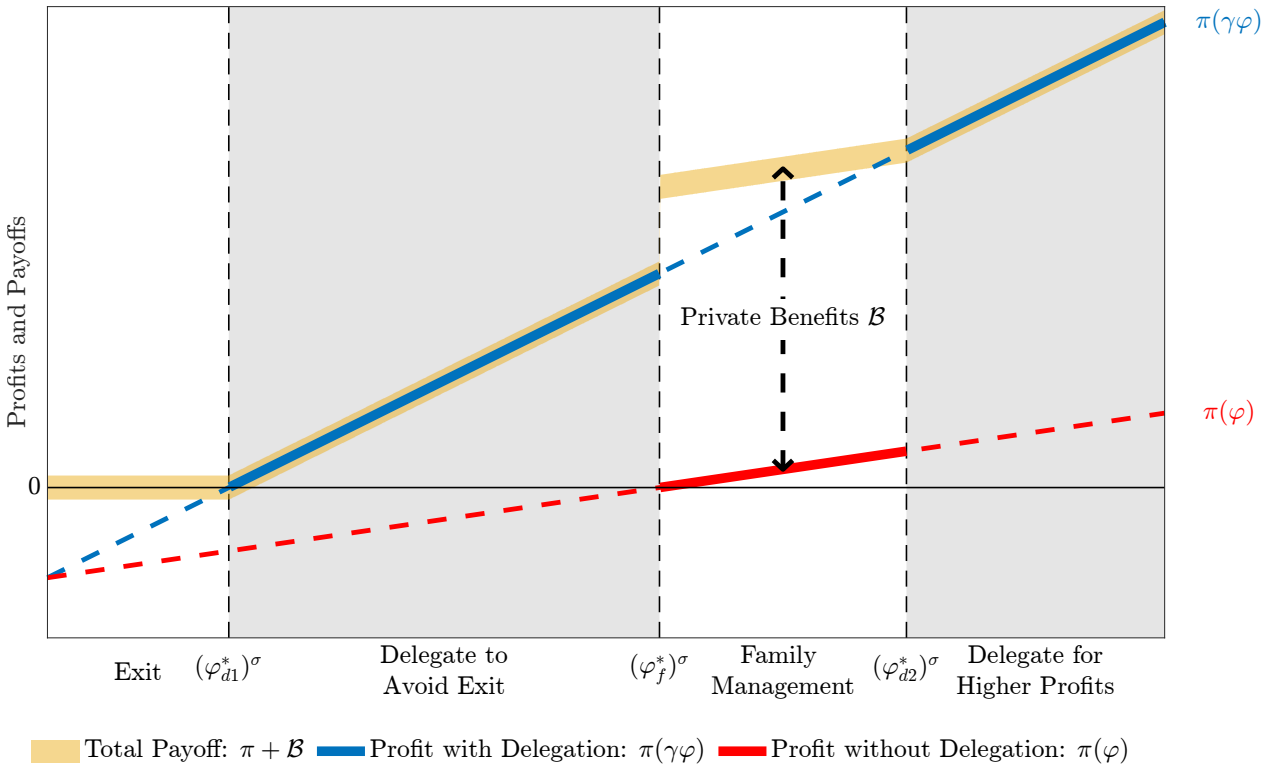
Proposition 1.

- $\varphi < \varphi_{d1}^*$: firm exits. It cannot make positive profits despite delegation.
- $\varphi_{d1}^* < \varphi < \varphi_f^*$: firm cannot make positive profits as a family firm but does make positive profits if it decides to delegate. Therefore the firm delegates management in order to avoid exit.
- $\varphi_f^* < \varphi < \varphi_{d2}^*$: the firm can survive as a family firm. It decides not to delegate management, as additional profits from delegation are not enough to outweigh the loss of private benefits.
- $\varphi > \varphi_{d2}^*$: the firm delegates since additional profits from delegation are outweigh the loss of private benefits.

Thus, the delegation decisions exhibit a U-shaped pattern. Low-productivity firms delegate to survive. Medium-productivity firms retain family management to enjoy private benefits. High-productivity firms delegate to maximize profits.

Figure 8 shows the delegation thresholds in a diagram.

Figure 8: Delegation Choice and Firm Productivity



Industry Equilibrium. The wage rate (w), the number of firms (N) and the distribution of active firms' productivities in the economy are determined by the free entry condition. Free entry requires that the sunk entry cost f_e equals the present value of expected profits. We can divide the firm's actions into the following cases.

The free entry condition implies that

$$f_e = [1 - G(\varphi^*_{d1})]\frac{1}{\delta}\overline{\pi} \tag{8}$$

where $\overline{\pi} = A\overline{\varphi}^{\sigma-1} - wf$ and

$$\begin{aligned}\overline{\varphi} =& \left(\int_{\phi^*_{d1}}^{\phi^*_f} \gamma^{\sigma-1}\varphi^{\sigma-1}\frac{g(\varphi)}{1-G(\varphi^*_{d1})}d\varphi + \int_{\phi^*_f}^{\phi^*_{d2}} \varphi^{\sigma-1}\frac{g(\varphi)}{1-G(\varphi^*_{d1})}d\varphi + \int_{\phi^*_{d2}}^{\infty} \gamma^{\sigma-1}\varphi^{\sigma-1}\frac{g(\varphi)}{1-G(\varphi^*_{d1})}d\varphi\right)^{\frac{1}{\sigma-1}} \\ =& \varphi^*_f C^{\frac{1}{\sigma-1}}\end{aligned} \tag{9}$$

where $C = \frac{k}{\gamma^k(\sigma-k-1)}\left(\left(\gamma^{\sigma-1}-1\right)\left(1-\frac{\mathcal{B}}{wf\left(\gamma^{\sigma-1}-1\right)}\right)^{\frac{\sigma-k-1}{\sigma-1}}-\gamma^k\right)$.

Using average productivity (9) in average profits, and using the zero profit condition (5) to eliminate A, we get that average profits are given by

$$\overline{\pi} = wf(C-1).$$

Substituting average profits in the free entry condition (8), and setting that wages as the numeraire ($w = 1$), yields the following expression for the three cutoffs in the model.

$$\begin{aligned}
\varphi_f &= \gamma\left(\frac{f(C-1)}{\delta f_e}\right) \\
\varphi_{d1} &= \frac{f(C-1)}{\delta f_e} \\
\varphi_{d2} &= \gamma\left(\frac{f(C-1)}{\delta f_e}\right)\left(\frac{\mathcal{B}}{wf\left(\gamma^{\sigma-1}-1\right)}\right)^{\frac{1}{\sigma-1}}
\end{aligned} \tag{10}$$

Using the exit cutt-off (5) and (10), we obtain the following expression for P, the inverse of which measures welfare in the economy.

$$P = \frac{1}{\rho\gamma}\left(\frac{f\sigma}{E}\right)^{\frac{1}{\sigma-1}}\left(\frac{\delta f_e}{f(C-1)}\right)^{\frac{1}{k}} \tag{11}$$

.

where $E = YP$ is market size. Welfare $W = P^{-1}$.

References

Ahluwalia, Montek, *Backstage: The Story Behind India's High Growth Years*, New Delhi: Rupa Publications India, 2019.

Akcigit, Ufuk, Harun Alp, and Michael Peters, "Lack of selection and limits to delegation: firm dynamics in developing countries," *American Economic Review*, 2021, *111* (1), 231–275.

Amiti, Mary and Jozef Konings, "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia," *American Economic Review*, December 2007, *97* (5), 16111638.

Atkin, David and Amit K Khandelwal, "How distortions alter the impacts of international trade in developing countries," *Annual Review of Economics*, 2020, *12*, 213–238.

Backus, Matthew, "Why is productivity correlated with competition?," *Econometrica*, 2020, *88* (6), 2415–2444.

Bernard, Andrew B, Stephen J Redding, and Peter K Schott, "Multiproduct firms and trade liberalization," *The Quarterly journal of economics*, 2011, *126* (3), 1271–1318.

Bertrand, Marianne and Antoinette Schoar, "The role of family in family firms," *Journal of economic perspectives*, 2006, *20* (2), 73–96.

_ , Paras Mehta, and Sendhil Mullainathan, "Ferreting out tunneling: An application to Indian business groups," *The quarterly journal of economics*, 2002, *117* (1), 121–148.

Bhagwati, Jagdish N and Thirukodikaval Nilakanta Srinivasan, *Foreign trade regimes and economic development: India* number bhag75-1, National Bureau of Economic Research, 1975.

Bloom, Nicholas and John Van Reenen, "Measuring and explaining management practices across firms and countries," *The quarterly journal of Economics*, 2007, *122* (4), 1351–1408.

_ , Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts, "Does management matter? Evidence from India," *The Quarterly journal of economics*, 2013, *128* (1), 1–51.

Burkart, Mike, Fausto Panunzi, and Andrei Shleifer, "Family firms," *The journal of finance*, 2003, *58* (5), 2167–2201.

Bustos, Paula, "Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms," *American Economic Review*, February 2011, *101* (1), 30440.

Caliendo, Lorenzo and Esteban Rossi-Hansberg, "The impact of trade on organization and productivity," *The quarterly journal of economics*, 2012, *127* (3), 1393–1467.

Chen, Cheng and Claudia Steinwender, "Import competition, heterogeneous preferences of managers, and productivity," *Journal of International Economics*, 2021, *133*, 103533.

Demsetz, Harold and Kenneth Lehn, "The structure of corporate ownership: Causes and consequences," *Journal of political economy*, 1985, *93* (6), 1155–1177.

Goldberg, Pinelopi K, Amit K Khandelwal, Nina Pavcnik, and Petia Topalova, "Multiproduct firms and product turnover in the developing world: Evidence from India," *The Review of Economics and Statistics*, 2010, *92* (4), 1042–1049.

Goldberg, Pinelopi Koujianou, Amit Kumar Khandelwal, Nina Pavcnik, and Petia Topalova, "Imported intermediate inputs and domestic product growth: Evidence from India," *The Quarterly journal of economics*, 2010, *125* (4), 1727–1767.

Hasan, Rana, Devashish Mitra, and Krishnarajapet V Ramaswamy, "Trade reforms, labor regulations, and labor-demand elasticities: Empirical evidence from India," *The Review of Economics and Statistics*, 2007, *89* (3), 466–481.

Jenter, Dirk and Fadi Kanaan, "CEO Turnover and Relative Performance Evaluation," *The Journal of Finance*, 2015, *70* (5), 2155–2182.

Kaplan, Steven N and Bernadette Minton, "How has CEO turnover changed? Increasing sensitivity to poor stock performance," *International Review of Finance*, 2011, *12* (1), 57–87.

Khanna, Tarun and Yishay Yafeh, "Business groups in emerging markets: Paragons or parasites?," *Journal of Economic literature*, 2007, *45* (2), 331–372.

Krueger, Anne O, "India's trade with the world: Retrospect and prospect," *India's economy: Performance and challenges*, 2010, pp. 399–429.

Leibenstein, Harvey, "Allocative efficiency vs." X-efficiency"," *The American economic review*, 1966, *56* (3), 392–415.

Marshall, Alfred, "Evidence before the Gold and Silver Commission [Cd. 5512] Question 9816 (16 January)," in "Official Papers," London: Macmillan, 1926, pp. 90–95. Original work published in 1888.

Panagariya, Arvind, "India's trade reform," in "India Policy Forum," Vol. 1 National Council of Applied Economic Research 2004, pp. 1–57.

Parrino, Robert, "CEO turnover and outside succession: A dynamic analysis," *Journal of Financial Economics*, 1997, *46* (2), 165–197.

Petrin, Amil and James Levinsohn, "Measuring aggregate productivity growth using plant-level data," *The Rand journal of economics*, 2012, *43* (4), 705–725.

Pursell, Garry and Zaidi Sattar, "Trade Policies in South Asia: An Overview," 2004.

Smith, Adam, *An Inquiry into the Nature and Causes of the Wealth of Nations*, London: W. Strahan and T. Cadell, 1776.

Stigler, George J, "The Xistence of X-efficiency," *The American Economic Review*, 1976, *66* (1), 213–216.

Sun, Liyang and Sarah Abraham, "Estimating dynamic treatment effects in event studies with heterogeneous treatment effects," *Journal of econometrics*, 2021, *225* (2), 175–199.

Topalova, Petia, "Factor immobility and regional impacts of trade liberalization: Evidence on poverty from India," *American Economic Journal: Applied Economics*, 2010, *2* (4), 1–41.

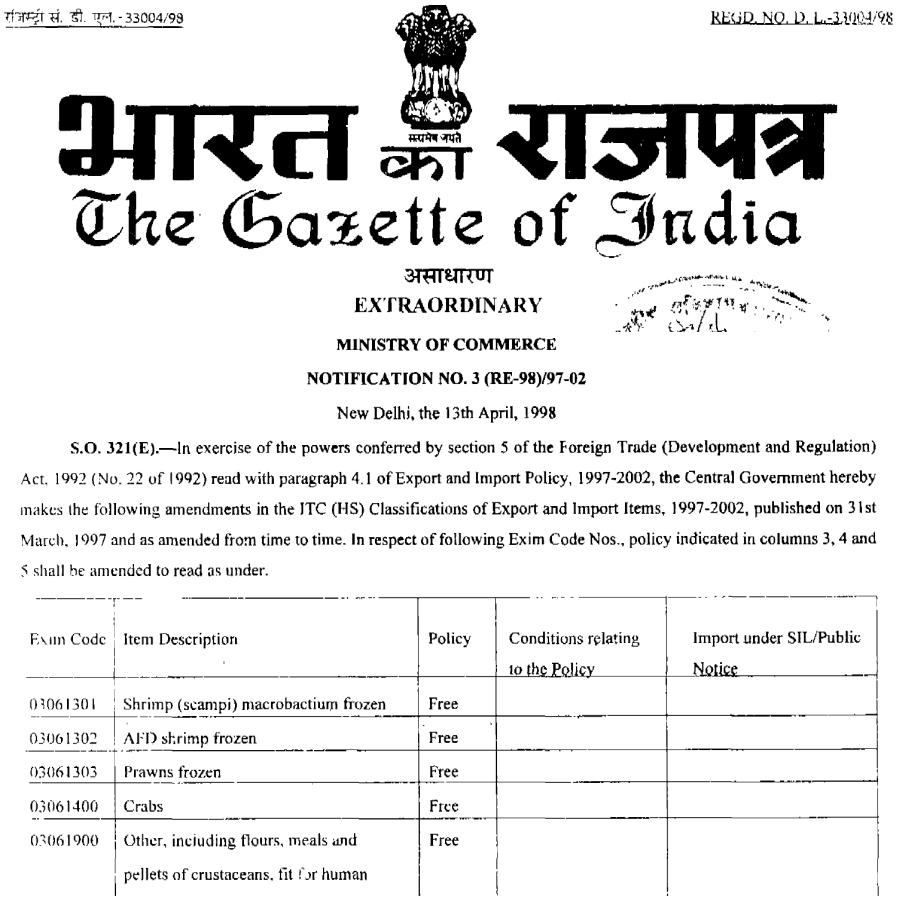
_ **and Amit Khandelwal**, "Trade liberalization and firm productivity: The case of India," *Review of economics and statistics*, 2011, *93* (3), 995–1009.

A Appendix

A.1 Appendix: Policy Background

A.2 Appendix: Data

Figure A1: Example of a 1998 Government of India Policy Notification Mentioning Product Codes for which QRs were Removed



रजिस्ट्री सं. डी. एल.-33004/98 REGD. NO. D. L.-33004/98

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY

MINISTRY OF COMMERCE

NOTIFICATION NO. 3 (RE-98)/97-02

New Delhi, the 13th April, 1998

S.O. 321(E).—In exercise of the powers conferred by section 5 of the Foreign Trade (Development and Regulation) Act, 1992 (No. 22 of 1992) read with paragraph 4.1 of Export and Import Policy, 1997-2002, the Central Government hereby makes the following amendments in the ITC (HS) Classifications of Export and Import Items, 1997-2002, published on 31st March, 1997 and as amended from time to time. In respect of following Exim Code Nos., policy indicated in columns 3, 4 and 5 shall be amended to read as under.

Exim Code	Item Description	Policy	Conditions relating to the Policy	Import under SIL/Public Notice
03061301	Shrimp (scampi) macrobactium frozen	Free		
03061302	AFD shrimp frozen	Free		
03061303	Prawns frozen	Free		
03061400	Crabs	Free		
03061900	Other, including flours, meals and pellets of crustaceans, fit for human	Free		

Notes: This figure shows an example of a government notification issued by the Ministry of Commerce in 1998, detailing the products for which quantitative restrictions were adjusted. The first column lists the 8-digit ITC HS codes, with corresponding product descriptions in the second column. The third column, labeled "Policy", indicates the status of restrictions; "Free" signifies that QRs on that specific product have been lifted. More than 30 such notifications, spanning over 1,000 pages, were digitized to create a novel dataset on product-level quantitative restrictions in India. *Source:* Ministry of Commerce, Government of India.

Table A1: Novel Product Concordances

Prowess Products		ITC HS Products		Industry	
3008040800	Sunflower seed oil	15121910	Sunflower oil edible grade	15142	Manufacture of vegetable oils and fats, excluding corn oil.
3008040804	Sunflower seed oil, refined				
4012080400	Suitcases	420212.04	Plastic moulded suit-cases	19121	Manufacture of travel goods like suitcases, bags and holdalls etc.
5024200404	Distempers	321000.01	Distempers	24222	Manufacture of paints, varnishes, enamels or lacquers.
6308361216	Washing Machines/Laundry Mach	84501100	Fully - automatic washing machines (upto 10kg)	29308	Manufacture of other electric domestic appliances n.e.c.: dishwashers, household type laundry equipment, electric razors including parts and accessories for electrical domestic appliances
		84501200	Other washing machines with built-in centrifugal drier (upto 10kg)		
		84501300	Other washing machines (upto 10kg)		

Notes: This table shows a mapping of ITC HS codes to both NIC industry codes and Prowess product codes. Two separate mapping exercises were conducted to achieve this concordance. First, 8-digit ITC HS codes were mapped to NIC industry codes at the 4-digit level using the HI to I3 concordance provided by the World Bank, which served as a foundation for further manual extension to the 5-digit NIC 1998 codes. Second, an ITC HS to Prowess mapping was created at the most granular level, linking 8-digit ITC HS codes to 10-digit Prowess codes based on product descriptions. This concordance links over 2,700 HS products to more than 6,000 Prowess products across 400 industries, providing a comprehensive framework for analyzing product-level and industry-level relationships. *Source:* CMIE Prowess and Ministry of Corporate Affairs, Government of India.

A.3 Appendix: Results

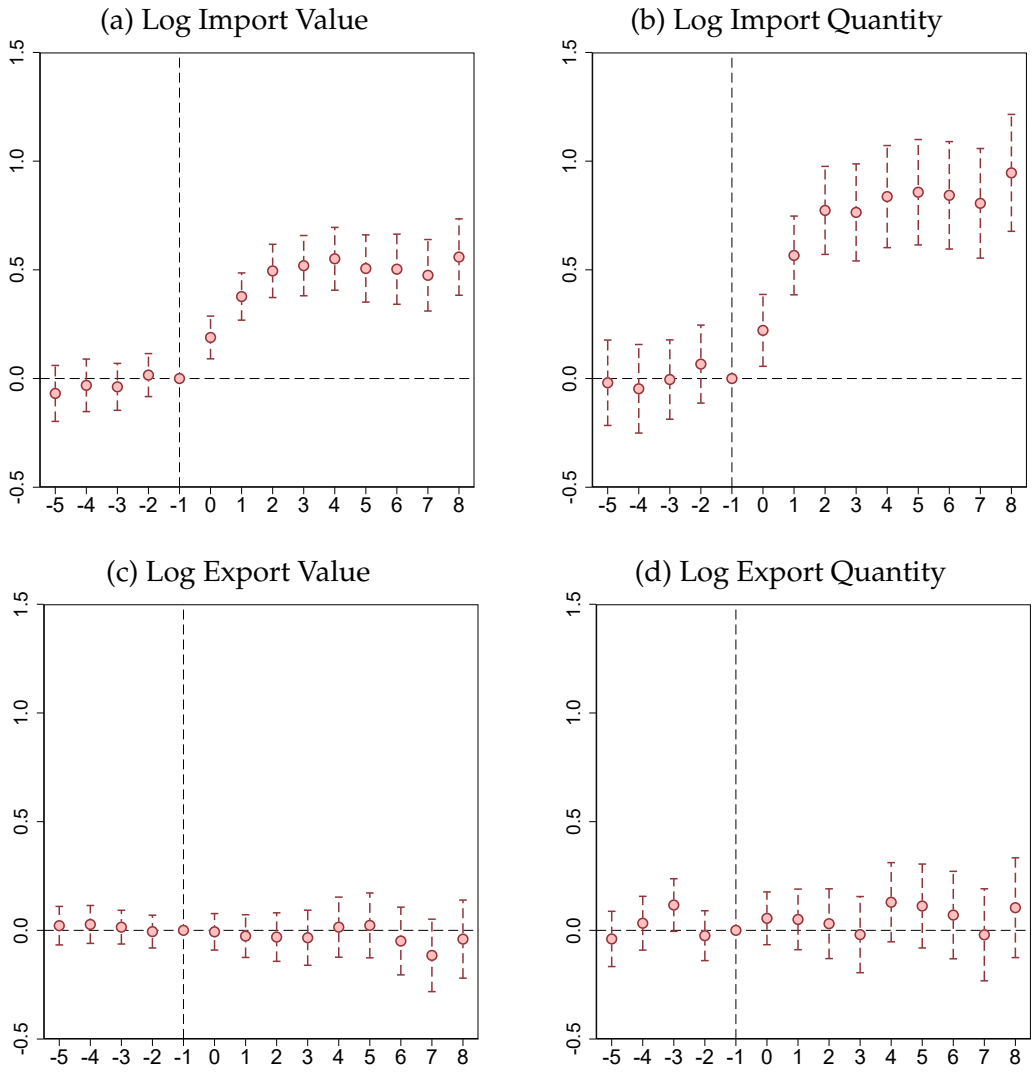
A.3.1 Aggregate Product-Level Analysis

Table A2: Value and Quantity of Imports Increase after QR Removal with No Impact on Exports

	(1) Import Value	(2) Import Quantity	(3) Export Value	(4) Export Quantity
5 years before event	-0.036	-0.012	0.020	-0.030
	(0.068)	(0.10)	(0.052)	(0.074)
4 years before event	-0.0072	0.039	0.061	0.11
	(0.073)	(0.12)	(0.054)	(0.078)
3 years before event	0.022	0.053	0.039	0.14**
	(0.065)	(0.11)	(0.046)	(0.068)
2 years before event	0.022	0.11	0.0098	0.033
	(0.056)	(0.13)	(0.043)	(0.069)
Year of event	0.18***	0.23***	-0.021	0.064
	(0.059)	(0.090)	(0.045)	(0.067)
1 year after event	0.37***	0.56***	-0.042	0.022
	(0.063)	(0.10)	(0.053)	(0.076)
2 years after event	0.46***	0.74***	-0.055	0.045
	(0.072)	(0.11)	(0.062)	(0.093)
3 years after event	0.52***	0.81***	-0.100	-0.067
	(0.080)	(0.13)	(0.071)	(0.10)
4 years after event	0.57***	0.90***	-0.054	0.14
	(0.080)	(0.13)	(0.074)	(0.10)
5 years after event	0.56***	0.97***	-0.068	0.091
	(0.088)	(0.13)	(0.080)	(0.11)
6 years after event	0.57***	0.95***	-0.096	0.090
	(0.091)	(0.14)	(0.084)	(0.11)
7 years after event	0.55***	0.93***	-0.16*	-0.0060
	(0.095)	(0.14)	(0.089)	(0.11)
8 years after event	0.63***	1.09***	-0.068	0.13
	(0.11)	(0.16)	(0.099)	(0.13)
HS-6 digit FE	✓	✓	✓	✓
HS-4 digit × Year FE	✓	✓	✓	✓
Observations	90364	89911	93222	92503
R^2	0.89	0.91	0.86	0.89

Notes: The table presents results from the event study specification (1), with corresponding event study estimates plotted in Figure (4). The dependent variables are log import value (column (1)), log import quantity (column (2)), log export value (column (3)), and log export quantity (column (4)). An HS-6 digit product is considered treated if QRs were removed from any of its constituent HS-8 digit products.β_{-1}, the coefficient for the year before QRs were removed, is normalized to zero. The policy is staggered from 1995 to 2001. All regressions control for HS-6 digit product fixed effects and HS-4 digit product × year fixed effects. Standard errors, clustered at the HS-6 digit product level, are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. *Source:* CMIE Trade_{dx}.

Figure A2: Value and Quantity of Imports Increase after QR Removal with No Impact on Exports: Robustness to Two-Way Fixed Effects Estimator



Notes: The figure presents β_k event study coefficients from Equation (1) using the two-way fixed estimator on annual HS-6 digit product-level panel data on imports and exports. The dependent variables are log import value (panel (a)), log import quantity (panel (b)), log export value (panel (c)), and log export quantity (panel (d)). An HS-6 digit product is identified as treated if QRs were removed from any of its constituent HS-8 digit products. β_{-1}, the coefficient prior to the year in which QRs were removed, is normalized to zero. The policy is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include HS-6 digit product fixed effects and HS-4 digit product $\times$ year fixed effects. Standard errors are clustered by HS-6 digit product. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Trade$_{dx}$.

A.3.2 Firm-Level Analysis

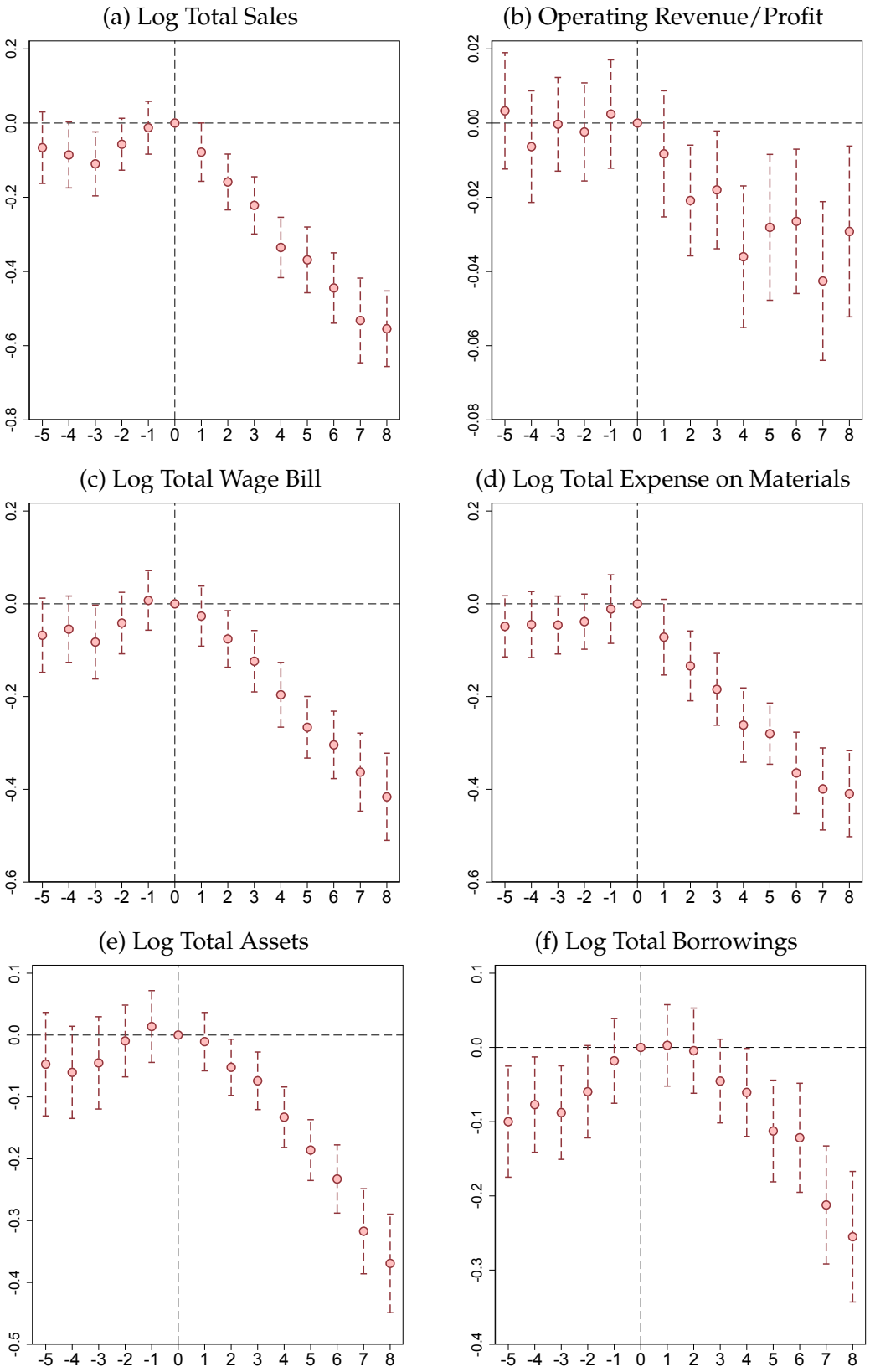
A.3.3 Firm Level Event Studies: Financial Indicators

Table A3: Domestic Firms Contract after QR Removal

	(1) Total Sales	(2) Operating Profits/ Revenue	(3) Total Wage Bill	(4) Total Expense on Materials	(5) Total Assets	(6) Total Borrowings
5 years before event	-0.064	-0.00079	-0.076**	-0.039	-0.043	-0.078**
	(0.040)	(0.0066)	(0.034)	(0.032)	(0.032)	(0.036)
4 years before event	-0.093**	-0.013*	-0.067**	-0.038	-0.066**	-0.047
	(0.043)	(0.0076)	(0.034)	(0.036)	(0.030)	(0.034)
3 years before event	-0.12***	-0.0048	-0.10***	-0.044	-0.038	-0.051
	(0.040)	(0.0066)	(0.034)	(0.033)	(0.031)	(0.033)
2 years before event	-0.056	-0.0033	-0.051*	-0.035	-0.00083	-0.028
	(0.035)	(0.0071)	(0.029)	(0.032)	(0.027)	(0.030)
1 year before event	-0.0099	0.0025	-0.00072	-0.0083	0.033	0.012
	(0.034)	(0.0078)	(0.028)	(0.037)	(0.025)	(0.031)
1 year after event	-0.079**	-0.0096	-0.031	-0.075**	0.0049	0.038
	(0.036)	(0.0086)	(0.029)	(0.037)	(0.022)	(0.031)
2 years after event	-0.15***	-0.021***	-0.072**	-0.14***	-0.036*	0.032
	(0.036)	(0.0075)	(0.029)	(0.033)	(0.022)	(0.031)
3 years after event	-0.22***	-0.014*	-0.13***	-0.20***	-0.052**	-0.0056
	(0.036)	(0.0084)	(0.032)	(0.035)	(0.022)	(0.031)
4 years after event	-0.34***	-0.033***	-0.19***	-0.28***	-0.11***	-0.022
	(0.041)	(0.0096)	(0.032)	(0.039)	(0.024)	(0.031)
5 years after event	-0.39***	-0.024**	-0.27***	-0.31***	-0.17***	-0.081**
	(0.045)	(0.0100)	(0.032)	(0.037)	(0.024)	(0.034)
6 years after event	-0.46***	-0.023**	-0.32***	-0.38***	-0.22***	-0.11***
	(0.046)	(0.0099)	(0.036)	(0.047)	(0.026)	(0.038)
7 years after event	-0.57***	-0.044***	-0.40***	-0.43***	-0.32***	-0.21***
	(0.055)	(0.0093)	(0.041)	(0.046)	(0.033)	(0.041)
8 years after event	-0.59***	-0.033***	-0.45***	-0.43***	-0.38***	-0.26***
	(0.050)	(0.011)	(0.045)	(0.051)	(0.037)	(0.047)
Firm FE	✓	✓	✓	✓	✓	✓
Three-Digit Industry × Year FE	✓	✓	✓	✓	✓	✓
Observations	72784	72784	73936	64773	78623	73713
R^2	0.76	0.35	0.82	0.78	0.83	0.76

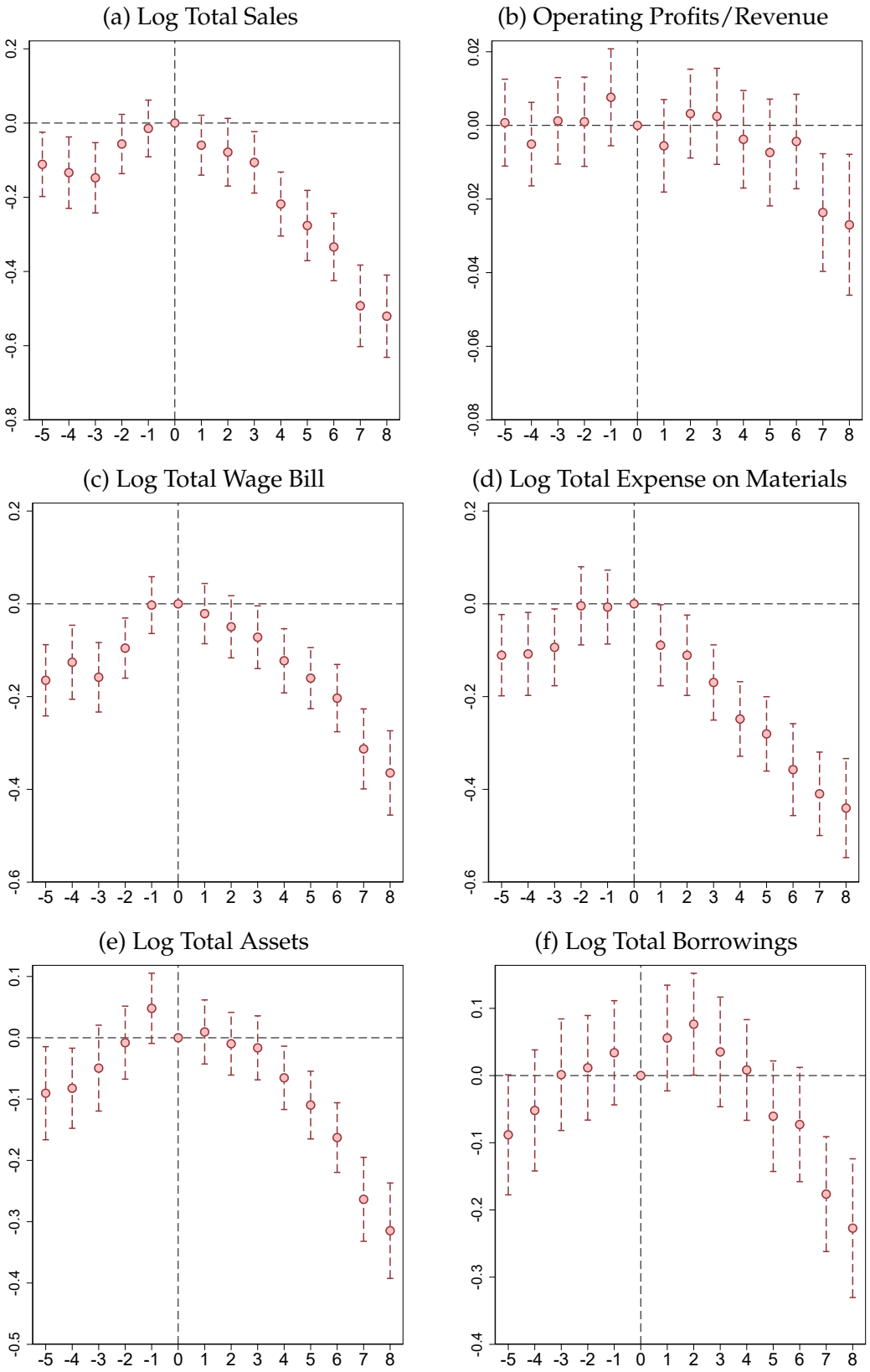
Notes: The table presents results from the event study specification (2), with corresponding event study estimates plotted in Figure (5). The dependent variables are: log total sales (column (1)), operating profits/revenue (column (2)), log total wage bill (column (3)), log total expense on materials (column (4)), log total assets (column (5)), and log total borrowings (column (6)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001. All regressions control for firm and three-digit industry × year fixed effects. Standard errors, clustered at the three-digit industry × year level, are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. *Source:* CMIE Prowess$_{dx}$.

Figure A3: Domestic Firms Contract after QR Removal: Robustness to Two-Way Fixed Effects Estimator



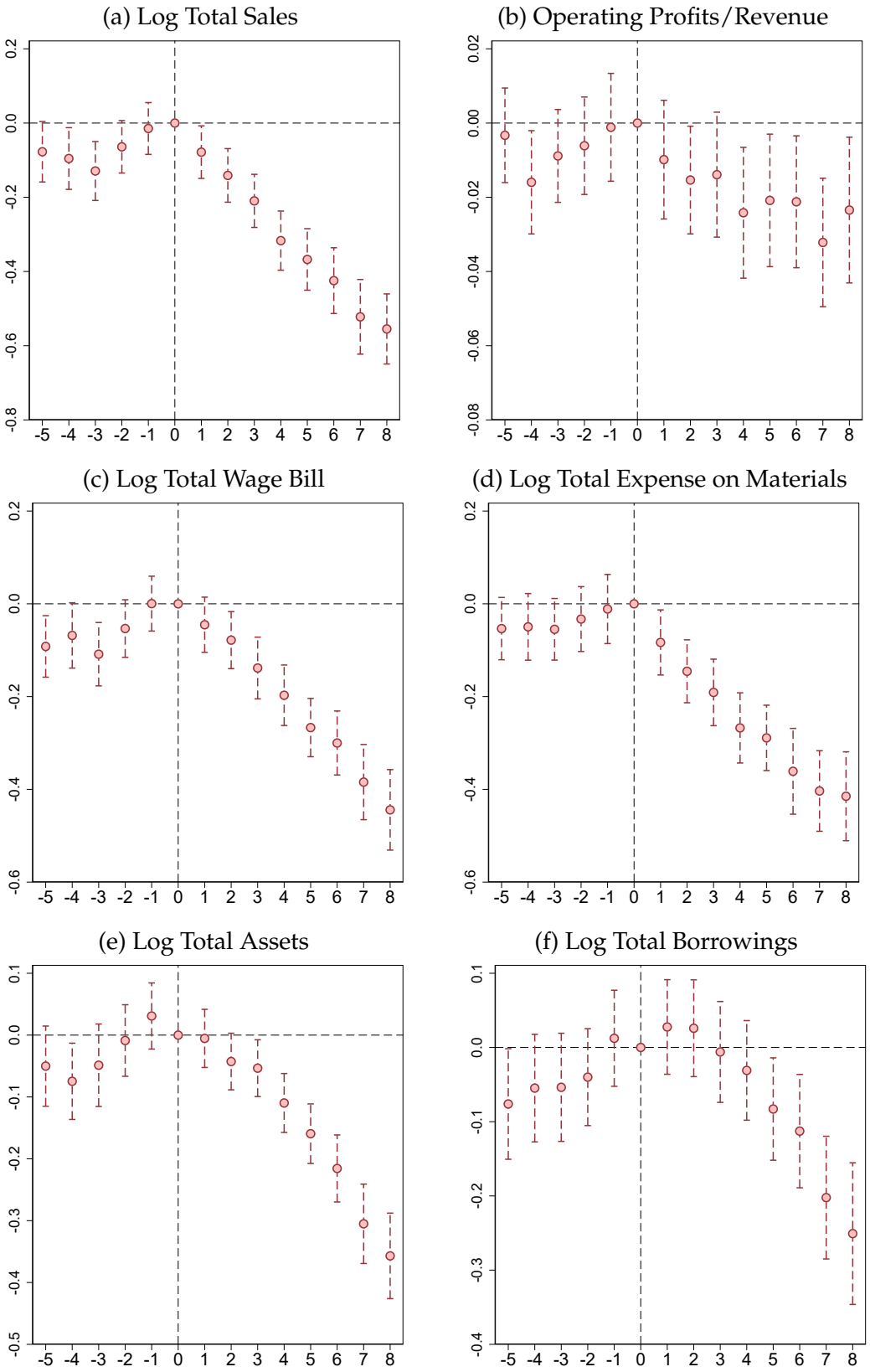
Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2), estimated using two-way fixed estimator. The dependent variables are: log total sales (panel (a)), operating profits/revenue (panel (b)), log total compensation (panel (c)), log total expense on raw materials (panel (d)), log total assets (panel (e)), and log total borrowings (panel (f)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines are the 95 percent confidence intervals. *Source:* Prowess.

Figure A4: Domestic Firms Contract after QR Removal: Robustness to Conditioning on Family Firms



Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2) for firms which were identified as family firms beginning from pre-policy period, where the dependent variables are: log total sales (panel (a)), operating profits/revenue (panel (b)), log total compensation (panel (c)), log total expense on raw materials (panel (d)), log total assets (panel (e)), and log total borrowings (panel (f)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$.

Figure A5: Domestic Firms Contract after QR Removal: Robustness to conditioning on Surviving Firms



Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2) for firms that survive after the shock (i.e., firms that do not exit after the shock). The dependent variables are: log total sales (panel (a)), operating profits/revenue (panel (b)), log total compensation (panel (c)), log total expense on raw materials (panel (d)), log total assets (panel (e)), and log total borrowings (panel (f)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$.

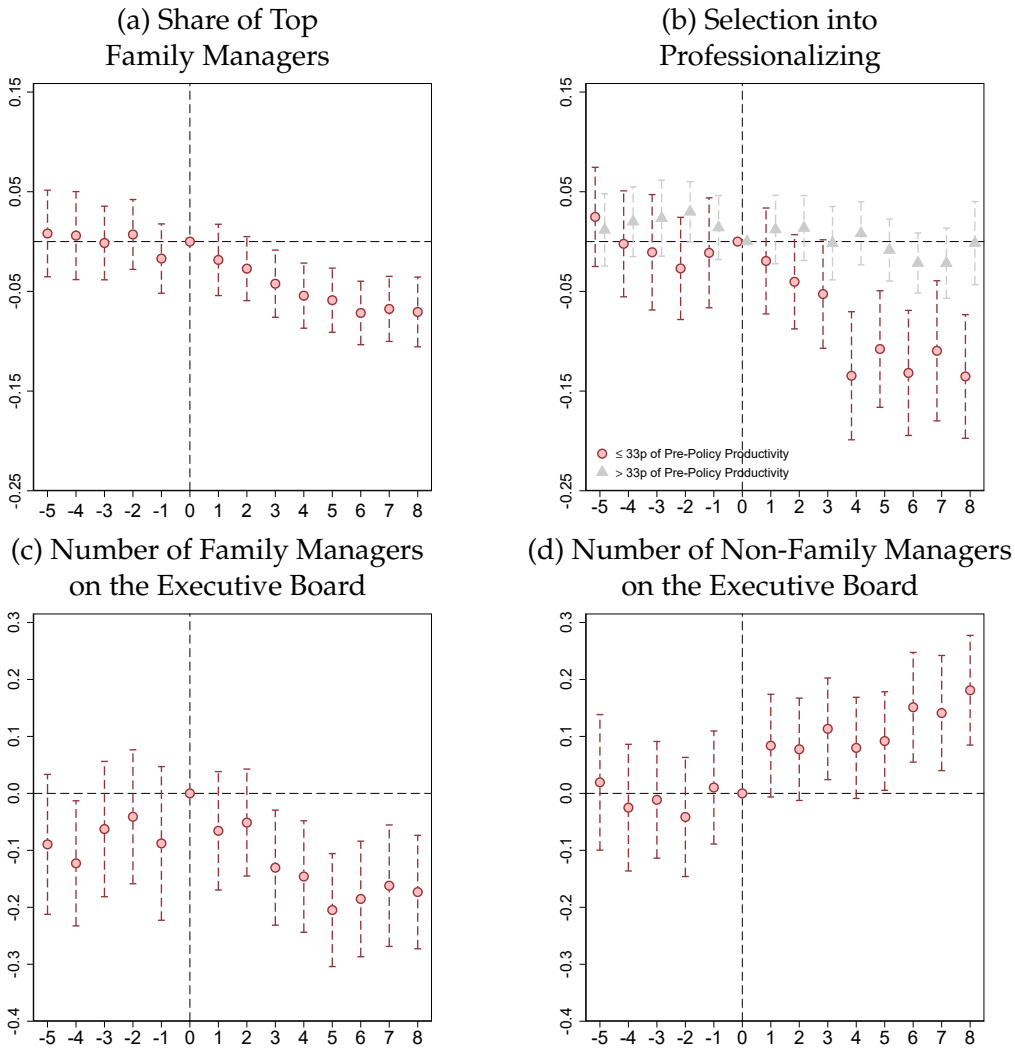
A.3.4 Firm Level Event Studies: Managerial Indicators

Table A4: Firms Reduce Family Members on the Executive Board of Directors after the QR Shock

	(1) Share of Top Family Managers	(2) Number of Family Managers	(3) Number of Non-Family Managers
5 years before event	0.0048	-0.093	0.017
	(0.023)	(0.066)	(0.064)
4 years before event	0.00080	-0.10*	-0.014
	(0.024)	(0.055)	(0.060)
3 years before event	-0.00094	-0.087	-0.0100
	(0.020)	(0.059)	(0.059)
2 years before event	0.0021	-0.050	-0.026
	(0.019)	(0.056)	(0.058)
1 year before event	-0.014	-0.10	0.017
	(0.019)	(0.063)	(0.059)
1 year after event	-0.011	-0.086	0.084*
	(0.019)	(0.053)	(0.051)
2 years after event	-0.028	-0.061	0.091*
	(0.017)	(0.053)	(0.048)
3 years after event	-0.044**	-0.15***	0.13***
	(0.018)	(0.053)	(0.047)
4 years after event	-0.061***	-0.16***	0.091*
	(0.018)	(0.054)	(0.049)
5 years after event	-0.061***	-0.24***	0.093*
	(0.018)	(0.052)	(0.048)
6 years after event	-0.072***	-0.18***	0.16***
	(0.017)	(0.053)	(0.052)
7 years after event	-0.069***	-0.17***	0.15***
	(0.017)	(0.053)	(0.055)
8 years after event	-0.077***	-0.18***	0.20***
	(0.018)	(0.052)	(0.052)
Firm FE	✓	✓	✓
Three-Digit Industry × Year FE	✓	✓	✓
Observations	23445	23800	23800
R^2	0.83	0.77	0.75

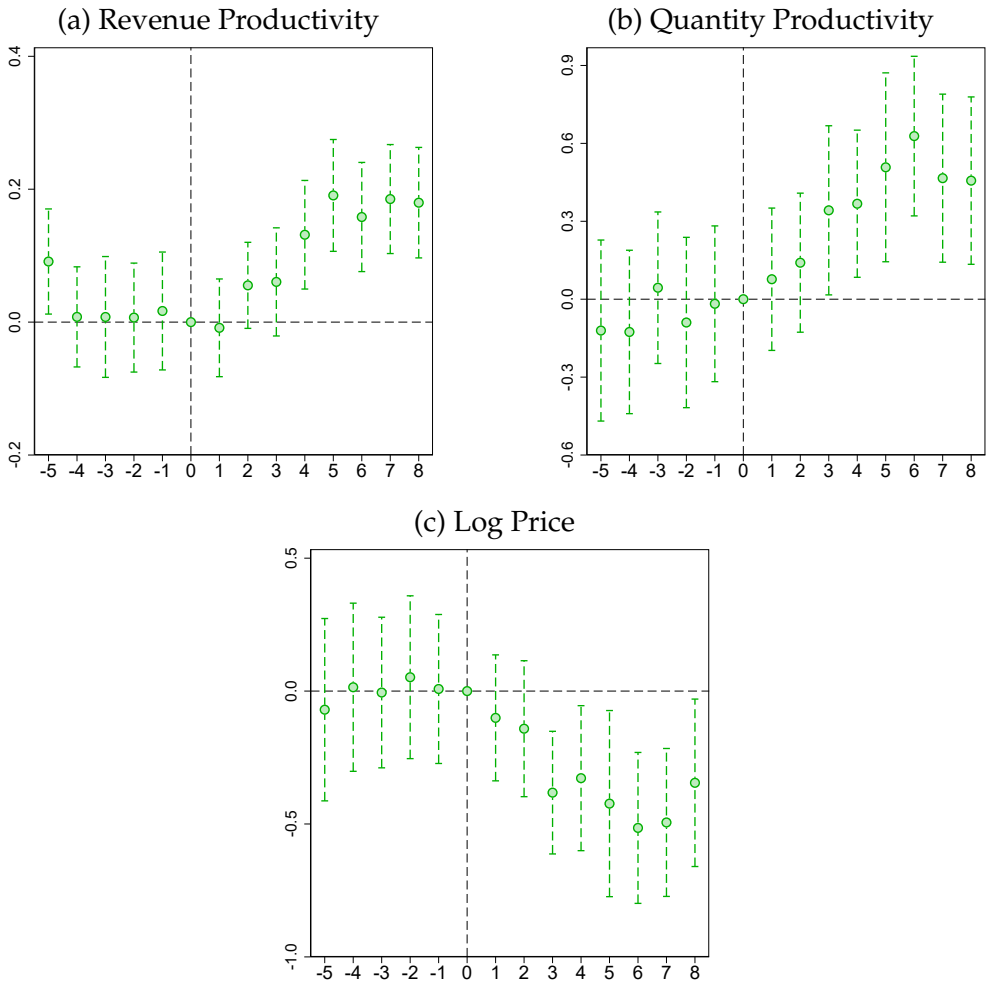
Notes: The table presents results from the event study specification (2), with corresponding event study estimates plotted in Figure (6). The dependent variables are: the share of family members on the executive board of directors of a firm (i.e., top management positions like CEO, CFO, MD, etc.) in (column (1)), the number of family members on the executive board of directors in (column (2)) and the number of non-family managers on the executive board of directors in (column (3)). A firm is identified as treated in a year if QRs were removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001. All regressions control for firm, four-digit industry × year and district × year fixed effects. Standard errors, clustered at the three-digit industry × year level, are reported in parentheses. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. *Source:* CMIE Prowess$_{dx}$.

Figure A6: Firms Reduce Family Members on the Executive Board of Directors after the QR Shock: Robustness to Two-Way Fixed Effects Estimator



Notes: The figure plots the estimated θ_k event study coefficients from a regression of the form given in (2), estimated using the two-way fixed estimator. The dependent variables are: the share of family members on the executive board of directors of a firm (i.e., top management positions like CEO, CFO, MD, etc.) in panel (a), share of top family managers dropped from the board while transitioning toward professional management in panel (b), the number of family members on the executive board of directors in panel (c) and the number of non-family professionals on the executive board of directors in panel (d). In panel (b), we examine selection into professionalizing by comparing firms based on their pre-policy productivity. Firms are divided into two groups: those in the bottom tertile of pre-policy productivity and the remaining firms. A firm is identified as treated in a year if QRs are removed on its highest-revenue product. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis labels denoting years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines are the 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

Figure A7: Increase in Productivity as Firms Shed Family Members after QR Removal: Triple Specification



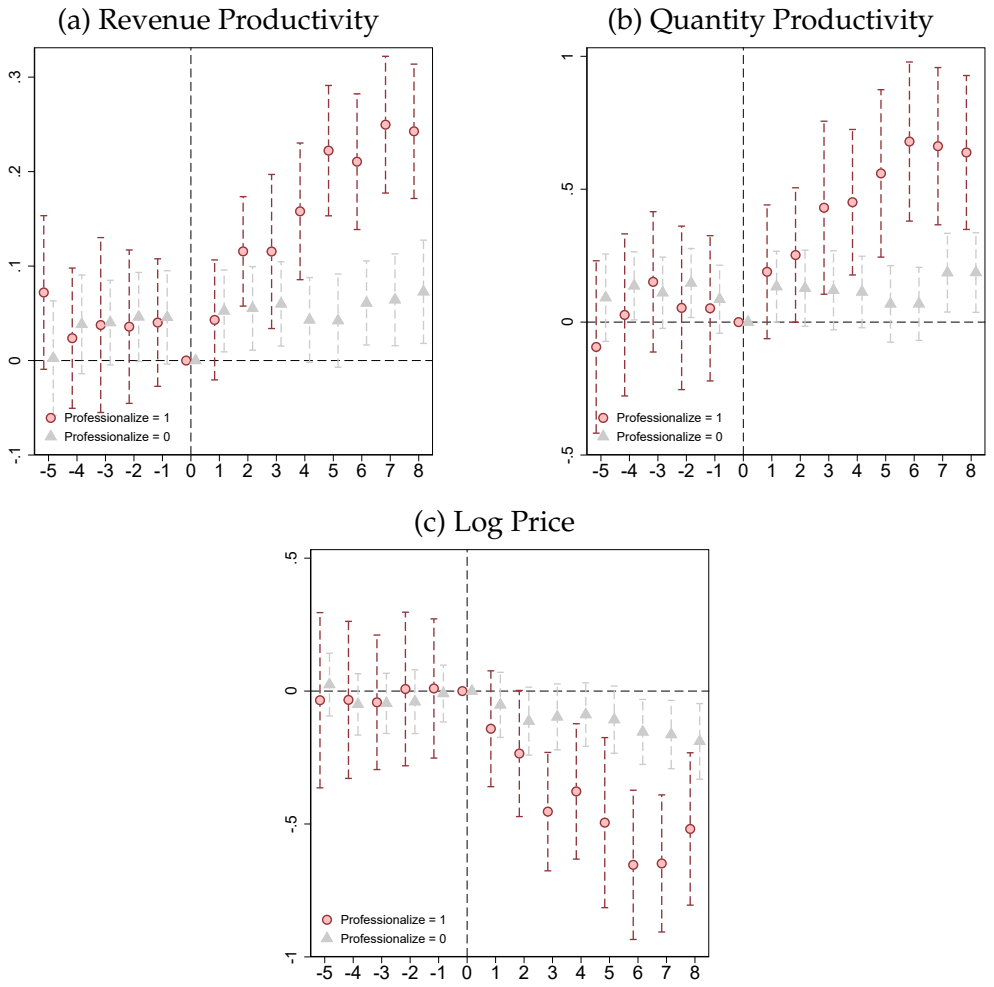
Notes: This figure presents the estimated θ_k event study coefficients from a regression specified in equation (2), with coefficients in Table A5. Event studies are conducted by interacting and taking differences between firms that professionalized their management after QR removal and those that did not. A firm is classified as treated in a year if QRs are removed on its highest-revenue product. A firm is considered to have professionalized if the share of family members on the executive board of directors declined in the post-policy period. The dependent variables are revenue productivity (TFPR) (panel (a)), quantity productivity (TFPQ) (panel (b)), and log price (panel (c)). TFPR and TFPQ are estimated using the method proposed in Petrin and Levinsohn (2012). Log price is defined as the ratio of a firms total value of products produced and the total quantity of products produced. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis indicating years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines represent 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.

Table A5: Increase in Productivity as Firms Shed Family Members after QR Removal: Triple Specification

	(1) Revenue Productivity	(2) Quantity Productivity	(3) Log Price
5 years before event	0.091**	-0.12	-0.070
	(0.040)	(0.18)	(0.17)
4 years before event	0.0079	-0.13	0.014
	(0.038)	(0.16)	(0.16)
3 years before event	0.0078	0.044	-0.0055
	(0.046)	(0.15)	(0.14)
2 years before event	0.0068	-0.090	0.052
	(0.042)	(0.17)	(0.16)
1 year before event	0.017	-0.018	0.0079
	(0.045)	(0.15)	(0.14)
1 year after event	-0.0086	0.077	-0.10
	(0.037)	(0.14)	(0.12)
2 years after event	0.055*	0.14	-0.14
	(0.033)	(0.14)	(0.13)
3 years after event	0.061	0.34**	-0.38***
	(0.041)	(0.17)	(0.12)
4 years after event	0.13***	0.37**	-0.33**
	(0.042)	(0.14)	(0.14)
5 years after event	0.19***	0.51***	-0.42**
	(0.043)	(0.19)	(0.18)
6 years after event	0.16***	0.63***	-0.51***
	(0.042)	(0.16)	(0.14)
7 years after event	0.19***	0.47***	-0.49***
	(0.042)	(0.16)	(0.14)
8 years after event	0.18***	0.46***	-0.35**
	(0.042)	(0.16)	(0.16)
Firm FE	✓	✓	✓
Three-digit Industry × Year FE	✓	✓	✓
Observations	24367	24367	24367
R^2	0.89	0.85	0.87

Notes: The table presents the estimated θ_k event study coefficients from a regression specified in equation (2), with corresponding estimates plotted in Figure (A7). Event studies are conducted by interacting and taking differences between firms that professionalized their management after QR removal and those that did not. A firm is classified as treated in a year if QRs are removed on its highest-revenue product. A firm is considered to have professionalized if the share of family members on the executive board of directors declined in the post-policy period. The dependent variables are revenue productivity (TFPR) (column (1)), quantity productivity (TFPQ) (column (2)), and log price (column (3)). TFPR and TFPQ are estimated using the method proposed in Petrin and Levinsohn (2012). Log price is defined as the ratio of a firm's total value of products produced and the total quantity of products produced. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001. All regressions include firm and three-digit industry × year fixed effects. Clustering of standard errors is at the three-digit industry × year. Standard errors are in parenthesis. ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. *Source:* CMIE Prowess_*dx* and the Ministry of Corporate Affairs, Government of India.

Figure A8: Increase in Productivity as Firms Shed Family Members after QR Removal: Robustness to Two-Way Fixed Effects Estimator



Notes: This figure presents the estimated θ_k event study coefficients from a regression specified in equation (2), estimated using two-way fixed estimator. Event studies are conducted separately for firms that professionalized their management after QR removal (in red) and those that did not (in grey). A firm is classified as treated in a year if QRs are removed on its highest-revenue product. A firm is considered to have professionalized if the share of family members on the executive board of directors declined in the post-policy period. The dependent variables are revenue productivity (TFPR) (panel (a)), quantity productivity (TFPQ) (panel (b)), and log price (panel (c)). TFPR and TFPQ are estimated using the method proposed in Petrin and Levinsohn (2012). Log price is defined as the ratio of a firms total value of products produced and the total quantity of products produced. θ_0, the coefficient for the year in which QRs were removed, is normalized to zero. The event is staggered from 1995 to 2001, with the x-axis indicating years relative to the event. All regressions include firm and three-digit industry $\times$ year fixed effects. Standard errors are clustered at the three-digit industry $\times$ year level. The vertical lines represent 95 percent confidence intervals. *Source:* CMIE Prowess$_{dx}$ and the Ministry of Corporate Affairs, Government of India.