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Gains from Targeting? Government Subsidies and Firm Performance in China

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Abstract

This paper studies the firm-level impact of the world's largest targeted capital import subsidy program implemented in China. Drawing on rich manufacturing firm survey data, product-level trade transactions, and a comprehensive list of capital goods eligible for subsidies, we exploit variation in firms' exposure to the subsidy program to assess its impact on credit access, investment, sales, and trade. We find that a one-standard-deviation increase in a firm's exposure to the subsidy leads to a 0.03% increase in total borrowing and a 0.05% reduction in financing costs. These financial benefits translate into substantial real effects, including a 0.15% rise in investment and a 1.39% improvement in the marginal revenue product of capital. The program's benefits persist over time and are especially pronounced for financially constrained firms and non-state enterprises, indicating that targeted import subsidies can effectively alleviate market frictions and foster industrial development.

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Non-Technical Summary

Governments often use subsidies to encourage specific economic activities, such as importing advanced technology to boost domestic capabilities. China implemented such a programme in late 2007, aiming to enhance firm productivity and technological development by reducing the cost of importing high-tech machinery not produced domestically. The policy offered support to all firms operated in mainland China regardless of their ownership through low-interest loans from policy banks and rebates on interest costs for qualifying imports, with eligible products listed in a government catalogue that was updated over time. Evaluating the real-world effectiveness of such targeted industrial policies is crucial for understanding their impact and informing future policy design.

To assess the programme's impact, this study uses detailed data covering thousands of Chinese manufacturing firms from 2002 to 2013. A firm's exposure to the policy is measured using the composition of its capital goods imports before the policy began in late 2007. Firms that imported more of the types of equipment later targeted by the subsidy were more likely to benefit once the programme was implemented. By comparing the post-policy performance of firms with different levels of pre-policy exposure, while controlling for other internal and external factors' the analysis isolates the causal effects of the subsidy programme.

The results show a clear positive impact of the import subsidy programme on firms that were more exposed to it. These firms increased their borrowing and invested more heavily in capital equipment compared to those with lower exposure. This investment translated into improved performance: firms became more productive by generating more output, and they became more profitable. They also expanded their operations, hired more workers, and paid higher wages.

However, the benefits were not evenly distributed. Firms that likely faced greater credit constraints before the policy, especially non-state-owned enterprises, experienced larger gains than state-owned firms, which generally have better access to finance. This suggests that the subsidy was particularly effective in easing financial frictions for firms. The analysis also shows that firms benefited more the longer they were exposed to the policy, although the positive effects tended to level off over time, indicating diminishing returns.

The findings suggest that well-targeted industrial subsidies, specifically those focused on specific products (like advanced capital equipment) rather than favouring particular firms, can be an effective tool for easing financial constraints and promoting firm growth domestically. By reducing the cost of acquiring productivity-enhancing capital, this Chinese programme successfully stimulated investment and improved multiple dimensions of firm performance, especially for financially-constrained enterprises. This experience offers valuable insights into how industrial policy can be designed to effectively support and economic development.

Gains from Targeting? Government Subsidies and Firm Performance in China*

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February 2025

Abstract

This paper studies the firm-level impact of the world's largest targeted capital import subsidy program implemented in China. Drawing on rich manufacturing firm survey data, product-level trade transactions, and a comprehensive list of capital goods eligible for subsidies, we exploit variation in firms' exposure to the subsidy program to assess its impact on credit access, investment, sales, and trade. We find that a one-standard-deviation increase in a firm's exposure to the subsidy leads to a 0.03% increase in total borrowing and a 0.05% reduction in financing costs. These financial benefits translate into substantial real effects, including a 0.15% rise in investment and a 1.39% improvement in the marginal revenue product of capital. The program's benefits persist over time and are especially pronounced for financially constrained firms and non-state enterprises, indicating that targeted import subsidies can effectively alleviate market frictions and foster industrial development.

JEL codes: F13, F14, D22

Keywords: Government subsidy, credit allocation, investment, financial constraint

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1 Introduction

Recent geopolitical tensions have renewed focus on industrial policy, with governments worldwide granting substantial subsidies to domestic firms to reduce unemployment, foster technology adoption, and enhance production capacity (Banerjee and Duflo, 2014; Criscuolo et al., 2019; Bonfim et al., 2023). China, often central in these discussions, has faced criticism for allegedly giving an unfair advantage to government-preferred firms, a strategy some argue may be counterproductive. Studies have shown that China's industrial policies and the economic stimulus measures following the global financial crisis have led to inefficient credit allocation (Cong et al., 2019; Branstetter et al., 2023). In contrast to these concerns, we demonstrate that well-targeted government subsidies can enhance firm performance by alleviating pre-existing credit constraints. Specifically, we show that targeted subsidies enhance credit access and reduce borrowing costs, with these financial benefits translating into greater investment, output, and employment—particularly for financially constrained and non-state-owned firms.

Our study focuses on a unique government subsidy program introduced by the Chinese central government in 2007 that targets capital goods imported by domestic firms. Unlike the more common practice of subsidizing domestic credit in export sectors (Akgündüz et al., 2018; Defever et al., 2020a,b; Matray et al., 2024) or reducing tariffs (Zia, 2008), our paper shifts the focus to direct import subsidies for capital goods. These high-value, durable assets are essential for advancing high-tech industries in which domestic production is still nascent, yet their high costs typically impose financing challenges that can impede technology adoption and capacity expansion (Rampini, 2019). The program stands out as the first national-level initiative specifying which capital goods and advanced technologies qualify for government support, with the list determined at the national level and updated multiple times to keep pace with technological changes. Firms importing listed products receive both fiscal subsidies and preferential credit from a major policy bank, directly addressing the financing challenges common to capital-intensive investments.

Because the program is both comprehensive and highly targeted, firms were unlikely to have precisely anticipated or rapidly adjusted their production structures. To identify its causal effects, we exploit firms' heterogeneous exposure to the subsidy prior to its implementation, using detailed transaction-level import data and official product lists. Our analysis adopts a difference-in-differences approach, carefully accounting for unobserved firm-specific characteristics as well as time-varying industry- and city-specific factors. The study spans 2002–2013, a period chosen to capture both immediate and longer-term effects while avoiding contamination from China's post-financial crisis stimulus policies.

Our analysis yields several findings that advance our understanding of industrial

policy effectiveness. First, we document that firms exposed to the import subsidy program experience significant improvements in credit access and financing costs. While Liu (2019) show how industrial policies propagate through production networks, and Aghion et al. (2015) show such policies are most effective when fostering competition, we examine how targeted import subsidies combine direct cost reduction and credit support to affect firm performance. Specifically, we find that treated firms experience a reduction in borrowing costs of 0.9 percentage points and an expansion in credit access of 6 percent relative to non-treated firms.

Second, we find that subsidized firms increase investment. Consistent with prior evidence that capital goods imports enhance productivity (Mutreja et al., 2018; Mo et al., 2021) and spur innovation (Bøler et al., 2015), we find that firms exposed to the subsidy program significantly increase their acquisition of capital goods and expand production capacity. Importantly, this increased investment translates into improved efficiency: treated firms show higher investment efficiency as measured by the marginal revenue product of capital and increased profitability. These findings extend Liu (2019)'s evidence on network effects by demonstrating how direct import subsidies can stimulate technological upgrading in importing firms. Moreover, consistent with Rampini (2019)'s emphasis on financial constraints as barriers to technology adoption, our results suggest that the program's combination of direct subsidies and credit support effectively enables firms to invest in advanced capital goods.

Third, the program generates broader improvements in firm performance that align with its strategic objectives. Treated firms experience significant increases in output, sales, employment, and trade performance. Moreover, our analysis reveals important heterogeneity associated with this import subsidy program. While credit access expands similarly across firms, the reduction in financing costs is primarily driven by firms facing higher financial frictions *ex ante*. These financially constrained firms also exhibit the most significant improvements in investment efficiency, profitability, and total output. A similar pattern emerges when examining ownership structure: although both state-owned enterprises (SOEs) and non-SOEs experience comparable improvements in credit access and borrowing costs, non-SOEs achieve significantly larger gains in investment efficiency, profitability, employment growth, and labor income. Furthermore, the benefits of the program also appear to accumulate over time. Firms with longer exposure to the subsidy show stronger and more persistent improvements in economic performance. This dynamic pattern, consistent with Rampini (2019)'s work on financial capacity and investment, suggests that sustained access to both imported capital goods and credit support allows firms to more fully realize the program's benefits.

Our results remain robust to a range of alternative specifications. These include controlling for other subsidies, restricting the sample to the pre-2009 period, using an alternative measure of firm exposure to the import subsidy, accounting for changes in

the reporting thresholds, and employing different fixed effects. Moreover, a placebo test using processing trade data—where firms are exempt from the import subsidy program—further confirms that our findings are not driven by spurious effects.

Our work advances several strands of literature. It first directly speaks to a growing literature exploring the consequences of targeted government support programs. A significant body of research has shown that government support can help firms overcome credit constraints and promote growth, particularly among smaller firms (Lelarge et al., 2010; Banerjee and Duflo, 2014; Bonfim et al., 2023). We examine a novel policy tool—targeted import subsidies for capital goods – and show how it affects both firms' financial conditions and technology adoption. Our findings align with broader evidence in the industrial policy literature. For instance, Criscuolo et al. (2019) finds that regional investment subsidies have larger effects on smaller firms, while Rotemberg (2019) shows that subsidy effectiveness varies with market structure. Similarly, we find that gains are most pronounced among small and private firms, which typically face stricter credit constraints than state-owned enterprises. This suggests that targeted support is especially valuable for firms facing financial limitations. We also complement the work of Akgündüz et al. (2018); Defever et al. (2020a,b); Matray et al. (2024). While these studies primarily examine firm-level export behavior in response to government export subsidies, our paper shifts the focus to subsidies on imports and expands the empirical evidence on the consequences of trade policy by highlighting the role of import subsidies.

Our study enriches the literature on industrial policies and firm performance in China. Studies focusing on listed firms find that government subsidies often fail to improve financial performance (Lim et al., 2018) or productivity (Branstetter et al., 2023). However, this evidence may be limited by excluding smaller, unlisted firms. Research examining broader policy effects has shown mixed results: Cai and Harrison (2021) find that the 2004 tax reform led to inefficient resource allocation favoring state-owned enterprises, while Chen et al. (2021) demonstrate that targeted R&D tax incentives can effectively shape firm investment. Building on Aghion et al. (2015)'s insight that industrial policies work best when enhancing competition rather than protecting incumbents, we show that well-designed, product-level targeting can improve both financial and real outcomes, with larger benefits for non-state and financially constrained firms.

Our analysis complements Li et al. (2023), who examine how the import subsidy program affects firms' export quality. While they show that subsidized capital goods imports lead to higher-quality exports, we focus on the program's financial channels and temporal dynamics. First, we explore how it alleviates credit constraints through direct subsidies and preferential credit access, a channel particularly crucial for small and non-state-owned firms. This provides new insights into how industrial policies support firm development through targeted credit allocation. Second, we analyze

the evolution of the subsidized product list, showing that sustained exposure drives persistent firm performance gains and underscoring the importance of long-term policy commitment for technological upgrading.

Our work also connects to research on how capital goods imports affect firm performance. A growing literature shows that imported capital goods can enhance firm-level productivity (Caselli, 2018; Mutreja et al., 2018; Lafortune et al., 2019; Mo et al., 2021) and innovation (Bøler et al., 2015; Bloom et al., 2016). While these studies emphasize direct technology transfer, we show that facilitating capital goods imports through targeted subsidies and credit support can generate broader improvements in firm performance. Specifically, our findings suggest that the combination of direct subsidies and enhanced credit access amplifies the benefits of capital goods imports beyond productivity gains, leading to significant improvements in output, employment, and exports.

The remainder of the paper is structured as follows: Section 2 provides an overview of the import subsidy program and describes the data used for the analysis. Section 3 details the construction of variables and the empirical models employed. Section 4 presents the baseline results, while Section 5 examines heterogeneity effects and explores the underlying mechanisms. Section 6 offers robustness checks for the findings. Finally, Section 7 concludes the study.

2 Institutions and Data

This section begins with a comprehensive overview of the institutional background of the import subsidy policy, detailing its objectives, design, tools, and implementation. It then introduces the two main micro-level datasets that form the basis of our empirical analysis.

2.1 The *Catalogue*

Since the 1950s, key equipment imports have been essential for facilitating technology transfer in China and were initially managed solely by the "China National Technical Import and Export Corporation".[1]

[1]The critical role of equipment imports stems from China's backward industrial environment and the innovation path chosen at the time. As a latecomer to global high-tech development, China faced the question: "how can we participate in the global ranking of high-tech development? In addition to relying on our own efforts to accelerate progress, an important approach is to introduce advanced technology from abroad" (Deng Xiaoping, 1993). Equipment import and technology trade became the two main ways of technology transfer. Early technology transfer was not only dominated by equipment imports, but also prioritized equipment imports. For example, in the first large-scale 156 technology transfers in the 1950s, 89% of foreign exchange was allocated to importing complete equipment. Even in the early 1980s, despite a government directive to "strictly control the import of complete sets of equipment" and prioritize "soft" technology transfers, equipment imports still accounted for 67% of total technology transfer.

With economic reforms in the 1980s, this responsibility was decentralized to industrial production departments and local governments. After China joined the WTO in the 2000s, the importance of encouraging the import of key equipment has been emphasized repeatedly in the annual "Government Work Report". However, until recently, the lack of specific guidance on which equipment to prioritize and how to support these imports limited the effectiveness of the policy. To address these challenges, in September 2007, the Chinese central government launched the *"Catalogue for the Guidance of Importing Technologies and Products"* (hereinafter, *Catalogue*).[2] This was the first national-level initiative to provide a detailed list of products and advanced technologies prioritized for import. The purpose of the *Catalogue* was to identify products and technologies essential for the development of high-tech industries that were not yet producible domestically.

The *Catalogue* is categorized into four sections aligned with government priorities: Part A focuses on advanced technologies, Part B on key equipment, Part C on high-tech industries, and Part D on natural resources. While most sections are text-based, Parts B and D include eight-digit Harmonized System (HS8) codes, allowing precise linkage to firm import records. For our focus on capital goods adoption, Part B is the most relevant, with capital goods accounting for 75% of the key equipment listed. Unlike intermediate goods (e.g., raw materials) or consumption goods, capital goods are durable, high-value items essential for capital-intensive production. They directly contribute to fixed asset investments, enhance production capacity, and improve output performance. To accurately identify capital goods, we utilize the United Nations Statistics Division's Broad Economic Categories Revision 4 (BEC), excluding a small subset of intermediate goods listed in Part B.[3]

Since its launch, the *Catalogue* has undergone five revisions, in 2009, 2011, 2014, 2015, and 2016, respectively (as of 2025).[4] Each revision identifies new key technologies and products that are in short supply domestically, while phasing out support for technologies and products that have achieved self-sufficiency or are no longer considered a priority.[5] The left panel of Figure 1 shows that the number of subsidized capital products at the HS6 level initially numbered around 80, then significantly increased to over 120, followed by steady growth through 2013.[6] Notably, a significant proportion

[2] *Guojia Fazhan he Gaige Weiyuanhui, Caizheng Bu, Shangwu Bu* (2007) No. 2515.

[3] The BEC classification divides goods and services into 19 categories, grouped into three broad classes: intermediate goods, capital goods, and consumption goods.

[4] The current version of this *Catalogue* comes from *Guojia Fazhan he Gaige Weiyuanhui, Caizheng Bu, Shangwu Bu* (2015) No. 1982.

[5] We compiled all versions of the *Catalogue* from 2007 to 2016 to construct an unbalanced panel of HS6 products included in the program. To do so, we first aggregate products from the tariff line level (HS8) to the HS6 level. We then utilize the concordance tables provided by the UN Statistics Division to align the data with the 2002 version of the HS6 classification for consistent year-to-year comparisons. For years between two revisions, we relied on the previous version of the *Catalogue* to identify the encouraged products.

[6] Our firm sample ends in 2013, although there is a notable downward adjustment of the number of subsidized capital products in 2016.

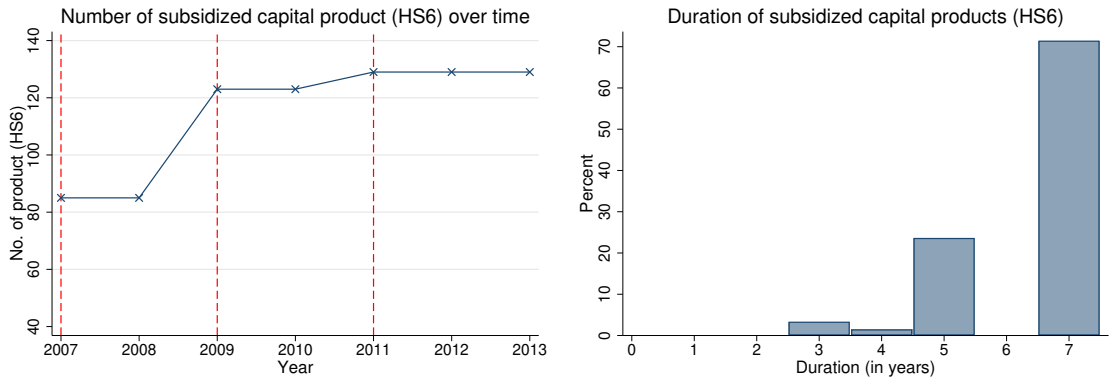


Figure 1: Subsidized capital good (HS6)

Sources: Authors' calculations based on various issues of the *Catalogue* published by National Development and Reform Commission (NDRC).

of capital products have received continuous supporting measures over years. The right panel of Figure 1, shows that more 60% capital products are subsidized for more than 7 years. On the other hand, around 10% capital products only receive support for three or four years, indicating that the government is also targeting some emerging industries or supporting short-term initiatives.

Eligible capital products span a diverse range of sectors at the HS4 level, including machinery, electronics, vehicles, and specialized instruments and devices. Figure A1 highlights these sectors, with the highest import values seen in "Machines and mechanical appliances with individual functions" (HS4: 8479), which covers key electronic components like motors and sensors, and "Electrical transformers, static converters, and inductors" (HS4: 8504), crucial for electrical power transmission systems. Figure A2 illustrates the origins of these subsidized products, showing a significant reliance on Asian suppliers, led by Japan, South Korea, Taiwan, and Singapore. Notably, the United States and European countries, particularly Germany, also account for a considerable share, reflecting a diverse import base for China's subsidized capital goods.

2.2 The import subsidy program: rebate and credit support

The government employs two primary tools to support eligible firms under the subsidy program. The first is a fiscal subsidy, calculated based on the total cost of qualified capital goods imports, effectively acting as a rebate to lower firms' import expenses. The second is direct bank credit, offering below-market interest rates for eligible imports. While detailed data on subsidy disbursements and special loans are unavailable, we present an overview of the support mechanisms and macro-level evidence to establish the policy context. This motivates and validates the instrumental variable measure of the policy shock developed in the next section.

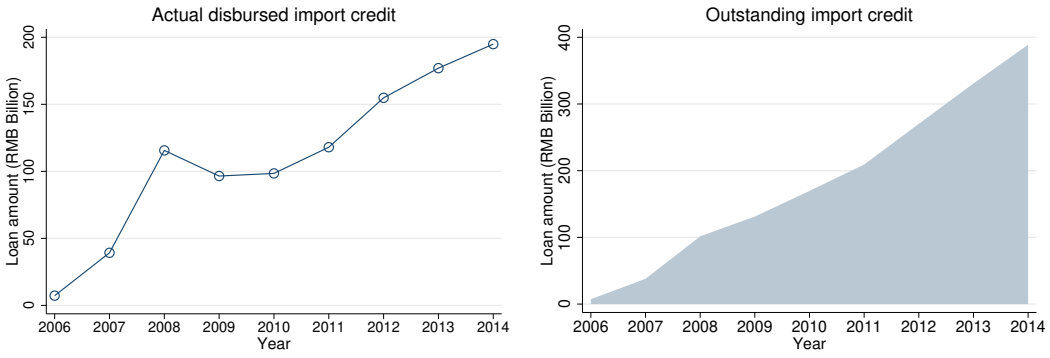


Figure 2: Import credit from Export-Import Bank of China

Sources: Authors' calculations from various issues of annual reports of Export-Import Bank of China.

The fiscal subsidy is implemented through a centralized funding mechanism, which is set aside for this particular use and is insulated from competing fiscal demands. The funding is administered by the central government's Special Funds for Foreign Trade and Economic Development. The specific requirements and application procedures for the subsidy are outlined in the *"Interim Measures for the Administration of Interest Subsidies for Import Credit Funds"* (hereinafter, *Interim Measures*) that are public to all firms.[7]

Under the *Interim Measures*, firms must meet specific criteria to qualify for the subsidy program. They must have imported products listed in the *Catalogue* through *ordinary trade* during a specified period, typically spanning the latter half of the previous year and the first half of the application year. Additionally, they must be the end-users of the imported products, with resale prohibited.[8] Eligible firms apply for the rebate through an annual open call conducted by the Minister of Commerce. The total amount of subsidy is determined by multiplying the import value in Chinese Renminbi (RMB) by a subsidized interest rate, which is capped by the benchmark loan prime rate set by the People's Bank of China.[9] Once approved, firms typically receive the funds within two to three months, often as a substantial lump-sum rebate.

In addition to the fiscal support, there is also dedicated import credit support for the program, known as "*Providing Credit Support for Import Commodities Encour-*

[7]Please see the gazette issued by *Caizheng Bu, Shangwu Bu* (2007) No. 205. However, this *Interim Measures* is not valid anymore. In 2012, *Caizheng Bu, Shangwu Bu* issued an updated version of this measure (No. 142) to replace the old one.

[8]Applicants are required to provide registration details, ownership structure (e.g., state-owned, private, foreign-invested), firm type, primary industry, and evidence of how the imports will promote trade performance, innovation, or industry upgrades. Firms must also demonstrate compliance with laws and timely payments, with no violations or delays in the prior three years (extended to five years in 2016). The program does not discriminate based on ownership, industry, or location.

[9]For instance, the subsidy rate was 0.32 RMB/Dollar for technology-related products and 0.06 RMB/Dollar for natural resource-related products in 2013 in Hunan province according to media news report.

aged by the State.[10] Eligible firms can access bank credits at a preferential loan rate, provided by the Export-Import Bank of China (EXIMB). The bank independently reviews loan project applications based on the *Catalogue* and allocates a certain amount of credit funds at a preferential interest rate in its annual credit plan for loans used to import the listed products. Figure 2 shows the evolution of the stock of import credit loans from EXIMB and the amount of actual disbursement from 2006 to 2014. In 2008, the first year following the subsidy program, import credit supply saw a notable increase from 39 billion RMB to 115 billion RMB. In the following years, the actual amount of disbursement remained at a comparable level to that of 2008 until 2012, when there was a further boost in the import credit supplied by the bank. As a consequence, from 2008 to 2014, the total outstanding import credit experienced an annual growth rate of 44% and reached 331 billion RMB at the end of 2013. This suggests that the government has been increasing its financial resources to support and promote the import subsidy program over time.

2.3 Data description

Our primary data source is the Annual Survey of Industrial Firms (ASIF) from China's National Bureau of Statistics. This survey covers manufacturing firms with annual sales above 5 million RMB during 1998-2010, and above 20 million RMB from 2011 onwards.[11] Following Wang and Yu (2013), we apply several cleaning procedures to ensure data quality. We exclude: (1) non-manufacturing firms, (2) observations with negative values for key variables (output, sales, exports, capital, assets, wages, or intermediate inputs), (3) observations with inconsistent financial records (total assets less than fixed or liquid assets, or sales less than exports), and (4) firms with fewer than five employees.

Our second data source is the Chinese Customs Trade Statistics (CCTS), which provides firm-level trade transactions from 2000 to 2016. The CCTS records all imports and exports at the firm-HS8 product-country level, including both values and quantities.[12] The data distinguishes between ordinary and processing trade.[13] We aggregate all data to the HS6 level and yearly frequency using the 2002 HS classification.[14]

To examine how capital subsidies affect firm performance, we merge the CCTS trade data with ASIF balance-sheet data. While both datasets use company registration numbers, they do not share unique identifiers. Following standard practices in

[10] *Shangwu Bu, Caizheng Bu, Guojia Fazhan he Gaige Weiyuanhu, Yinjian Hui* (2007) No. 385.

[11] Data for 2010 is unavailable.

[12] Export values are FOB prices and import values are CIF prices, in US dollars. Quantities are recorded in various units (kilograms, pieces, meters, etc.).

[13] Under ordinary trade, firms pay import duties on foreign inputs and can sell their output both domestically and abroad. Under processing trade, firms import inputs duty-free but must export their finished products.

[14] For 2000-2006, we aggregate the original monthly data to yearly observations.

the literature, we match firms across datasets using an algorithm that relies on names and contact details, such as zip codes and phone numbers.[15] This matching process generates a large, representative sample, covering approximately 33% of output value, 43% of total liabilities, and 69% of aggregate exports for manufacturing firms in the ASIF sample from 2002 to 2013.[16] The merged dataset allows us to analyze firms' financial and trade performance across multiple dimensions. To mitigate trade performance volatility due to China's World Trade Organization accession, we limit our analysis to 2002-2013.

To ensure that firms engage in ordinary trade and are end-users of eligible products, we exclude wholesalers and firms engaged in other modes of trade, i.e., processing trade.[17] Our primary sample consists of 442,693 firm-year observations and 67,097 unique firms from 2002 to 2013 (excluding 2010). Detailed summary statistics for all firms in our sample, including key firm-level characteristics and outcome variables, are presented in Table 1. In our sample, the median firm has 228 employees, a total output of 64 million RMB, assets valued at 13 million RMB, and a business age of 9 years. Table A2 in the appendix provides detailed definitions of our dependent variables.

3 Empirical Strategy

3.1 Firm-level exposure to subsidy policy

To identify the causal effects of the subsidy policy on firms' financial and real outcomes, we need a measure of the subsidy policy shock. This measure should be exogenous to individual firms while capturing the varying degrees of shock each firm experiences. While we can identify eligible firms in post-policy years based on the policy criteria, this approach relies on firms' actual import behavior, which may already be influenced by the policy. Instead, by observing firms' import behavior before the policy was introduced, we leverage the policy's introduction year, subsequent changes, and pre-policy import data to construct a firm-level exposure measure using a Bartik (or "shift-share") instrument:[18]

$$Exposure_{f,t} = \sum_{p \in \kappa} \omega_{f,p,t_o} \times Catalogue_{p,t} \tag{1}$$

[15] For a detailed description of the ASIF dataset and its linkage with the CCTS, see Egger et al. (2021).

[16] A detailed breakdown of the matching rates between ASIF and CCTS is provided in Table A1 in the Appendix.

[17] We follow the procedure developed by Ahn et al. (2011) to identify wholesaler, which utilizing keywords in firm names to remove wholesalers and retailers from the dataset.

[18] The shift-share type of instrument has been used in studies in similar contexts, see for example Demir et al. (2024)

Table 1: Summary statistics

Variable	Mean	Median	St.dev.	N
Panel A: Merged ASIF-CCTS				
total output (thousand RMB)	376,790	64,260	2,767,458	442,693
employment	565	228	2,244	441,194
fixed assets (thousand RMB)	122,110	13,650	1,398,720	442,878
age	11	9	10	442,710
total borrowing (thousand RMB)	207,792	25,996	2,141,313	442,844
Panel B: Dependent variables				
$\Delta \ln(\text{total borrowing})_{fict}$	0.085	0.067	0.604	347,308
$\text{borrow cost}_{fict}(\%)$	3.557	2.418	5.033	270,681
investment_{fict}	0.040	-0.002	0.208	348,797
ROA_{fict}	0.077	0.037	0.151	437,764
$\ln \text{MRPK}_{fict}$	1.618	1.563	1.174	437,064
$\ln \text{output}_{fict}$	11.204	11.071	1.607	442,693
$\ln \text{sale}_{fict}$	11.180	11.046	1.607	442,684
$\ln \text{sale}_{fict}^{domestic}$	10.272	10.659	2.950	442,444
$\ln \text{employment}_{fict}$	5.440	5.434	1.224	441,194
$\ln \text{wage}_{fict}$	8.470	8.396	1.486	395,514
$\ln \text{export}_{fict}$	8.873	9.229	2.338	339,843
$\ln \text{HS8}_{fict}^{export}$	1.474	1.386	1.065	288,891
$\ln \text{country}_{fict}^{export}$	1.626	1.609	1.147	288,891
$\ln \text{import}_{fict}$	6.750	7.047	3.267	247,023
$\ln \text{HS8}_{fict}^{import}$	1.631	1.386	1.504	247,023
$\ln \text{country}_{fict}^{import}$	6.750	7.047	3.267	247,023

Note: The table presents summary statistics for the key variables utilized in the empirical analysis spanning two time periods: 2002 to 2009 and 2011 to 2013. The subscripts f,i, c, t, refer to firm, four-digit industry, city, and year respectively.

where ω_{f,p,t_o} represents the share of capital product p in firm f's total capital imports during the years prior to the subsidy policy. Specifically, to avoid endogeneity from firms' import behavior after the policy took effect, we base the exposure variable on 2002 – 2007 capital product import data, taking 2007 as the pre-policy year since the policy was announced in the second half of that year. For each capital product p, we calculate its import share ω_{f,p,t_o} and interact it with a dummy variable $Catalogue_{p,t}$ which indicates whether product p is on the *Catalogue* in year t. The firm-level exposure to the policy shock is then obtained by summing over all capital products a firm imports in the capital product set κ categorized based on Broad Economic Categories Revision 4 (BEC).[19]

The interpretation of $Exposure_{f,t}$ is that it reflects, for each \$1 of a firm's pre-policy capital imports, the extent to which it is exposed to the post-policy subsidy.

[19]We use the BEC Revision 4 for which there is a correspondence table with the Harmonized System classification (https://unstats.un.org/unsd/trade/classifications/correspondence-tables.asp)

Table 2: Predicative power of pre-policy import share on actual import share

$\omega_{f,p,t}$	2008	2009	2011	2012	2013
	(1)	(2)	(3)	(4)	(5)
ω_{f,p,t_o}	1.117***	1.007***	0.845***	0.780***	0.765***
	(0.012)	(0.014)	(0.016)	(0.016)	(0.017)
Observations	117,022	93,118	84,098	75,739	68,861
R-squared	0.784	0.771	0.747	0.743	0.736
Firm FE	Yes	Yes	Yes	Yes	Yes

Note: The regression is at firm-product level. ω_{f,p,t_o} denotes the average share of firm f's imports of capital product p in its total capital product imports during 2002 - 2007. The dependent variable $\omega_{f,p,t}$ refers to firm f's import share of capital product p in year t, as specified in the corresponding column. Robust standard errors, clustered at firm level, are reported in parenthesis below the coefficients. Asterisks denote significance levels * < 0.1, ** < 0.05, *** < 0.01.

Essentially, $Exposure_{f,t}$ serves as a measure of "treatment intensity" based on the firm's initial capital import composition and whether these products are subsidized in a given year. Our identification strategy uses a staggered difference-in-differences approach, with continuous treatment intensity as the primary variable, leveraging firms' varying exposure to Catalogue-listed products before the subsidy program.

This identification strategy relies on three main assumptions. First, the import share of a capital product ω_{f,p,t_o} pools information from a large and heterogeneous set of importers. Import values for each capital product are not concentrated among a few firms: the average number of importers per capital product is around 1,200, with the average share of the largest importer holding 13% (Figure 3). Second, the import composition of a firm's import of capital product has to be persistent over time, so that a firm's import share of a capital product in the past can predict its future share. We compare our Bartik-type instrument variable to actual firm-product-level exposure to the subsidy shock, and show that they follow similar distribution (Figure 4). In Table 2 we show that for each post-policy year, a firm's pre-policy import share strongly correlates with its post-policy actual import share, thus reliably capturing firm import behavior and subsidy exposure. Third, cross-sectional variation in eligible product imports reflects only policy intention at the national level or observable firm characteristics, but is uncorrelated with unobserved firms' characteristics that affect demand. In order to validate the last assumption, we control for unobserved firm features using firm fixed effects in our regression model.

3.2 Methodology

To assess the impact of the import subsidy on firm outcomes, we use a difference-in-differences approach, exploiting time variation and cross-sectional differences in

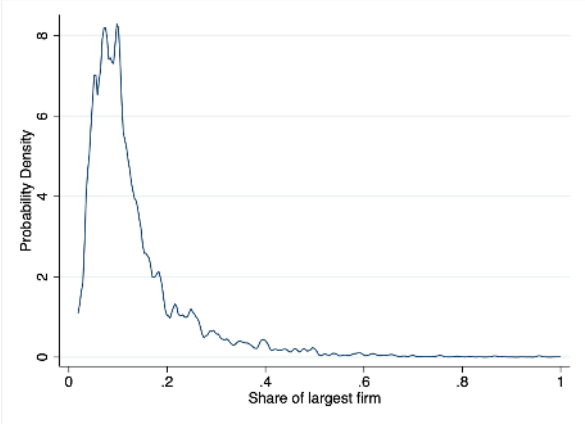


Figure 3: Distribution of the share of largest firm in capital product import values

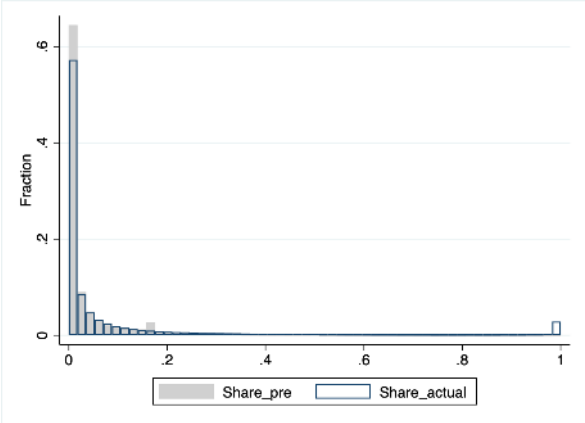


Figure 4: Distribution of Bartik-type and actual capital product import share

program exposure. The model is specified as follows:

$$Outcome_{fict} = \beta_0 + \beta_1 Exposure_{ft} + \gamma X_{ft-1} + \delta_f + \delta_{it} + \delta_{ct} + \varepsilon_{fict} \tag{2}$$

The dependent variable, $Outcome_{fict}$, captures various firm performance dimensions for firm f in industry i, county c, and year t. Industry is defined using the 4-digit China Industry Classification (2002 version), and firm location is identified at the city level. Our key variable, $Exposure_{ft}$, represents the time-varying treatment intensity, as defined in section 3.1. Firms that only imported subsidized non-capital goods post-policy are excluded to ensure the treatment reflects the capital goods subsidy impact. The vector X_{ft-1} controls for lagged firm characteristics including trade status (exporter/importer or two-way trader), size (log of total assets), and age.

The coefficient of interest β_1 measures how firm exposure to the subsidy program affects various outcomes, detailed in section 4. Our specification includes three sets of fixed effects to address potential confounding factors. First, firm fixed effects (δ_f) control for time-invariant characteristics such as managerial ability. Second, industry-

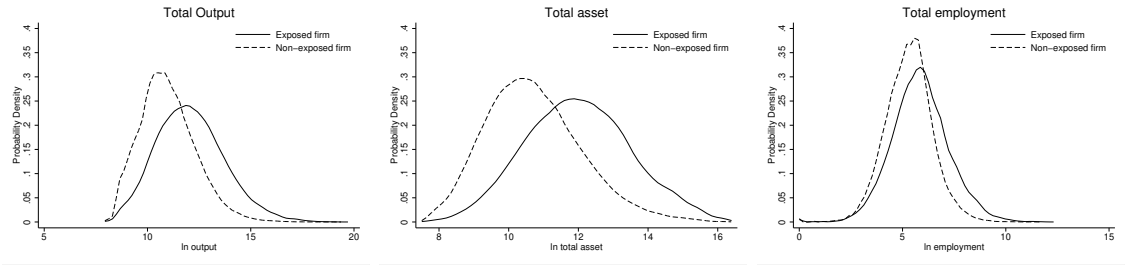


Figure 5: Empirical density of firms' total output, asset, and employment.

Sources: Authors' calculation using merged ASIF-CCTS data from 2002-2009, 2011-2013.

year fixed effects (δ_{it}) absorb time-varying shocks common to all firms in an industry, which is crucial since the *Catalogue* selection may target industries with greater potential for technological advancement. Third, city-year fixed effects (δ_{ct}) account for local economic conditions and policies.[20] This fixed effect structure ensures β_1 captures only within-firm variations in outcomes due to subsidy exposure, net of industry trends and local shocks. We cluster standard errors at the firm level to account for serial correlation.

4 Baseline results

Before conducting the firm-level analysis, we first present summary statistics for firms with and without subsidy exposure. This allows us to identify potential differences between these firms and those without subsidy exposure in section 4.1. We then examine several firm-level outcomes. First, we assess firms' financial responses, focusing on credit access and borrowing costs. Next, we study firms' investment behavior, focusing on durable adoption and investment efficiency. Finally, we evaluate the broader performance outcomes including output, employment, and export activity.

4.1 Preliminary evidence

We categorize firms into two groups based on their program exposure: those with positive exposure ($Exposure > 0$) in at least one year, and those with zero exposure ($Exposure = 0$) throughout the sample period. Figure 5 plots the empirical density of total output, assets, and employment for both groups. The distributions reveal that exposed firms are larger, with higher levels of output, assets, and employment compared to non-exposed firms.

[20]These local factors include special economic zone benefits (e.g., preferential land-use policies, improved financing access, and tax exemptions) and potential lobbying by local governments, particularly in cities with industry concentrations.

Table 3: Financial responses, investment and investment efficiency

Dep.Var.	Δln(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	ln MRPK$_{fict}$
	(1)	(2)	(3)	(4)	(5)
$Exposure_{ft}$	0.061**	-0.906***	0.029***	0.020***	0.273***
	(0.029)	(0.261)	(0.009)	(0.006)	(0.038)
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes
N	337,277	206,549	338,800	338,726	338,904
Adjusted R^2	0.102	0.400	0.105	0.518	0.757

Note: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels * < 0.1, ** < 0.05, *** < 0.01.

4.2 Financial responses, investment and efficiency

To assess firms' financial responses to the subsidy program, we analyze changes in both credit access and borrowing costs. For credit access, we measure year-to-year changes in log total liabilities. While this measure includes all forms of debt, bank loans were the primary funding source for manufacturing firms during our sample period (2002-2013) before China's corporate bond market expanded significantly. Following Bach (2014), we examine overall borrowing rather than isolating subsidized debt to avoid overstating credit constraints through substitution effects. For borrowing costs, we construct effective interest rates following Aghion et al. (2015) by dividing interest paid by current liabilities for firms reporting non-zero interest or liabilities. While we lack direct data on policy-directed credit from state banks or local governments, these measures allow us to assess how program exposure affects firms' overall financial conditions.

Table 3 presents the results of estimating Equation (2) using debt growth and borrowing cost as the outcome variables (columns 1-2). The estimates show that firms highly exposed to capital product subsidy exhibit higher borrowing and lower borrowing costs. In terms of economic significance of the estimated effects on financial responses, our baseline estimates implies that a one-standard-deviation increase in $Exposure_{ft}$ leads to a 0.03% increase in borrowing capacity and a 0.05% reduction in financing costs. This effect is economically important as the average debt growth between 2008-2013 observed in the data is 8.5% and the average effective interest rate is 3.5%.[21]

Next, we examine firm investment behavior, which is defined as the change in firms'

[21]Our result indicates a one-unit increase in $Exposure_{ft}$ is associated with a 6.1% increase in total borrowing. Given that the mean of $Exposure_{ft}$ is 0.008 and the standard deviation is 0.051, the estimated coefficient indicates that a one-standard-deviation increase in $Exposure_{ft}$ would translate to approximately 0.31% ($0.061 \times 0.051 = 0.003$) increase in borrowing. Similarly, for financing cost, the reduction is calculated as $0.906 \times 0.051 = 0.046\%$ for one-standard-deviation increase of $Exposure_{ft}$.

Table 4: The effect of import subsidy on firm real outcomes

Dep.Var.	$\ln \text{output}_{fict}$	$\ln \text{sale}_{fict}$	$\ln \text{sale}^{domestic}_{fict}$	$\ln \text{employee}_{fict}$	$\ln \text{wage}_{fict}$
	(1)	(2)	(3)	(4)	(5)
$Exposure_{ft}$	0.297***	0.289***	0.326***	0.292***	0.456***
	(0.036)	(0.036)	(0.077)	(0.036)	(0.035)
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes
N	342,179	342,173	324,962	342,259	296,978
Adjusted R^2	0.832	0.833	0.800	0.808	0.848

Note: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

physical capital as a share of their previous year's total assets, reflecting directly firms' acquisition of capital goods and expansion of production capacity. Column 3 of Table 3 shows that firms with higher subsidy exposure significantly increase their investment: a one-standard-deviation increase in $Exposure_{ft}$ leads to a 0.15% rise in the investment rate. This effect is economically meaningful given that the average investment rate in our sample is 4.0% of total assets and the median is only -0.20%.

While our results show that subsidy exposure increases credit access and investment, these direct effects do not fully capture the marginal benefits of additional credit or extra investment. In fact, cheaper credit may lead to inefficient or excessive investment due to agency problems (Stein, 2003). To address this concern, we examine two measures of efficiency. First, we use return on assets (ROA), calculated as operating profit over average assets. By using operating profit, we exclude non-operating income where import subsidies are recorded, ensuring our ROA measure captures genuine profitability improvements rather than mechanical effects of receiving subsidies. Second, following Gopinath et al. (2017), we examine the marginal revenue product of capital (MRPK), measured as the ratio of sales revenue to total assets, which captures the efficiency of capital allocation.

Columns 4–5 of Table 3 indicate that firms with higher subsidy exposure experience improved profitability and capital efficiency. Specifically, a one-standard-deviation increase in $Exposure_{ft}$ is associated with an increase in ROA of 0.10%, which is notable given the median ROA of 3.7% across all years. Similarly, MRPK rises by 1.39%, a substantial improvement relative to its average value of 10. Overall, these results underscore the positive impact of the subsidy program on firms' financial performance, investment levels, and investment efficiency.

Table 5: The effect of import subsidy on firms' trade performance

Dep.Var.	$\ln \text{export}_{fict}$	$\ln \text{HS8}_{fict}^{Export}$	$\ln \text{country}_{fict}^{Export}$	$\ln \text{Import}_{fict}$	$\ln \text{HS8}_{fict}^{Import}$	$\ln \text{country}_{fict}^{Import}$
	(1)	(2)	(3)	(4)	(5)	(6)
$Exposure_{ft}$	0.545***	0.485***	0.199***	1.304***	0.883***	0.552***
	(0.098)	(0.043)	(0.038)	(0.078)	(0.040)	(0.031)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	222,803	222,803	222,803	174,068	174,068	174,068
Adjusted R^2	0.699	0.735	0.787	0.780	0.823	0.751

Note: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$.Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels * < 0.1, ** < 0.05, *** < 0.01.

4.3 Real outcomes

Having established that the subsidy program affects firms' financial and investment decisions, we next examine its impact on broader firm performance. Table 4 presents estimates of how subsidy exposure affects output, sales, employment, and wages. All outcomes are measured in logarithms, allowing us to interpret the coefficients as percentage changes.

The estimation results for these outcomes are presented in Table 4. We observe that import subsidy significantly boosts all strategic objectives of exposed firms. The magnitude of these effects is approximately ten times larger than those observed for investments, indicating that exposure to the subsidy drives initial capacity expansion through capital investment, which then amplifies firm operations through a multiplier effect.

4.4 Trade performance

We next examine how the subsidy program affects firms' trade activities. Table 5 presents estimates using various measures of trade performance: trade values, number of products traded, and number of trading partners. The analysis includes firms that engage in any form of trade (exporting, importing, or both).

The results are summarized in Table 5. Columns 1–3 show that firms with greater exposure to the subsidy program improved their export performance, evidenced by higher export volumes, an increase in the variety of exported products, and an expansion of export destinations. This suggests that the policy shock drives firms to scale up production and workforce, which in turn enhances export activity. On the import side, columns 4–6 indicate that the subsidy program enables firms to increase overall imports, not limited to subsidized products, and to broaden their sourcing countries. These findings highlight the program's role in fostering both import and export growth, contributing to firms' trade diversification and market expansion.

5 Heterogeneous effect

In this section, we examine the heterogeneity in the effects of the subsidy shock across firm characteristics, focusing on financial frictions and ownership structures. Additionally, we exploit variation in the duration of firms' exposure to the subsidy program to analyze its differential impacts. By investigating firms with varying lengths of policy exposure, we assess how the effects evolve over time and whether the subsidy program delivers sustained benefits or exhibits diminishing returns in the long term.

5.1 Financial friction

Our baseline results demonstrate that this import subsidy program successfully meets its policy objectives. Firms with high exposure to the subsidy exhibit significant expansions in fixed-asset investment, improved investment efficiency, and better real outcomes. Moreover, the policy enhances access to finance and reduces borrowing costs. Given that these outcomes appear efficient, a natural question arises: why did firms not achieve these results on their own? In an efficient financial market, credit should naturally flow to firms with the most promising investment opportunities. If this is not the case, it suggests that market frictions are at work. In the following section, we examine the role of financial frictions and assess how the subsidy program helps alleviate these constraints. For instance, firms with promising investment opportunities might struggle to obtain financing due to limited credit histories (e.g., young firms) or insufficient collateral (e.g., small firms). In such cases, a subsidy can act as a catalyst, alleviating these constraints and fostering growth.

To investigate this, we use a firm's interest coverage ratio (ICR) — the ratio of earnings to interest expenses — as a proxy for financial frictions, following the methodology of Das and Tulin (2017). A lower ICR indicates higher financial distress, with interest expenses constituting a significant burden relative to earnings. Since a low ICR can also result from temporary shocks to costs or revenue, we calculate the pre-policy average ICR for the period 2002–2007 to provide a persistent measure of financial friction. We define a dummy variable, $Friction_{f,t_o}$, which equals one if a firm's pre-policy average ICR is below the industry average during the same period. This variable captures whether a firm consistently faced greater financial stress *ex ante*, prior to the subsidy program. We include an interaction term between the firm's $Exposure_{ft}$ and $Friction_{f,t_o}$ in our baseline regression to examine the differential effects.

Our results are presented in Table 6. First, there is no significant difference in credit access between financially stressed and non-stressed firms, and both groups experience similar increases in total financing. However, the reduction in financing costs is primarily driven by firms that faced higher financial frictions *ex ante*. Furthermore, this group of firms also exhibits the most substantial improvements in investment efficiency, profitability, and total output. These findings underscore the subsidy program's

Table 6: Role of financial friction

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.129***	-0.318	0.043***	0.014	0.193***
	(0.034)	(0.439)	(0.011)	(0.009)	(0.055)
$\times$ $Friction_{f,t_o}$	-0.002	-1.273**	-0.009	0.028**	0.171**
	(0.047)	(0.561)	(0.014)	(0.012)	(0.079)
N	260,074	172,584	260,986	260,869	260,964
adj. R^2	0.091	0.390	0.104	0.524	0.777
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.304***	0.348***	0.563***	0.409***	0.504***
	(0.045)	(0.134)	(0.166)	(0.051)	(0.056)
$\times$ $Friction_{f,t_o}$	0.162**	0.218	-0.104	-0.046	-0.110
	(0.064)	(0.161)	(0.216)	(0.069)	(0.075)
N	263,165	263,101	171,297	263,217	236,548
adj. R^2	0.855	0.680	0.702	0.844	0.851
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$.Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

critical role in addressing financial frictions, enabling firms under financial distress to invest more effectively and achieve better outcomes.

5.2 State ownership

While the interest coverage ratio (ICR) provides one way for assessing financial frictions in the absence of detailed loan-level data, we can further explore these frictions by examining how the policy's effects vary with firm characteristics—particularly ownership structure. In China, state-owned enterprises (SOEs) typically enjoy preferential access to credit due to their ties with state-owned and policy banks, which are more inclined to offer financial support. This preferential access can impose financial constraints on non-SOEs, which often face limited credit availability and higher borrowing costs.

To investigate how the policy affects firms with different ownership structures, we interact the time-varying subsidy exposure with a state-ownership dummy variable. The estimated results are presented in Table 7, which document several important findings. First, both SOEs and non-SOEs experience increased borrowing and reduced borrowing costs, with no evidence of a heavy policy tilt toward SOEs. This

Table 7: Role of state ownership

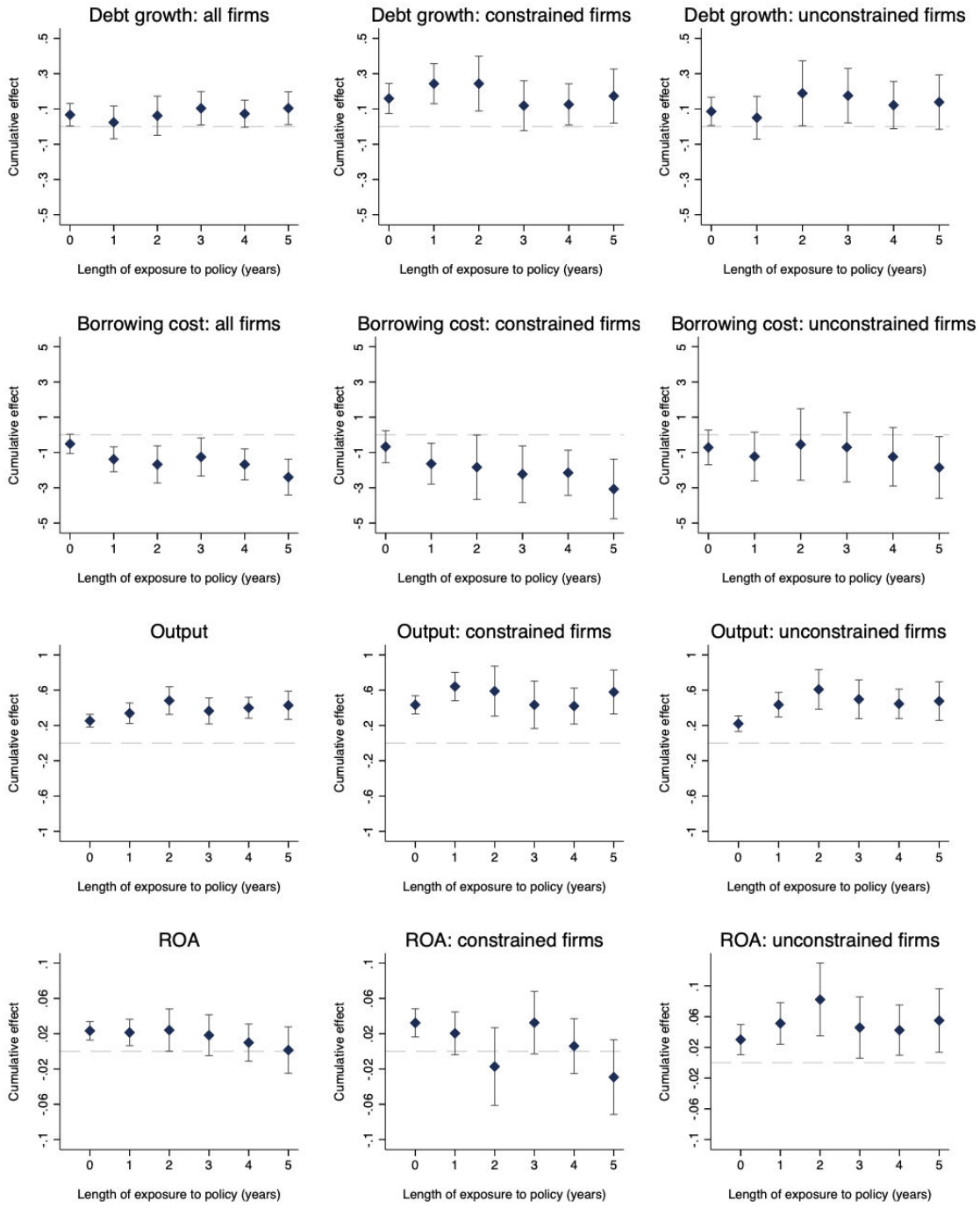
	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	Δ ln(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	ln MRPK$_{fict}$
$Exposure_{ft}$	0.059**	-0.909***	0.027***	0.021***	0.287***
	(0.030)	(0.273)	(0.009)	(0.006)	(0.039)
$\times$ SOE_f	0.064	0.042	0.046	-0.030*	-0.359***
	(0.152)	(0.661)	(0.035)	(0.018)	(0.137)
N	337,277	206,549	338,800	338,726	338,904
adj. R^2	0.101	0.400	0.105	0.518	0.757
	Panel B: Real outcomes				
Dep.Var.	ln output$_{fict}$	ln sale$^{domestic}_{fict}$	ln export$_{fict}$	ln employee$_{fict}$	ln wage$_{fict}$
$Exposure_{ft}$	0.307***	0.343***	0.560***	0.336***	0.483***
	(0.037)	(0.080)	(0.101)	(0.036)	(0.036)
$\times$ SOE_f	-0.255	-0.438*	-0.358	-1.120***	-0.768***
	(0.176)	(0.227)	(0.385)	(0.216)	(0.187)
N	342,179	342,045	222,803	342,259	296,978
adj. R^2	0.832	0.667	0.699	0.808	0.848
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$.Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels * < 0.1, ** < 0.05, *** < 0.01.

suggests that the subsidy program is well-targeted at the product level, irrespective of state ownership. Second, while SOEs and non-SOEs see similar increases in total credit for a given level of subsidy exposure, non-SOEs demonstrate higher gains in investment efficiency and profitability. Additionally, non-SOEs experience a greater positive impact on employment growth and labor income improvement. These findings highlight that non-SOEs, which often face credit rationing and higher financing costs, benefit significantly from the subsidy program. By alleviating these financial constraints, the policy enables non-SOEs to invest more effectively and improve their real outcomes. Unlike large-scale credit stimulus policies that often exacerbate credit misallocation, the targeted subsidy policy not only enhances credit allocation but also fosters better real outcomes. This approach effectively addresses financial frictions and promotes economic growth and development.

5.3 Dynamic effects

Works on industrial policies have emphasized their long-term success, which is determined by whether there are prominent dynamic effects (Kline and Moretti, 2014). This line of literature states that continued support is needed in order to achieve lasting



Note: This figure explores the effects of length of exposure to the import subsidy on firms' financial and real outcomes by presenting estimates of equation (3). The bars represent 95 percent confidence intervals.

Figure 6: Length of exposure to subsidy on firms' financial and real outcomes

gains in firms' real performance. To shed lights on this question, we study the effects of length of exposure to import subsidy at the level of individual firms and check if there is significant heterogeneity in this dimension. To do so, we estimate a version of

equation (2) with firm-level treatment intensity. In this alternative specification, we include a firm-level treatment component that equals the number of years that a firm had been exposed to the program. Specifically, we estimate the following equation:

$$Outcome_{fict} = \beta_0 + \sum_{k=0}^{5} \beta_k \times Exposure_{f,t-k} + \gamma X_{ft-1} + \delta_f + \delta_{it} + \delta_{ct} + \varepsilon_{fict} \tag{3}$$

where $Exposure_{f,t-k}$ is a firm f's exposure in year $t-k$, i.e. lagged k periods. We consider dynamic effects up to five years, and we also distinguish between effects on financially constrained and unconstrained firms, using the definition of ICR.

Figure 6 displays the estimates of β_k for key financial and real outcomes. It shows that at the aggregate level, the effects of the subsidy program on firms' total borrowing, borrowing cost, output, and profitability are sustainable five years into the subsidy program. That is, the longer firms remain exposed to the import subsidy, the stronger the improvements in credit access and the greater the reductions in borrowing costs. These dynamic financial effects also translate into enhanced real outcomes, as evidenced by progressively larger impacts on output with extended treatment duration. While the effects on output are incremental over the length of exposure, the effect on profitability appears to be more prominent in the initial three years. Consistent with our static results, most firm outcomes are more prominent for *ex ante* financially constrained firms, especially in the first two years of being exposed to the subsidy. Overall, our results seem to be supportive of the view that industrial policies with longer duration could have a lasting gain. To ensure long-run improved performance in targeted industrial areas, a "big push" type of policy may be warranted to lift the area into a new equilibrium.

6 Robustness Checks

In this section, we conduct a series of robustness exercises to test the validity and reliability of our results, while addressing potential threats to identification. That is, we disentangle the potential confounding factors, appeal to changes in the sample composition, and to the adoption of placebo tests using non-eligible firms.

6.1 Other subsidies

As subsidy-exposed firms produce strategically important products, they may simultaneously receive other forms of government financial support. The Chinese government frequently directs subsidies to firms through industrial policies targeting specific sectors (e.g., the auto industry) or activities like R&D, equipment upgrades, and employment stabilization. While our research design mitigates contamination from these policies, there is still a possibility that some cases fall outside the typical sectoral or locational

scope, potentially biasing our estimates of the import subsidy program's effects.

To address this, we leverage firm-reported "other subsidies" in the ASIF dataset, which include state funding for R&D, fixed asset purchases, and technology upgrades but exclude import subsidies or related credit support. Less than 20% of subsidy-exposed firms report receiving other subsidies.[22] First, we re-estimate our baseline by excluding firms with other subsidies and find that the results remain consistent. Next, we extend our baseline by introducing a binary variable, denoted as $Other\ subsidy_{ft}$, finding that the magnitude of their effect is only one-tenth of the import subsidy program's impact. Moreover, other subsidies do not exhibit the same borrowing cost reduction as the import subsidy program. Overall, these findings (Table A3) confirm that our results are robust and primarily driven by the import subsidy program, rather than confounding effects from other government subsidies.

6.2 Economic stimulus plan

To further isolate the effects of the import subsidy program from those of China's large-scale stimulus package enacted in response to the global financial crisis, we conduct a robustness check by restricting our sample to the pre-2009 period. At the end of 2008, the Chinese government launched a 4 trillion RMB stimulus package focused on infrastructure spending and credit expansion to bolster lending to the real economy. Existing research indicates that this stimulus led to increased firm borrowing and investment in 2009 and beyond, although it also contributed to some degree of credit misallocation (Cong et al., 2019).

In contrast, the import subsidy program was introduced in mid-2007 and began distributing credit and subsidies as early as late 2007, continuing into 2008. Although the two policies target different sets of firms, their overlapping timeframes raise concerns about potential confounding effects. To address this issue, we restrict our analysis to the period from 2002 to 2008—prior to the implementation of the stimulus package—using our baseline estimation strategy. Results presented in Table A4 confirm that subsidy-exposed firms increased total borrowing, reduced borrowing costs, boosted investment, and expanded output, consistent with our baseline findings. This reassures us that the observed effects are driven by the import subsidy program rather than the overlapping stimulus plan.

6.3 Placebo test

A notable characteristic of Chinese trading activities is the prevalence of processing trade, where firms import inputs under tariff exemptions provided that all produced

[22] Chinese government subsidies to domestic firms are very complex and difficult to trace, and it is especially rare for a large sample of surveyed manufacturing firms. Despite our efforts to identify other subsidies from ASIF, errors and omissions still existed due to quality of self-reporting and changing of accounting standards.

output is subsequently re-exported abroad. In contrast, ordinary trade requires firms to pay tariffs on imported inputs and involves the production and export of final goods. The subsidy program we study specifically targets firms engaged in ordinary trade. Consequently, even if a firm imports key equipment from the *Catalogue*, if it operates under processing trade, it remains ineligible for dedicated program credit support and fiscal rebates. As a result, if such firms are *ex-ante* credit constrained, the subsidy's impact on real outcomes—such as investment and output—may be less effective or even muted.

This institutional feature provides an opportunity for a placebo test. We examine firms that conducted processing trade throughout our sample period (2002-2013), constructing their exposure measure identically to our baseline. Table A5 shows no significant effects on either financial or real outcomes for these firms, supporting our interpretation that the baseline effects are indeed driven by the subsidy program rather than other concurrent factors.

6.4 Alternative measure of exposure

We next consider an alternative definition of $Exposure_{ft}$. Specifically, we construct the measure using firms' import shares from 2002–2006 instead of the baseline period 2002–2007. This earlier pre-policy window further alleviates concerns that firms might have anticipated the policy announcement in late 2007 and adjusted their import behavior accordingly. The alternative measure retains the same structure as the baseline—interacting these pre-policy import shares with the time-varying catalogue indicators—but employs a more conservative base period for calculating import shares.

Using this alternative exposure measure, we obtain results that are qualitatively similar to our baseline estimates, albeit with slightly smaller magnitudes. As shown in Table A6, exposed firms still experience significant improvements in financial outcomes—such as reduced borrowing costs and enhanced investment efficiency—as well as in real outcomes, including higher output, employment, and wages. The consistency of these results with our baseline findings reinforces the robustness of our main conclusions to different pre-policy windows for measuring exposure.

6.5 Other robustness checks

We conduct two additional robustness checks to validate our findings. First, we restrict the sample to firms with annual output exceeding 20 million RMB to address changes in the ASIF reporting threshold after 2011. Results in Table A7 confirm the consistency of our findings under this threshold, reinforcing their robustness. Second, we introduce alternative fixed effects, including firm and province-sector-year fixed effects. The latter controls for unobserved province-sector-specific interventions, such as local subsidies, tax incentives, or targeted development programs, ensuring that our

coefficient β_1 reflects only within-firm variations over time. Table A8 shows that the results remain robust. Together, these robustness checks strengthen the credibility of our analysis by addressing potential concerns and alternative explanations. Furthermore, in unreported results, we confirm that controlling for the effective corporate income tax rate does not alter our conclusions.

7 Conclusion

This paper examines how targeted import subsidies affect firm performance through both financial and real channels. While existing research shows that broad-based liquidity support in industrial policies often lead to inefficient credit allocation, we demonstrate that well-designed, product-level targeting can enhance both credit access and firm performance. Using comprehensive firm-level data from 2002 to 2013, we exploit variation in firms' exposure to subsidized capital goods imports to identify the program's effects.

Our analysis yields three key findings. First, exposure to the subsidy program is associated with significant improvements in credit access and reductions in borrowing costs, which in turn drive increased investment. Second, these financial benefits translate into substantial real effects: treated firms experience higher output, sales, employment, and enhanced trade performance. Third, the program's benefits are especially pronounced for financially constrained firms and non-state enterprises, indicating that targeted import subsidies can effectively alleviate market frictions without generating distortions that favor incumbent firms.

These results provide new insights into industrial policy design. While previous work emphasizes how industrial policies affect firms through production networks and market competition, we show that targeted import subsidies can improve firm performance by alleviating financial constraints. The program's success in generating larger gains for previously constrained firms suggests that well-designed industrial policies can enhance both credit allocation efficiency and real outcomes. Our findings have important implications for understanding how targeted trade policies can promote industrial development in economies with financial market friction.

References

Aghion, P., J. Cai, M. Dewatripont, L. Du, A. Harrison, and P. Legros (2015): "Industrial policy and competition," *American economic journal: macroeconomics*, 7, 1–32.

Ahn, J., A. K. Khandelwal, and S.-J. Wei (2011): "The Role of Intermediaries in Facilitating Trade," *Journal of International Economics*, 84, 73–85.

Akgündüz, Y. E., S. H. Kal, and H. Torun (2018): "Do subsidised export loans increase exports?" *The World Economy*, 41, 2200–2215.

Bach, L. (2014): "Are small businesses worthy of financial aid? Evidence from a French targeted credit program," *Review of Finance*, 18, 877–919.

Banerjee, A. V. and E. Duflo (2014): "Do firms want to borrow more? Testing credit constraints using a directed lending program," *Review of Economic Studies*, 81, 572–607.

Bloom, N., M. Draca, and J. Van Reenen (2016): "Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity," *The review of economic studies*, 83, 87–117.

Bøler, E. A., A. Moxnes, and K. H. Ulltveit-Moe (2015): "R&D, international sourcing, and the joint impact on firm performance," *American Economic Review*, 105, 3704–3739.

Bonfim, D., C. Custódio, and C. Raposo (2023): "Supporting small firms through recessions and recoveries," *Journal of Financial Economics*, 147, 658–688.

Branstetter, L. G., G. Li, and M. Ren (2023): "Picking winners? Government subsidies and firm productivity in China," *Journal of Comparative Economics*, 51, 1186–1199.

Cai, J. and A. Harrison (2021): "Industrial policy in China: Some intended or unintended consequences?" *ILR Review*, 74, 163–198.

Caselli, M. (2018): "Do all imports matter for productivity? Intermediate inputs vs capital goods," *Economia Politica*, 35, 285–311.

Chen, Z., Z. Liu, J. C. Suárez Serrato, and D. Y. Xu (2021): "Notching R&D investment with corporate income tax cuts in China," *American Economic Review*, 111, 2065–2100.

Cong, L. W., H. Gao, J. Ponticelli, and X. Yang (2019): "Credit allocation under economic stimulus: Evidence from China," *The Review of Financial Studies*, 32, 3412–3460.

Criscuolo, C., R. Martin, H. G. Overman, and J. Van Reenen (2019): "Some causal effects of an industrial policy," *American Economic Review*, 109, 48–85.

Das, M. S. and M. V. Tulin (2017): *Financial frictions, underinvestment, and investment composition: Evidence from Indian corporates*, International Monetary Fund.

Defever, F., J.-D. Reyes, A. Riaño, and G. Varela (2020a): "All these worlds are yours, except India: The effectiveness of cash subsidies to export in Nepal," *European Economic Review*, 128, 103494.

Defever, F., A. Riano, and G. Varela (2020b): "Evaluating the impact of export finance support on firm-level export performance: Evidence from Pakistan," .

Demir, B., B. Javorcik, T. K. Michalski, and E. Ors (2024): "Financial constraints and propagation of shocks in production networks," *Review of Economics and Statistics*, 106, 437–454.

Egger, P., S. X. Rao, and S. Papini (2021): "A new algorithm for matching Chinese NBS firm-level with customs data," *China Economic Journal*, 14, 311–335.

Gopinath, G., Ş. Kalemli-Özcan, L. Karabarbounis, and C. Villegas-Sanchez (2017): "Capital allocation and productivity in South Europe," *The Quarterly Journal of Economics*, 132, 1915–1967.

Kline, P. and E. Moretti (2014): "People, places, and public policy: Some simple welfare economics of local economic development programs," *Annu. Rev. Econ.*, 6, 629–662.

Lafortune, J., E. Lewis, and J. Tessada (2019): "People and machines: A look at the evolving relationship between capital and skill in manufacturing, 1860–1930, using immigration shocks," *Review of Economics and Statistics*, 101, 30–43.

Lelarge, C., D. Sraer, and D. Thesmar (2010): "Entrepreneurship and credit constraints: Evidence from a French loan guarantee program," in *International differences in entrepreneurship*, University of Chicago Press, 243–273.

Li, J., A. Lu, and S. Wu (2023): "Imports of key capital goods and quality upgrading: Evidence from China's import subsidy policy," *China Economic Review*, 80, 101988.

Lim, C. Y., J. Wang, and C. C. Zeng (2018): "China's "mercantilist" government subsidies, the cost of debt and firm performance," *Journal of Banking & Finance*, 86, 37–52.

Liu, E. (2019): "Industrial Policies in Production Networks," *The Quarterly Journal of Economics*, 134, 1883–1948.

Matray, A., K. Müller, C. Xu, and P. Kabir (2024): "EXIM's exit: The real effects of trade financing by export credit agencies," Tech. rep., National Bureau of Economic Research.

Mo, J., L. D. Qiu, H. Zhang, and X. Dong (2021): "What you import matters for productivity growth: Experience from Chinese manufacturing firms," *Journal of Development Economics*, 152, 102677.

Mutreja, P., B. Ravikumar, and M. Sposi (2018): "Capital goods trade, relative prices, and economic development," *Review of Economic Dynamics*, 27, 101–122.

Rampini, A. A. (2019): "Financing durable assets," *American Economic Review*, 109, 664–701.

Rotemberg, M. (2019): "Equilibrium effects of firm subsidies," *American Economic Review*, 109, 3475–3513.

Stein, J. C. (2003): "Agency, information and corporate investment," *Handbook of the Economics of Finance*, 1, 111–165.

Wang, Z. and Z. Yu (2013): "Trading Partners, Traded Products and Firm Performances of China's Exporter Importers: Does Processing Trade Make a Difference?" *The World Economy*, 165–193.

Zia, B. H. (2008): "Export incentives, financial constraints, and the (mis) allocation of credit: Micro-level evidence from subsidized export loans," *Journal of financial economics*, 87, 498–527.

Appendix

Table A1: Matching Statistics in 2000-2009 & 2011-2013

	CCTS (transaction data)		ASIF (firm data)	Matched		Sample
Year	Transactions	No. of firms	No. of firms	matched	%	
2000	10,598,192	80,882	162,885	23,752	29.37%	
2001	11,637,903	88,150	171,255	27,339	31.01%	
2002	13,843,463	102,859	181,554	31,040	30.18%	18,186
2003	16,616,696	122,142	196,222	36,077	29.54%	21,191
2004	19,703,008	151,638	278,980	55,304	36.47%	31,282
2005	22,819,118	178,086	271,835	56,622	31.79%	31,539
2006	25,661,754	206,755	301,960	62,654	30.30%	34,011
2007	10,635,560	235,281	336,768	70,351	29.90%	37,005
2008	11,230,600	250,281	412,173	81,386	32.52%	41,214
2009	11,340,589	261,672	279,133	76,810	29.35%	37,989
2011	14,283,417	309,030	302,593	70,346	22.76%	30,099
2012	15,004,521	326,750	311,314	74,183	22.70%	32,056
2013	15,692,109	342,007	344,875	77,830	22.76%	32,527

Note: Matching rate is defined as the number of matched unique firms divided by the number of unique firms in CCTS.

Table A2: Variable Definitions

Variables	Definition
Panel A: Dependent variables	
$\Delta \ln(\text{total borrowing})_{fict}$	Log change of total liabilities from $t-1$ to t
$\text{borrow cost}_{fict}$	$\frac{\text{Interest expense}_t}{\text{Current liabilities}_t} \times 100(\%)$
investment_{fict}	$\frac{\Delta\text{Capital stock}_t}{\text{Total assets}_{t-1}}$
$\ln \text{MRPK}_{fict}$	Log of marginal revenue product of capital = $\text{Log}\left(\frac{\text{Sales revenue}_t}{\text{Total assets}_t}\right)$
ROA_{fict}	Return on assets = $\frac{\text{Operating profit}_t}{\text{Average asset}_{t-1,t}}$
$\ln \text{output}_{fict}$	Log of total industrial output in value at t
$\ln \text{sales}_{fict}$	Log of total sales at t
$\ln \text{sales}_{fict}^{domestic}$	Log of total domestic sales at t
$\ln \text{employment}_{fict}$	Log of total number of employee at t
$\ln \text{wage}_{fict}$	Log of total wage bills at t
$\ln \text{export}_{fict}$	Log of total export values at t
$\ln \text{HS8}_{fict}^{export}$	Log of number of exported HS8 at t
$\ln \text{country}_{fict}^{export}$	Log of number of exported destinations at t
$\ln \text{import}_{fict}$	Log of total import values at t
$\ln \text{HS8}_{fict}^{import}$	Log of number of imported HS8 at t
$\ln \text{country}_{fict}^{import}$	Log of number of import countries at t
Panel B: Independent variables	
size_{t-1}	Total asset at $t-1$
$\text{trade status}_{t-1}$	= 0 if firm neither exports nor imports (domestic firm) at $t-1$; = 1 if firm only exports at $t-1$; = 2 if firm only imports at $t-1$; = 3 if firm both exports and imports at $t-1$
$\text{Friction}_{f,t_o}$	Dummy = 1 if firm's pre-policy (2002-2007) average ICR is below the industry average during the same period; ICR (interest coverage ratio) is defined as the ratio of total profit to interest expense
SOE_f	Dummy = 1 if firm a is state-owned enterprises

NOTE: The subscripts f, i, c, t, refer to firm, industry, city, and year respectively.

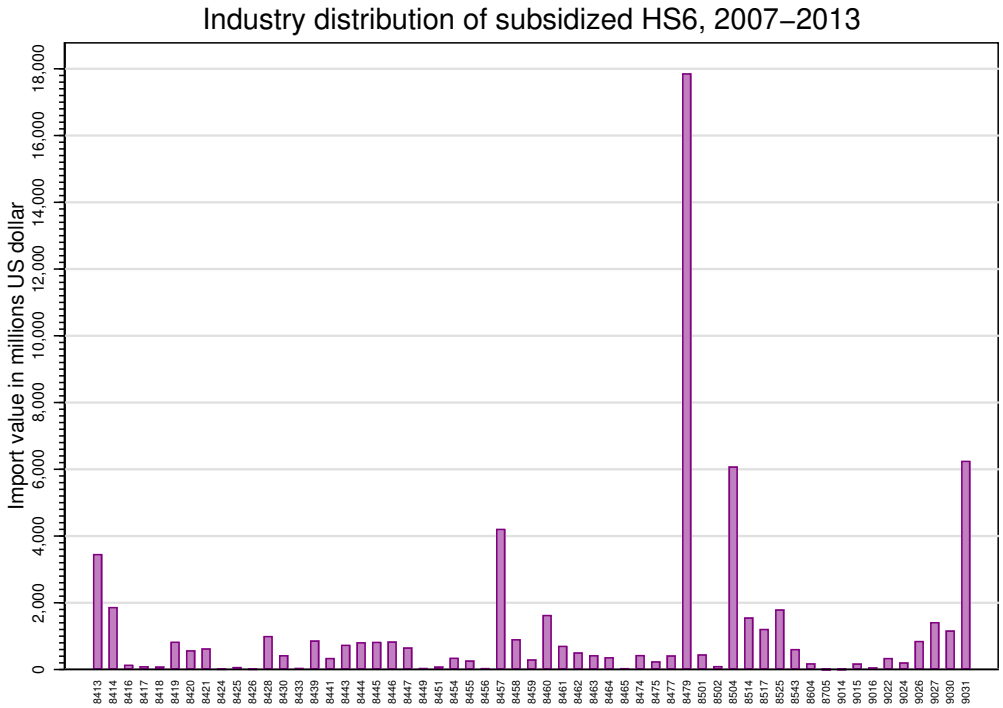


Figure A1: Subsidized capital goods (HS6) by industry.

Sources: Authors' calculation using the *Catalogue* and merged CCTS-ASIF data from 2007-2009, 2011-2013.

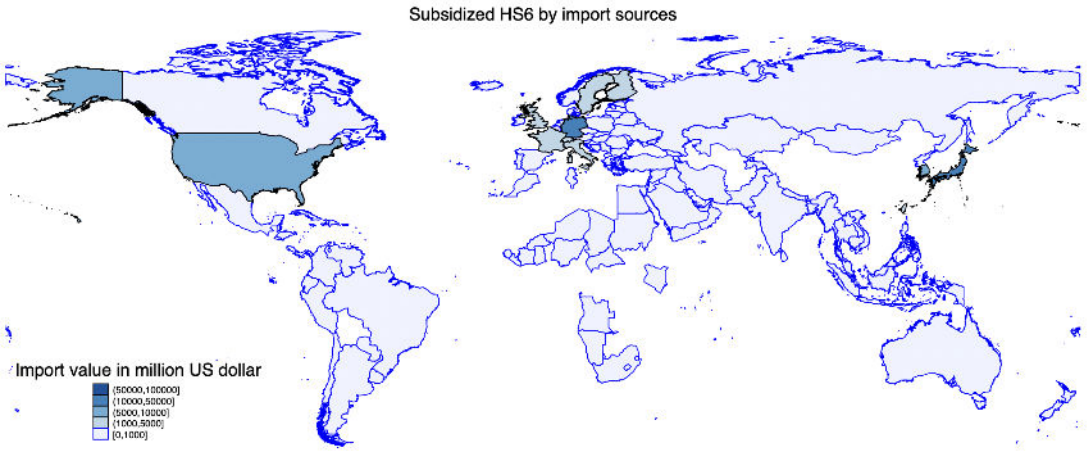


Figure A2: Subsidized capital goods (HS6) by import sources.

Sources: Authors' calculation using the merged ASIF-CCTS data from 2007-2009, 2011-2013.

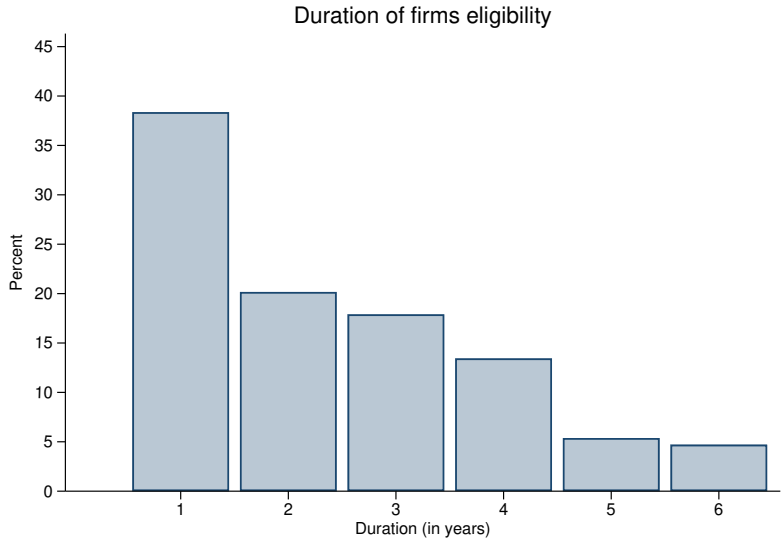


Figure A3: The duration of firms' eligibility.

Sources: Authors' calculations using merged ASIF-CCTS data from 2002-2009, 2011-2013.

Table A3: Robustness: disentangle other subsidy program

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.061**	-0.906***	0.029***	0.020***	0.273***
	(0.029)	(0.261)	(0.009)	(0.006)	(0.038)
$Other\ subsidy\ dummy_{ft}$	0.028***	0.014	0.005***	-0.001**	0.025***
	(0.003)	(0.026)	(0.001)	(0.001)	(0.004)
N	337,277	206,549	338,800	338,726	338,904
adj. R^2	0.102	0.400	0.105	0.518	0.757
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.297***	0.326***	0.546***	0.292***	0.456***
	(0.036)	(0.077)	(0.098)	(0.036)	(0.035)
$Other\ subsidy\ dummy_{ft}$	0.054***	0.055***	0.113***	0.036***	0.067***
	(0.004)	(0.010)	(0.010)	(0.003)	(0.004)
N	342,179	342,045	222,803	342,259	296,978
adj. R^2	0.832	0.667	0.699	0.808	0.849
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

Table A4: Robustness: prior to 2009-2010 large-scale economic stimulus years

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.101***	-0.928***	0.037***	0.025***	0.177***
	(0.039)	(0.351)	(0.012)	(0.009)	(0.046)
N	217,745	130,596	218,788	218,849	218,894
adj. R^2	0.106	0.439	0.131	0.543	0.822
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.298***	0.471***	0.403***	0.436***	0.298***
	(0.048)	(0.121)	(0.144)	(0.037)	(0.048)
N	221,053	220,979	140,806	221,053	221,053
adj. R^2	0.840	0.700	0.730	0.895	0.840
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

Table A5: Robustness: using processing trade sample only

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	-0.188	-9.634	0.057	0.019	0.038
	(0.121)	(7.399)	(0.144)	(0.021)	(0.110)
N	55,449	26,524	55,878	55,866	55,742
adj. R^2	0.042	0.213	0.324	0.419	0.755
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.051	0.061	0.197	0.039	0.039
	(0.108)	(0.106)	(0.123)	(0.111)	(0.131)
N	55,843	55,843	36,912	55,878	47,708
adj. R^2	0.814	0.809	0.775	0.780	0.806
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

Table A6: Robustness: alternative measure of subsidy intensity

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.053*	-0.785***	0.023***	0.020***	0.257***
	(0.030)	(0.273)	(0.009)	(0.006)	(0.039)
N	337,277	206,549	338,800	338,726	338,904
adj. R^2	0.101	0.400	0.105	0.518	0.757
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.256***	0.271***	0.473***	0.266***	0.428***
	(0.038)	(0.080)	(0.102)	(0.037)	(0.037)
N	342,179	342,045	222,803	342,259	296,978
adj. R^2	0.832	0.667	0.699	0.808	0.848
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes:$Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

Table A7: Robustness: keep firms with annual sales above 20 million RMB

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.110***	-0.787***	0.033***	0.023***	0.305***
	(0.026)	(0.255)	(0.009)	(0.006)	(0.037)
N	277,850	180,928	278,396	278,355	279,207
adj. R^2	0.106	0.425	0.119	0.547	0.786
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.353***	0.404***	0.541***	0.315***	0.462***
	(0.029)	(0.078)	(0.103)	(0.036)	(0.036)
N	281,120	280,999	185,551	281,195	246,836
adj. R^2	0.883	0.667	0.698	0.805	0.851
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes	Yes	Yes

Notes:$Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.

Table A8: Robustness: different fixed effects

	(1)	(2)	(3)	(4)	(5)
	Panel A: Financial outcomes				
Dep.Var.	$\Delta \ln$(total borrowing)$_{fict}$	borrow cost$_{fict}$	Investment$_{fict}$	ROA$_{fict}$	$\ln$ MRPK$_{fict}$
$Exposure_{ft}$	0.047	-1.316***	0.022***	0.007	0.278***
	(0.029)	(0.231)	(0.008)	(0.006)	(0.038)
N	336,563	205,827	338,087	338,021	338,204
adj. R^2	0.097	0.400	0.101	0.499	0.752
	Panel B: Real outcomes				
Dep.Var.	$\ln$ output$_{fict}$	$\ln$ sale$^{domestic}_{fict}$	$\ln$ export$_{fict}$	$\ln$ employee$_{fict}$	$\ln$ wage$_{fict}$
$Exposure_{ft}$	0.227***	0.182**	0.648***	0.311***	0.410***
	(0.036)	(0.075)	(0.098)	(0.035)	(0.035)
N	341,463	341,330	222,277	341,545	296,347
adj. R^2	0.831	0.663	0.694	0.804	0.845
Firm controls	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Province-sector-year FE	Yes	Yes	Yes	Yes	Yes

Notes: $Exposure_{ft}$ is defined in section 3.1. Firm controls include firm size (measured as the logarithm of total assets), a binary indicator of trade status (i.e., whether a firm engages in exporting, importing, or both), and firm age. All firm characteristics are measured as of year $t-1$. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels $^{*} < 0.1$, $^{**} < 0.05$, $^{***} < 0.01$.