Alleviating Government Frictions Through Loan Policy: VAT Rebate Loans and Trade Adjustment*

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January 14, 2026

Abstract

Government policy implementation can create frictions that harm firm performance, yet it remains unclear how governments can alleviate such frictions when they themselves face fiscal constraints. We study whether and how value-added tax (VAT) rebate receivable loans help firms adjust to trade shocks, specifically anti-dumping duties. This loan program significantly improves exporters' resilience to trade shocks: firms are 4.8 percentage points more likely to maintain export relationships when facing tariffs, offsetting 40 percent of the negative effect. The policy operates through a collateral channel, with benefits concentrated among firms holding larger rebate receivables. Our findings provide evidence that financial instrument design can effectively alleviate government frictions while spreading fiscal costs over time.

Keywords: Government frictions, VAT rebate delays, export adjustment, anti-dumping duties.

JEL Classification: F14, G21, G28, H25, O16

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*I am grateful to Xiaoyun Yu and Janet Gao for valuable guidance. I thank Chun Chang, Yongxiang Wang, and Xiao Zhao for helpful comments and suggestions. All errors are my own.

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I. Introduction

Government policy implementation can create frictions that harm firm performance. Previous literature establishes that government payment delays create adverse economic impacts (Ponticelli and Alencar, 2016; Lu and Ma, 2023; Barrot and Nanda, 2020), yet it remains unclear how governments can alleviate such frictions when they themselves face fiscal constraints. We examine a loan policy design that offers an alternative solution: by allowing firms to pledge government receivables as collateral, the policy alleviates liquidity frictions without requiring immediate fiscal outlays. In the context of Chinese exporters, we study whether and how value-added tax (VAT) rebate receivable loans help firms adjust to trade shocks, specifically anti-dumping duties.

The VAT rebate system in China creates a fundamental liquidity challenge. Exporters face a 3-6 month lag between paying VAT on inputs and receiving VAT rebates on exports. During this waiting period, substantial working capital becomes tied up in pending rebate receivables, creating acute cash flow pressures, when hit by external trade barriers. The loan policy we study allows firms to use these receivables as collateral for short-term financing, effectively converting illiquid government obligations into immediate liquidity. This institutional design provides firms access to working capital while spreading fiscal costs over time, making it a viable second-best solution when budgetary constraints prevent timely payments.

We merge firm-level shipment data from China Customs with the National Tax Survey (NTS) Database. This provides us a comprehensive panel of Chinese exporters with detailed information on exports, VAT payments, and rebate receivables during 2007-2016. Our identification strategy exploits the staggered adoption of VAT rebate receivable loan policies across 325 Chinese cities combined with variation in anti-dumping duties imposed on Chinese exports. We show that treatment and control cities are largely balanced on pre-existing characteristics, and our empirical specifications include city-by-year fixed effects to absorb all time-varying city-level shocks that might correlate with both policy adoption and firm outcomes.

We find that the policy significantly improves firms' resilience to trade shocks. After policy adoption, firms facing anti-dumping duties are 4.8 percentage points more likely to

maintain export relationships with sanctioning countries, offsetting approximately 40 percent of the tariff's negative effect. The policy operates through a collateral channel: firms with more capital tied up in rebate receivables benefit disproportionately, and direct examination of balance sheets confirms increased short-term borrowing among treated firms.

However, our findings reveal two important limitations. First, while the policy helps firms maintain existing export relationships, it does not enhance trade diversion to alternative markets. This distinction underscores that liquidity constraints and capability constraints, such as market knowledge and buyer networks, represent different barriers to trade adjustment. Second, policy benefits concentrate among firms with existing banking relationships, with no effect on the extensive margin of credit access. This information friction suggests that even well-designed policies may fail to reach all intended beneficiaries. Our findings demonstrate that addressing government-created frictions requires attention to both mechanism design and information dissemination channels.

First, we examine the effects of anti-dumping duties on Chinese exporters using comprehensive firm-product-country shipment data spanning 2007 to 2016. We document two main patterns of trade adjustment. Anti-dumping duties significantly depress exports of targeted products to sanctioning countries, operating primarily through the extensive margin: firms are substantially more likely to exit sanctioned markets rather than scale back shipment volumes. Furthermore, exporters partially offset these losses by diverting sanctioned products toward non-sanctioning destinations, with adjustment occurring along both extensive and intensive margins.

We then examine how VAT rebate receivable loans affect exporters' trade adjustment, including direct responses to tariffs and trade diversion. We find that the introduction of rebate-backed loans significantly mitigates exporters' vulnerability to tariff shocks in their existing markets. After policy adoption, firms exposed to anti-dumping duties are 4.8 percentage points more likely to maintain export relationships with sanctioning countries, offsetting approximately 40 percent of the tariff-induced exit effect. This stabilizing effect operates almost entirely on the extensive margin, indicating that improved liquidity helps firms remain active in affected markets rather than expand shipment volumes. However, the policy does not significantly enhance trade diversion to alternative markets, suggesting

it primarily alleviates liquidity constraints rather than facilitates the discovery of new export destinations, which requires different capabilities such as market knowledge and buyer networks.

We next examine whether the policy operates through alleviating liquidity constraints from delayed VAT rebates. Using a triple-difference specification that exploits heterogeneity in firms' pre-existing exposure to government friction, measured by unfulfilled VAT rebate receivables, we find that firms with more capital tied up in rebate receivables benefit disproportionately from the policy. These financially constrained firms become significantly more likely to maintain exports to sanctioned markets and redirect exports to alternative destinations after policy adoption. Direct examination of firms' balance sheets reveals that the policy increases short-term borrowing among firms with existing banking relationships, consistent with the collateral channel. However, the policy does not increase credit access on the extensive margin, highlighting an information friction in policy implementation: firms with established bank relationships are more likely to learn about and successfully apply for rebate-backed loans, while firms lacking such connections may remain unaware of the program despite potential eligibility.

These findings contribute to our understanding of how financial policies can be designed to alleviate government-created frictions. Specifically, VAT rebate receivable loan helps ease liquidity constraints arising from delayed VAT rebate disbursement, and thus facilitate firms' adjustment to trade shocks. By converting illiquid government receivables into working capital, the policy enables exporters to withstand negative demand shocks in their existing markets. At the same time, the policy exhibits important limitations: it does not substantially accelerate geographic diversification and does not reach all potentially eligible firms.

Taken together, the results suggest that relaxing government-induced liquidity constraints is necessary but not sufficient for comprehensive trade adjustment, and that information frictions in policy implementation can meaningfully limit program effectiveness even when the underlying financial design is well targeted.

Our paper contributes to several strands of the literature at the intersection of government frictions, international trade, and financial infrastructure. A growing body of work

documents how policy implementation can create frictions that harm firm performance. Lu and Ma (2023) show that VAT rebate delays create substantial export losses, with financially constrained firms both suffering more from delays and being more likely to face longer delays. Ponticelli and Alencar (2016) find that timely enforcement by courts is essential for financial reforms to work effectively in Brazil. Barrot and Nanda (2020) demonstrate that the Quickpay program in the United States, which accelerates government payments to small business contractors, increases employment among participating firms. These studies establish that government payment delays create adverse economic impacts.

However, it remains unclear how governments can alleviate such frictions when facing their own fiscal constraints. We contribute to this literature by showing that loan policy design offers an alternative solution: by allowing firms to pledge government receivables as collateral, the policy helps alleviate government friction without requiring immediate fiscal outlays. This finding has important policy implications, particularly for fiscally constrained governments. In China, most local governments face tight budgets while bearing partial responsibility for VAT rebate payments. Our results demonstrate that when institutional and fiscal constraints prevent timely payments, converting government receivables into collateral-backed financing provides a viable second-best solution. This approach alleviates liquidity frictions for firms while spreading fiscal costs over time, making it applicable to other contexts where governments create payment delays due to budgetary limitations.

Our paper also contributes to the literature on firms' resilience in response to negative demand shock. Access to financial capital has been shown to be important for exporting activities (Amiti and Weinstein, 2011; Manova, 2013). Financial intermediations like banks play an important role in easing financial and information frictions. Alfaro, Brussevich, Minoiu, and Presbitero (2025) show that banks offering trade finance services in Asia mitigate trade search cost of importers during U.S.-China trade tension. Firm-level capital structure affects the flexibility to enter new markets with new products, in response to an adverse demand shock in a healthy and stable banking environment. Friedrich and Zator, 2023 show that firms with low financial leverage can redirect sales to new and existing product-destination markets in non-Muslim countries during the cartoon crisis. Our paper contributes to this strand of literature by examining whether improved short-term liquidity provided by

financial policy facilitates trade adjustment. We find that while such policies help firms maintain market presence in the face of tariff shocks, they do not significantly enhance firms' ability to diversify across markets. This distinction underscores the different roles played by financial constraints and other barriers to trade adjustment, such as market-specific knowledge and buyer networks.

Finally, our paper contributes to the literature on trade barriers, especially anti-dumping duties. Governments worldwide frequently resort to anti-dumping measures - permissible under WTO rules - to protect domestic firms and industries, especially during periods of economic distress. Recent evidence in Brazil shows that such measures reduce imports and increase employment in protected sectors (De Souza and Li, 2025). As the world's largest exporter, China has also become the primary target of anti-dumping actions. Existing studies document that anti-dumping duties significantly reduce Chinese exports of targeted products (Lu, Tao, and Zhang, 2013) and that trade policy uncertainty discourages firms' entry into foreign markets (Crowley, Meng, and Song, 2018). Using anti-dumping duties as an exogenous adverse demand shock, we complement this literature by providing new firm-level evidence on both the contractionary effects of tariffs on exports and firms' trade diversion responses across destinations.

The rest of the paper is organized as follows. Section II provides institutional background on China's VAT rebate system and the diffusion of VAT rebate receivable loan policies across Chinese cities. Section III describes our data sources, including firm-level shipment and financial records, anti-dumping duty information, and our manually constructed dataset on policy adoption. Section IV presents our identification strategy and baseline results on the effects of anti-dumping duties on exports and trade diversion and how VAT rebate receivable loans affect firms' trade adjustment to tariff shocks. Section V investigates the mechanisms through which the policy operates, including evidence on the collateral channel and improvements in short-term liquidity. Section VI offers concluding remarks.

II. Institutional Background

A. VAT Rebate System and Liquidity Frictions

The VAT Rebate Receivable Loan is a financial policy instrument first introduced in China in 2001 through a joint notice issued by the People's Bank of China, the Ministry of Foreign Trade and Economic Cooperation, and the State Administration of Taxation. The policy was designed to address a fundamental liquidity challenge faced by exporters: the 3 - 6 month time lag between the payment of VAT on inputs and the receipt of VAT rebates on exports. During this waiting period, substantial amounts of working capital become tied up in pending rebate receivables, creating acute cash flow pressures, particularly for small and medium-sized firms.

The core mechanism operates as follows: Commercial banks provide short-term loans (up to one year) to qualified exporters, using their pending tax rebate receivables as collateral. The loan amount is typically capped at 70-90% of the unfulfilled rebate. With fiscal interest subsidies or guarantee mechanisms provided by local governments, the effective annual interest rate typically ranges around 4-5%, approximately 200-300 basis points below standard short-term business lending rates.

The loan mechanism involves four-party coordination among exporters, commercial banks, tax authorities, and PBoC branches. The standardized procedure follows seven steps, as shown in figure 3. Local tax and commerce authorities verify the VAT rebate receivable amount and ensure that VAT rebates are deposited into a designated escrow account, which is used exclusively for loan repayment. Once the rebate is deposited, the bank automatically deducts the loan principal and interest before releasing the remaining balance to firms. Local governments and PBoC branches coordinate verification and, in some cities, provide interest subsidies or risk-compensation funds. Banks retain full discretion over lending decisions. This design alleviates firms' liquidity constraints without requiring immediate fiscal outlays, and provides immediate access to liquidity without increasing credit risk for bank.

The liquidity provided under this framework is economically meaningful. With a standard VAT rate of 17% in China, an exporter that spends 50 cents on inputs per dollar of exports accumulates VAT rebate receivables of 8.5 cents. Given typical lending caps of 70-90%,

rebate-backed loans provide roughly 6 cents of immediate liquidity per dollar of exports, equivalent to about 12% of sales. This magnitude is comparable to, and in many cases exceeds, the short-term liquidity firms typically obtain from trade credit or working-capital facilities in the United States. Figure 1 illustrates the VAT rebate process for exporters under two scenarios: without rebate-backed financing (Panel A) and with rebate receivable-backed loans (Panel B)

B. Policy Diffusion and Implementation

Although the VAT rebate receivable loan was introduced nationally in 2001, actual implementation remained limited for over a decade. The policy's adoption accelerated only after 2012, driven by a combination of fiscal pressures on local governments and macroeconomic shocks affecting exporters.

Local governments play a critical coordinating role in this framework, as shown in figure 2. First, tax authorities help banks verify the authenticity and amount of VAT rebate receivables reported by firms, addressing a key information asymmetry. Second, the policy requires active promotion because banks lack commercial incentives to offer these loans independently. With returns of only 4-5 percent, rebate-backed loans are substantially less profitable than lending to high-return sectors such as real estate. This explains the limited take-up despite the policy's formal existence since 2001.

Local Government Incentives. Three factors motivate local governments to promote the policy. First, the 2004 VAT rebate reform shifted 7.5 percent of fiscal responsibility for rebate payments from the central government to provincial governments. As local fiscal conditions deteriorated, delays in rebate disbursement lengthened, creating acute liquidity pressures for exporters, especially small firms. Second, exporters facing rebate delays encounter working capital constraints that limit their ability to maintain production and fulfill export contracts. Third, cyclical macroeconomic shocks, such as tightened monetary policy or external demand collapses, amplify the need for alternative financing mechanisms.

Examples of Policy Adoption. The timing and motivation for policy adoption varied across cities. Urumqi (a northwestern capital) began promoting rebate-backed loans in response to tightened credit conditions, as the central bank raised reserve requirement ratios, making it difficult for exporters to obtain traditional bank loans. Qingdao (a coastal city) adopted the policy in 2008 following the collapse in global demand, with national exports declining 22 percent in 2009, creating urgent liquidity needs among its export-oriented firms.

Policy adoption is potentially endogenous to macroeconomic conditions, local fiscal capacity, and city's dependence in export. Our empirical strategy addresses this concern by exploiting within-city-year variation across firms by controlling for city-by-year fixed effects, which absorb all time-varying city-level shocks that might correlate with both policy adoption and firm export performance.

C. Data Collection

We manually construct a city-year level panel dataset documenting the implementation of VAT rebate receivable loan policies across 325 prefecture-level cities from 2005 to 2017. For each city-year observation, we record two key variables: (1) whether the city issued formal policy documents promoting export tax rebate-backed financing, and (2) whether the city provided fiscal support measures such as interest subsidies or risk compensation funds.

We employ a systematic web-based search approach using multiple keyword combinations in Chinese, including "VAT rebate receivable loan", "VAT rebate receivable custody loan", and "VAT rebate pledge loan". Policy information is collected following a prioritized source hierarchy: municipal government websites, local branches of the People's Bank of China, municipal finance and tax bureaus, local commercial banks, and authoritative local media outlets. All collected documents are manually reviewed to verify implementation status. Figure 6 presents examples of policy announcements from local governments, illustrating the typical form of policy documentation used in our dataset construction.

Cities that adopted the policy during 2005-2017 span diverse geographic and economic contexts: Qingdao (coastal, 2006), Shenzhen (special economic zone, 2009), Suizhou (inland third-tier city, 2009), Urumqi (northwestern capital, 2011), and Linyi (inland prefecture, 2013). This widespread adoption reflects a bottom-up policy innovation process, contrasting

with the top-down implementation that characterizes most policies in China. While policy adoption may be endogenous to city-level characteristics, it is plausibly exogenous to individual exporters' responses to tariff shocks, particularly after controlling for city-by-year fixed effects.

Figure 5 document the temporal and spatial diffusion of the policy. Export tax rebate loan policies spread slowly before 2010 and accelerated sharply after 2012, reaching broad national coverage by 2017. By 2017, 178 of 325 cities (54.8 percent) had adopted the policy, though only 57 cities (17.5 percent) offered accompanying fiscal subsidies. Early adopters were concentrated in coastal and economically developed regions, with later adoption expanding to inland cities. The staggered adoption pattern across diverse cities provides the identifying variation for our empirical analysis.

III. Data

Our analysis draws on four primary data sources: (1) firm-level export transactions from China Customs, (2) firm-level financial and tax records from the National Tax Survey Database, (3) anti-dumping duty information from the World Bank's Global Anti-Dumping Database, and (4) city-level data from the China Stock Market & Accounting Research (CSMAR) Database. We describe each data source below.

A. Firm-level Shipment and Financial Data

China Customs Data. The firm-level shipment data come from the China Customs Trade Statistics (CCTS) database, collected by China's General Administration of Customs. The database covers all export and import transactions from 2000 to 2016, recording detailed information on product codes (HS 8-digit), destination countries, export values, quantities, average price and firm identifiers.

National Tax Survey Database. We merge the shipment data with the National Tax Survey (NTS) Database, a comprehensive firm-level dataset spanning 2007 to 2016 (Giannetti, Liao, You, and Yu, 2021; Lu and Ma, 2023). The NTS Database offers several

advantages over other widely used Chinese firm datasets, including the Annual Survey of Industrial Firms (ASIF). First, it is jointly collected by the State Administration of Taxation and the Ministry of Finance for tax monitoring and policy evaluation, ensuring high data quality. Second, it provides more complete coverage of small firms while maintaining robust representation of large firms across all thirty-one provinces and eighty-four industries. Third, it contains unique detailed information on firms' taxation (VAT payments, claimed rebates, and received rebates), financing (cash flow, bank loans, trade credit), and business operations (sales, exports, profits).

The merged dataset covers the period 2007-2016 and includes 41,525 exporters. This allows us to track firm-level responses to the VAT rebate loan policy, including changes in export behavior, tax positions, and financial characteristics.

B. Anti-dumping Duties Data

Information on bilateral anti-dumping duties comes from the World Bank's Global Anti-Dumping Database (Bown, 2015). The database provides comprehensive coverage of AD investigations, including product information (HS 10-digit for the United States), initiation dates, preliminary determinations, and final duty rates. During our sample period (2007-2016), 545 AD cases targeted Chinese exports, with a median duty rate of 64.9 percent.

C. City-level Characteristics

City-level data come from the CSMAR China Economy Database. Variables include export-to-GDP ratio, total export value, GDP, real estate investment, fiscal revenue and expenditure, population, and year-end outstanding loan balance of financial institutions. These variables, measured in 2005 (prior to any city adopting the VAT rebate loan policy), are used to test for balance between treatment and control cities in our identification strategy.

D. Summary Statistics

Table II presents summary statistics for the firm-product-country-year panel covering 2007-2016. We partition the sample into four mutually exclusive groups based on whether a

product was ever subject to an AD duty and whether the destination country initiated AD duties against China. This data structure is helpful in distangle firms' responses to tariff shocks

The sample comprises 14,817,232 firm-product-country-year observations. The largest subsample consists of non-AD-dutiable products exported to AD-initiating countries (Panel B), followed by non-AD-dutiable products to non-initiating countries (Panel D). AD-dutiable products constitute a smaller share: 1.2 million observations for exports to non-initiating countries (Panel C) and 289,443 observations for exports to sanctioning countries (Panel A).

Average export values are similar across groups, ranging from $148 million to $259 million per firm-product-country-year observation. AD-dutiable products exported to sanctioning countries (Panel A) exhibit the highest mean export value at $259 million, despite facing an average duty of 20.9 percent. This pattern is consistent with the fact that larger export flows are more visible targets for anti-dumping investigations. All variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers.

IV. Empirics

A. Identification Strategy

Our identification strategy exploits the staggered adoption of VAT rebate receivable loan policies across Chinese cities. Between 2006 and 2017, local governments gradually introduced these policies to alleviate exporters' liquidity constraints arising from delays in VAT rebate disbursement. As documented in Figures 4 and 5, policy diffusion accelerated after 2012, with 178 of 325 cities (54.8%) implementing the policy by 2017.

Our identification assumption is that cities that adopted the policy serve as a valid treatment group for comparison with non-adopting cities. A key identification concern in this setting is whether policy adoption correlates with pre-existing city characteristics that also affect firms' export outcomes. Press coverage and policy documents from local governments indicate that adoption decisions reflected multiple considerations, including municipal fiscal capacity, export intensity, macro and local banking sector development. These factors are

observable in our data. We provide evidence supporting this assumption by testing whether initial city characteristics predict policy adoption. Table III reports results from regressions of the binary policy indicator $1(Policy)$ on city-level characteristics measured in 2005, before any city had adopted the policy.

Column (1) reports the mean of each characteristic in control cities (non-adopters). Column (2) reports control group means. Column (3) presents estimates from separate regressions of the policy indicator on each characteristic, controlling for province fixed effects. Column (4) reports results from a multivariate regression including all characteristics simultaneously with province fixed effects.

The results show that treatment and control cities are largely balanced on initial observables. Export-to-GDP ratio, log exports, log GDP, fiscal expenditure-to-revenue ratio, fiscal variables, bank loans, and population do not significantly predict policy adoption in either bivariate or multivariate specifications. Real estate investment-to-GDP ratio shows a marginally significant coefficient in the bivariate regression, but becomes insignificant in the multivariate specification.

The results show that treatment and control cities are largely balanced on initial observables. Export-to-GDP ratio, logarithm of exports, logarithm of GDP, fiscal expenditure-to-revenue ratio, fiscal variables, population, and the total balance of all outstanding loans from financial institutions do not significantly predict policy adoption in either bivariate or multivariate specifications. Only real estate investment-to-GDP ratio differs systematically between treatment and control cities, with a significant coefficient in the bivariate regression. In the multivariate regression (Column 4), none of the pre-existing characteristics significantly predicts policy adoption. This suggests that conditional on province fixed effects, treated and control cities are comparable along observable dimensions prior to policy implementation.

Cities with higher real estate investment are more likely to promote tax rebate-backed loans. A higher real estate investment-to-GDP ratio likely reflects a development model in which credit and resources are disproportionately allocated to the real estate sector. Our sample period coincides with China's real estate boom: in major cities, real housing prices grew at an average annual rate of 13.1 percent between 2003 and 2013 (Fang, Gu, Xiong,

and Zhou, 2016). Rising land prices make it economically rational for banks to prioritize lending to real estate developers or firms backed by real estate collateral. Consistent with this pattern, property-related loans accounted for approximately 25 percent of Chinese banking assets through the third quarter of 2016 (Liu and Xiong, 2018). In such cities, export-oriented firms are more likely to face tighter financing constraints, which in turn increases local governments' incentives to introduce targeted financial instruments - such as export tax rebate-backed loans - to support exporters.

By contrast, export dependence itself does not predict policy adoption. This suggests that local governments do not immediately introduce tax rebate-backed loans in response to short-run fluctuations in exports. More broadly, even when governments seek to support exporters, they may choose alternative policy tools, such as fiscal subsidies, rather than financial instruments. The adoption of tax rebate-backed loans therefore likely reflects underlying distortions in local credit allocation rather than a direct response to export shocks.

To address potential endogeneity concerns, our empirical strategy exploits variation across firms within city-year and within firms over time, by controlling for city-by-year fixed effects.

B. Firms' Responses to Tariffs

Hit by anti-dumping duties, exporters experience substantial declines in exports (Lu et al., 2013; Jabbour, Tao, Vanino, and Zhang, 2019), face increased trade costs (Felbermayr and Sandkamp, 2020), and adjust their export strategies (Crowley et al., 2018; Su, Wang, Zhang, and Lin, 2025). Some exporters divert sanctioned products to countries other than the initiating ones, a phenomenon known as trade diversion or deflection in the trade literature. However, evidence on trade diversion is mixed. One explanation is that fixed costs of exporting are country-specific (Chaney, 2008; Arkolakis, 2010), making market entry decisions independent across destinations and potentially limiting firms' ability to redirect exports.

For Chinese exporters during our sample period (2007-2016), anti-dumping duties represent the primary source of tariff risk. Before testing how VAT rebate receivable loans facilitate trade adjustment during adverse shocks, we first examine the baseline effects of

anti-dumping duties on firms' exports, including both direct impacts and trade diversion patterns.

B.1. Direct Impacts of Tariffs on Exports

Table IV examines the direct effect of anti-dumping duties on firms' exports of sanctioned products to sanctioning countries. We estimate:

$$\text{Trade Outcome}_{ipdt} = \beta \times \tau_{pdt} + \text{FEs} + \varepsilon_{ipdt}, \tag{1}$$

where τ_{pdt} is the ad valorem AD duty imposed by country d on product p, taking the value of zero for all product-country-year combinations without such duties or after duty removal. The specification includes three layers of fixed effects: product-country, firm-product-year, and firm-country, which absorb time-invariant product-destination characteristics, firm-product-specific time trends, and firm-destination relationships. This stringent specification isolates within-firm-product-destination variation in tariff exposure over time.

We start by focusing on the overall impacts in panel A. Results show that a one standard deviation increase in duty (0.158) is associated with 32.85 percentage points larger decrease in total exports (column 1) and 29.36 percentage points larger decrease in exports volume. Both estimates are highly significant and quantitatively large, confirming that tariffs substantially suppress trade in directly targeted products.

Panel B decomposes these effects into extensive and intensive margins. On the extensive margin, a one standard deviation increase in anti-dumping duty reduces the probability of exporting a given product to a sanctioned destination by 2.96 percentage points. This estimate is highly significant and represents complete cessation of some export relationships. The estimates in column 3 shows that a one standard deviation increase in duty is associated with a 6.26 percentage point larger decrease in export volume (column 3). The effects on export value and average price in the intensive margin are not statistically significant.

These findings reveal that tariffs operate primarily through the extensive margin: firms stop exporting sanctioned products to sanctioning countries rather than scaling back shipment quantities among continuing exporters. This is consistent with the existence of fixed

costs of maintaining export relationships. When tariffs make a market sufficiently unprofitable, firms exit entirely rather than continuing to export at reduced levels.

B.2. Trade Diversion

We next examine whether firms redirect exports away from sanctioned products or sanctioning countries. We construct firm-level exposure to anti-dumping duties as:

$$\text{Tariff}_{it} = \sum_{p,d} \tau_{pdt} \times s_{i,pd,t-1}, \tag{2}$$

where τ_{pdt} is the ad valorem AD duty imposed by country d on product p, and $s_{i,pd,t-1}$ is the share of firm i's total exports from product p to country d in year $t-1$.

Table V estimates the effect of firm-level tariff exposure on three subsamples: (1) non-AD-dutiable products to AD-initiating countries, (2) AD-dutiable products to non-initiating countries, and (3) non-AD-dutiable products to non-initiating countries.

Panel A shows that a one standard deviation increase in firm-level tariff exposure (0.158) is associated with a 7.7 percentage point larger decrease in exports of non-sanctioned products to sanctioning countries (column 1). This suggests a broader contraction in trade with countries imposing AD duties, extending beyond the directly affected products. Conversely, a one standard deviation increase in exposure is associated with a 20.8 percentage point larger increase in exports of sanctioned products to non-sanctioning countries (column 2), indicating substantial trade diversion to alternative markets. Firms also experience a 14.1 percentage point larger decrease in exports of non-sanctioned products to non-sanctioning countries (column 3), potentially reflecting resource reallocation or overall firm-level setbacks. The volume effects mirror these patterns, with a 7.5 percentage point decrease (column 4), a 30.7 percentage point increase (column 5), and an 11.5 percentage point decrease (column 6), respectively.

Panel B decomposes these effects into extensive and intensive margins. For non-sanctioned products to sanctioning countries, the effect operates primarily through the intensive margin, with a 3.9 percentage point larger decrease in export value conditional on continuing to export (column 6), while the extensive margin effect is small and insignificant (0.3 percentage

points, column 2). The increase in sanctioned products to non-sanctioning countries reflects both entry into new markets (1.9 percentage point increase in export probability, column 3) and expansion in volume at the intensive margin among existing exporters, accompanied by lower unit prices.

These results reveal two key patterns. First, anti-dumping duties lead to significant contractions in firms' exports to sanctioning countries, operating primarily through the extensive margin for directly sanctioned products and through the intensive margin for non-sanctioned products. Second, firms engage in substantial trade diversion of sanctioned products toward non-sanctioning destinations, with effects operating through both the extensive margin (market entry) and the intensive margin (volume expansion). This diversification response demonstrates that despite the existence of market-specific fixed costs, firms retain some ability to redirect exports when faced with trade barriers.

C. Impacts of VAT Rebate Receivable Loans in Trade Adjustment

In this section, we study the role of VAT rebate receivable loans in trade adjustment of exporters in response to anti-dumping shocks. Specifically, we focus on two main responses of exporters, direct setbacks in exporters' intensive-margin sales and trade diversion along both the extensive margin and the intensive margin of quantities.

Table VI presents difference-in-differences estimates of how VAT rebate receivable loans affect firms' responses to trade shocks. We estimate:

$$\text{Export Outcome}_{ipdt} = \beta(\text{Tariff} \times \text{Post}_{c,t}) + \gamma\text{Tariff} + \delta\text{Post}_{c,t} + \text{FEs} + \varepsilon_{ipdt}, \tag{3}$$

where $\text{Post}_{c,t}$ indicates the post-policy period in city c.

Panel A examines direct responses to tariffs using the subsample of AD-dutiable products to AD-initiating countries. The negative main effect of tariffs confirms that AD duties reduce the probability of exporting to sanctioned markets. The coefficient of interest is β, which captures the effect of VAT rebate receivable loan on exports performance. The estimated coefficient in columns (1) and (2) indicate that after policy adoption, firms facing tariffs are 4.8 percentage points more likely to maintain export relationships. The magnitude of

the point estimate is stable when adding city-year fixed effects in column (2). The policy attenuates approximately 40 percent of the tariff's negative effect on the extensive margin.

The volume effects in columns (3) and (4) show negative point estimates for the interaction term, though statistically insignificant. This suggests the policy primarily helps firms maintain market presence rather than expand export volumes in sanctioned markets.

Panel B tests whether the policy facilitates trade diversion to non-sanctioning countries. The positive main effect of tariff exposure confirms that firms redirect sanctioned products to alternative markets on average. However, the interaction terms are insignificant across all specifications, indicating the policy does not significantly enhance trade diversion. The lack of effect on diversion is consistent with the interpretation that VAT rebate-backed loans primarily alleviate liquidity constraints rather than facilitate the discovery of new export markets, which requires different capabilities such as market knowledge and buyer networks.

These findings suggest that by converting illiquid VAT rebate receivables into working capital, the policy enables exporters to weather negative demand shocks in their existing markets, but does not substantially accelerate geographic diversification.

V. Discussion of Mechanisms

A. How VAT Rebate Receivable Loans Help Trade Adjustment: Collateral Channel

We examine whether the policy's effectiveness varies with firms' pre-existing liquidity constraints from delayed VAT rebates. We measure constraints using the unfulfilled rebate ratio, Rebate_i, defined as unfulfilled VAT rebates scaled by total assets in the year prior to policy adoption. This captures the share of firm assets tied up in rebate receivables. We estimate a triple-difference specification:

$$\begin{aligned}\text{Export Outcome}_{ipdt} =& \beta_1(\text{Tariff} \times \text{Rebate}_i \times \text{Post}_{c,t}) + \beta_2(\text{Tariff} \times \text{Rebate}_i) \\ &+ \beta_3(\text{Tariff} \times \text{Post}_{c,t}) + \beta_4(\text{Rebate}_i \times \text{Post}_{c,t}) \\ &+ \gamma \text{Tariff}_{pt} + \delta \text{Post}_{c,t} + \text{FEs} + \varepsilon_{ipdt}.\end{aligned} \tag{4}$$

Table VII reports the triple-difference estimates. Panel A examines firms' direct responses to tariffs in sanctioned markets. The coefficient of interest, β_1, is positive and significant across both specifications. The estimates show that firms with higher rebate receivables are more likely to weather tariff shocks after the policy. The negative estimated coefficient on Rebate $\times$ Post indicates that absent tariff shocks, firms with high rebate receivables perform worse after policy adoption, consistent with these firms being more financially constrained.

Panel B examines trade diversion to non-sanctioning countries. The positive and significant triple-difference coefficient of β_1 indicates that firms with higher VAT rebate receivables are better able to redirect exports to alternative markets after policy adoption when facing tariff exposure. The negative estimates on the interaction term between $Tariff$ and $Rebate$ suggest that before policy adoption, firms with more cashflow locked in rebate receivable struggled to reallocate exports across destinations when facing tariff shocks.

These results provide evidence on the collateral channel: by allowing firms to pledge their VAT rebate receivables as collateral for short-term loans, the policy alleviates liquidity constraints that would otherwise prevent firms from maintaining or redirecting export activities when hit by negative demand shocks.

B. Improved Short-term Liquidity

In this section, we directly tests whether the policy increases firms' access to short-term credit. We estimate:

$$Y_{it} = \beta \text{Rebate}_i \times \text{Post}_{ct} + \alpha \text{Post}_{ct} + \text{FEs} + \varepsilon_{it}, \tag{5}$$

where Y_{it} measures firms' short-term liabilities. The specification includes firm fixed effects to control for time-invariant firm characteristics and city-year fixed effects to account for local economic conditions.

The results are provided in Table VIII. The estimates in column (1) show no significant effect on overall current liability. However, we find a significant positive effect on firms' current liability in intensive margin conditional on having positive current liabilities as suggested in column (2). This suggests that among firms already accessing short-term credit,

those with higher VAT rebate receivables increase their borrowing after policy adoption. The extensive margin effect in column (3) is small and insignificant, indicating the policy does not substantially increase the probability of obtaining any short-term credit.

This pattern suggests the policy primarily helps firms with existing banking relationships expand their short-term borrowing by providing additional collateral, rather than enabling previously unbanked firms to access credit markets. This is at least partially due to the institutional design of the policy, which operates through commercial banks and requires firms to pledge verified VAT rebate receivables. The results highlight a potential information friction in policy implementation: firms with established bank relationships are more likely to learn about the program through their lenders' networks and successfully apply for VAT rebate-backed loans, while firms lacking such connections may remain unaware of or unable to access the program despite potential eligibility.

VI. Concluding Remarks

Government policies can create frictions even when pursuing legitimate objectives. In the context of China, delays in VAT rebate disbursement - driven by local fiscal constraints - tie up exporters' working capital and exacerbate liquidity pressures. Studying a loan program that converts pending VAT rebate receivables into collateral-backed financing, we show that governments can partially alleviate such self-created frictions through financial design without requiring immediate fiscal outlays. Exploiting staggered policy adoption across cities and variation in anti-dumping duties, we find that the policy significantly improves firms' resilience to trade shocks by helping them maintain existing export relationships, primarily through a collateral channel that benefits firms with larger rebate receivables. At the same time, the policy exhibits clear limitations: it does not facilitate geographic diversification and its benefits concentrate among firms with existing banking relationships, highlighting the distinct roles of liquidity constraints, capability barriers, and information frictions in trade adjustment. More broadly, our findings suggest that while collateral-based financial mechanisms offer a viable second-best response to government-induced liquidity frictions in fiscally constrained environments, their ultimate effectiveness depends critically on comple-

mentary implementation and outreach that ensure broad access and address heterogeneous adjustment barriers.

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Appendix A. Figures and Tables

FIGURE 1. VAT Rebate Process: Comparison of Scenarios With and Without Rebate-Backed Loans

This figure illustrates the VAT rebate process for exporters under two scenarios: without rebate-backed financing (Panel A) and with rebate receivable-backed loans (Panel B).

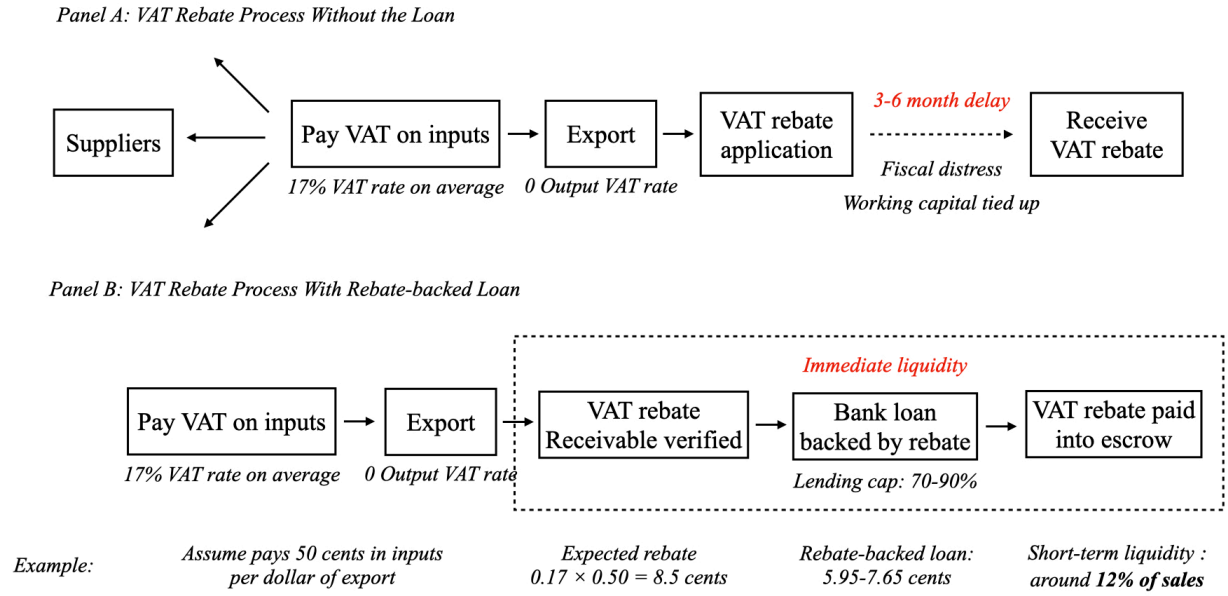


FIGURE 2. Institutional Framework of VAT Rebate Receivable Loan Policy. This figure depicts the institutional relationships and interactions among key stakeholders in the VAT rebate receivable loan system

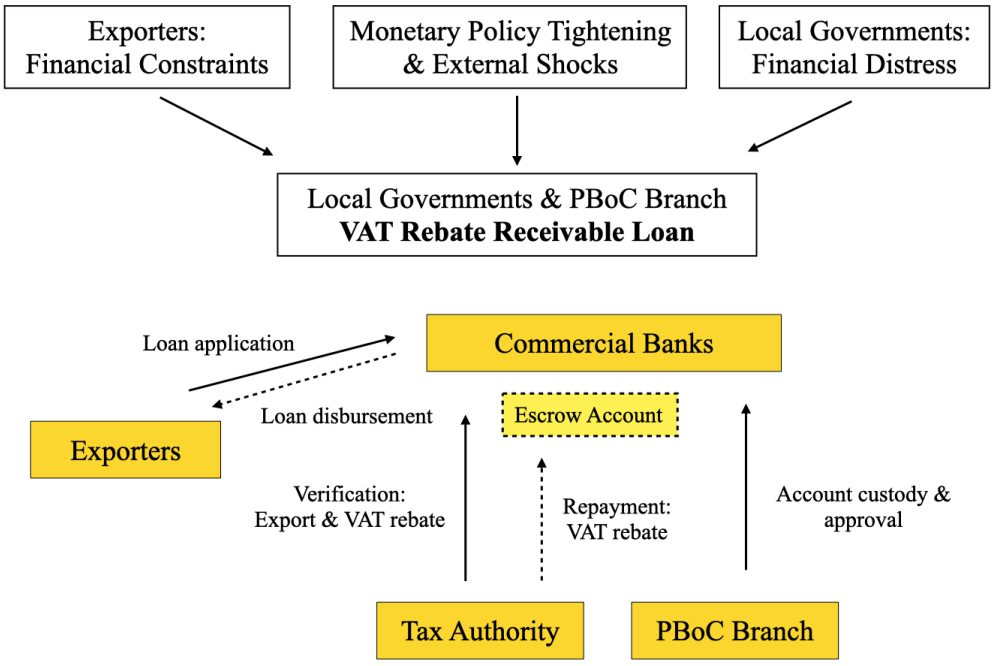


FIGURE 3. VAT Rebate Receivable Loan Application and Disbursement Process.

This figure illustrates the seven-step sequential process for exporters to obtain rebate-backed loans, from initial application through final account release. The process involves coordination among exporters, commercial banks, tax authorities, and the People's Bank of China (PBoC) branch, with the key mechanism being an escrow account where VAT rebates are deposited and automatically used for loan repayment.

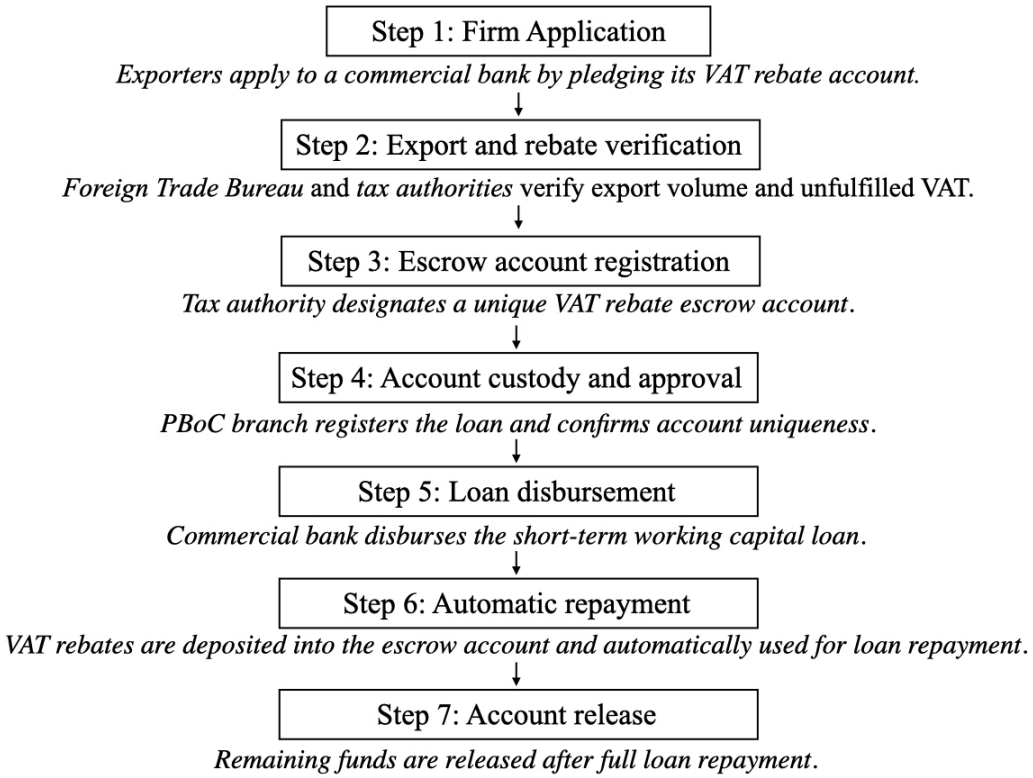


FIGURE 4. Temporal Diffusion of VAT Rebate Receivable Loan in China. The figures below show the diffusion of this policy. Export tax rebate loan policies spread slowly before 2010 and accelerated sharply after 2012, reaching broad national coverage by 2017. By 2017, more than half of Chinese cities had adopted the policy, but fewer than 20% offered accompanying fiscal subsidies

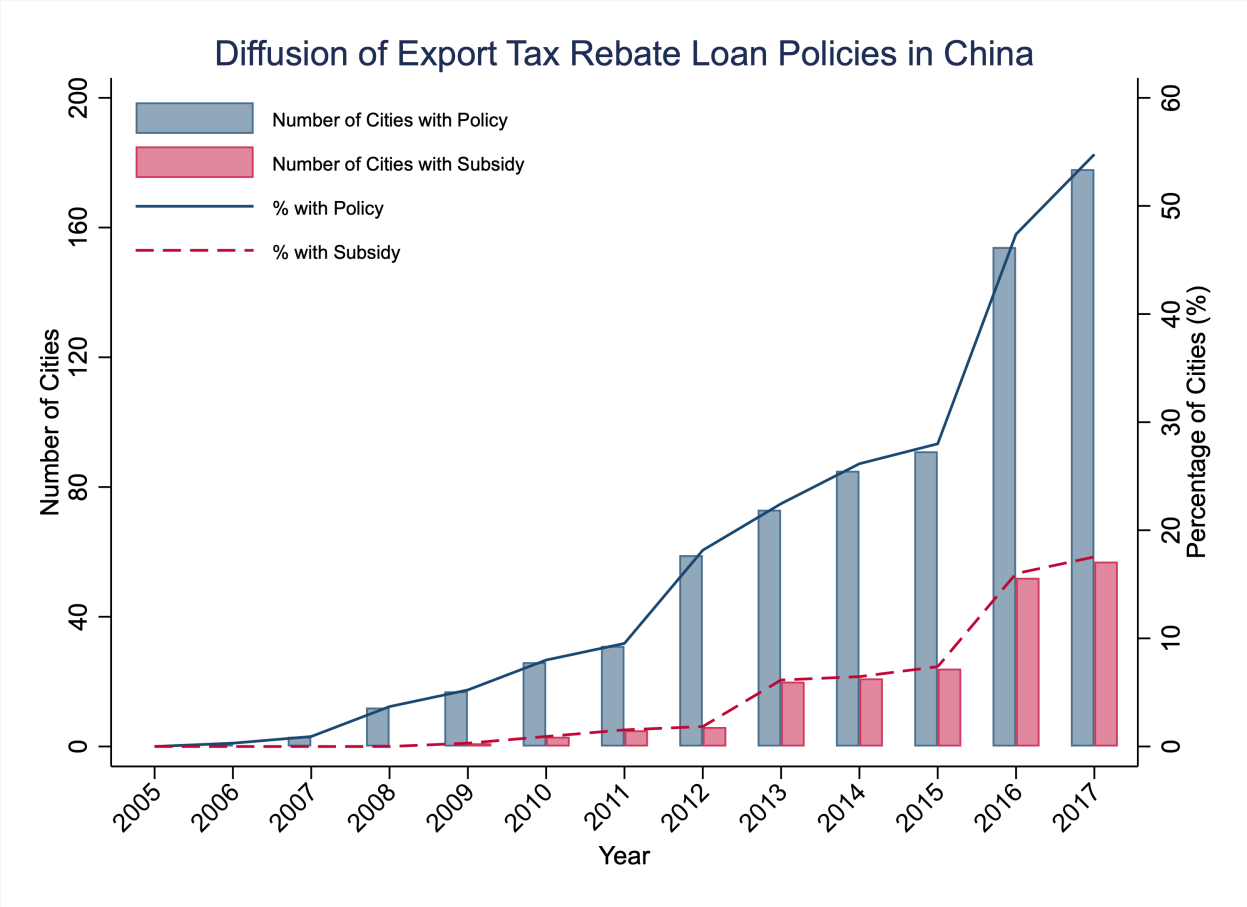
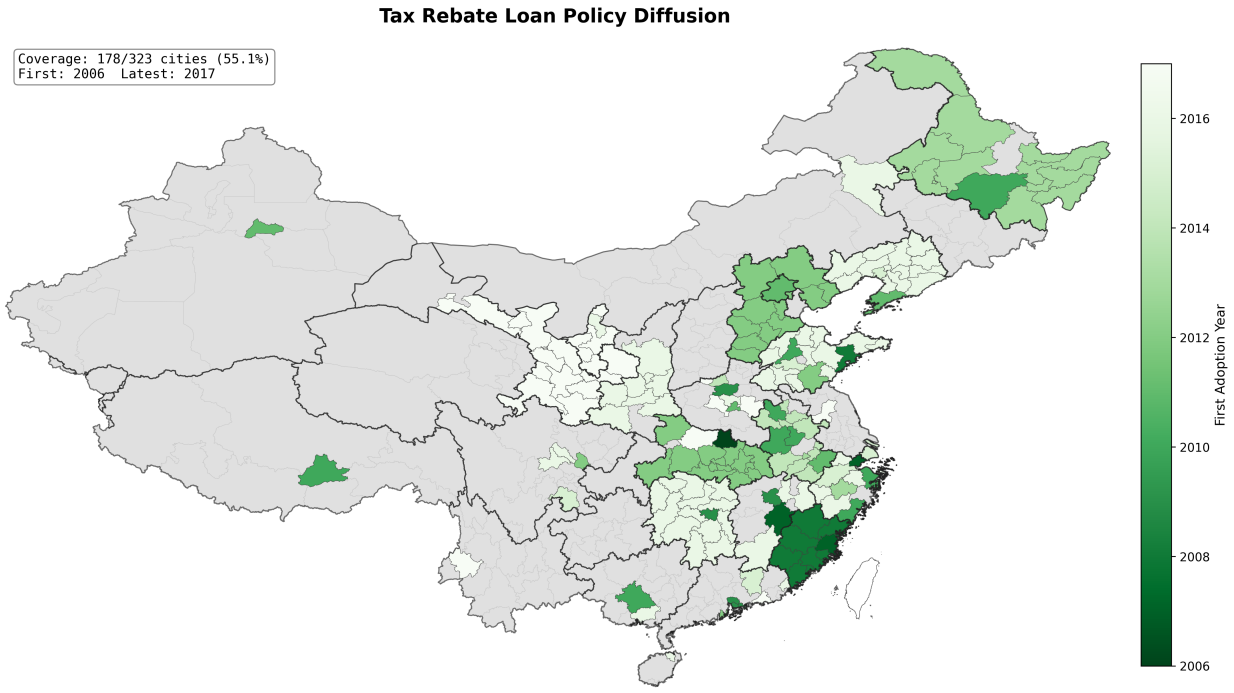
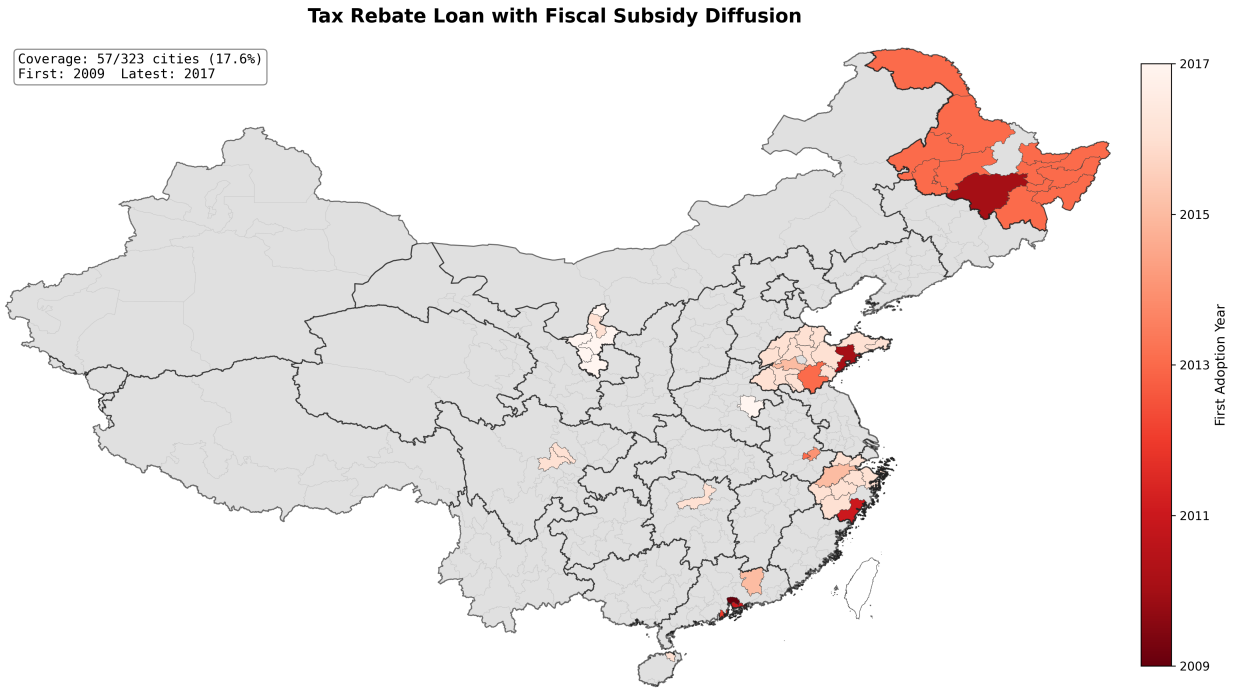


FIGURE 5. Geographic Diffusion of VAT Rebate Receivable Loan in China. Panel (a) illustrates the spatial diffusion of tax rebate loan policies across 323 Chinese cities from 2006 to 2017, with darker green shades indicating earlier adoption. Panel (b) displays the substantially more limited diffusion of tax rebate loan programs accompanied by fiscal subsidies, covering only 17.6% of cities (57 out of 323) between 2009 and 2017, with darker red shades indicating earlier adoption.

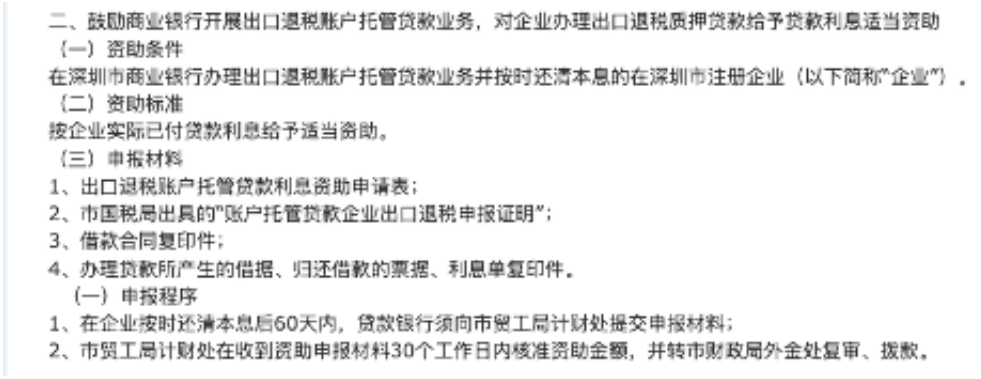


(a) Loan Policy



(b) Loan Policy with Fiscal Subsidies

FIGURE 6. Examples of Local Government Policy Announcements
This figure displays representative policy announcements from local governments promoting VAT rebate receivable loan programs. Panel (a) shows a policy document from Shenzhen, a coastal city outlining program requirements and implementation procedures. Panel (b) presents a news report documenting policy outcomes and beneficiary firms. These examples illustrate the typical documentation we use to identify policy adoption dates and verify implementation across Chinese cities.



二、鼓励商业银行开展出口退税账户托管贷款业务，对企业办理出口退税质押贷款给予贷款利息适当资助

（一）资助条件

在深圳市商业银行办理出口退税账户托管贷款业务并按时还清本息的在深圳市注册企业（以下简称"企业"）。

（二）资助标准

按企业实际已付贷款利息给予适当资助。

（三）申报材料

1、出口退税账户托管贷款利息资助申请表；

2、市国税局出具的"账户托管贷款企业出口退税申报证明"；

3、借款合同复印件；

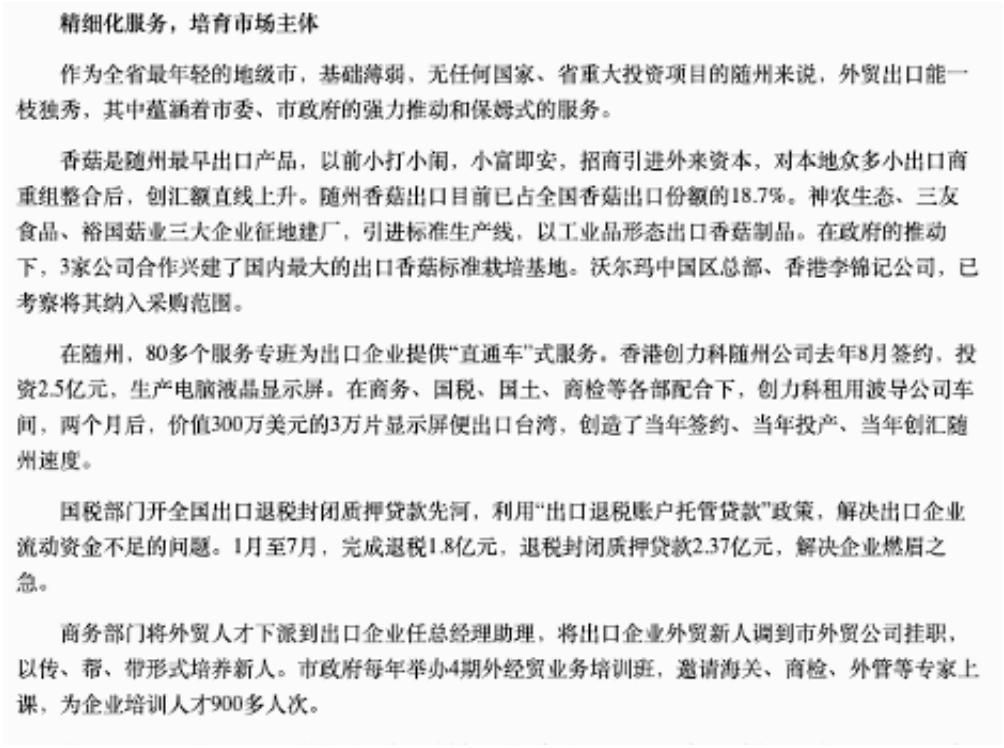
4、办理贷款所产生的借据、归还借款的票据、利息单复印件。

（一）申报程序

1、在企业按时还清本息后60天内，贷款银行须向市贸工局计财处提交申报材料；

2、市贸工局计财处在收到资助申报材料30个工作日内核准资助金额，并转市财政局外金处复审、拨款。

(a) Policy of Shenzhen in 2009



精细化服务，培育市场主体

作为全省最年轻的地级市，基础薄弱，无任何国家、省重大投资项目的随州来说，外贸出口能一枝独秀，其中蕴涵着市委、市政府的强力推动和保姆式的服务。

香菇是随州最早出口产品，以前小打小闹，小富即安，招商引进外来资本，对本地众多小出口商重组整合后，创汇额直线上升。随州香菇出口目前已占全国香菇出口份额的18.7%。神农生态、三友食品、裕国菇业三大企业征地建厂，引进标准生产线，以工业品形态出口香菇制品。在政府的推动下，3家公司合作兴建了国内最大的出口香菇标准栽培基地。沃尔玛中国区总部、香港李锦记公司，已考察将其纳入采购范围。

在随州，80多个服务专班为出口企业提供"直通车"式服务。香港创力科随州公司去年8月签约，投资2.5亿元，生产电脑液晶显示屏。在商务、国税、国土、商检等各部配合下，创力科租用波导公司车间，两个月后，价值300万美元的3万片显示屏便出口台湾，创造了当年签约、当年投产、当年创汇随州速度。

国税部门开全国出口退税封闭质押贷款先河，利用"出口退税账户托管贷款"政策，解决出口企业流动资金不足的问题。1月至7月，完成退税1.8亿元，退税封闭质押贷款2.37亿元，解决企业燃眉之急。

商务部门将外贸人才下派到出口企业任总经理助理，将出口企业外贸新人调到市外贸公司挂职，以传、帮、带形式培养新人。市政府每年举办4期外经贸业务培训班，邀请海关、商检、外管等专家上课，为企业培训人才900多人次。

(b) News Report on Loan Policy in Suizhou in 2009

TABLE I

Adoption of VAT Rebate Receivable Loan Policies.

This table reports the year-by-year diffusion of VAT rebate receivable loan policies across 325 Chinese cities from 2005 to 2017. Policy adoption accelerated significantly after 2011, reaching 55% of cities by 2017, while fiscal subsidy provision remained more limited at 18% coverage. This reflects local governments' varying fiscal capacity to support these financial programs.

Year	Cities w/ Policy	Cities w/ Subsidy	%Policy	%Subsidy
2005	0	0	0.0	0.0
2006	1	0	0.3	0.0
2007	3	0	0.9	0.0
2008	12	0	3.7	0.0
2009	17	1	5.2	0.3
2010	26	3	8.0	0.9
2011	31	5	9.5	1.5
2012	59	6	18.2	1.8
2013	73	20	22.5	6.2
2014	85	21	26.2	6.5
2015	91	24	28.0	7.4
2016	154	52	47.4	16.0
2017	178	57	54.8	17.5

TABLE II
Summary Statistics.
This table presents summary statistics for the firm-product-country-year panel during the 2007-2016 sample period. We classify each product-country pair into four groups based on whether the product was ever subject to an AD duty and whether the country initiated AD duties on China: (1) AD-dutiable products × AD-initiating countries (Panel A), (2) non-AD-dutiable products × AD-initiating countries (Panel B), (3) AD-dutiable products × non-initiating countries (Panel C), and (4) non-AD-dutiable products × non-initiating countries (Panel D). Value denotes export value in million USD, Amount represents export quantity in millions of units, Average Price is calculated as value divided by quantity, and Duty indicates the ad valorem tariff rate. All values are winsorized at the 1% and 99% percentiles to account for outliers.

	N	Mean	Median	Std. Dev.	p25	p75
Panel A: Sanctioning Countries × Sanctioned Products						
Value (million USD)	289,443	258.659	9.146	868.766	0.110	74.998
Amount (million)	289,443	74.171	1.000	261.696	0.001	17.130
Average Price (USD)	219,342	318.043	4.629	2,870.860	2.027	14.304
Duty	282,832	0.209	0.333	0.158	0.000	0.333
Panel B: Sanctioning Countries × Non-Sanctioned Products						
Value (million USD)	8,296,309	199.370	8.324	724.463	0.238	63.026
Amount (million)	8,296,309	45.094	0.525	193.626	0.001	8.500
Average Price (USD)	6,270,774	743.840	7.417	4,592.280	2.730	29.289
Duty	8,296,309	0.000	0.000	0.000	0.000	0.000
Panel C: Non-Sanctioning Countries × Sanctioned Products						
Value (million USD)	1,221,761	173.908	7.580	661.089	0.206	55.449
Amount (million)	1,221,761	60.835	0.215	235.928	0.000	10.000
Average Price (USD)	846,060	809.912	4.364	4,917.700	1.600	23.890
Duty	1,221,761	0.000	0.000	0.000	0.000	0.000
Panel D: Non-Sanctioning Countries × Non-Sanctioned Products						
Value (million USD)	5,009,719	148.419	6.400	608.752	0.260	45.605
Amount (million)	5,009,719	35.886	0.116	175.451	0.000	4.585
Average Price (USD)	3,499,202	1,463.660	7.101	6,571.130	2.410	44.323
Duty	5,009,719	0.000	0.000	0.000	0.000	0.000

TABLE III
Predictive Power of Pre-existing City Characteristics on Treatment Status.

The table tests whether initial characteristics (in 2005) predict the adoption of tax rebate backed loan 1(Policy) in a given city. The unit of observation is a city. Column (1) reports the mean in the control group for the variables. Column (3) reports the differences in the means between the treatment and control for the variable, controlling for province fixed effects. Column (3) reports the estimate from a multivariate regression of the binary treatment indicator 1(*Policy*) on all city-level characteristics in a single regression, controlling for state fixed effects. Standard errors are clustered at the province level. t statistics is reported in parentheses.

	Control Means	Treated Means	1(*Policy*)	
	(1)	(2)	(3)	(4)
Export/GDP	0.012	0.016	1.408	0.752
			(1.375)	(0.551)
Log(Exports)	7.027	8.843	0.008	0.001
			(1.465)	(0.077)
Log(GDP)	5.466	5.838	0.011	0.000
			(0.890)	(0.006)
Real Estate Investment/GDP	0.044	0.049	1.276**	1.050
			(2.136)	(1.439)
Fiscal Expenditure/Revenue	2.882	2.575	−0.014	0.009
			(-1.588)	(0.385)
Log(Fiscal Revenue)	11.501	11.793	0.004	0.063
			(0.539)	(0.542)
Log(Fiscal Expenditure)	12.420	12.578	0.000	-0.062
			(0.065)	(-0.523)
Log(Bank Loans)	11.445	13.918	0.003	0.001
			(0.699)	(0.144)
Log(Population)	5.380	5.107	-0.011	-0.018
			(-0.613)	(-0.782)
Province FE			Yes	Yes

TABLE IV
Direct Impacts of Tariffs on Exports: AD-dutiable products×AD-initiating countries

This table reports the impact of anti-dumping (AD) duties on the value, volume, and unit price of a firm's exports of a given product to a destination country. The estimation exploits the subsample of AD-dutiable products×AD-initiating countries, a firm-country-product-year panel during 2007-2016.

$$\text{Trade Outcome}_{ipdt} = \beta \times \tau_{pdt} + FEs + \varepsilon_{ipdt}$$

where $TradeOutcome_{ipdt}$ is the outcome variable of product p that firm i exports to destination country d. τ_{pdt} is the first ad valorem AD duties imposed by country d on product p; for any "country-product-year" pair without such a duties, it takes the value of 0. If the AD duties are later removed, τ_{pdt} takes the value of 0. Standard errors are clustered at the firm level. t statistics is reported in parentheses.

Panel A. Overall Exports

	Log(1+Exports)	Log(1+Volume)
	(1)	(2)
AD duty$_{pct}$	-2.079***	-1.858***
	(-4.667)	(-4.599)
Product×Country FE	Yes	Yes
Firm×Product×Year FE	Yes	Yes
Firm×Country FE	Yes	Yes
Adjusted R^2	0.440	0.491
Observations	118,262	118,262

Panel B. Separating Extensive and Intensive Margins

	Have Export	Log(Exports)	Log(Volume)	Log(Price)
	(1)	(2)	(3)	(4)
AD duty$_{pct}$	-0.187***	-0.339	-0.396*	-0.184
	(-4.625)	(-1.619)	(-1.863)	(-1.204)
Product×Country FE	Yes	Yes	Yes	Yes
Firm×Product×Year FE	Yes	Yes	Yes	Yes
Firm×Country FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.283	0.746	0.789	0.741
Observations	118,262	82,376	80,850	80,850

TABLE V
Trade Diversion: other subsamples

We construct firm-level exposure to anti-dumping duties. Firm i's exposure to AD duties in year t is defined as

$$\text{Tariff}_{it} = \sum_{p,d} \tau_{pdt}\, s_{i,pd,t-1},$$

where τ_{pdt} is the first ad valorem AD duty imposed by country d on product p, and $s_{i,pd,t-1}$ is the fraction of firm i's total exports derived from product p to country d in $t-1$.

$$\text{Trade Outcome}_{ipdt} = \beta \times \text{Tariff}_{it} + FEs + \varepsilon_{ipdt}$$

This table reports the impact of firm-level exposure to AD duties on exports using subsamples of non-AD-dutiable products × AD-initiating countries, AD-dutiable products × non-initiating countries, and non-AD-dutiable products × non-initiating countries, in a firm–country–product–year panel during 2007–2016. Standard errors are clustered at the firm level. t statistics is reported in parentheses.

Panel A. Overall Exports

	Log(1+Exports)			Log(1+Volume)		
AD dutiable product	No	Yes	No	No	Yes	No
AD initiating countries	Yes	No	No	Yes	No	No
	(1)	(2)	(3)	(4)	(5)	(6)
$Tariff_{it}$	-0.489**	1.318***	-0.891***	-0.475***	1.941***	-0.730**
	(-2.529)	(2.757)	(-2.716)	(-2.946)	(3.536)	(-2.559)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product×Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.134	0.191	0.167	0.248	0.333	0.342
Observations	6,615,906	888,803	3,647,318	6,615,906	888,803	3,647,318

Panel B. Extensive and Intensive Margins

	Have Export			Log(Exports)		
AD dutiable product	No	Yes	No	No	Yes	No
AD initiating countries	Yes	No	No	Yes	No	No
	(2)	(3)	(4)	(6)	(7)	(8)
$Tariff_{it}$	-0.019	0.119***	-0.040	-0.245**	-0.403**	-0.484**
	(-0.966)	(3.205)	(-1.073)	(-2.238)	(-2.455)	(-2.387)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product×Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.067	0.106	0.099	0.347	0.490	0.427
Observations	6,615,906	888,803	3,647,318	5,247,546	698,102	2,880,518

(continued)

	Log(Volume)			Log(Price)		
AD dutiable product	No	Yes	No	No	Yes	No
AD initiating countries	Yes	No	No	Yes	No	No
	(10)	(11)	(12)	(14)	(15)	(16)
$Exposure_{it}$	-0.372***	0.751**	-0.440***	0.054	-1.186***	-0.045
	(-3.485)	(2.008)	(-2.851)	(0.803)	(-3.470)	(-0.301)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Product×Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.508	0.651	0.641	0.710	0.747	0.810
Observations	5,159,101	679,214	2,810,695	5,159,101	679,214	2,810,695

TABLE VI
Impacts of VAT Rebate Receivable Loans in Trade Adjustment

We estimate a difference in difference specification:

$$\text{Export Outcome}_{ipdt} = \beta_1 \left(\text{Tariff} \times \text{Post}_{c,t}\right) + \gamma \text{Tariff} + \delta \text{Post}_{c,t} + \text{FEs} + \varepsilon_{ipdt}$$

This table reports the effects of VAT rebate receivable loans on firms' exports. Panel A reports the impacts on firms' direct response to tariffs using AD-dutiable products × AD-initiating countries sample, where $tariff$ is measured at product-country-year level. Panel B reports the impacts on firms' trade diversion using AD-dutiable products × non-initiating countries, where $tariff$ is aggregated in firm-year level. Post_{ct} indicates the post-policy period in city c. Standard errors are clustered at the city-year level, and t-statistics are reported in parentheses.

Panel A. Direct Response to Tariffs: Sanctioning Countries × Sanctioned Products

	Have Export		Log(Volumes)	
	(1)	(2)	(3)	(4)
Tariff × Post	0.048**	0.044*	-0.091	-0.135
	(2.058)	(1.794)	(-0.600)	(-0.807)
Tariff	-0.120***	-0.108***	-0.428***	-0.416***
	(-7.730)	(-6.593)	(-2.941)	(-2.747)
Post	-0.008		0.025	
	(-0.934)		(0.495)	
Product-Country FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
City-Year FE	No	Yes	No	Yes
Observations	219,125	218,882	167,655	167,416
R-squared	0.102	0.108	0.563	0.564

Panel B. Trade Diversion: Non-Sanctioning Countries × Sanctioned Products

	Have Export		Log(Volumes)	
	(1)	(2)	(5)	(6)
Tariff × Post	-0.036	-0.016	-0.178	-0.408
	(-0.711)	(-0.409)	(-0.379)	(-0.886)
Tariff	0.130***	0.063**	0.807**	0.532*
	(2.999)	(2.238)	(2.508)	(1.869)
Post	-0.004		-0.107***	
	(-0.570)		(-3.357)	
Product-Country FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
City-Year FE	No	Yes	No	Yes
Observations	888,803	888,667	679,214	679,081
R-squared	0.106	0.116	0.651	0.654

TABLE VII
How VAT Rebate Receivable Loans Help Trade Adjustment: Collateral

We estimate a triple-difference specification:

$$\begin{aligned}\text{Export Outcome}_{ipdt} = &\beta_1 \left(\text{Tariff} \times \text{Rebate}_i \times \text{Post}_{c,t}\right) \\ &+ \beta_2 \left(\text{Tariff} \times \text{Rebate}_i\right) + \beta_3 \left(\text{Tariff} \times \text{Post}_{c,t}\right) \\ &+ \beta_4 \left(\text{Rebate}_i \times \text{Post}_{c,t}\right) + \gamma \text{Tariff}_{pt} + \delta \text{Post}_{c,t} + \text{FEs} + \varepsilon_{ipdt}\end{aligned}$$

We measure firms' financial constraints from delayed VAT rebates in the year prior to VAT rebate receivable loan policy using the unfulfilled rebate ratio, $Rebate_i$. $Rebate_i$ is defined as unfulfilled VAT rebates scaled by total assets, which captures the share of firm assets tied up in rebate receivables. Post_{ct} indicates the post-policy period in city c. Standard errors are clustered at the city-year level, and t-statistics are reported in parentheses.

Panel A. Direct Response to Tariffs: Sanctioning Countries × Sanctioned Products

	Have Export	
	(1)	(2)
Tariff × Rebate × Post	1.078**	1.188**
	(1.989)	(2.086)
Tariff × Rebate	-0.051	-0.194
	(-0.159)	(-0.592)
Tariff × Post	0.026	0.021
	(0.852)	(0.681)
Rebate × Post	-0.394**	-0.469**
	(-2.043)	(-2.400)
Tariff	-0.098***	-0.094***
	(-3.948)	(-3.694)
Post	0.000	
	(0.038)	
Product-Country FE	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	No
City-Year FE	No	Yes
Observations	105,983	105,839
R-squared	0.102	0.106

Panel B. Trade Diversion: Non-Sanctioning Countries × Sanctioned Products

	Have Export	
	(1)	(2)
Tariff × Rebate × Post	5.634**	5.093**
	(2.173)	(2.131)
Tariff × Rebate	−7.126***	−6.019**
	(-2.824)	(-2.566)
Tariff × Post	−0.053	−0.016
	(-0.746)	(-0.331)
Rebate × Post	−0.007	−0.053
	(-0.128)	(-1.135)
Tariff	0.179**	0.070
	(2.221)	(1.606)
Post	0.000	
	(0.065)	
Product-Country FE	Yes	Yes
Firm FE	Yes	Yes
Year FE	Yes	
City-Year FE		Yes
Observations	466,975	466,900
Adjusted R^2	0.106	0.115

TABLE VIII
Do Firms Get More Short-term Liquidity?

This table examines how VAT rebate receivable loan affects firms' short-term liquidity, measured by non-current liability.

$$\mathrm{Y}_{it} = \beta \mathrm{Rebate}_i \times \mathrm{Post}_{ct} + \alpha \mathrm{Post}_{ct} + \mathrm{FEs} + \varepsilon_{it}$$

$Rebate_i$ is defined as unfulfilled VAT rebates scaled by total assets, which captures the share of firm assets tied up in rebate receivables. Post_{ct} indicates the post-policy period in city c. Standard errors are clustered at the city-year level, and t-statistics are reported in parentheses.

	Log(1+Current liability)	Log(Current liability)	Has(Current liability)
	(1)	(2)	(3)
Rebate × Post	-0.074	0.425**	0.009
	(-0.158)	(2.553)	(0.172)
Firm FE	Yes	Yes	Yes
City-year FE	Yes	Yes	Yes
Observations	111,062	109,899	111,592
Adjusted R^2	0.777	0.902	0.126

Appendix B. Data Collection on Loan Policy

This appendix describes the construction of a city-year level panel dataset documenting the implementation of VAT rebate receivable loan policies in China from 2005 to 2017. The dataset covers 325 prefecture-level cities with exporting firms across all 31 provinces.

I. Search Strategy. We employ a systematic web-based search approach to identify policy documents and implementation records. For each city-year pair, searches are conducted using multiple keyword combinations, including:

- VAT rebate receivable loan
- VAT rebate receivable custody loan
- VAT rebate loan
- VAT rebate receivables pledge

To ensure comprehensive coverage of historical documents, searches are performed using both Arabic numerals (e.g., 2008) and Chinese character representations of years. All collected policy documents are manually reviewed to verify relevance and implementation status.

II. Source Hierarchy. Policy information is collected following a prioritized source hierarchy to ensure data reliability:

1. Municipal government official websites (policy documents and press releases)
2. Local branches of the People's Bank of China (work reports and statistical bulletins)
3. Municipal finance bureaus, commerce bureaus, and tax bureaus
4. Local financial regulatory authorities
5. Local branches of major commercial banks
6. Local authoritative media outlets
7. Document-sharing platforms containing archived policy records

III. Variables Collected. For each city-year observation, the dataset records:

- Whether the city issued formal policy documents promoting VAT rebate receivable loans.
- Whether the policy included fiscal support measures, such as interest subsidies or government-backed risk compensation funds.