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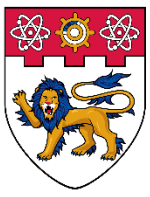

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Export Volatility with Trade Policy Uncertainty: Evidence from China*

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Abstract

This paper studies the effect of trade policy uncertainty on firm-level volatility. Using data on exporting firms from China around its WTO accession, we find that a reduction of trade policy uncertainty between China and the US decreases the volatility of firm-level export to the US and increases the volatility of export to the rest of the world. In the aggregate level, the shock in trade policy uncertainty has no significant effect on the volatility of total firm export or the volatility of total firm sales. Our finding suggests a risk-sharing effect among export destinations.

Keywords: *Export volatility, trade policy uncertainty, risk-sharing*

JEL classification: *F1*

*All errors are the authors' own responsibility.

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1 Introduction

Exporting is usually risky due to uncertainty in foreign demand and trade policies or exchange rate fluctuations as well as other sources of risk. A number of studies have found a positive correlation between trade and volatility. di Giovanni and Levchenko (2009) show that trade openness is positively correlated with sector-level output volatility. Vannoorenberghe (2012) has shown that exports are usually more volatile than domestic sales. Thus rational exporters should try to manage the aggregate risk of its sales by diversifying their sales portfolio, both between domestic sales and export and among export destinations. Indeed, Vannoorenberghe (2012) finds that output variations of the domestic and export market are negatively correlated at the firm level. On the other hand, Vannoorenberghe, Wang and Yu (2016) find that export diversification not necessarily decreases export volatility using Chinese firm data. Existing empirical studies on volatility and export are mostly cross-sectional investigations comparing the level of export volatility or sales volatility across firms or sectors. This paper provides another perspective by focusing on the change of volatility upon an exogenous shock to the trade policy uncertainty faced by exporters. We study how firms adjust their export volatility among their export destinations in response to a policy uncertainty shock in one particular market. If there is risk sharing between markets, we should see firms react to a shock in one market by adjusting their sales in another market. Using data on Chinese exporters around China's WTO accession we do find that a reduction of trade policy uncertainty between China and the US decreases the volatility of firm-level export to the US and at the same time increases the volatility of export to the rest of the world.

Ever since China's open-up reform in the early 1980s, China has been actively building up favorable trade relationships with other countries. This process is marked by China's formal WTO accession in the end of 2001. Actually before China's WTO entry, most of its trading partners had already granted China the most-favored-nation (MFN) treatment.[1] Exporters from China were facing a given set of pre-determined MFN tariff rates. The only exception is the United States, with which China's MFN treatment is subject to annual renewal until China's formal WTO entry. This annual renewal created a policy uncertainty for Chinese firms exporting to the US. With successful renewal, which is not certain at all, Chinese exporters exporting to the US would face a schedule of low tariff rates under the MFN treatment. However, in case of unsuccessful renewal, they would be facing a schedule

[1]See more policy background in Pierce and Schott (2016), Handley and Limão (2017), and Feng, Li and Swenson (2017).

of much higher non-MFN tariff rates. As a result, Chinese exporters were facing uncertain tariff rates before China's WTO accession. The possible worst-case tariff rates differ across industries, creating different magnitude of risk or uncertainty for exporters from different industries. And larger difference between MFN and non-MFN tariff rates naturally suggests larger policy uncertainty for Chinese exporters.[2]

Trade policy uncertainty is directly linked to firms' export volatility as firms make their export decisions partly based on their expectation of future tariff rates, which depends on their beliefs about US continuing granting China the MFN treatment as well as the two sets of tariff rates under MFN treatment and non-MFN treatment. The more uncertain is the renewal or the larger is the difference between MFN and non-MFN tariff rates, the more risky and volatile firms' export will be. As a result, everything else equal, we shall expect to see more volatile exports for firms from industries with higher trade policy uncertainty.[3] And a reduction of this trade policy uncertainty shall decrease their export volatility. In order to identify this causal relationship, we adopt a difference-in-difference approach using China's WTO accession as the exogenous shock to the trade policy uncertainty between China and the US.[4] After China's formal WTO entry, its MFN treatment with all WTO members are assured. Thus the aforementioned trade policy uncertainty between China and the US no longer exists after China's WTO accession. As argued by a number of studies on trade policy uncertainty in the literature, both the MFN and non-MFN tariff rates are quite exogenous to Chinese exporters.[5] We utilize this exogenous reduction of trade policy uncertainty between China and the US, as well as the industry-level heterogeneity in trade policy uncertainty to apply the difference-in-difference identification strategy. In order to ensure the randomness of treatment, we also control for the potential effects of all the *ex-ante* determinants of industry-level trade policy uncertainty on export volatility changes.

Our empirical analysis uses customs data on the universe of Chinese exporting firms from 2000 to 2006, matched with detailed balance sheet data from the Annual Survey of Industrial Firms. We find that the reduction of trade policy uncertainty between China and the US decreases firms' volatility of export to the US and increases the volatility of export to the rest of the world. In the aggregate level, it has no significant effect on the volatility of total firm

[2]Following the literature on trade policy uncertainty, we use the log difference of MFN and non-MFN tariff rates to measure the trade policy uncertainty for each industry. More details will be presented in our empirical section.

[3]We abstract away from individual firm's belief about the renewal possibility and focus only on the industry-level policy uncertainty measure, the MFN and non-MFN tariff rate difference.

[4]Note that this trade policy uncertainty does not exist for other trading partners of China.

[5]See examples like Handley and Limão (2015), Pierce and Schott (2016), Feng, Li and Swenson (2017) among others.

export or the volatility of total sales (including domestic sales). These findings are robust to a series of firm-level and industry-level time-varying controls as well as year and firm fixed effects. The results combined suggest a risk-sharing effect among export destinations. Each firm manages its aggregate risk of exports by adjusting exports to different destination markets. The risk reduction for export to the US allows more volatile exports to other destinations.[6] Our findings are inline with Vannoorenberghe (2012) in terms of risk sharing between different markets. The difference is that in our sample, we only find risk-sharing effect among different export destinations but not much risk sharing between export and domestic market since the reduction in trade policy uncertainty has no significant effect on the volatility of aggregate export or the volatility of aggregate sales.

We also find that the risk-sharing effect mainly appear among larger exporters rather than small exporters. Only for larger exporters, the reduction of trade policy uncertainty decreases their export volatility to the US and in the meantime increases their export volatility to the rest of world. Whereas for smaller exporters, the reduction of trade policy uncertainty only decreases their export volatility to the US without any significant effect on the export volatility to other markets. It seems that only larger exporters are able to substitute their export volatility among their export destinations. This finding is inline with Vannoorenberghe, Wang and Yu (2016) where they find that export diversification decreases aggregate export volatility only for larger exporters.

Our paper is closely related to two strands of literature. First, it contributes to the literature on the relationship between export and volatility, for examples such as Rodrik (1998) and Bejan (2006) at the country level; di Giovanni and Levchenko (2009) at the sector level; Bush et al. (2009) and Vannoorenberghe (2012) at the firm level. Our findings are closely related to Vannoorenberghe (2012) and Vannoorenberghe, Wang and Yu (2016) as we use a difference-in-difference approach to find similar results as theirs. We compare the average export volatility adjustments by firms from different industries facing heterogeneous trade policy uncertainty shocks. Our results are inline with both studies that exporters manage their exports to different markets to smooth the aggregate export volatility and that larger firms do better in this risk-sharing dimension than smaller firms.

This paper is also related to a recent literature analyzing the effects of trade policy uncertainty on various economic activities. We directly adopt the methodology from these papers

[6]Further decomposition shows that the increase of export volatility to the rest of the world mainly comes from export to countries other than the G7 countries. It may be the case that G7 countries have similar market risks. So risk sharing happens mainly between the US and countries outside of G7.

and investigate its effect on firms' export volatility. Handley and Limão (2015, 2017) study the effects of trade policy uncertainty reductions on China's exports to the US and its welfare implications. Pierce and Schott (2016) show that import competition from China after the trade policy uncertainty reduction contributes to the sharp decline of US manufacturing employment. Feng, Li and Swenson (2017) and Crowley, Meng and Song (2018) both look at the entry of Chinese export with trade policy uncertainty; Ma and Liu (2017) look at the effect of trade policy uncertainty on firm innovation and find positive response after the removal of such uncertainty. Chen and Zhao (2019) look at the effect of trade policy uncertainty on firm's optimal inventory stocks. This paper utilizes the direct link between uncertainty and export volatility to investigate the change of volatility of export to different markets.

The rest of the paper is organized as follows. Policy background, our empirical specifications as well as the data and variable description are presented in Section 2. Our main results as well as various robustness checks are then presented in Section 3, followed by the concluding remarks in Section 4.

2 Empirical Investigation

In this section we present the trade policy background for Chinese exporters with particular focus on the trade policy between China and the U.S. and explain the design of our empirical specification as well as the data and main variables we use in this paper.

2.1 Policy Background

The Trade Act of 1974 states that the US would grant access to non-market economies in the presence of (1) a bilateral commercial agreement and (2) the compliance of freedom-of-emigration requirement. At the same time, the US President was given authority to waive the second requirement on an annual renewable basis, subject to approval by the US Congress. In 1980 a bilateral commercial agreement was signed between the US and China and gave the MFN status to China's exports to the US. And then during the 1980s this MFN status was renewed as the waiver was renewed annually without any sign of objection in the Congress. But after the events of the Tiananmen Square in 1989 in China, concerns about human rights violations led to demand for legislation to revoke China's temporary MFN status. Indeed, the US House of Representatives voted on this issue every year from

1990 until 2001, when China finally gained its WTO accession. Although China's MFN status was never actually revoked since 1980, it came close in 1990, 1991 and 1992 when the House passed legislation to revoke it but the Senate failed to sustain the vote. As a result, these annual renewal exercises were quite uncertain to Chinese firms and the MFN treatment from the US is not guaranteed. Exporters to the US market had to prepare for the possibility that tariff rates might increase sharply to the non-MFN levels. However, this uncertainty of MFN treatment is eliminated after China's WTO accession. After the WTO accession, Chinese exporters are certain to face the MFN tariff rates when exporting to the U.S. market. Thus trade policy uncertainty prevails before China's WTO accession and disappears after that.

The differences between the MFN tariffs and non-MFN tariffs are quite large. The mean non-MFN tariff rate was roughly 32% while the mean bound tariff rate was only 3.6% at the HS 6-digit product level. Thus the uncertainty is indeed quantitatively relevant for Chinese exporters' decisions. Additionally, the difference between MFN tariff and non-MFN tariff differs a lot across different industries. This gives us the perfect setting to carry out a difference-in-difference approach investigation. For exporters in those industries with larger (smaller) MFN and non-MFN tariff differences, the trade policy uncertainty is higher (lower). Larger uncertainty naturally leads to more volatile sales to the US market by Chinese exporters.

2.2 Empirical Specification

We write down a standard difference-in-difference specification (DID) to identify the changes of export volatility to different markets for Chinese exporters upon a reduction of trade policy uncertainty in the US market as follows

$$\ln y_{ijt}^{s} = \beta\ TPU_s * Post02_t + \boldsymbol{Z}_{st}'\gamma + \boldsymbol{X}_s * Post02_t + \alpha_i + \lambda_t + \varepsilon_{ist}, \tag{1}$$

where i, j, s and t represent firm, export destination, industry and year respectively; y_{ijt}^{s} represents our dependent variable of interest, the export volatility for firm i of industry s to destination j at time t, where j can be the US, the rest of the world other than US, the rest of world (total export) or the world (including China for firm total sales). We discuss the measurement of volatility in the next subsection; TPU_s is the trade policy uncertainty measure of industry s in 2001. The measurement of trade policy uncertainty is discussed in the next subsection; $Post2002_t$ is a dummy variable representing the post-

WTO period, taking a value of 1 if it is year 2002 and onwards, and 0 otherwise; α_i is the firm fixed effect, controlling for all time-invariant differences across firms; λ_t is the year fixed effect controlling for all yearly common shocks to all firms such as aggregate business cycle fluctuations; $\boldsymbol{Z}_{st}$ is a vector of time-varying firm and industry characteristics that may also affect firms' export volatility, such as capital-labor ratio, export intensity and financial constraint, industry state-owned-enterprise share, number of foreign firms; and ε_{ist} is the error term. Though our regression is at the firm level, the difference-in-difference estimation is based on comparison across industries. Thus we cluster standard errors at the industry level.

Our specification requires that the differences between MFN tariff and non-MFN tariffs are exogenous and random across industries. So that our selection of treatment industries, those with larger differences, is exogenous and random. The non-MFN tariffs were arguably exogenous. Pierce and Schott (2016) argue that, non-MFN tariffs were set decades ago and remained stable over recent decades. Similarly, since U.S. bound tariffs were also set well in advance of China's WTO entry, and were applied to all GATT/WTO members, they also should have been exogenous from Chinese exporters' considerations. Thus the trade policy uncertainty should be arguably exogenous. The other concern is the randomness of treatment, i.e. TPU, across industries, since those industries that are subject to more uncertain tariffs are likely to be selected by some unknown criteria. What we can do is to find out the determinants for TPU of each industry and then control for their effects on our variable of interest upon China's WTO entry. Potential candidates include export intensity, input share in total export, state-owned enterprises share, tariff levels and changes, etc. We find that export intensity and input share in total export are the two significant determinants for industry TPU. Denote all these industry characteristics by $\boldsymbol{X}_s$, we then add $\boldsymbol{X}_s * Post02_t$ to our DID specification to control for their potential effects on export volatility.

2.3 Data and Variables

We use the firm-level export transaction data from the Chinese Customs Trade Statistics database from 2000 to 2006. All export transactions through the Chinese customs are included, including firm identity, dates of transactions, HS8 product code, price and volume of goods, export destination. We aggregate exports for each firm at each year by destinations to calculate the export volatility to the US, export volatility to the rest of the world (others),

as well as the aggregate export volatility. Since we will use the trade policy uncertainty between China and the US, so we only keep firms that export to the US through our sample.[7]

The Chinese customs data doesn't contain information about firms' operations. We match it with detailed balance sheet data from the Annual Survey of Industrial Firms of the National Bureau of Statistics (NBS) in China. This database includes state-owned firms of all sizes and other firms with annual turnover exceeding 5 million yuan (equivalent to around 700 thousand U.S. dollars)in the manufacturing sectors. The two database are matched using firm names and their key contact details such as postcode, legal person name, and telephone number as the identifier.[8] The matched data set contains all firm-level characteristics that we control in our estimations, such as firm productivity, export intensity, capital-labor ratio as well as financial constraint. From this data we also calculate our industry-level control variables including export share, state-owned-enterprise share, foreign firm number for each year. Summary statistics for our key variables are presented in Table 1.

2.3.1 Export Volatility

We measure the volatility of export and sales following Vannoorenberghe (2012) and Vannoorenberghe, Wang and Yu (2016). The volatility is the deviation of export growth from its average. We first calculate the mid-point growth rate (g_{ijt}) of firm i's export to destination j (j represents the US or the rest of the world other than the US) at time t (x_{ijt}) as

$$g_{ijt} = \frac{x_{ijt} - x_{ijt-1}}{(x_{ijt} + x_{ijt-1})/2}.$$

Once we have the growth rates of export, we run a simple regression as follows to compare growth rate at each point of time with its average. And the residual is defined as volatility at that time. Specifically,

$$g_{ijt} = \delta_i + \gamma_t + \upsilon_{ijt},$$

where δ_i is exporter fixed effect and γ_t is time fixed effect, while the the absolute value of the residual is defined at the volatility, $Vol_{ijt} = |\upsilon_{ijt}|$.

Similar to Vannoorenberghe, Wang and Yu (2016), in the robustness check we adopt an

[7] We also relax this criteria by focusing on firms who export to the US for 6 years when calculating the export volatility in the robustness check. Similar results are found.

[8] See Yu (2015) for more details of matching the two database.

alternative measure for export volatility. We conduct another firm-specific regression of the growth rate of exports on a constant, a linear time trend and a squared time trend, and take the squared residuals as our alternative measure of volatility.

2.3.2 Trade Policy Uncertainty

Our measurement of trade policy uncertainty directly follows the literature. We follow Pierce and Schott (2016), Feng et al. (2017), Ma and Liu (2017) and use the gap between MFN tariff rats and non-MFN tariff rates to measure the policy uncertainty faced by Chinese firms exporting to the U.S. market.[9] This difference can be large and varies across industries. Specifically, we measure the trade policy uncertainty for each CIC 3-digit and 4-digit industry as follows

$$TPU_s = log(\tau_s^{non-mfn}/\tau_s^{mfn});$$

where $\tau_s^{non-mfn}$ and τ_s^{mfn} are respectively the average non-MFN tariff rates and MFN tariff rates for each 3-digit or 4-digit industry s.

We also adopt alternative policy uncertainty measures proposed by Handley and Limão (2015) to check the robustness of our main result using a simplified version as

$$TPU_s = 1 - (\tau_s^{column2}/\tau_s^{mfn})^{-\sigma}, \text{ with } \sigma = 2 \text{ or } 3.$$

3 Results

We present our main empirical results as well as various robustness checks in this section. Before we jump into the tables of estimation results, we show the dynamic patterns of export volatility for firms from two groups of industries with high and low trade policy uncertainty using two figures. Figure 1 plots the average volatility of exports to the US for two groups of firms, firms from industries with above-median *ex-ante* trade policy uncertainty and firms from industries with below-median *ex-ante* trade policy uncertainty. On the other hand, Figure 2 plots the volatility of exports to markets other than the US for the two groups of firms. It is shown that export volatility is in general decreasing over time. And the export volatility to the US is higher than the export volatility to other markets when comparing the two figures both before and after China's WTO accession. Focusing on the pre-WTO

[9]The non-MFN tariff rates are from Feenstra et al. (2002).

period, year 2001, we can see that firms facing higher trade policy uncertainty have higher volatility for export to the US but lower volatility for export to the other markets compared to firms facing lower trade policy uncertainty. This suggests a risk-sharing effect among one's export markets.

When looking at the relative changes in export volatility, Figure 1 also shows that when trade policy uncertainty is eliminated from 2002, firms in industries with *ex-ante* higher uncertainty witness a drop in their export volatility to the US. Whereas for firms from industries with *ex-ante* lower uncertainty, their export volatility to the US does not drop significantly after the shock. When we look at their export volatility to other markets in Figure 2, firms from high-uncertainty industries did not experience the sharp drop of volatility compared to those from low-uncertainty industries. Taking together, when looking at the changes of export volatility to different markets, it is quite clear from the two figures that there is some substitution effect or risk-sharing between the export volatility to two different markets.

3.1 Main Results

The main results based on our specification 1 are presented in Table 2. Column (1) shows that after China's WTO accession the export volatility decreases more for firms from industries with *ex-ante* higher trade policy uncertainty. The column (2) shows the the reduction of trade policy uncertainty increases firms' export volatility to other markets more for those firms from industries with *ex-ante* higher trade policy uncertainty. Taking together, the reduction of trade policy uncertainty between China and the US decreases export volatility to the US and increases export volatility to other markets at the same time. It suggests that firms manage their aggregate risk of export by adjusting export flows between different markets. This is further confirmed in column (3) that the trade policy uncertainty shock has negligible effect on the volatility of firms' aggregate export. The insignificant effect of trade policy uncertainty on the volatility of total firm sales as shown in column (4) seems to suggest that the uncertainty shock induced risk-sharing does not show up between export and domestic sales.

All our estimations include time-varying firm-level control variables such as total factor productivity, export intensity, capital-labor ratio and financial constraint and time-varying industry-level control variables including the export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy

reforms happening in China around that period such as the state-owned-enterprise reform and FDI deregulation happened around our sample period. As discussed above, to address the concern that our treatment of trade policy uncertainty may not be random across industries, we find those potential determinants of *ex-ante* policy uncertainty and control for their effects on our dependent variables. These determinants of TPU at the industry level include tariff changes, tariff levels, industry SOE-share in 2001, industry intermediate input share in 2001 and industry export-intensity in 2001. Their interactions with the $Post_{02}$ dummy are included to control for their potential effects on our dependent variables.[10]

3.2 Robustness Checks

We subject our main finding in column (1) and (2) of Table 2 to various robustness checks in this subsection and discuss the heterogeneous effects of policy uncertainty on the export volatility for different types of exporters.

3.2.1 Checks on the Identifying Assumptions

We first carry out some robustness checks on the identifying assumptions for our aforementioned difference-in-difference strategy.

First, we change our main regressor $TPU * Post_{02}$ to yearly interactions $TPU * Year$ to see if our found treatment effect indeed arises from the WTO accession in the end of 2001. The results are shown in column (1) and (4) of Table 3 for export volatility to the US and export volatility to the other markets. We see that export volatility to the US decreases for high-TPU industry exporters for every year after 2002 (relative to base year 2001), though not statistically significant for 2002. The export volatility to other markets increases for high-TPU industry exporters for every year after 2002. The results are inline with our main results presented above.

Second, to further check if it is TPU that is driving the export volatility adjustments for exporters, we randomly assign a TPU value to each industry and see if this random treatment gives us any significant treatment effect using our empirical estimation strategy. The results are shown in the column (2) and (5) of Table 3. With randomly reassigned treatment group,

[10] Among these potential determinants, we find that industry intermediate input share in 2001 and industry export-intensity in 2001 are significantly correlated with TPU at the industry level. We include all of them as controls in all the estimations.

our main result is gone. It suggests that indeed it is the trade policy uncertainty that is driving the relative export volatility changes between exporters from different industries.

Lastly, related to the above check, one concern about TPU measure is that the randomness of the TPU treatment across industries may be related to the aggregation level when we construct these measures. To address this concern, we redo our estimation at the CIC 4-digit industry level. The results are similar and shown in column (3) and (6) of Table 3.

3.2.2 Alternative Measures for Trade Policy Uncertainty

We now check the robustness of our results to alternative measures for our main variables. For trade policy uncertainty, there are various alternative measures proposed in the literature. To ensure the robustness of our finding, we check two alternative policy uncertainty measures proposed by Handley and Limão (2015). The measure is described in the data and variable section. Results are presented in Table 4. It is shown that our main findings are robust to these alternative trade policy uncertainty measures. Firms from *ex-ante* high TPU industries decrease their export volatility to the US market while increase their export volatility to other markets.

3.2.3 Alternative Measures for Export Volatility and Alternative Sample

As discussed in the data and variable section above, there are several ways to measure export volatility following the literature. We check the robustness of our findings using another alternative measure, which removes the time trend in export growth. We conduct another firm-specific regression of the growth rate of exports on a constant, a linear time trend and a squared time trend, and take the squared residuals as our alternative measure of volatility. The results using this new volatility measure is presented in column (1) and (3) in Table 5. Similar results as our baseline estimation are found.

Similar to Vannoorenberghe, Wang and Yu (2016), we also relax our sample selection to allow firms who did not export continuously after 2001 to the US to our sample when calculating the export volatility. Specifically, we include those who only miss one year in the post-WTO period. Estimation results using the new sample are presented in column (2) and (4). Again the results are similar to our main results presented above.

3.2.4 Heterogeneous Effects

As shown by Vannoorenberghe, Wang and Yu (2016), export diversification not necessarily decreases export volatility for Chinese firms. The risk sharing from export diversification only appears for large exporters. Following their insight, we check if the risk sharing effect that we found in our sample only appear for large exporters. We divide our sample into two subsamples using the median of log export in the initial year of our sample.

The results are shown in Table 6. In column (1) and (2) for large firms, we do see the trade policy uncertainty shock decreases their export volatility to the US and increases their export volatility to other markets. However, for small firms we only see that uncertainty reduction decreases export volatility to the US without any significant effect on the export volatility to other markets. It suggests that only large firms substitute risks between their export markets whereas small firms do not.

4 Conclusion

This paper studies the effect of trade policy uncertainty on firm-level volatility. Using data on exporting firms from China around its WTO accession and a difference-in-difference estimation approach, we find that the reduction of trade policy uncertainty decreases firms' volatility of export to the US and increases the volatility of export to the rest of the world. In the aggregate level, it has no significant effect on the volatility of total firm export or the volatility of total sales. These findings are robust to a series of firm-level and industry-level time-varying controls as well as year and firm fixed effects. The results suggest a risk-sharing effect among export destinations. Firms manage their aggregate risk of exports by adjusting exports to different destination markets. The risk reduction for export to the US allows more volatile exports to other destinations.

We also find that the risk-sharing effect mainly appear among large exporters rather than small exporters. Only for larger exporters, the reduction of trade policy uncertainty decreases their export volatility to the US and in the meantime increases their export volatility to the rest of world. Whereas for smaller exporters, the reduction of trade policy uncertainty only decreases their export volatility to the US without any significant effect on the export volatility to other markets. It seems that only larger exporters are able to substitute their export volatility among their export destinations.

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Figure 1: Volatility of Firm Export to the US

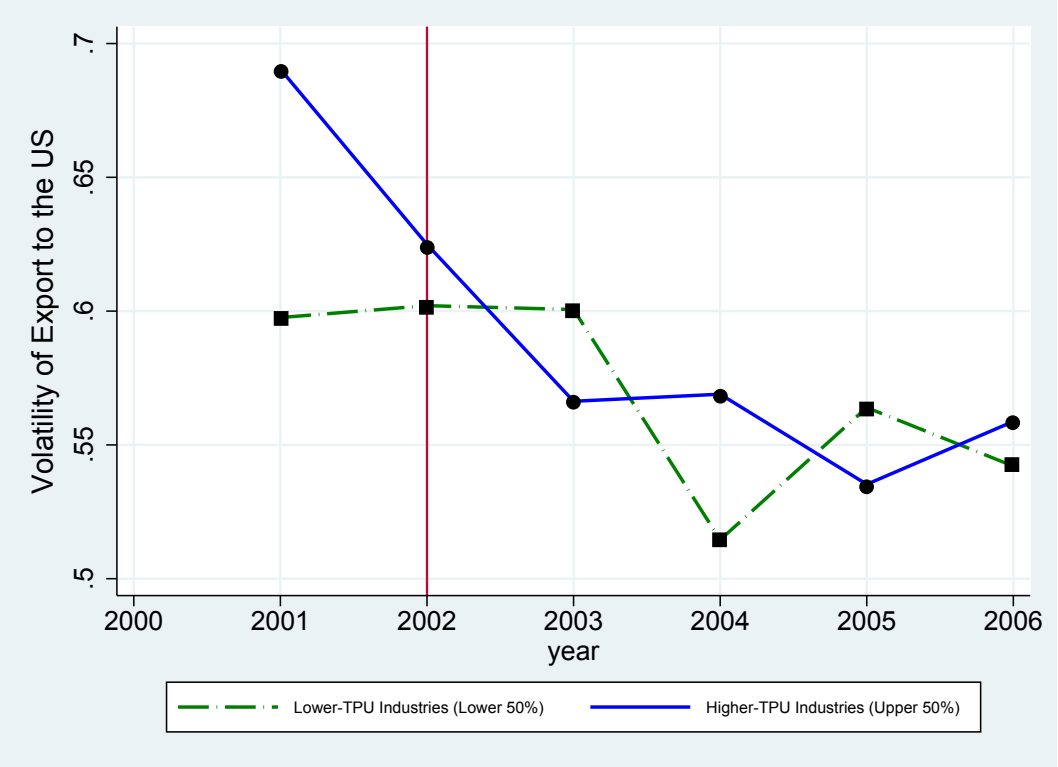

Figure 2: Volatility of Firm Export to Other Destinations (Except the US)

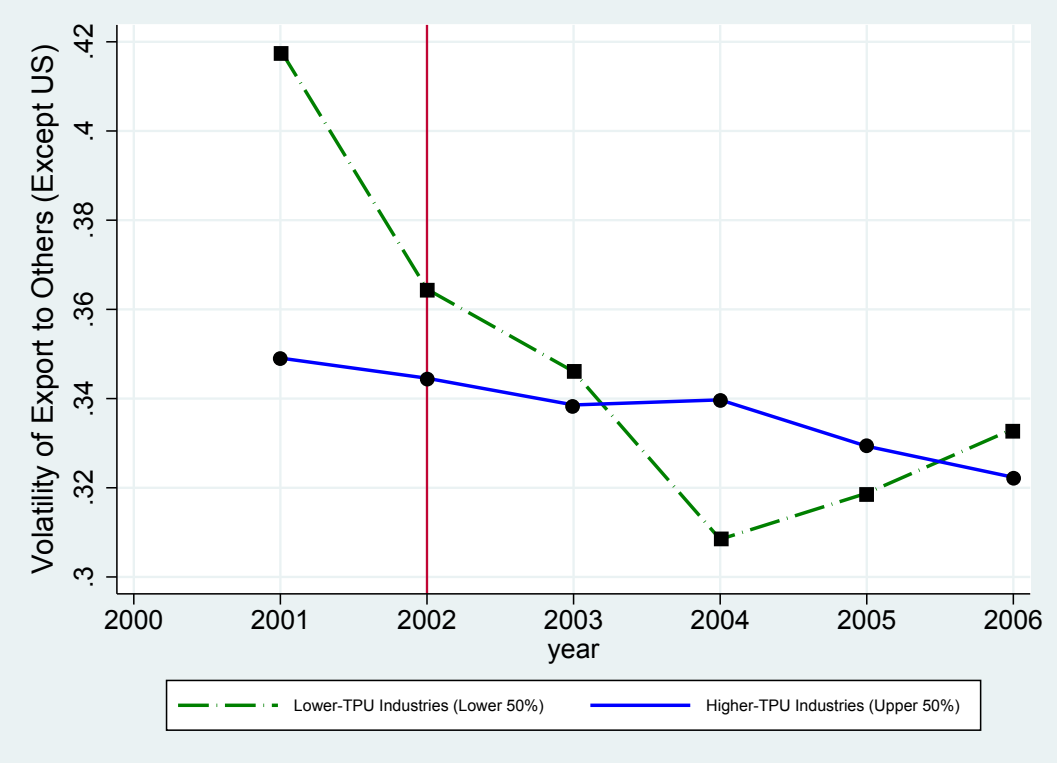

Table 1: Summary Statistics

Variable (Firms-level)	mean	sd	5%	95%	N
Vol_{US}	0.583	0.545	0.0340	1.769	7656
Vol_{Others}	0.341	0.349	0.0200	1.087	6036
Vol_{Sales}	0.194	0.191	0.0120	0.558	7656
Vol_{Export}	0.281	0.285	0.0190	0.847	7406
TFP	9.606	1.095	7.958	11.55	8932
Export-Share	−4.679	2.236	−8.891	-2.192	8932
Capital-Labor Ratio	3.696	1.193	1.753	5.682	8932
Financial Constraint	0.0240	0.0840	-0.0110	0.115	8932
Variable (Industry-level):	mean	sd	5%	95%	N
TPU	1.233	0.641	0.195	2.220	924
Number_{FDI}	3.421	1.564	0.000	5.666	945
Share_{SOE}	0.336	0.201	0.000	0.679	945
$\text{Export-Intensity}_{01}$	0.034	0.025	0.003	0.085	945
IM-Share_{01}	0.414	0.358	0.000	1.000	945
Delta-Tariff	0.002	0.019	-0.015	0.031	945
Tariff_{01}	0.042	0.038	0.000	0.125	945

Table 2: Main Results on Export Volatility and Trade Policy Uncertainty

Dependent variable:	(1)	(2)	(3)	(4)
Export Volatility	To USA	To Others	Total Export	Total Sales
$\text{TPU}\times\text{Post}_{02}$	-0.0745^{***}	0.0621^{***}	0.00839	0.000819
	(0.0276)	(0.0203)	(0.0193)	(0.0193)
Controls	Yes	Yes	Yes	Yes
$\text{X}\times\text{Post}_{02}$	Yes	Yes	Yes	Yes
FE_{year}	Yes	Yes	Yes	Yes
FE_{firm}	Yes	Yes	Yes	Yes
Observations	7,554	5,976	7,554	7,554
R-squared	0.478	0.407	0.393	0.337

Note: Standard errors clustered at the CIC 3-digit industry level are in parentheses, and$^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$. Firm controls include TFP, Export Intensity, Capital/Labor Ratio and Financial Constraint; Industry controls include export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy reforms in China such as state-owned-enterprise reform and FDI deregulation. X are the determinants of TPU at the industry level, including tariff changes, tariff levels, industry SOE-share_{01}, industry IM-share_{01} and industry $\text{export-intensity}_{01}$.

Table 3: Robustness Checks on the Identifying Assumptions

Dependent variable:	To USA			To Others		
	(1)	(2)	(3)	(4)	(5)	(6)
Export Volatility	Yearly	Random-Treatment	4-digit Industry	Yearly	Random-Treatment	4-digit Industry
TPU×2002	−0.0573			0.0554**		
	(0.0382)			(0.0253)		
TPU×2003	−0.0910***			0.0491*		
	(0.0274)			(0.0260)		
TPU×2004	−0.0366			0.0881***		
	(0.0369)			(0.0257)		
TPU×2005	−0.110***			0.0736**		
	(0.0340)			(0.0282)		
TPU×2006	−0.0772**			0.0486*		
	(0.0314)			0.0269		
Random Treatment$_{01}$ ×Post$_{02}$		0.00102			0.00367	
		(0.00339)			(0.00305)	
TPU×Post$_{02}$			−0.0648**			0.0723***
			(0.0264)			(0.0193)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
X×Post$_{02}$	Yes	Yes	Yes	Yes	Yes	Yes
FE$_{year}$	Yes	Yes	Yes	Yes	Yes	Yes
FE$_{firm}$	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,554	7,356	7,518	5,976	5,976	5,940
R-squared	0.481	0.486	0.479	0.410	0.475	0.408

Note: Standard errors clustered at the CIC 3-digit industry level for column (1)(2)(4)(5) and at the CIC 4-digit industry level for column (3)(6) are in parentheses, and$^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$. Firm controls include TFP, Export Intensity, Capital/Labor Ratio and Financial Constraint; Industry controls include export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy reforms in China such as state-owned-enterprise reform and FDI deregulation. X are the determinants of TPU at the industry level, including tariff changes, tariff levels, industry SOE-share$_{01}$, industry IM-share$_{01}$ and industry export-intensity$_{01}$.

Table 4: Alternative Measures of Trade Policy Uncertainty (TPU)

Dependent variable:	To USA		To Others	
	(1)	(2)	(3)	(4)
Export Volatility	$\sigma = 2$	$\sigma = 3$	$\sigma = 2$	$\sigma = 3$
TPU×Post$_{02}$	−0.130**	−0.106**	0.313***	0.498***
	(0.0554)	(0.0495)	(0.101)	(0.0162)
Controls	Yes	Yes	Yes	Yes
X×Post$_{02}$	Yes	Yes	Yes	Yes
FE$_{year}$	Yes	Yes	Yes	Yes
FE$_{firm}$	Yes	Yes	Yes	Yes
Observations	7,554	7,554	5,976	5,976
R-squared	0.478	0.478	0.407	0.407

Note: Standard errors clustered at the CIC 3-digit industry level are in parentheses, and$^{***}p < 0.01$,$^{**}p < 0.05$,$^{*}p < 0.1$. Firm controls include TFP, Export Intensity, Capital/Labor Ratio and Financial Constraint; Industry controls include export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy reforms in China such as state-owned-enterprise reform and FDI deregulation. X are the determinants of TPU at the industry level, including tariff changes, tariff levels, industry SOE-share$_{01}$, industry IM-share$_{01}$ and industry export-intensity$_{01}$.

Table 5: Alternative Measures of Export Volatility and Alternative Sample

Dependent variable:	To USA		To Others	
	(1)	(2)	(3)	(4)
Export Volatility	removed of time trend	export 6 years	removed of time trend	export 6 years
$TPU \times Post_{02}$	-0.145^{**}	-0.0662^{**}	0.108^{***}	0.0406^{*}
	(0.0571)	(0.0495)	(0.0359)	(0.0236)
Controls	Yes	Yes	Yes	Yes
$X \times Post_{02}$	Yes	Yes	Yes	Yes
FE_{year}	Yes	Yes	Yes	Yes
FE_{firm}	Yes	Yes	Yes	Yes
Observations	7,554	8,862	5,976	7,781
R-squared	0.446	0.484	0.389	0.455

Note: Standard errors clustered at the CIC 3-digit industry level are in parentheses, and$^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$. Firm controls include TFP, Export Intensity, Capital/Labor Ratio and Financial Constraint; Industry controls include export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy reforms in China such as state-owned-enterprise reform and FDI deregulation. X are the determinants of TPU at the industry level, including tariff changes, tariff levels, industry SOE-share$_{01}$, industry IM-share$_{01}$ and industry export-intensity$_{01}$.

Table 6: Heterogeneous Effect

Dependent variable:	Large Firms		Small Firms	
	(1)	(2)	(3)	(4)
Export Volatility	To USA	To Others	To USA	To Others
$TPU \times Post_{02}$	-0.0619^{*}	0.0737^{***}	-0.0985^{**}	0.0506
	(0.0330)	(0.0234)	(0.0384)	(0.0351)
Controls	Yes	Yes	Yes	Yes
$X \times Post_{02}$	Yes	Yes	Yes	Yes
FE_{year}	Yes	Yes	Yes	Yes
FE_{firm}	Yes	Yes	Yes	Yes
Observations	3,798	3,006	3,756	2,970
R-squared	0.505	0.423	0.445	0.383

Note: Standard errors clustered at the CIC 3-digit industry level are in parentheses, and$^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$. Firm controls include TFP, Export Intensity, Capital/Labor Ratio and Financial Constraint; Industry controls include export share to control for aggregate demand shift, state-owned-enterprise share and number of foreign firms to control for other policy reforms in China such as state-owned-enterprise reform and FDI deregulation. X are the determinants of TPU at the industry level, including tariff changes, tariff levels, industry SOE-share$_{01}$, industry IM-share$_{01}$ and industry export-intensity$_{01}$.