

Incomplete VAT Rebates to Exporters: How Do they Affect China's Export performance?

Julien Gourdon, Stéphanie Monjon & Sandra Poncet

Highlights

- We investigate how changes in the VAT rebates affect export performance in China.
- We provide evidence of significant repercussions of adjustments in export VAT rebates on China's export performance
- The results suggest that the repercussions of a one percentage point change in the VAT rebate are identical whether it corresponds to a positive or a negative change.



Abstract

During the last decade, the Chinese government has frequently changed the value added tax (VAT) refund levels offered to exporters. Indeed, China's VAT system is not neutral, in particular because the exporters may not receive complete refund of the domestic VAT paid on their inputs. This paper investigates how changes in the VAT rebates affect export performance in China. Our empirical analysis relies on export volume data at the HS6 product level over the 2003-12 period. To address potential endogeneity, we exploit an eligibility rule that disqualifies processing trade with supplied materials from the rebates. We find that the adjustments to the VAT rebates have significant repercussions on the exported volume: a one percentage point increase in the VAT rebate can lead to a 7% increase in export volumes. This magnitude allows to better understand the strong resistance of China's exports amid the global recession.

Keywords

VAT system, Export tax, Export performance, China.

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Incomplete VAT rebates to exporters : how do they affect China's export performance?¹

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1. Introduction

China's system of VAT rebates to exporters is viewed with growing suspicion and has been accused of giving unfair advantage to its firms in global trade (Way, 2011; Evenett et al., 2012). In the 2010 Global Trade Report, it was even considered as the most important, in terms of trade covered, discriminatory state measure (Evenett and Fritz, 2010). The specificity of the Chinese export VAT rebate system comes from that exporters may not receive complete refund of the domestic VAT paid on their inputs.

The extent of the refund varies widely across commodities from zero to full refund of the 17% typical VAT rate. During the last decade, the export VAT rebate rates have been frequently adjusted, upwards and downwards, depending on the goals Chinese government pursued. In the first half of the 2000s VAT rebates adjustments were part of a move to promote "higher value" products and reduce the export economy's reliance on "undesirable industries" notably those that pollute the environment. From 2008 a majority of VAT export rebates have been increased as an effort to mitigate the negative repercussions of the international crisis. In total, over the 2002-12 period, 87% of the products at the HS6 level underwent at least one change of their VAT refund rate, either upward or downward.² The export VAT rebate system hence clearly appears to be a major instrument of the industrial policy in China. However, contrary to other forms of public intervention such as currency manipulation, multiple subsidies and trade protection, the rather confusing system of tax rebates for exporters in China has been largely overlooked. This paper proposes a careful evaluation of the exact magnitude of the repercussions on the frequent upward and downward adjustments in China's VAT rebate system carried out in the last 10 years.

Theoretically as put forward by Feldstein and Krugman (1990), incomplete rebates amount to export taxes, which is actually a protectionist measure that would reduce both imports and

¹We are grateful to Zhang Yuheng for her research assistance.

²The average probability that an adjustment is carried out in a given year for a given HS6 product is 34% over the period. It reaches more than 60% in 2004 and between 2007 and 2009.

exports. Thus, the immediate effect of VAT rebate cuts is, if not passed on to prices, the erosion of the exporters' profits. This will encourage certain manufacturers to change their mix of production and foreign importers to consider alternative sources of supply. Both adjustments would result in lower export quantities. By contrast, export quantities are expected to rise following an increase in the VAT refund rate. However, the literature is relatively silent on whether the exporters will react in the same way when the rebate is increased or decreased.

Few studies analyze the impact of VAT rebates in China. Chen et al. (2006) using aggregate data from 1985 to 2002 find that the value of export tax rebates is positively correlated with the country's exports, final domestic consumption, and foreign exchange reserve. In an effort to mitigate the issue of reverse causality, Chandra and Long (2013) use firm-level panel data for 2004-2006 and find a positive association between a firm export volume and the average rebate rate (over exports) of the firm's industry-province pair.³

We depart from this analysis as we directly link the rebate rate at a very detailed level of products (HS6) and the corresponding export quantity for China. Our focus on quantities is motivated by the growing evidence of practices of underreporting of export values by exporters to avoid paying taxes (VAT or processing taxes) that are based on export values (Ferrantino et al., 2012). Quantities are more easily observable by customs authorities and hence may be less subject to such misreporting practices. Moreover, we build on recent efforts to address the problem of omitted variables which traditionally hinders the evaluation of trade policies' impact on export performance. It is indeed likely that the timing and the scope of the refund rate changes are correlated with various broader economic variables, such as worldwide conditions and product characteristics as well as other industrial policies which are likely to be drivers of export performance. Chinese authorities may have simultaneously adjusted VAT rebates upward and implemented other trade promotion measures. The risk is then to over-estimate the positive effects of export VAT refunds. Another problem concerns the reverse causality. Indeed, export VAT rebate rates may be raised to boost exports of low performing products or, by contrast, of commodities with a greater potential for export growth giving. Both problems may create endogeneity.

Our empirical strategy is based on two corrections. Firstly, our estimates account for fixed effects at the HS6 level and controls for time varying characteristics at the industry through sector-year dummies. We show that our results are robust to controls for export taxes, import taxes, export dynamics and world demand. Nevertheless some unobserved policies and features may be omitted. Secondly, in order to counter the remaining endogeneity we exploit variations in the expected impact of the VAT rebates by trade regimes due to an eligibility rule that disqualifies processing trade with supplied materials from the rebates. The typical export VAT policy is that of "exempt, credit, and refund" (or "refund after collection"). By contrast, the "no collection

³The explanatory variable in this study is the average ratio of the value of VAT rebates over exports, computed on all exporting firms in the same province and the same 2-digit CIC industry in the year. It is instrumented with a proxy of local fiscal conditions.

and no refund" policy applies to processing trade with supplied inputs. In this type of processing trade, the firm undertakes processing or assembling work on materials it does not own. Even if the exporter paid VAT on local purchases, it is not entitled to any export refund. We hence expect VAT rebates to have a higher effect on export activities when eligible trade (ordinary and processing trade with imported materials) is pervasive. Our empirical approach consists in filtering the impact of VAT rebates using a product-level share of eligible trade, which captures its exposure to the changes in rebates. This strategy is conceptually similar to a difference in difference estimate. Our approach is justified by the recent literature showing that the choice between trade forms relates to a variety of intrinsic factors such as the domestic availability and quality of inputs or the extent of financial constraints, that are independent of the VAT rebate policy. Our data confirm that the share of non eligible export is not related to the VAT rebate at the product level.

Our results are consistent with the theoretical prediction that the VAT system with incomplete rebates for exports reduces trade quantities. We measure a positive and significant effect of VAT rebates which turns insignificant when exports are entirely under non eligible processing with supplied inputs. Our benchmark estimate suggests that a one percentage point increase in the VAT rebate can lead to a 7% increase in export quantities. The change extent in export quantities is the same in case of VAT rebate decrease. Our results are robust to various measures of VAT rebate policy, subsamples, and to the inclusion of additional controls. The magnitude of our estimates allows to better understand the resistance of China's exports amid the global recession. They also suggest that the adoption of a full VAT rebate system like in many Western countries may raise Chinese exports by 45%. If full VAT rebate is held as the "normal" scenario, this impressive figure challenges the accusation of unfair subsidization of exports by China.

The remainder of the paper is structured as follows. The next section describes the Chinese VAT rebate system. Section 3 presents the data and variable construction. Section 4 then overviews our empirical specification and discusses the results. Last, Section 5 concludes.

2. The VAT rebate system

2.1. Evolution of the VAT rebate system

Implemented in 1994 to replace old industrial and commercial standard tax, the Chinese VAT system differs from the one applied in many Western countries, in particular because it is not neutral (Yan, 2010). In theory, neutral VAT imposes a zero rate applied to exported goods and a full refund of the domestic VAT paid by the exporters on their inputs. In China, VAT applies at a standard rate of 17 percent⁴, while a zero rate applies to export goods. However, China has applied a partial VAT refund, which is variable by sector and commodity. Consequently, China's

⁴A reduced rate of 13 percent applies to basic staples or household necessities such as food, fuel, electricity, books, newspapers and magazines, and agricultural products. The VAT rates have remained constant over the last decade.

VAT system imposes additional tax costs on exporters whose goods are granted a VAT refund rate lower than the applicable VAT rate. Over the 2002-2012 period, only 16% of tariff lines reported a rebate rate equal to the VAT rate. Incomplete rebate which is equivalent to export taxation (Feldstein and Krugman, 1990) is hence the rule in China.

The rationale for such export restrictions are diverse (Bouët and Laborde, 2011). Manipulation of terms-of-trade is a first explanation. If a country supplies an important share of the world market, restricting its exports induces a rise of the world price and an improvement of its terms of trade. Another justification connects to food security. Public authorities can decrease the consumption price of a good by reorienting domestic supply toward the domestic market (Piermartini, 2004). This motivation has justified the implementation of export taxes and other forms of export restrictions during the food crisis of 2006-2008 (WTO, 2008). If the measure discourages more specifically raw commodities exports, this is equivalent to an indirect subsidy to higher-value-added manufacturing or processing industries. Indeed, the domestic price of inputs compared to the world price is lowered. Thus, like import tariffs, export tariffs imply redistribution of income to the detriment of domestic producers of the commodity taxed and to the benefit of domestic consumers and public revenues. A last rationale of export tax adjustments is the stabilization of domestic prices for export producers.

During the 1980s, Chinese authorities used export refund mainly to deter exports of agriculture and raw material products (Wang, 2011).⁵ With the rising outward-orientation of the national economy, export tax refund adjustments have been carried out frequently to address different types of economic issues: managing the trade surplus, increasing government revenue or guiding the growth of certain industries. In the 2000s growing concerns about energy and environmental problems have prompted Chinese authorities to target a shift of China's export structure toward more value-added and high technology products and away from those generating pollution and consuming large amounts of natural resources or energy. In September 2006, VAT refunding was abolished for several natural resources and primary products and reduced for a number of highly polluting and energy consuming products. By contrast some VAT refund rates were increased to promote high value added and high technological products.

VAT rebates were also adjusted to address looming trade disputes. The booming of the Chinese trade surplus since 2000 generated worries from its trade partners in WTO. In order to keep its trade surplus under control, China has profoundly modified its system in 2007: the adjustments were designed to substantially reduce the VAT refund rate. More recently, the global economic crisis induced the authorities to raise the export VAT refund rates on thousands of commodities while continuing to promote technological upgrading. But adjustments also benefited labor-intensive goods and VAT rebates were also raised for some steel products and other final products of energy-intensive sectors (HKTDC, 2009).

⁵In a general way, export tax rebate refers to the money the tax authority returns to exporting enterprises for the indirect tax they pay in the production and distribution process.

Figure (1) reports the evolution of the ratio between the VAT rebate and the VAT rates between 2002-2012. The VAT rebate share declines continuously from 2002 before rebounding in 2009 in reaction to the international crisis. In 2008, eligible exporters could get back roughly 53% of their VAT cost, down from 84% in 2002. This proportion rose back to 63% in 2009 and remained at that level since.

2.2. Eligibility in the VAT rebate system

At the risk of oversimplifying the reality, there are two major export refund methods in China (China Tax & Investment Consultants Ltd, 2008): the standard method is the “exempt-credit-refund” (or “refund after collection”) method and the exception is the “tax-exempt” (or “no collection and no refund”) method. With the latter method, even if the exporter paid VAT on local purchases, it is not entitled to any export refund. The main example of this non-eligibility is when the goods purchased locally are used by a manufacturer engaged in export processing with supplied materials. In this type of processing trade, the Chinese firm undertakes processing or assembling work on materials it does not own. The property of these materials is kept by a foreign party. The Chinese authorities then consider that there are no imports and no exports sales. Exports under this regime is hence not eligible for export refund. This contrasts sharply with the standard method of “exempt-credit-refund”, where the amount of input VAT that the taxpayer pays for the purchase of input goods used in the manufacture of export sales can be offset against the output VAT collected on local sales if any. The Chinese VAT rebate policy on exports is complex and has been changing frequently over time. But, the method of computing the rebate is rather stable (Ferrantino et al., 2008). According to Circular No.7 (2002), the official formula used to calculate VAT payable for general trade and processing exports with purchased imported materials is as follows:

$$\text{VAT payable} = \text{output VAT} - \text{Input VAT} + \text{NCNR} \quad (1)$$

where output VAT is the VAT collected on domestic sales (domestic sales \times VAT rate), input VAT is the VAT paid on domestically purchased inputs and NCNR is a non-creditable and non-refundable amount. If TVA payable is negative, the tax bureau will refund it.⁶ NCNR is evaluated in the following manner:

$$\text{NCNR} = (\text{Exports-BIM}) \times (\text{VAT rate} - \text{VAT rebate rate}) \quad (2)$$

where Exports denotes the value of exports and BIM the bonded duty free imported materials.

Our empirical approach exploits the eligibility rule that disqualifies processing trade with supplied materials for the rebates. We use the eligible export share as a way to filter the impact of VAT rebates at the product level. This strategy is relevant only if the VAT rebate policy does

⁶In fact, the amount of refundable VAT is capped by $(\text{Exports-BIM}) \times (\text{VAT rebate rate})$

not impact the trade form chosen by the processing firms. A recent and growing literature underlines the specific motives of processing trade with supplied materials in China. Manova and Yu (2012) argue that the importance of financial constraints affects companies' chosen trade form. Ownership of imported intermediates entails high up-front costs which vary between sectors due to differences in working capital requirements and financial vulnerability. Manova and Yu (2012) provide empirical evidence that financial constraints restrict firms to processing trade with supplied inputs. Fernandes and Tang (2012) also investigate the rationale behind the ownership of imported intermediates. They show that the choice between trade forms relates to factors advanced by theories of the boundaries of the firm such as control and hold-up. Their results suggest that control over imported components by international firms is an alternative to asset ownership to alleviate hold-up by export-processing plants. We hence can expect the extent of processing trade with supplied materials to depend mostly on the observability of inputs use or the dominance and power of foreign buyers.⁷ Brandt and Morrow (2013) focus on another specificity of firms engaged in processing with supplied inputs, their inability to source domestically. Indeed contrary to manufacturers engaged in ordinary trade and processing with imported materials, those in processing trade with supplied inputs are not allowed to buy inputs from China. Their role in China's exports should hence relate to the attractiveness of Chinese suppliers. The extent of processing trade with supplied inputs should hence decline with improvements in the number, diversity, quality or cost advantage of the Chinese manufacturers of intermediate inputs. Brandt and Morrow (2013) find evidence consistent with the role of domestic market size as a determinant of the organization of trade.

Consistently with these arguments, our data discard the fear that products with high rebate are characterized by a low share of non-eligible exports. Figures (2) to (4) plot the ratio of VAT rebate over VAT rate against the share of non-eligible exports for 2002, 2008 and 2012 respectively. These years correspond to the starting and ending points of our sample and the reversal year in the VAT rebate policy (2008). They suggest that there is little correlation between the VAT rebate policy and trade forms.

Figure (5) reports the share of non-eligible exports between 2001 and 2012. It displays a continuous decline over the period which further suggests the lack of direct link between the trade mode choice and the ups and downs of the VAT rebate policy. The downward trend would by contrast be consistent with the relaxation of financial constraints over time (in the spirit of Manova and Yu, 2012) or the growing diversity and quality of China's intermediates (as suggested by Brandt and Morrow, 2013).

⁷It could also depend on the relationship specificity of physical capital (Nunn and Trefler, 2011).

3. Data and Indicators

3.1. Trade data

The database collected by the Chinese Customs provides yearly values and quantities of exports at the HS 8-digit product disaggregation. The data separate trade flows depending on the trade regime. Our study focuses on the three main trade regimes : ordinary trade, processing trade with imported materials and processing trade with supplied materials (also called processing & assembling).⁸ The latter refers to “the type of inward processing in which foreign suppliers provide raw materials, parts or components under a contractual arrangement for the subsequent reexportation of the processed products. Under this type of transaction, the imported inputs and the finished outputs remain property of the foreign supplier” (General Administration of Customs of the People’s Republic of China, 2013). Processing trade with imported materials (also known as import-and-assembly) refers to “business activities in which the operating enterprise imports materials/parts by paying foreign exchange for their processing, and exports finished processed products for sale abroad” (Yu and Manova, 2012).

We aggregate the data at the HS6 level and obtain a panel covering 5,878 products over the 2002-12 period. Several adjustments are made. We drop the 225 HS6 products (representing roughly 7% of the export value yearly) for which the quantity unit is not consistent through time.⁹ We account for changing HS classifications in 2007 and 2012 by dropping products for which the classification changed from that 2002. The sample reduces by 531 HS6 products totalling around 13% of yearly exports.

Lastly, we compute the world demand for a given product using the BACI world trade dataset.¹⁰ The specifications which control for the world demand exclude an additional 402 products (accounting for about 4% of yearly exports) in order to match the 1996 classification used in the BACI dataset.

3.2. Data on VAT and export taxes

Our variable of interest is the VAT rebate. VAT rebate rates and VAT rates at the tariff-line level (HS 8-digit or more disaggregated levels) are taken from the Etax yearbooks of the Chinese Customs. We aggregate the data to the HS 6-digit (5878 products) using the yearly average of the rates.¹¹ While VAT rebates undergo frequent adjustments, the VAT rate remains constant

⁸The data also refer to a number of other regimes such as international aid, border trade, contracting projects, customs warehousing trade and logistics goods by customs special control area. These other regimes represent overall less than 7% of exports over the 2003-2012 period. These regimes are not included in our analysis since we have limited information on how the VAT rebate policy applies to them.

⁹Quantities could for example be reported in tons in one year and in pairs or units another.

¹⁰This dataset is based on COMTRADE data using an original procedure that reconciles the declarations of exporters and importers (Gaulier and Zignago, 2010). BACI uses the 1996 HS 6-digit product nomenclature. BACI is downloadable from <http://www.cepii.fr/anglaisgraph/bdd/baci.htm>.

¹¹We use simple average of all tariff-lines within a HS6 product and all sub-periods within the year.

between 2002 and 2012 for a given HS6 product. Since our empirical strategy exploits variations in the eligibility to VAT rebates related to the share of processing trade with supplied materials, we exclude from our analysis the 1465 products for which the share of non-eligible trade (i.e. processing trade with supplied inputs) is either zero or 100% throughout the studied period. This amounts to excluding 25% of the HS6 products which represent 5% of the total export value over the period.

Export tax is another fiscal measure targeting the exports in China, although affecting much less products than the export VAT rebate policy. Export taxes have been used for a long time in China but have known a recent revival in 2007. The main stated objective of export taxes is to curb the exports of polluting or energy-intensive or resources-intensive products since the 11th Five Year Plan (2006-10). Similarly to the export VAT rebates, Chinese authorities have proceeded to frequent adjustments of export taxes and have modified the list of commodities subject to export taxes (WTO, 2008). Export taxes applied by China are levied on a MFN basis and generally involve ad valorem rates in relation to f.o.b. value. Export taxes are defined by several rates: a statutory rate, an interim rate (applied for a specific period) and in some cases a special rate. When it exists, the interim rate applies by default. It can be higher or lower than the statutory rate. Interim export taxes can also apply to products without statutory rate.¹² From 2009, the authorities introduced a special tax on a limited number of products, mainly chemical fertilizers and some raw materials.¹³

The export taxes are collected from the websites of the general administration of customs of People's Republic of China (www.customs.gov.cn) and the ministry of finance of the People's Republic of China (www.gss.mof.gov.cn). We compute the yearly export tax at the HS 6-digit level as the simple average over the various lines. It includes the special tax (from 2009) when applicable. The number of HS6 products on which an export tax applies rose from 20 in 2002 to 252 in 2012.¹⁴

Data on import tariff at the HS6 level come from World Integrated Trade Solution (WITS). We compute simple averages of MFN tariffs which measure the average level of nominal tariff protection applied to imports into China.

¹²In 2008, 3 tariff lines (at the HS 8-digit level) were targeted only by a statutory export tax, 68 by statutory and interim taxes and 268 only by an interim tax. Among the lines with statutory and interim taxes, only 3 had an interim tax superior to statutory tax.

¹³In 2009, 35 lines (at the HS 8-digit level) were subject to special export duties.

¹⁴During the 2006-2008 food crisis, export taxes have been used on food exports in order to control inflation (Lohmar and Gale, 2008). In this period, China withdrew export VAT refund and introduced temporary export taxes on grain and flour to reduce grain exports and cool domestic grain prices. Fertilizers have also been targeted. The case of fertilizers illustrates the strategic use of export taxes by China. Following a growing shortage of fertilizers in China in 2006, a series of measures were implemented to maintain the domestic supply capacity of fertilizers (Evenett et al., 2012). In particular, fertilizers were targeted by a special tax in addition to the export tax. Recently the export taxes have also been modified to mitigate the negative effects of the global crisis on Chinese exports. The authorities have decreased, or even removed, the taxes on some products, like wheat, rice, steel, and some non-ferrous metals.

3.3. Different classifications of products

To test the robustness of our results, we verify that our results hold after excluding categories of products that have been specifically targeted by Chinese authorities. We use different classifications, including high technology products and energy- and emissive-intensive products.

We use the list established by OECD of 319 high-technology products (Hatzichronoglou, 1997). Energy- and emission-intensive products are identified using the European Commission classification that singles out 78 HS6 products as energy and carbon emission intensive (Bergmann et al., 2007). Rare earth products are the ones listed in the WTO reports products under conflict are a small group of 21 HS6 products of raw materials¹⁵

Table 1 reports the summary statistics for our final sample used in our benchmark regressions. It covers observations for 3279 HS6 products representing roughly 63% of Chinese total exports between 2002-2012. The standard VAT rate of 17% applies to roughly 95% of the HS6 products in our final sample.

4. Empirical strategy

4.1. Empirical specification

Our empirical approach consists in a reduced form equation relating the rebate rate and the exported quantity. We investigate the impact of export VAT rebate policy through its differential effect between eligible and non-eligible trade regimes. We observe for each HS6 product and year the VAT rebate, the VAT rate and the shares of exports by trade regimes. To ease the comparison between eligible and non eligible trade regimes, we consider only ordinary trade and processing trade in our analysis, hence excluding exports under the “Others” category that groups other flows such as aid, border trade, barter trade and consignment. Our benchmark specification regresses the export quantity on the interaction terms of VAT rebates with the shares of exports under eligible “exempt-credit-refund” and non-eligible “tax-exempt” (“Elig.” share and “Non Elig.” share, respectively). The two shares (“Elig.” and “Non Elig.”) hence conveniently sum to one for each HS 6-digit product in a year. To make up for the potential circularity and simultaneity problems, we lag all right-hand side variables on VAT policy (VAT rebates and VAT tax rates) and trade regime exports shares one year.

Our dependent variable is the log of the export quantity of HS6 product k in year t . It is

¹⁵Recently the “China Raw Materials dispute” at WTO has highlighted Chinese efforts to restrict its exports of rare earth products which are key in the production process of important high valued products. China is by far the world’s largest producer of the 17 metals known collectively as “rare earths”. In the 2000s, Chinese authorities have gradually tightened restrictions on these products in an effort to encourage the domestic processing of the metals and secure a better position in the global value chain. China justified these export restrictions by its efforts to limit environmental damages caused by the extraction of rare earths. While limiting exports the policy clearly encouraged the expansion of the domestic processing industry, leading the WTO to reject its argument.

regressed on the share of rebate over the VAT rate in the preceding year interacted with the eligibility and non eligibility shares. Our specification is:

$$\begin{aligned} \ln \text{Export quantity}_{k,t} &= \alpha_E \text{VAT rebate rate}_{k,t-1} \times \text{Elig. share}_{k,t-1} & (3) \\ &+ \alpha_{NE} \text{VAT rebate rate}_{k,t-1} \times \text{Non Elig. share}_{k,t-1} + \beta \text{Elig. share}_{k,t-1} \\ &+ \delta Z_{k,t} + \mu_k + \nu_{s,t} + \epsilon_{k,t} \end{aligned}$$

We include product fixed effects hence appealing to a within (fixed-effects) HS6-product estimator. We further add sector-year dummies $\nu_{s,t}$ to capture time-varying sector specificities such as supply or demand shocks. Sectors are defined following the Chinese classification of sectors.¹⁶ We rely on the 3-digit classification and include 1660 time-varying sector dummies (for 166 sectors over 10 years). They help to account for shocks in demand or supply that are common to products of a given sector. They also capture the general equilibrium effects of the VAT rebate adjustments corresponding to the fact that exports for a product k may be affected by the changes in the rebates of other products. Since most of the substitution in terms of supply and demand is likely to take place within sectors (that group products of greater degree of substitution) these effects are absorbed by the sector-year dummies. Our control set Z includes the share of exports by foreign firms (Foreign share) and that of state-owned firms (State share) since export performance has been shown in the literature to vary depending on the firm ownership (Amiti and Freund, 2010).¹⁷

We report the results with standard errors clustered at the 2-digit sector as this tends to give more conservative (larger) estimates for standard errors (Wooldridge, 2003),

Since “Non Elig. share” and “Elig. share” sum to one for each product, α_E and α_{NE} have a natural interpretation: they measure the impacts of the VAT rebate policy when the exports are exclusively under eligible trade and exclusively under non eligible trade, respectively. They are hence expected to be in turn positive and significant and insignificant.

4.2. Benchmark results

Table 2 presents the results of regressing export quantities on the VAT rebates by HS6 products. Column (1) reports the estimates of a specification including the VAT rebate and its interaction with the non-eligible export share. Column (2) includes the interactions of VAT rebate with both the non-eligible export share and the eligible export share as presented in Equation (1). Columns (1) and (2) show that VAT rebates are positively associated with export performance (i.e., the α_E parameter of Equation (1) is significant and positive). The negative coefficient on

¹⁶Concordance of Chinese (GB/T) industry codes and HS codes are taken from Upward et al. (2013).

¹⁷All firms (whatever their ownership type) receive similar VAT rebates or pay identical export and import duties.

the interaction with the non-eligible export share in column (1) indicates that the effect declines as the share of non-eligible exports rises. The lack of significance of α_{NE} in column (2) suggests as expected that the repercussions of VAT rebates turn insignificant when exports are entirely under non eligible processing with supplied inputs.

The following columns include alternative measures of the VAT rebate policy to account for the fact that the applied VAT rate differs across products: the non-refunded VAT rate in column (3) and the ratio of the VAT rebate as a fraction of the VAT rate in column (4). They are computed as $\text{VAT rebate}_{k,t-1} - \text{VAT}_{k,t-1}$ and $\frac{\text{VAT rebate}}{\text{VAT}}_{k,t-1}$, respectively. The results suggest that our findings do not depend on the way the rebate policy is apprehended: similar findings hold when rebates are measured in absolute terms (columns (1) to (3)) or in relative terms (column (4)). Column (3) confirms that looking at the non-rebated VAT (VAT rate minus VAT rebate) gives similar coefficients but inversely signed, as expected.

Consistently with our expectation, α_E is positive and greatly significant and α_{NE} is insignificant. Coefficient of 0.07 on the interaction of VAT rebates with eligible export share suggests that a one percentage point increase in the VAT rebate can lead to a 7% increase in export quantities. This effect is economically large. Our estimates suggest that if a full VAT refund was applied in China as it is in most developed countries, Chinese exports could jump by 45% ($=7\% \times 6.4$, where 6.4 is the average non-refunded VAT rate in 2012) in quantity.

4.3. Robustness checks

Table 3 verifies that our benchmarks results hold when using alternative proxies to apprehend the VAT rebate policy. Column (1) uses a dummy variable that takes the value of 1 when the rebate is strictly positive (and zero otherwise) for a product-year pair. In column (2) the dummy is set to 1 when the rebate represents at least half of the VAT rate applicable to a product in a given year. The results are very consistent with those based on the continuous indicator. The impact of benefiting from a positive or large rebate is positive and significant but disappear when non eligible trade is pervasive.

Column (3) investigates the possible asymmetry of the repercussions of VAT rebates upward and downward adjustments. The interactions between VAT rebate and the export shares are further differentiated depending on whether the VAT rebate has increased or decreased compared to the previous year. Interestingly whatever the evolution the interactions with the non eligible export share are insignificant. By contrast the interactions with the eligible export share are positive and significant. Although the point estimate under the rise scenario is slightly greater than under the decline scenario (0.078 compared to 0.070), the difference is not significant. These results suggest that the export effects of a one percentage point change in the VAT rebate are identical whether it corresponds to a positive or a negative change.

Column (4) runs Equation (4) considering only processing trade, hence excluding ordinary trade. The non eligible and eligible shares are recomputed in percent of processing exports. This

specification allows to verify that our estimates do not simply reflect factors relating to the organization of exports between ordinary and processing trade. Brandt and Morrow (2013) suggest for example that falling import tariffs on inputs explain almost fully the average increase in the share of exports occurring through ordinary trade in China between 2000 and 2006. One could worry that if import tariffs and VAT rebates are correlated, our estimates capture this story instead of repercussions of the VAT rebate policy. Also, excluding ordinary trade helps to check that our results do not only pick up the consequences of misreporting practices of exporters to avoid paying taxes. Ferrantino et al. (2012) argue that stricter enforcement on processing trade at the Chinese border makes processing exporters less likely to under-report than normal exporters.¹⁸ Another issue relates to the fact that ordinary exports embody more than twice as much domestic value added per USD as do processing exports (Koopman et al., 2012; Kee and Tang, 2012). Greater value-added content results in greater non-refundable VAT cost for a given VAT rebate. But it results in larger refunds from a given increase in VAT rebate. Focusing on processing trade allows eliminating this source of potential bias due to variations in domestic content. Findings of positive and significant α_E and insignificant α_{NE} even after ordinary trade is excluded confirm a trade-creating effect of VAT rebates. Moreover, (eligible) processing trade seems particularly sensitive to the rebates level, with a doubled coefficient compared to column 1. This is consistent with evidence of low profitability of processing activities and therefore their likely great sensitiveness to changes in costs (Defever and Riaño, 2012; Wang and Yu, 2012).

Table 4 checks the robustness of our results across various subsamples, the rebate policy being measured using the VAT rebate rate as in Table 2. First in column (1), we ensure that our estimates are not driven by variations in the VAT rate across products and drop the 153 HS6 products enjoying the reduced rate of 13 percent (instead of the basic 17%). Then, we drop different types of products which have been targeted by Chinese authorities either as strategic or as undesirable. This allows to address the concern of omitted unobserved policies that may correlate both with the VAT rebate and the export performance. Column (2) restricts the sample to manufacturing products (hence excluding agriculture). This helps verifying that our estimates do not simply reflect specific features relating to agriculture. Agricultural products have indeed received particular attention from Chinese authorities concerned by food security in a context of rising price tensions notably in 2006-8. The same logic guides the exclusion of products which enjoyed full rebate at any time during our sample period since they may have benefited from other unobserved support policies (column 3). Despite sharp reduction in the number of observations (one third of products are dropped in the latter case), the point estimates are virtually unchanged. Our findings of a positive and significant α_E but insignificant α_{NE} also hold when dropping product categories that have explicitly been targeted by the Chinese authorities such as rare earth products (column 4), energy and pollution intensive products (column 5) or high-tech products (column 6). In column (4), the few but very strategic rare earth products are

¹⁸Another reason why processing exporters are less likely to under-report than normal exporters relates to the formula of non-creditable and non-refundable VAT presented in Section (2.2). According to that formula, processing traders can reduce VAT liability either illegally by understating exports or legally by purchasing more bonded duty free imported materials (BIM). This latter possibility is not available to normal traders.

excluded to make sure that they are not driving our results. Column (5) drops energy and carbon intensive products to account for the efforts of Chinese authorities to reduce pollution-intensive activities. Last, in column (6), high-tech products as defined by OECD.¹⁹ are excluded to make sure that our results are not simply reflecting the many unobserved subsidies granted to the production of these goods. As part of China's deliberate effort to sustain the upgrading of its exports, exporters of high-tech products are indeed likely to benefit from a variety of policies such as FDI promotion, production and R&D subsidies or access to tax-favored high-tech zones.

In Table 5 we check the robustness of our results to the inclusion of additional controls. Column (1) includes the value of the export tax to verify that our results do not simply capture the repercussions of the recent revival of export taxes. As explained in Section 3.2 export taxes have been applied to a growing number of products (covering in our sample 218 HS6 products in 2012 up from 8 products in 2003). In column (2) we further account for the repercussions of the export dynamics. We compute the change in export quantity for products from $t - 2$ to $t - 1$ at the HS6 product level using the Chinese customs data. The remaining two columns add a proxy for world demand at the product level and import tax successively. World demand is measured as total import value in the world for a given product from BACI. Due to missing information on these two variables for 2012, the sample is restricted to 2003-11 in columns (3) and (4). Also the number of products declines due to inconsistent coding of products between the 1996 classification of BACI and the 2002 classification of the Chinese customs data. Consistently with theoretical expectations, export tax enters with a negative sign: export tax has a significant deterrent effect on the quantity exported. A one percentage point increase in export tax reduces export quantity by 5.4%. This additional control does not however affect our benchmark result of a positive impact of VAT rebate that turns insignificant when ineligible export is pervasive. The two proxies for product-level export dynamics, respectively capturing supply aspects in China and worldwide demand have a positive association with export quantity, while our main message on the impact of VAT rebates is not altered. When included in column (4), import tax enters with a negative sign which suggests that products enjoying greater protection from international markets have a lower propensity to be exported. This is consistent with import tariff protection giving an advantage to domestic manufacturers at home. Our main findings remain unchanged in all specifications, indicating that our estimates of the repercussions of the VAT rebate policy do not simply reflect other trade policy instruments or supply and demand dynamics.

Table 6 replicates Table 5 using export value instead of export quantity. As argued above, our empirical approach so far deliberately relied on export quantity as the explained variable of export performance because of the potential measurement problem due to the incentive of exporters to underreport the export values to avoid paying taxes. As evident from Equation 2, the tax burden of exporters is proportional to export value. Ferrantino et al. (2012) confirm the widespread evasion of VAT by exporting firms in China. One could hence be concerned by the risk of over-estimating the repercussions of VAT rebates when looking at export values. Results

¹⁹Similar results are obtained when using alternative classifications of technological level and dropping high skill products (UNCTAD) or high-tech products defined by Eurostat.

in Table 6 suggest a positive impact of VAT rebates on export value. The coefficient estimate is not significantly different from that measured based on export quantity. Intuitively one would expect a lower coefficient for values since exporters may not pass a rebate rise fully on to prices. Table 7 presents the results looking at the unit value (computed as the ratio of export value over export quantity). We find a weak negative impact of VAT rebates on unit price suggesting that exporters largely absorb VAT rebate adjustments in their markups. This does not mean that the prices do not change over time. In presence of fixed effects by sector-year which capture the broad repercussions of demand and supply shifts, our results indicate that increasing the VAT rebates help support the export activity by raising its profitability. Overall, our results display a consistent pattern whereby the massive rise in VAT rebates implemented in 2008 by Chinese authorities helped maintaining the profitability of domestic exporters amid declining world prices and resulted in greater export quantity and value from China.

Table 8 investigates the sectoral scope of the microeconomic mechanism linking VAT rebates and exports. It controls for the repercussions of the average VAT rebates measured at a more aggregate level, HS4 and HS3, respectively. Following the logic exposed when presenting Equation 4, we introduce the average VAT rebate interacted with both the eligible and non-eligible share. This approach indirectly allows to analyze the general equilibrium effects of the VAT rebates adjustments. A rise in the VAT rebate for a given HS6 product is indeed likely to induce firms to reallocate their exports from other products (within the corresponding sector) towards him. There is also some evidence in the Chinese context of misclassification of exports from products with high tax rates to products with low tax rates (Fisman and Wei, 2004). We may be concerned that our results fully reflect these misclassification practices. Columns (1) and (2) add the interactions of average VAT rebates (HS4 and HS3 respectively) in our benchmark specification of column (1) of Table 2. Columns (3) and (4) add controls for export tax, import tax and export dynamics as in the column (4) of Table 5. The results suggest very limited repercussions of VAT rebate changes across products. As expected the coefficients on the interaction of average VAT rebate with eligible export share are negative : exports of a given HS6 decline following a rise in the VAT rebates in adjacent products. However they fail to be robustly significant. Two factors can explain this result. First, our regressions include fixed effects by sector and year that already account for this effect. Second, idle capacity and the absence of rigidity in the labor market may allow Chinese producers to expand the production and exports of products benefiting from higher VAT rebates without negative repercussions on the other lines of production. In any case, our results tend to refute the potential bias due to misclassification practices. Accounting for the effect across products leaves our measured impact.

5. Conclusion

This paper relies on a product-level database covering exports from China to study how export performance is affected by the VAT rebate policy. Our empirical strategy to address potential endogeneity exploits an eligibility rule that disqualifies processing trade with supplied materials

from the rebates. Our estimates rely on export quantity data at the HS6 product level over the 2003-2012 period and provide evidence of significant repercussions of adjustments in export VAT rebates on China's export performance. We measure a positive and significant effect of VAT rebates. Our benchmark estimate suggests that a one percentage point increase in the VAT rebate can lead to a 7% increase in export quantities. Moreover, the results suggest that the repercussions of a one percentage point change in the VAT rebate are identical whether it corresponds to a positive or a negative change. The magnitude of our estimates allows to better understand the resistance of China's exports amid the global recession and confirms the key role of trade policy in China's rising advantage in global markets.

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Figure 1: Evolution of VAT rebate share (over VAT rate) 2002-2012



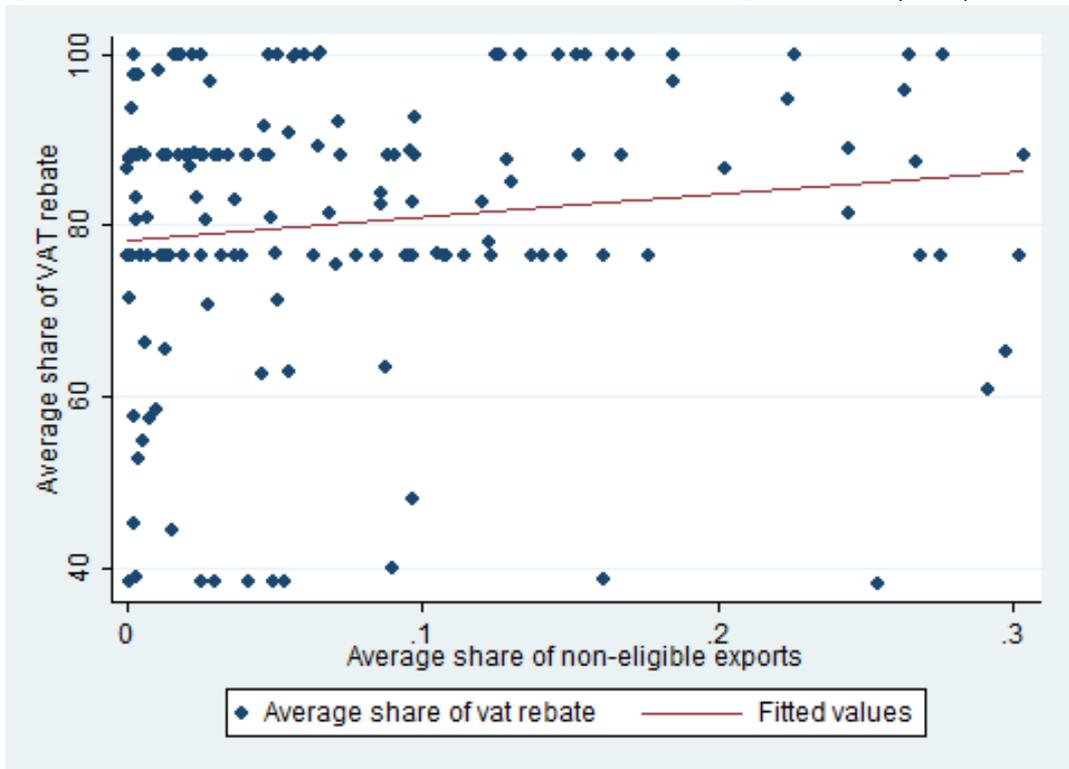
Note: The VAT rebate share is computed as the simple average over all products.

Table 1 – Summary statistics of variables

Variables	Mean	Std. Dev.	Min	Max
VAT rate (%)	16.83	0.81	13	17
VAT rebate (%)	11.64	4.75	0	17
VAT rebate share over VAT rate (%)	68.98	27.70	0	100
Non eligible export share	0.08	0.16	0	1
Processing imported inputs export share	0.18	0.23	0	1
Ordinary export share	0.74	0.29	0	1
Foreign export share	0.34	0.26	0	1
State export share	0.25	0.22	0	1
Export tax (%)	0.27	2.77	0	106.3
Import tariff (obs=27576)	10.26	6.55	0	68
World demand million \$ (obs=26871)	2,172	7,637	0.005	2.34e+05

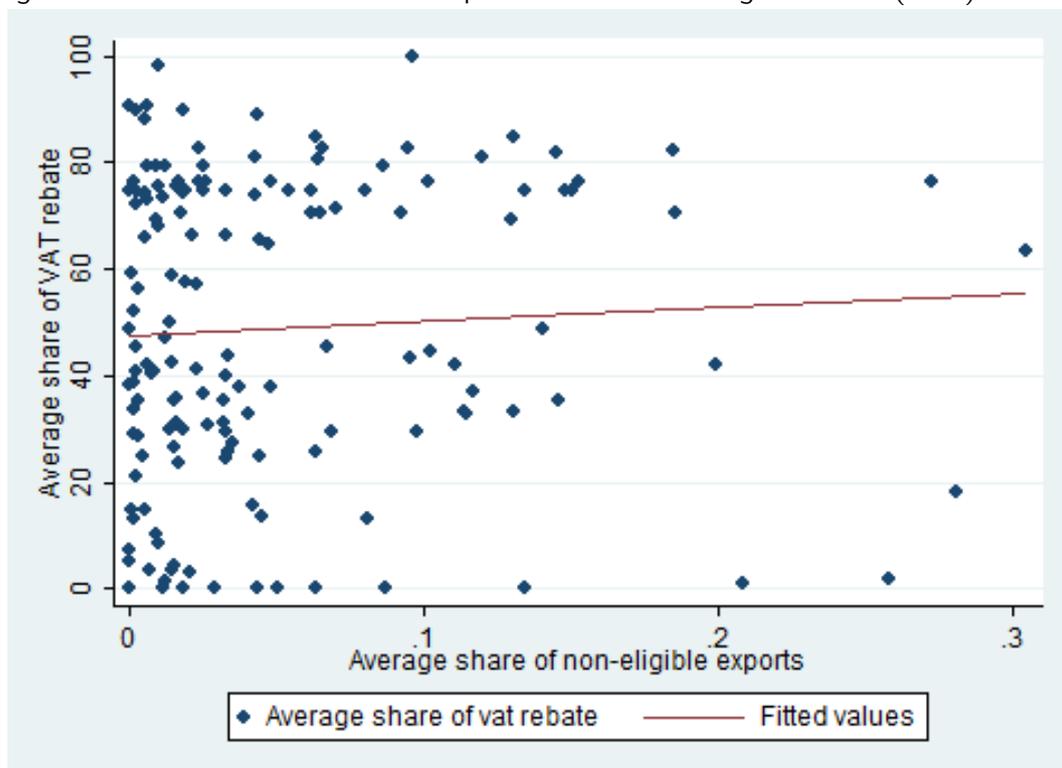
Please refer to Section 3 of the text for a detailed description of these variables. The statistics are based on the sample (30,564 observations) used in the first column of Table 2. VAT rates, VAT rebate rates, the share of the VAT rebate over VAT rates, export taxes and import tariffs are measured in percentage, between 0 and 100.

Figure 2: VAT rebate share and export share of non-eligible trade (HS3) in 2002



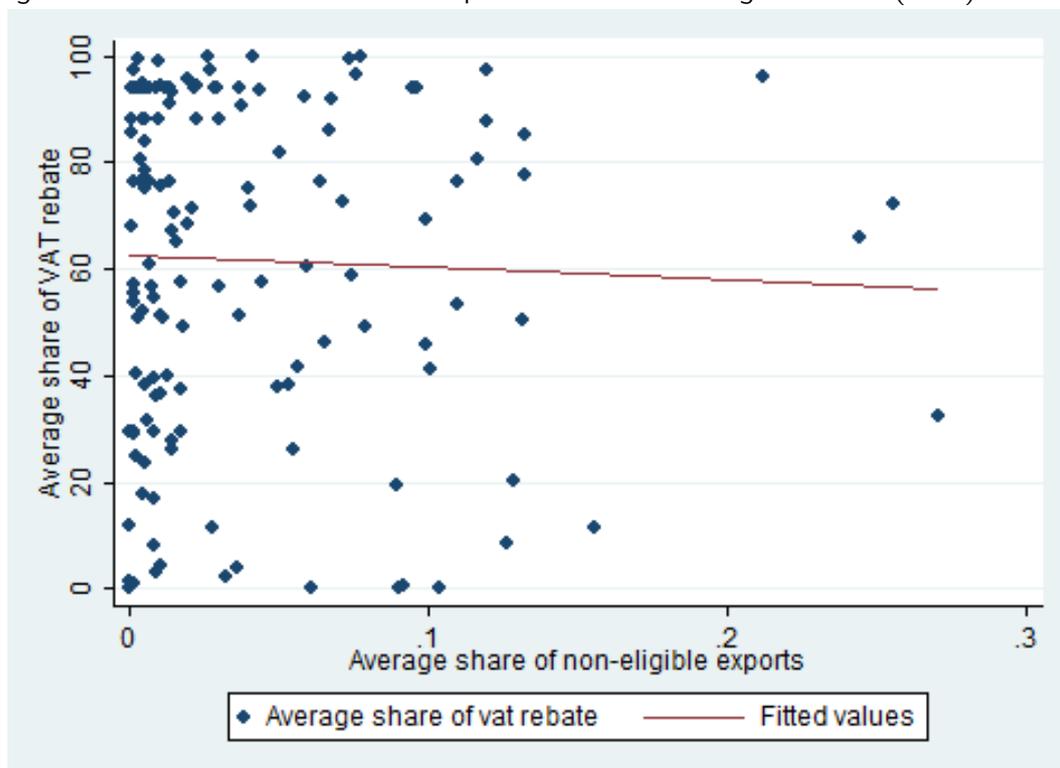
Note: The VAT rebate share is computed as a simple average. The share of non-eligible trade is computed based on the exports value (for a given HS3).

Figure 3: VAT rebate share and export share of non-eligible trade (HS3) in 2008



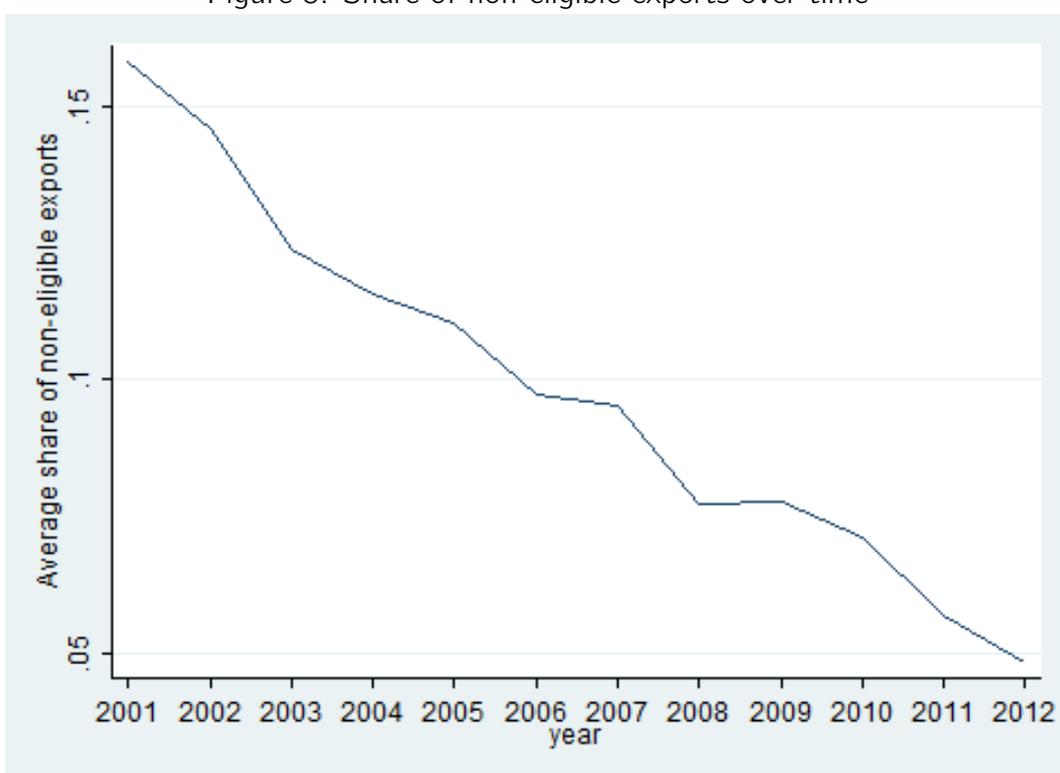
Note: The VAT rebate share is computed as a simple average. The share of non-eligible trade is computed based on the exports value (for a given HS3).

Figure 4: VAT rebate share and export share of non-eligible trade (HS3) in 2012



Note: The VAT rebate share is computed as a simple average. The share of non-eligible trade is computed based on the exports value (for a given HS3).

Figure 5: Share of non-eligible exports over time



Note: Non-eligible exports are those under “processing with supplied inputs”. The share is computed based on the exports value.

Table 2 – Exports and VAT rebates: Benchmark results

Explained variable	Ln export quantity HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
VAT rebate	0.070 ^a (0.014)			
VAT rebate × non eligible export share	-0.050 ^c (0.026)	0.020 (0.019)		
VAT rebate × eligible export share		0.070 ^a (0.014)		
(VAT - VAT rebate) × non eligible export share			-0.015 (0.018)	
(VAT - VAT rebate) × eligible export share			-0.070 ^a (0.014)	
$\frac{VAT\ rebate}{VAT}$ × non eligible export share				0.003 (0.003)
$\frac{VAT\ rebate}{VAT}$ × eligible export share				0.012 ^a (0.002)
Non eligible export share	0.851 ^b (0.356)	0.851 ^b (0.356)	-0.013 (0.170)	0.880 ^b (0.355)
Foreign export share	0.183 (0.115)	0.183 (0.115)	0.181 (0.115)	0.182 (0.115)
State export share	0.008 (0.132)	0.008 (0.132)	0.007 (0.131)	0.010 (0.132)
Fixed effects	H6 products and sector-year			
Observations	30,564			
R-squared (within)	0.30	0.30	0.30	0.30
Number of HS6 products	3,192			

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year.

Table 3 – Exports and VAT rebates: alternative rebate policy measures

Explained variable	Ln export quantity HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
	Processing and ordinary		Processing only	
VAT rebate dummy × non eligible export share	-0.217 (0.392)			
VAT rebate dummy × eligible export share	0.766 ^a (0.124)			
Dummy $\frac{VATrebate}{VAT} > 50\%$ × non eligible export share		-0.041 (0.224)		
Dummy VAT rebate >50% × eligible export share		0.436 ^a (0.094)		
VAT rebate × non eligible export share × rise			0.008 (0.024)	
VAT rebate × eligible export share × rise			0.078 ^a (0.015)	
VAT rebate × non eligible export share × decline			0.020 (0.018)	
VAT rebate × eligible export share × decline			0.070 ^a (0.014)	
VAT rebate × non eligible export share				0.007 (0.022)
VAT rebate × eligible export share				0.156 ^a (0.009)
Non eligible export share			0.867 ^b (0.357)	1.645 ^a (0.279)
Eligible export share	-0.133 (0.129)	-0.638 ^b (0.298)		
Foreign export share	0.183 (0.118)	0.191 (0.118)	0.183 (0.115)	0.328 ^c (0.176)
State export share	0.026 (0.135)	0.019 (0.135)	0.011 (0.132)	0.163 (0.175)
Fixed effects	H6 products and sector-year			
Observations		30,564		27,313
R-squared (within)	0.29	0.29	0.30	0.19
Number of HS6 products		3,192		3,172

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year. The explained variable is export quantity under ordinary and processing trade regimes in columns 1 to 3. In column 4 it is the export quantity under processing trade regime.

Table 4 – Exports and VAT rebates: alternative samples

Explained variable	Ln export quantity HS6/year (2003-2012)					
	(1)	(2)	(3)	(4)	(5)	(6)
	only VAT=17	only manuf	w/o full rebate	w/o rare earth	w/o energy intensive	w/o high tech products
VAT rebate × eligible export share	0.073 ^a	0.070 ^a	0.074 ^a	0.069 ^a	0.068 ^a	0.071 ^a
	(0.014)	(0.015)	(0.016)	(0.014)	(0.013)	(0.015)
VAT rebate × non eligible export share	0.020	0.015	0.019	0.023	0.024	0.012
	(0.018)	(0.019)	(0.020)	(0.018)	(0.021)	(0.020)
Eligible export share	-0.929 ^b	-0.946 ^b	-0.887 ^b	-0.786 ^b	-0.755 ^b	-0.876 ^b
	(0.384)	(0.382)	(0.359)	(0.314)	(0.362)	(0.364)
Foreign export share	0.099	0.158	0.153	0.188	0.173	0.160
	(0.114)	(0.117)	(0.132)	(0.115)	(0.116)	(0.123)
State export share	-0.055	0.005	-0.028	0.020	0.001	0.004
	(0.129)	(0.135)	(0.178)	(0.131)	(0.132)	(0.143)
Fixed effects	H6 products and sector-year					
Observations	29,187	29,698	19,061	30,514	30,155	28,063
R-squared (within)	0.31	0.30	0.31	0.30	0.30	0.30
Number of HS6 products	3,039	3,096	1,982	3,186	3,150	2,036

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year.

Table 5 – Exports and VAT rebates: adding controls

Explained variable	Ln export quantity HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
VAT Rebate × eligible export share	0.067 ^a	0.065 ^a	0.061 ^a	0.063 ^a
	(0.014)	(0.013)	(0.013)	(0.013)
VAT Rebate × non eligible export share	0.018	0.016	0.029	0.030
	(0.019)	(0.019)	(0.027)	(0.027)
Eligible export share	-0.837 ^b	-0.842 ^b	-0.520	-0.485
	(0.366)	(0.355)	(0.521)	(0.533)
Foreign export share	0.194	0.173	0.165	0.170
	(0.116)	(0.110)	(0.128)	(0.130)
State export share	0.018	0.016	0.052	0.062
	(0.134)	(0.129)	(0.151)	(0.157)
Export tax	-0.054 ^a	-0.054 ^a	-0.046 ^a	-0.046 ^a
	(0.011)	(0.011)	(0.011)	(0.011)
Lag export growth		0.075 ^a	0.124 ^a	0.123 ^a
		(0.021)	(0.034)	(0.032)
World demand			0.683 ^a	0.655 ^a
			(0.069)	(0.063)
Import tax				-0.020 ^b
				(0.009)
Fixed effects	H6 products and sector-year			
Observations	30,564	30,564	25,828	25,800
R-squared (within)	0.30	0.31	0.35	0.35
Number of HS6 products	3,192	3,192	2,983	2,982

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year. In columns 3 and 4 observations for 2012 are dropped due to missing information on import tax and world demand.

Table 6 – Exports value and VAT rebates

Explained variable	Ln export value HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
VAT Rebate × eligible export share	0.062 ^a (0.013)	0.059 ^a (0.012)	0.056 ^a (0.012)	0.059 ^a (0.011)
VAT Rebate × non eligible export share	0.016 (0.017)	0.014 (0.017)	0.026 (0.025)	0.025 (0.025)
Eligible export share	-0.761 ^b (0.303)	-0.761 ^b (0.290)	-0.449 (0.450)	-0.425 (0.459)
Foreign export share	0.378 ^a (0.137)	0.353 ^b (0.131)	0.336 ^b (0.139)	0.345 ^b (0.141)
State export share	-0.048 (0.139)	-0.046 (0.133)	0.039 (0.151)	0.059 (0.157)
Export tax	-0.046 ^a (0.009)	-0.046 ^a (0.009)	-0.041 ^a (0.010)	-0.041 ^a (0.010)
Lag export growth		0.084 ^a (0.020)	0.135 ^a (0.031)	0.133 ^a (0.030)
World demand			0.886 ^a (0.096)	0.857 ^a (0.079)
Import tax				-0.018 ^b (0.008)
Fixed effects	H6 products and sector-year			
Observations	30,564	30,564	25,828	25,800
R-squared (within)	0.47	0.48	0.52	0.53
Number of HS6 products	3,192	3,192	2,983	2,982

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year. In columns 3 and 4 observations for 2012 are dropped due to missing information on import tax and world demand.

Table 7 – Exports price and VAT rebates

Explained variable	Ln export unit value HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
VAT Rebate × eligible export share	-0.005 ^c (0.003)	-0.006 ^c (0.003)	-0.005 (0.003)	-0.005 (0.003)
VAT Rebate × non eligible export share	0.000 (0.010)	0.000 (0.010)	-0.002 (0.011)	-0.002 (0.011)
Eligible export share	0.045 (0.122)	0.045 (0.123)	0.011 (0.156)	0.005 (0.156)
Foreign export share	0.234 ^a (0.049)	0.231 ^a (0.049)	0.212 ^a (0.049)	0.208 ^a (0.050)
State export share	-0.014 (0.049)	-0.014 (0.049)	-0.012 (0.057)	-0.015 (0.058)
Export tax	0.008 ^a (0.002)	0.008 ^a (0.002)	0.005 ^a (0.002)	0.005 ^a (0.002)
Lag export growth		0.009 ^c (0.005)	0.011 (0.009)	0.011 (0.009)
World demand			0.204 ^a (0.062)	0.203 ^a (0.062)
Import tax				0.003 (0.003)
Fixed effects	H6 products and sector-year			
Observations	30,564	30,564	25,828	25,800
R-squared (within)	0.33	0.33	0.32	0.32
Number of HS6 products	3,192	3,192	2,983	2,982

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year. In columns 3 and 4 observations for 2012 are dropped due to missing information on import tax and world demand.

Table 8 – Exports and VAT rebates: controlling for cross-products effects

Explained variable	Ln export quantity HS6/year (2003-2012)			
	(1)	(2)	(3)	(4)
VAT Rebate × eligible export share	0.084 ^a (0.015)	0.075 ^a (0.019)	0.083 ^a (0.020)	0.075 ^a (0.019)
VAT Rebate × non eligible export share	0.126 ^c (0.065)	0.005 (0.060)	0.009 (0.053)	0.005 (0.060)
Eligible export share	-0.902 ^b (0.351)	-0.355 (0.437)	-0.789 ^a (0.273)	-0.355 (0.437)
Foreign export share	0.182 (0.115)	0.172 (0.131)	0.183 (0.116)	0.172 (0.131)
State export share	0.009 (0.132)	0.061 (0.156)	0.009 (0.131)	0.061 (0.156)
VAT Rebate × eligible export share (HS4)	-0.019 (0.012)	0.018 (0.060)		
VAT Rebate × non eligible export share (HS4)	-0.116 (0.071)	-0.029 (0.022)		
VAT Rebate × eligible export share (HS3)			-0.033 ^c (0.018)	0.018 (0.060)
VAT Rebate × non eligible export share (HS3)			-0.004 (0.052)	-0.029 (0.022)
Export tax		-0.046 ^a (0.011)		-0.046 ^a (0.011)
Lag export growth		0.123 ^a (0.032)		0.123 ^a (0.032)
World demand		0.651 ^a (0.063)		0.651 ^a (0.063)
Import tax		-0.021 ^b (0.009)		-0.021 ^b (0.009)
Fixed effects	H6 products and sector-year			
Observations	30,564	25,800	30,564	25,800
R-squared (within)	0.30	0.35	0.30	0.35
Number of HS6 products	3,192	2,982	3,192	2,982

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit sector level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level. All right-hand side variables on VAT rebate policy and trade regime shares are lagged one year. In columns 2 and 4 observations for 2012 are dropped due to missing information on import tax and world demand.