Trade Policy Uncertainty and Exports: Evidence from China's WTO Accession

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Abstract:

This paper studies how reduction in trade policy uncertainty affects firm-level export decisions. Using a firm-product level dataset on Chinese exports to the United States and the European Union in the years surrounding China's WTO accession, we provide strong evidence that reduction in trade policy uncertainty *simultaneously* induced firm entries to and firm exits from export activity within fine product-level markets. In addition, we uncover accompanying changes in export product prices and quality that coincided with this reallocation: firms that provided higher quality products at lower prices entered the export market, while firms that had higher prices and provided lower quality products prior to the changes, exited. To explain the simultaneous export entries and exits, as well as the change in product export prices and quality induced by trade policy uncertainty changes, we provide a model of heterogeneous firms which incorporates trade policy uncertainty, tracing the effects of the changes in policy uncertainty on firm-level payoffs and the resulting selection effects which apply to new entrants and incumbents.

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1. Introduction

This paper studies how trade policy uncertainty affects firms export decisions. In particular, we study the micro firm-level response margins which shaped firm export changes following changes in trade policy uncertainty. To answer these questions, we take advantage of the trade activities of Chinese firms that exported to the United States at the time of China's 2001 WTO entry.

Three factors make this setting especially suitable for addressing our question. First, Chinese exports to the United States during this period were characterized by strong dynamics. As Figure 1 shows, the exceptional acceleration of China's export growth coincided almost exactly with China's WTO entry. More important, as we show in detail in section 2, there was remarkable reallocation of export activities across firms. Firms who exited the export market between 2000 and 2006 were responsible for 76 percent of China's total export value just prior to China's WTO accession. Indeed, while some of the reallocation led to market share expansion by established exporters, new exporters who entered export following China's WTO entry were responsible for 67 percent of China's export activity in 2006.

Second, China's WTO entry provided exporters with a substantial reduction in trade policy uncertainty due to the WTO guarantee of Most Favored Nation (MFN) treatment. China's WTO accession removed the threat that the U.S. might at some future time revoke its Most Favored Nation treatment of China's exports, reverting instead to the much higher general tariff rates levied by the U.S. on non-MFN countries.[1]

Third, the United States is one of the most important markets for Chinese exporting firms. For firms that ever exported to the US during the period of 2000 to 2006, 25% of their export value was shipped to the United States, followed by 18% to the European Union and 12% to Japan.

Analysis of China's exports to the U.S. reveals a number of robust links between trade policy uncertainty reduction and firm exports. First, we find that trade volume growth associated with new export entry was positively related to product-level uncertainty reduction following from China's WTO accession. These product level responses to uncertainty reduction were apparent by 2002 and grew in magnitude over

[1] Prior to China's WTO entry each of its trade partners was free to decide whether to provide China access to their MFN tariff schedule. MFN status for China, which was suspended in 1951 by the United States, was restored in 1980, though its continuation was subject to annual extensions. Following 1989, the annual renewal of China's MFN status became a source of considerable debate in the U.S. Congress. See http://en.wikipedia.org/wiki/Most_favoured_nation.

the longer horizon. More important, we also find a positive relationship between the degree of trade policy uncertainty reduction and *exits* by some of the incumbent firms that were engaged in U.S. export prior to the policy changes.

To understand why trade policy uncertainty reduction induced export entry by one group of firms while it caused another group of firms to exit, we compare the export characteristics of new exporters with the characteristics of exiters.[2] We find strong evidence that new exporters charged lower prices while they exported higher quality goods than did exiting firms. Moreover, we find that the advantages of new exporters relative to exiting exporters were larger for products that experienced larger reductions in trade policy uncertainty.

Our discovery of simultaneous export entry and export exit at the product-level are not initially intuitive. In particular, it is commonly assumed that lower tariff uncertainty, which facilitates entry by new exporters, will also benefit, or at worst be harmless, to incumbents in the export market. Consequently heterogeneous firm models, such as Melitz (2003) and Melitz and Ottaviano (2008), do not predict an increase in the exit from export by some exporting incumbents following favorable trade policy developments. In other words, while trade liberalization expands export opportunities and induces export entry, these models do not predict that trade liberalization will also cause some incumbents to exit the export market.

Nonetheless, recent work on the effects of trade liberalization, demonstrates the value of modelling and evaluating effects stemming from the reallocation of activities across firms and products. For example, Mayer, Melitz and Ottaviano (2014) consider how changes in export competition will lead to changes in product export composition, with consequences for firm-level productivity, while Melitz and Redding (2013) demonstrate how endogenous firm selection effects have the potential to influence aggregate productivity.

To explain the simultaneous entries by new exporters and exits by incumbent firms, we provide a parsimonious extension of Melitz (2003), which incorporates trade policy uncertainty in a setting where congestion effects influence the cost of export. In particular, our model demonstrates how trade policy uncertainty reduction, which lowers

[2] The term “new exporter” refers to a firm that was not involved in export in 2000, but exported in one of the years following China’s WTO accession. The export “exiters” are defined as firms that exported to the US in 2000 but ceased their US export after China’s WTO accession. Further details about the definitions are provided in Section 2.

firm expectations about the level of tariff payments, encourages export entry due to the expectation of increased export profits. In turn, as an increasing mass of firms seek to serve the export market, congestion externalities raise the per-period fixed costs of export which are tied to export support such as logistics, finance, and ongoing advertising (see Bergin and Lin (2012)). Ultimately, as congestion externalities raise the fixed costs of export, and the cutoff productivity for export, lower productivity incumbent firms whose productivity falls short of the new export productivity thresholds cease to export. Nonetheless, while the lowest productivity exporters may be driven out of the market due to rising cutoff levels, the total number of exporting firms may increase due to new export entry by firms lured by the improved trade policy environment.

By demonstrating a connection between reductions in trade policy uncertainty and firm export activities, our work adds to the recent literature on trade policy uncertainty and international trade, pioneered by Handley (2014) and Handley and Limao (2014a, 2014b).[3] Our paper is closest to Handley and Limao (2014b) which also studies the effects of trade policy uncertainty reductions on China's U.S.-destined exports and the welfare implication for US consumers. However, while Handley and Limao (2014b) focuse on export growth changes at the product-level, our study provides insights on the diverse changes within products which are tied to firm-level decisions within industries. Notably, our work is the first to document and explain the simultaneous entry and exit responses which stem from trade policy uncertainty reduction.[4]

Our main finding – that Chinese firm export responses involve reallocation through simultaneous entries and exits – also supports recent work in international trade that shows the effects of trade policy changes are often observed on the extensive margin.[5] Indeed, by tracking the margins of China's export changes associated with China's WTO

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[3] Another type of uncertainty, market-specific demand uncertainty, has been studied in the literature. For example, in a partial equilibrium representative firm setting, Conconi, Sapir and Zanardi (2013) studies how demand uncertainty in a foreign market leads firms to experiment with exports before engaging in FDI. In a heterogeneous though still partial equilibrium setting, Nguyen (2012) shows how demand uncertainty may cause firms to delay exporting in order to gather information about foreign demand and to use previous demand realizations to forecast unknown levels of demand in as yet untested destinations. In contrast, our analysis of trade policy uncertainty focuses on the simultaneous entry and exit of firms in the same market which crucially hinges on *general* equilibrium conditions.

[4] Khandelwal, Schott and Wei (2013) also show that following the removal of quotas on Chinese textile and clothing exports in *2005*, high-productivity new entrants entered the export market with relatively low prices as they replaced low-productivity firms who exported high-priced exports. However, their explanation, the removal of inefficient institutional arrangements, favored a subset of firms who were active in quota-limited industries, while our results extend to a period several years before the final removal of quota system and extends to other industries that did not experience similar changes in quota treatment.

[5] For example, Debaere and Mostashari (2010) provide evidence that extensive margin responses to U.S. tariff policy changes had an effect on U.S. country-product imports.

accession, including shifts in export activity from low-quality high-price exiters to high-quality low-price new exporters, our paper also contributes to the understanding of resource reallocations induced by trade liberalization. While the current literature, (e.g., Melitz (2003) and Melitz and Ottaviano (2008)) sheds light on the resource reallocation between domestic firms and exporting firms, our study identifies an additional margin as it shows how decreases in trade policy uncertainty can lead to reallocation towards more productive newcomers and away from less productive exiting exporters.[6] The reallocation effects we observe are also similar to the reallocation effects uncovered in Alfaro and Chen's (2015) work on FDI spillovers, due to the role for selection effects.[7] The characteristics of new exporters and exiters we document in our work are also consistent with the observations of Chinese export prices in Mandel (2013) which studies how competition from Chinese exporters affected the mark-ups and marginal costs of other exporters who shipped their products to the U.S.

Finally, our paper also contributes to the literature that seeks to understand how changes in trade policy have influenced U.S. economic outcomes. The relevance of this issue is made apparent by the work of Autor, Dorn and Hanson (2013), and Autor, Dorn, Hanson and Song (2014), both of which show how the increased imports from China affected U.S. labor markets. In addition, Pierce and Schott (2013) find that the uncertainty reduction associated with China's WTO accession can help explain changes in U.S. manufacturing employment and wages. Indeed, our results suggest that the unusually strong downturn in the U.S. manufacturing labor market noted by Pierce and Schott (2013) may have been driven not only by the growth in overall exports that followed the trade policy uncertainty reduction, but also by the intensification of product market competition in the U.S. stemming from the exits of less capable firms and the entry of higher-quality and higher-capability exporting firms.

The rest of the paper is organized as follows. Section 2 discusses the salient features of Chinese export dynamics between 2000 and 2006, and introduces the key policy developments tied to China's WTO accession. Section 3 provides a model which helps to explain the developments of this period, explaining the mechanism through which trade policy uncertainty reductions may induce simultaneous entries and exits. Section 4 introduces the data and presents our empirical results regarding the impacts of uncertainty

[6] A growing strand of macroeconomics literature, including Ghironi and Melitz (2005), Alessandria and Choi (2007) and Ruhl and Willis (2014), study firms' entry and export decisions in business cycles through the lens of dynamic, stochastic general equilibrium (DSGE) models.

[7] Alfaro and Chen's (2015) discovers that increases in aggregate productivity following FDI are due to between-firm selection effects which lead to the exit of the least productive firms in addition to the beneficial within firm productivity spillovers which enhance the productivity of ongoing firms.

reductions on firms' entry and exit decisions. Section 5 further examines the impact of uncertainty reduction as manifested by the intensification of market competition. Section 6 concludes.

2. Background: Aggregate Reallocation and Trade Policy Uncertainty

In this section, we document two stylized facts that are potentially linked to each other. The first fact is that there was a dramatic reallocation of export activities across firms following China's WTO accession, largely due to shifts in export value tied to extensive margin of entries and exits. The second fact is that China's WTO entry provided exporters with a substantial reduction in trade policy uncertainty. In succeeding sections, we will examine whether the aggregate reallocations can be explained by the reductions in trade policy uncertainty.

2.1 Aggregate Reallocation

To provide information on the export dynamics in China's 2000 to 2006 U.S. exports, we decompose changes according to the margins of adjustment. Through the paper, we define four margins of adjustment: "exiters", "incumbents", "new exporters" and "adders". The "new exporters" and "adders" are summed together to form the aggregate we term, "new entrants". For each year *t* after WTO accession (*t* = 2002 through 2006), the margins of "exiters", "incumbents", and "new entrants" are defined respectively as the *firm*product* combinations that were exported to the US in 2000 but not in year *t*, that were exported both in 2000 and in year *t*, and that were exported in year *t* but not in year 2000. Among the "new entrants" groups, the "new exporters" margin refers to firms that were not involved in exports in 2000, while the "adders" margin is defined as exports of new goods in year *t* by a firm which exported other goods in 2000 but not the good in question.

We then calculate the market share changes associated with each margin between 2000 and 2006 for both the overall exports as well as firm groups classified by ownership. To do that we first calculate the market share tied to each margin *m* (including the incumbents, exiters, new exporters, and adders) for each HS 6-digit product *h* in each year t, $EXshare_{mht} = EX_{mht}/(\sum_{mh} EX_{mht})$. Next we take the difference in the market share between 2000 and 2006 for each product *h*, and calculate the average difference for each margin across products.[8]

[8] The market share of each margin *m* for each HS 6-digit product *h* in each year *t*, $EXshare_{mht}$, the difference in the market share between 2000 and 2006 for each product *h*, $D\_EXshare_{mh}$, and the average

Table 1 reports the changes in export market shares disaggregated by response margin and ownership.[9] Column 1 provides the decomposition for China's overall exports, while columns 2 to 4 provide the decomposition for each type of ownership: state-owned enterprises (SOE), foreign-invested enterprises (FIE) and domestic private firms (DOM). It should be noted that for each margin, the sum of market share changes made by the different ownership groups sums to the market share changes for overall exports. That is, in each row, the last three columns sum to the first column.

Table 1 shows that China's U.S. exports experienced a tremendous aggregate reallocation between new entrants and exiters. The export growth was disproportionately driven by the changes along the extensive margin, with the largest reallocation occurring between exiting exporters (a decline in share of 76 percentage points) and the activities conducted by new exporter entrants (an increase in share of 67 percentage points). In the two margins of new entrants, the market share growth generated by the adders (a 19 percentage point increase) was considerably smaller than contributions associated with new exporters. Since these are intriguing developments, our paper seeks to evaluate whether the reallocation was related to the reductions in trade policy uncertainty following China's WTO accession.

2.2 Trade Policy Uncertainty Reduction

As an outsider to the GATT and the successor WTO framework, China missed out on participating in the multiple rounds of tariff negotiations and reductions that occurred through international agreements concluded by the GATT/WTO process. Although the U.S. agreed to allow China to benefit from the same tariff concessions that were offered to GATT/WTO members who received MFN treatment, such treatment was extended on a provisional basis that was subject to annual renewal.

Dumbaugh (2001) and Pregelj (2005) describe the politically controversial annual renewals of MFN tariff treatment to China prior to China's WTO accession. Since continued access to MFN treatment was not assured, any exporters had to consider the possibility of sharp tariff increases on their exports to the United States. Indeed, the

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difference for each margin across products, $AVG\_D\_EXshare_m$, are defined respectively as: $EXshare_{mht} = EX_{mht}/(\sum_{mh} EX_{mht})$, $D\_EXshare_{mh} = EXshare_{mh06} - EXshare_{mh00}$, $AVG\_D\_EXshare_m = Average(D\_EXshare_{mh})$.

[9] Differences in the table are marked with stars if they are statistically significant. Triple stars, *** , represent a significance level of 1%. We obtain the statistics by running regressions of the changes in market shares on a constant. For comparison, we also examined the decomposition based on changes in market shares between 2000 and 2002. Since the results are very similar, they are reported in Appendix Table 1.

possibility of trade action has not disappeared entirely following China's WTO accession, as there has been political pressure for U.S. trade action against China, to pressure China to increase the value its currency “in accordance with accepted market-based trading policies”.[10]

Nonetheless, China's WTO accession lowered the possibility for tariff adjustment via the loss of MFN treatment, and thereby, mitigated the worst-case tariffs, and the risk of change, that Chinese exporters needed to consider. The worst-case tariff before China's WTO accession, if China lost its MFN tariff treatment, was the United States' special rate of duty assigned to trade restricted countries.[11] After China's WTO accession the worst-case tariff became the much lower schedule of WTO bound tariffs.[12] As Figure 2 shows, the reductions in the worst-case tariff were substantial. The mean non-MFN tariff was roughly 32 percent while the mean bound tariff was only 3.6 percent. Moreover, the non-MFN tariff varied widely across product lines.

In contrast to the large reductions in trade policy uncertainty, the U.S. applied tariffs on imports changed almost imperceptibly. As Table 2 shows, U.S. applied tariffs on imports averaged over the years 2000 and 2002 were roughly 3.65%. Moreover, the U.S. applied MFN tariffs only declined by a tiny amount, only 0.16 percentage points, between 2000 to 2002.[13]

Figure 3 provides more detail on the distribution of non-MFN tariffs by sector. Two patterns stand out. First, all U.S. sectors had worst-case tariffs that applied to non-MFN countries, and the worst-case tariff rates were very high. If the U.S. decided to revoke its MFN treatment of China’s exports, no sector was immune from the threat of sizeable tariff increases. Second, within each sector, the non-MFN tariff varied dramatically across products. Since non-MFN tariffs were not uniform even within sectors, we can exploit the product-level tariff variation to identify exporters' responses to changes in trade policy uncertainty.

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[10] In contrast with the implied tariff penalty associated with loss of MFN, which would differ product by product, the proposed penalty for currency manipulation is often a single tariff (e.g., 25%) which would be applied *uniformly* to all China’s exports to the U.S., and which would be set to offset the degree to which China’s currency were deemed to be underpriced.

[11] These tariffs are also interchangeably referred to as non-most favored nation treatment tariffs (non-MFN), non-normal trade relation tariffs (non-NTR) or Column 2 tariffs (Feenstra, Romalis & Schott, 2002). They were originally set in the Smoot-Hawley Tariff Act of 1930.

[12] The United States granted permanent MFN tariffs to China in October 2000. Negotiations on China's terms of membership in the WTO concluded in September 2001. Permanent MFN tariff treatment for China by the U.S. became effective on Jan 1, 2002.
See http://www.wto.org/english/news_e/pres01_e/pr243_e.htm.

[13] There were no further large adjustments to applied tariffs through the period of 2002 to 2006.

The worst-case tariffs were arguably exogenous. Pierce and Schott (2012) 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 countries in the world, they too should have been exogenous.

3. Theory and Predictions

In this section we develop a heterogeneous firm model to study the impact of trade policy uncertainty reduction on firms' export decisions. We find that uncertainty reductions induce new export entry, and more importantly, may also drive out incumbent firms when new entry increases competition in export markets.

3.1 Basic Setting

There are two countries, home and foreign. In addition, while there are two or more industries in the economy we only focus on one industry in which firms produce a continuum of differentiated goods. This industry is characterized by monopolistic competition, as in the Melitz (2003) framework.

Without loss of generality, we assume that the total expenditure on goods in this industry is a constant share of the economy's total income, as is the case when consumers have Cobb-Douglas preferences over industries. In our representative industry, we focus on the home firms' decisions regarding export to the foreign market.[14] Thus all demand side variables in our model involve foreign country variables while all supply side variables in our model involve the home country.

Following Melitz (2003), there are an infinite number of time periods and the discount rate is ρ. In each period, the foreign country's preference for home products is given by CES preferences, or $U=\left[\int_{\omega\in\Omega} q(\omega)^{\frac{\sigma-1}{\sigma}}\, d\omega\right]^{\frac{\sigma}{\sigma-1}}$, where $\sigma>1$ is the elasticity of substitution between varieties. Consequently demand for each variety follows $q(\omega)=Q\left[p(\omega)/P\right]^{-\sigma}$ and the revenue each firm collects (tariff inclusive) is

$$r(\omega)=R\left[p(\omega)/P\right]^{1-\sigma} \quad (1),$$

[14] Since our empirical work focuses on firms' export outcomes, we only present our model's implications for firm exports. However, a simple extension of our model would enable us to study firm sales in the home market as well. For simplicity, we also ignore foreign firms producing in this industry. Implicitly, this assumes that Chinese firms have comparative advantage in their export goods, or that importers devote a fixed share of their expenditures to imports in each industry.

where $P = \left[\int_{\omega \in \Omega} p(\omega)^{1-\sigma} d\omega \right]^{\frac{1}{1-\sigma}}$, $R = \int_{\omega \in \Omega} r(\omega) d\omega$ and $Q = U = R / P$.

On the supply side, prior to production, each firm must pay a one-time sunk entry cost, f_e, to learn its productivity, φ, which is drawn from a common distribution with c.d.f. $G(\varphi)$ and p.d.f. g(φ). Upon learning its productivity, if the firm decides to export to the foreign market the firm pays a per-period fixed export cost, $M^\eta f$, where M is the total mass of exporting firms, and $\eta \geq 0$ represents the degree of congestion externalities involved in entering export markets. In our setting the fixed export cost rises with the number of exporters due to increased competition from other exporting firms for the resources that are used in the provision of the export fixed costs. In the literature, this specification of fixed costs is represents an imperfectly elastic supply of a specific factor which is required for entry.[15] We note that the increase in export fixed costs in the face of intensified export activity is also consistent with our later empirical finding (see section 5) that new exporters charged lower prices while producing higher quality export goods as compared with exiting firms.

3.2 Trade Policy and Uncertainty

We follow Feenstra and Romalis (2014), Caliendo, Feenstra, Romalis and Taylor (2015) and Handley and Limao (2014b) in assuming that exporting firms face an ad valorem tariff ν charged by the foreign country such that $\tau = 1 + \nu > 1$. That is, for a given Free on Board price p^* received by the firm, it must charge consumers in the destination foreign market a price $p = \tau p^*$. Alternatively, given tariff inclusive revenue $r = pq$, the earnings received by the firm are r / τ, and the tariff collected by the foreign government is $r((\tau - 1) / \tau)$.

We follow Handley and Limao (2014a) in assuming that policy uncertainty concerns the applied tariff rate. Absent the protection of WTO membership, the foreign country may at any time decide to change its tariffs. We model this uncertainty as an arrival rate, λ, which characterizes the risk that the foreign country will choose to replace its current tariff schedule with an alternative tariff schedule in each period. If the foreign country decides to adjust its tariffs, the new tariff will be drawn from a distribution $H(\tau)$ with support $[1, \bar{\tau}]$, where $\bar{\tau} \geq \tau$ is the highest possible tariff levied by the foreign country. In

[15] See Bergin and Lin (2012), Berentsen and Waller (2010) and Rocheteau and Wright (2005) for examples motivated by search and advertising costs.

our setting, this is equivalent to the U.S. removing China's MFN treatment, and applying the higher non-MFN tariffs to Chinese imports instead.

3.3 Firm Decision

To highlight the mechanisms that underpin our model, it is helpful to review the firm timeline. In each period, a large pool of identical potential entrants decides whether to enter the export market or not. When firms make their entry decisions, they are aware of the current applied tariff rate and the degree of future trade policy uncertainty. After they decide to enter the market, they first pay the entry cost and receive their productivity draw. After they observe their productivity levels, firms decide next whether to produce (and export). If a firm decides to export, it pays the fixed export cost and starts to export. In subsequent periods, unless the current applied tariff rate and the degree of future trade policy uncertainty change, firms will not have any incentive to enter or exit the market.

When the current applied tariff rate and the degree of future trade policy uncertainty change, however, the original equilibrium no longer holds. Indeed, due to the changed payoffs facing existing and potential firms, the change in trade policy will trigger firm entries and exits. In turn, equilibrium is restored as the firm entries and exits bring the aggregate variables in line with the new equilibrium.

Given the timeline for firm decisions, the firm problem can be solved backward. First, conditional on given aggregate variables, the firm calculates its profits at varying tariff levels. Second, based on information on tariff levels and trade policy uncertainty, the firm calculates its present value of expected profits. Third, the firm compares export profits with the per-period fixed costs of export as it determines whether to export or not. Finally, potential entrants decide whether to pay the entry cost and to learn their productivity.

3.3.1 Firm Production in Each Period

Without loss of generality, we assume that foreign expenditure in each period, R, is given exogenously. We assume further that the home wage is fixed and normalized to unity.

Given tariffs charged by the foreign government, the variable profit the firm will earn is $v(\varphi) \equiv (\frac{p}{\tau} - \frac{1}{\varphi})q$. Profit maximization given CES preferences over varieties leads to the firm's pricing rule,

$$p(\varphi)=\frac{\sigma}{\sigma-1}\frac{\tau}{\varphi} \quad (2).$$

Consequently, the firm's variable profit is given by $v(\varphi)=(\frac{\sigma}{\sigma-1}-1)\frac{q}{\varphi}=\frac{\sigma}{\sigma-1}\frac{\tau q}{\varphi}\frac{1}{\sigma\tau}=\frac{r(\varphi)}{\sigma\tau}$.

Substituting the pricing rule, Eq. (2), into the firm's revenue function, Eq. (1), and the variable profit equation, we get, respectively,

$$r(\varphi)=R\left[\frac{\sigma-1}{\sigma}\frac{P\varphi}{\tau}\right]^{\sigma-1} \quad (3)$$

and

$$v(\varphi)=\frac{R}{\sigma}(\frac{\sigma-1}{\sigma}P\varphi)^{\sigma-1}\tau^{-\sigma} \quad (4).$$

Since all firms with the same productivity will charge the same price, the aggregate price index can be rewritten as $P=\left[\int_0^\infty p(\varphi)^{1-\sigma}M\mu(\varphi)d\varphi\right]^{\frac{1}{1-\sigma}}$, where $\mu(\varphi)$ is the p.d.f. of the productivity distribution for surviving firms. Substituting the pricing rule, Eq. (2), into the aggregate price, it becomes $P=\frac{\sigma}{\sigma-1}\frac{\tau}{\tilde{\varphi}}M^{\frac{1}{1-\sigma}}=p(\tilde{\varphi})M^{\frac{1}{1-\sigma}}$, where $\tilde{\varphi}\equiv\left[\int_0^\infty \varphi^{\sigma-1}\mu(\varphi)d\varphi\right]^{\frac{1}{\sigma-1}}$ is the average productivity of surviving firms.

When we substitute the aggregate price into Equations (3) and (4), each firm's revenue and variable profit become

$$r(\varphi)=\frac{R}{M}(\frac{\varphi}{\tilde{\varphi}})^{\sigma-1} \qquad (5)$$

and

$$v(\varphi)=\frac{1}{\tau\sigma}\frac{R}{M}\left[\frac{\varphi}{\tilde{\varphi}}\right]^{\sigma-1} \quad (6).$$

Similar to Melitz (2003), it is easy to derive the following conditions,

$$R = Mr(\tilde{\varphi}),\ V = Mv(\tilde{\varphi}), \text{ and } Q = M^{\frac{\sigma}{\sigma-1}}q(\tilde{\varphi})$$

where V is the total variable profit obtained by all participating firms.

3.3.2 Export Participation

A firm's export participation decision is based on its present value of variable profit and the fixed cost of export. The present value of variable profits for a firm with productivity, φ, is

$$v_p(\tau_t,\varphi) = v(\tau_t,\varphi) + \rho\left(\left(1-\lambda\right)v_p(\tau_t,\varphi) + \lambda E_\tau v_p(\tau_{t+1},\varphi)\right) \quad (7)$$

where the expectation term is taken based on the distribution of possible tariffs. Taking expectations on both sides, we have $E_\tau v_p(\tau,\varphi) = \frac{1}{1-\rho}E_\tau v(\tau,\varphi)$. Substituting this back into Eq. (7), the present value of profits becomes,

$$v_p(\tau_t,\varphi) = \frac{1}{1-\rho}\left(\delta_a v(\tau_t,\varphi) + \delta_E E_\tau v(\tau,\varphi)\right) \quad (8)$$

where $\delta_a = \frac{1-\rho}{1-\rho\left(1-\lambda\right)}$, $\delta_E = \frac{\rho\lambda}{1-\rho\left(1-\lambda\right)}$ and $\delta_a + \delta_E = 1$.

We note that terms in the right-hand brackets of Eq. (8) represent a weighted average of current variable profit based on the current tariff, τ_t, and the unconditional expected variable profit which accounts for the uncertainty regarding future tariff changes. If trade policy uncertainty rises, which is represented by an increase in the expected arrival rate, λ, the firm will increase the weight on the term for the expected variable profit, while decreasing the weight it places on its current profit that is based on currently applied tariffs.

Substituting the variable profit function, Eq. (6) into Eq. (8), we further simplify the present value of variable profit as

$$v_p(\tau_t,\varphi) = BRT_t\varphi^{\sigma-1} \quad (9)$$

where $B = \frac{1}{M\sigma(1-\rho)\tilde{\varphi}^{\sigma-1}}$ and $T_t = \delta_a\tau_t^{-1} + \delta_E E_\tau\left(\tau^{-1}\right)$.

To gain further intuition about the compound tariff term, T, note that this term depends on the current applied tariff, as well as an expected term related to the tariff distribution and the weights. Let us say that the applied tariff is relatively low, close to the lower bound of the distribution $H(\tau)$, so that τ_t^{-1} is relatively high and $\tau_t^{-1} > E_\tau(\tau^{-1})$.

The uncertainty facing exporting firms can now be summarized by two terms. The first term is the expectation term, $E_\tau(\tau^{-1})$. If the unconditional distribution of tariff is further away from the applied tariff, τ_t, then this expectation term is smaller. For example, if the tariff distribution follows a uniform distribution, then the larger is the upper bound of the tariff distribution, the smaller is this expectation term. In practice, as discussed in section 2, considering that the worst case scenario tariffs faced by Chinese firms in the US are the non-normal trade relation tariffs (non-NTR tariff) before WTO accession and a much lower WTO bound tariff after WTO accession, there is then a shift for the tariff distribution toward the applied low tariffs and thus the expectation term increases. In our empirical application, since the reductions of the worst-case scenario tariff differ across products, the variation in the expectation term is our main source of identification.

The second factor characterizing the level of trade policy uncertainty are the weights, δ_a and δ_E, which in turn depend on the arrival rate, λ, for trade policy shocks. Since we assume $\tau_t^{-1} > E_\tau(\tau^{-1})$, a larger arrival rate indicates a larger probability that tariffs will rise compared with the currently low applied rate. Thus, the compound tariff, T, is increasing in the arrival rate. In practice, China's WTO accession reduced the arrival rate characterizing the possibility of tariff increases since WTO membership guarantees MFN treatment. Thus WTO accession implies a decrease in the level of T. However, since the reduction in the arrival rate tied to MFN treatment is identical for all products, we cannot use this term to estimate the effects of uncertainty reduction on firm export decisions.

It is important to note that the term, RT_t, is the present value of expected revenue received by exporting firms.[16] Thus, changes in the compound tariff term translate directly into changes in the revenue received by firms.

[16] To see this, note that R/τ is the revenue received by firms in each period (exclusive of tariffs).

A firm starts to produce and export if the expected profit of exporting is greater than zero. I.e. for firms with expected profit of exporting, $\pi_p(\tau_t, \varphi) = BRT_t\varphi^{\sigma-1} - M^\eta f/(1-\rho),$ the productivity cutoff, φ^*, can be determined as

$$\pi_p(\tau_t, \varphi^*) = 0 \; or \;\; \varphi^{*\sigma-1} = (M^\eta f)/((1-\rho)BRT_t) \qquad (10).$$

3.3.3 Entry Decision and Equilibrium

Given the cutoff productivity, the productivity distribution for surviving firms is given by,

$$\mu(\varphi) = \begin{cases} \frac{g(\varphi)}{1-G(\varphi^*)} & if \; \varphi \geq \varphi^* \\ 0 & if \; \varphi < \varphi^* \end{cases}.$$

Accordingly, the average productivity is given by

$$\tilde{\varphi} = [\frac{1}{1-G(\varphi^*)}\int_{\varphi^*}^{\infty}\varphi^{\sigma-1}g(\varphi)d\varphi]^{\frac{1}{\sigma-1}}$$

Let $\bar{\pi}_p = \pi_p(\tau_t, \tilde{\varphi})$ denote the average export profit for surviving firms. Free entry requires the expected value of export activity based on potential productivity draws to equal to the entry cost,

$$0 * G(\varphi^*) + \bar{\pi}_p * [1 - G(\varphi^*)] = f_e$$

The free entry condition (FE) can then be rewritten as

$$\bar{\pi}_p = \frac{f_e}{1-G(\varphi^*)}. \qquad (11)$$

Note that $\bar{\pi}_p = v_p(\tau_t, \tilde{\varphi}) - M^\eta f/(1-\rho)$ and $\frac{v_p(\tau_t,\tilde{\varphi})}{v_p(\tau_t,\varphi^*)} = (\frac{\tilde{\varphi}}{\varphi^*})^{\sigma-1}$, a second relation between the average profit and cutoff productivity level, the zero cutoff profit condition (ZCP), can be derived as

$$\bar{\pi}_p = M^\eta f k(\varphi^*)/(1-\rho), \qquad (12)$$

where $k(\varphi) = (\frac{\tilde{\varphi}(\varphi)}{\varphi})^{\sigma-1} - 1.$

The free entry condition (FE) and the zero cutoff profit condition (ZCP) here are almost identical to the ones derived in Melitz (2003), except that the mass of exporting firms positively affects fixed export costs. Thus, given the mass of firms, M, there exists a unique solution for the average profit and the cutoff productivity. Since the solutions are functions of the mass of firms, $\bar{\pi}_p(M)$ and $\varphi^*(M)$, Appendix A1 shows that these functions are increasing in the mass of firms, M.

To solve the equilibrium mass of firms, we recall the present value of variable profit, Eq. (9). It implies that the variable profit for the average productivity firm is

$$v_p(\tau_t, \tilde{\varphi}) = \frac{RT_t}{(1-\rho)M\sigma}. \qquad (13)$$

Consequently, the average profit is given by the following condition, which we name as the "market clearing condition" (or MC),[17]

$$\bar{\pi}_p = v_p(\tau_t, \tilde{\varphi}) - \frac{M^\eta f}{1-\rho} = \frac{1}{1-\rho}\left(\frac{RT_t}{M\sigma} - M^\eta f\right) \qquad (14)$$

Eq. (14) defines another relation between the average profit $\bar{\pi}_p$ and the mass of firms, M. In this equation, the average profit is a decreasing function in the mass of firms.

Thus there exists a unique pair of firm mass, M, and average profit, $\bar{\pi}_p$ which solves Eq. (11), (12) and Eq. (14). The cutoff productivity, φ^*, is also jointly determined when the mass of firms, M, is determined.

An important implication of the equilibrium solution is that, when there are reductions in trade policy uncertainty, or more specifically when the worst-case tariff, $\bar{\tau}$, declines, the expectation term $E_\tau(\tau^{-1})$ rises and the compound tariff term, T_t, rises as well. Recall that the term, RT_t, the expected level of firm revenue, implies that an increase in T_t will shift the downward sloping MC curve up, in Eq. (14). Therefore the equilibrium is characterized by a larger mass of firms and a higher average profit. In turn, a higher average profit encourages more firms to enter into the market. Finally, restoration of the relationship given in Eq. (11), requires an increase in the cutoff productivity, φ^*.[18]

[17] It is named "market clearing" condition following Melitz (2003). Essentially, it is equivalent to the equation $\Pi = M_e f_e$, where Π is aggregate profit and M_e is the total number of potential entrants.
[18] When the current applied tariff rate is low compared with the worst case tariff, decreases in the arrival rate, λ, or a reduction in the applied tariff will have similar effects, since either change will increase T_t.

Our model predicts that reduced trade policy uncertainty will lead to an increase in the mass of firms exporting to the foreign market.[19] However, as the mass of exporting firms increases the fixed cost of exporting faced by each exporter, the cutoff productivity increases. As a consequence, some of the lower-productivity incumbent exporting firms can no longer survive and have to exit the export market. Therefore when trade policy uncertainty declines, our model predicts that we will observe export entry by more productive firms (new entrants with productivity level above the increased new cutoff productivity) at the same time that some less productive incumbent firms exit from export (incumbent firms with productivity between the old and the new cutoff productivities). This market reallocation outcome is the key prediction we test, when we turn to our data.

4. Data and Empirical Results

Our theory predicts that trade policy uncertainty reductions will lead to a larger mass of exporting firms. In turn, due to general equilibrium effects, the cutoff productivity for continued export will increase, driving some of the lower-productivity incumbent exporting firms out of the export market. Thus, in this section we empirically test whether trade policy uncertainty reductions due to China's WTO accession led to firm entries and exits that meet with our predictions.

4.1 Data

Our empirical analysis uses China's transaction-level customs data, which track the universe of exports by Chinese firms for years 2000-2006. The dataset provides detailed information including firm identifiers, product codes (8-digit codes which we aggregate to the internationally comparable 6-digit HS codes), destination country (we only make use of the exports to the United States and European Union countries), transaction value and quantity.[20]

We obtain non-MFN tariffs from Feenstra, Romalis and Schott (2002) while we collect the bound tariff data from the WTO website. The WTO website also provides the applied tariffs which we use in our study as well.

[19] In a model without uncertainty Caliendo, Feenstra, Romalis and Taylor (2015) are the first to note that tariff reductions can lead to entry.

[20] We restrict our attention to China-US trade because the worst-case tariff before China's WTO accession is only readily available for the U.S. However, in the robustness section, we also use China's export to the EU countries to serve as a control group.

We measure the trade policy environment using three variables. These variables are the average applied import tariffs (τ_h, or avt), the change in the applied import tariffs ($d\tau_h$, or dat), and the change in tariff uncertainty ($dgap_h$). Tariffs are measured at the HS 6-digit product level.

The first tariff variable, τ_h, measures the average U.S. tariff rate which was applied to imports of product h between 2000 and 2002. The variable, $d\tau_h$, is constructed by subtracting the applied tariff rate in 2002 (after China's WTO accession) from the tariff rate applied tariff in 2000 (prior to China's WTO accession). Positive values of this measure imply that Chinese exporters benefitted from reduction in applied tariffs. Finally, if we define gap as the difference between the worst-case tariff and the applied tariff in a given year, the reduction in uncertainty, $dgap_h$, is then defined as $dgap_h = (gap_{2000}, before\ WTO\ accession) - (gap_{2002}, after\ WTO\ accession)$. Positive values of $dgap_h$ indicate that trade policy uncertainty was reduced.[21] Summary statistics in Table 2 provide information on tariff levels, tariff changes and the degree of uncertainty reduction that followed China's WTO entry.

Before we turn to estimation, we check raw correlations to check whether the changes in China's U.S.-destined exports were consistent with an explanation based on uncertainty reduction. To this end, we assign each product to one of the four uncertainty groups based on the degree of uncertainty reduction. Products that had no change in uncertainty were assigned to the group one (Duncert1). This group accounts for about 15% of all HS 6-digit products. All remaining products are assigned to three groups, Duncert2 to Duncert4. Of the products with non-zero changes in trade policy uncertainty, 1/3rd of the goods had the smallest reductions in uncertainty and were assigned to the group Duncert2. Similarly, 1/3rd of the goods with medium reductions in tariff uncertainty were assigned to group Duncert3, and the last 1/3rd with the largest reductions in tariff uncertainty were assigned to the group Duncert4.[22]

If uncertainty reduction influenced export decisions, we should observe that China's export growth was most pronounced for products which benefitted from the largest reductions in trade policy uncertainty. Consistent with this prediction, Figure 4 shows that the largest growth in trade value and in the number of exporting firms was in the group of firms (Duncert4), which benefited the strongest reductions in tariff uncertainty.

[21] If we construct our tariff measures replacing 2002 with later years in the 2002-2006 interval the tariff measure changes only slightly, since U.S. tariffs were stable during this period.
[22] Specifically, group one includes all products whose $dgap_h$ was zero. The values for $dgap_h$ for products in Group 2 ranged from 2.2 to 29.5 percentage points, while the value for products in Group 3 spanned from 29.5 to 40.1 percentage points. The value exceeded 40.1 percentage points for products in Group 4.

As we formed our dataset, we constructed two measures of fixed export costs. The first is constructed based on the China's manufacturing survey data, and is given as the fixed assets of exporting firms.[23] In particular, it is the weighted average of total fixed assets per 1000 RMB sales across firms exporting the good, where each firms' share in the exports of the good are used as weights. While this measure does not directly measure fixed export costs, Castro, Li, Maskus and Xie's (2013) work on the fixed cost of exporting indicates that fixed costs of exporting are correlated with such firm characteristics.

For a second measure of fixed export costs, we construct the intermediary share of exports as a proxy for fixed costs of exporting.[24] The intermediary share of exports, *imshare*, is calculated as the intermediary export value as a share of the total export value for each product in 2006. Our use of *imshare* is motivated by the work of Ahn, Khandelwal and Wei (2011) and Bernard, Grazzi and Tomasi (2012), which show that the intermediary share of trade is higher for markets that are more costly to enter. To avoid endogeneity while ensuring that the market conditions are similar to those of the U.S., we use China's exports to non-US G7 countries to construct our product-level measures of the intermediary share.

4.2 Baseline Results: Impacts and Reallocation

Our baseline regression estimates

$$\mathrm{dlnEXNum}_{\mathrm{mh}} = \alpha + \beta_1 \mathrm{dgap}_{\mathrm{h}} + \beta_2 \mathrm{d}\tau_{\mathrm{h}} + \beta_3 \tau_{\mathrm{h}} + \beta_4 \mathrm{f}_{\mathrm{h}} + \alpha_{\mathrm{hs2}} + \varepsilon_{\mathrm{h}} \quad (15)$$

The dependent variable is the change of log number of exporting firms in margin *m* for product *h*. As our focus is the extensive margin adjustment, we primarily study the new entrant and exiter margins.

The exact definition of the dependent variable varies across margins. Since the new entrant margin is zero by definition in year 2000, the variable $\mathrm{dlnEXNum}_{\mathrm{mh}}$ is the log number of new entrants for product *h* in year *t* after WTO accession. In later regressions, our new entrant margin is further divided into new exporter and adder margins. The dependent variables for these margins are defined similarly. In contrast, the dependent

[23] For details about this dataset, see Feng, Li and Swenson (2015).
[24] We define a firm as an intermediary firm if the firm data had at least one of the two following indicators: 1) if its Chinese name includes characters such as international trade, import, export, shopping mall, supermarket, commercial, etc, as in Ahn, Kandwall and Wei (2011), and/or 2) if the firm was observed in China's 2008 enterprise census and the census categorized the firm as a wholesaler or retailer.

variable for the exiter margin is the log number of firms, which are categorized as exiters by year *t* following China's WTO accession, for product *h* in year 2000.

Trade policy variables were constructed following the definitions introduced earlier in this section. Our main variable of interest is $dgap_h$, which measures the trade policy uncertainty reduction for product h. Since our model predicts that reductions in trade policy uncertainty will lead to exports by new entrants, we expect $\beta_1 > 0$. In other words, since positive values of $dgap_h$ indicate that firms faced reduced uncertainty following China's WTO accession, we expect the improved environment to increase export activity. Our next important variable, $d\tau_h$, captures changes in applied tariffs; positive values of this measure capture the magnitude of decreases in applied tariffs. Thus, our model predicts $\beta_2 > 0$, since applied tariff reductions have similar effects as decreases in trade policy uncertainty. Finally, we include the average tariff level, τ_h, to control for the possibility that tariff levels may have affected the cutoff productivity and therefore the number of new firms entering the market.

In our estimation equation, we include at least one of the two measures of fixed export costs defined earlier: the average fixed asset to sales ratio for exporting firms, and/or the product-level intermediary share of exports. The reason for including fixed costs is that, as shown in Eq. (10), fixed export costs are related to the cutoff productivity level. In particular, industries with higher fixed costs have a higher cutoff productivity. If the lower end of the productivity distribution is more densely populated with smaller firms then the number of new firms entering the market may be larger in low fixed cost industries than in high fixed cost industries when trade policy uncertainty declines. We expect a negative coefficient on this variable, i.e., $\beta_4 < 0$. Finally, to control for industry-level economic factors that affect the level of new exports, we include HS 2-digit fixed effects.

Table 3 provides the first set of results. Beginning with column 1 we regress the log number of new entrants in 2006 on our trade policy variables: uncertainty reduction (*dgap*), the applied tariff reduction (*dat*) and the average tariff (*avt*). All standard errors are clustered at HS 2-digit level in Table 3 and in all subsequent regressions. We find that uncertainty reduction had a positive and significant effect on the growth of the number of new entrants, while the average tariff and the applied tariff reductions did not have significant effects.

In column 2, we add our measure of export fixed costs, average fixed assets to sales ratio for exporters, to the regression. As expected, we find that the coefficient on the fixed cost measure is negative and highly significant. However, the inclusion of fixed cost measure does not affect the sign or the significance of the coefficient on our uncertainty reduction measure, although the magnitude is slightly smaller. In column 3, we add the second fixed cost measure, the intermediary share of exports. Now both measures of export costs have the expected negative coefficients, while our estimated effect of uncertainty reductions continues to indicate that declines in trade policy uncertainty contributed to the growth of the number of new entrants.

In columns 4-6 of Table 3 we move to the full estimation equation that adds HS 2-digit fixed effects to the specification. The inclusion of these fixed effects is warranted first, if there is any concern that the fixed asset and intermediary share variables are imperfect measures of the fixed costs of exporting. The inclusion of HS 2-digit fixed effects is also desirable if there are sector-specific unobserved factors or trends that affected the extent of new entries by sector. In addition, to check whether our estimated coefficient magnitudes are sensitive to our choice of time frame, we examine three time periods: 2000 to 2002, to 2004 and to 2006, respectively. As we move across time horizons, our dependent variable (though not our independent variables) is updated accordingly.[25]

Comparison of columns 3 and 6, both of which reflect the 2000 to 2006 time horizon, shows that the inclusion of HS 2-digit fixed effects causes the estimated coefficient on uncertainty reductions to decline in magnitude. However, both estimates remain highly significant. In addition, if we compare the coefficient magnitudes across different time horizons (through comparison of the coefficients in columns 4 through 6), we note that the estimated coefficient on uncertainty reduction grows as we move from the two-year window to the four or six year interval. Thus, it appears that the full response to trade policy uncertainty reduction took a number of years to complete.

Similar to columns 4-6 in Table 3, Table 4 reports results when the new entrant margin is further divided into new exporter (columns 1-3) and adder margins (columns 4-6). Applying our basic estimation equation to these two margins separately, the estimates uniformly show that the intensity of new entrant activity, whether due to the activities of new exporters or adders, was greatest for products that experienced larger reductions in trade uncertainty.

[25] Updating independent variables would not affect the results since the applied tariffs and the worst case tariffs did not change meaningfully in the period following China's WTO accession.

There is one noticeable difference between the new exporter margin and the adder margin, however. In particular, in later years (2004 and 2006), uncertainty reduction had a larger impact on the new exporter margin than it did on the adder margin. The growing response of new exporters is intuitive, as we expect the time involved in adding new export products by existing exporters might be shorter than the time involved in making a fresh entry to export.

In columns 7-9 of Table 4, we turn to the exiter margin. Similar to findings on the new entrant margin, our results also show that larger magnitude reductions in tariff uncertainty were positively correlated with the strength of export destruction through the disappearance of Chinese exporters who had formerly been active in the U.S. market in 2000. Moreover, the magnitude of export destruction grew, as we move from the two-year estimation window to longer intervals.

One concern regarding our results is that they might be driven by some special fast-expanding industries. For example, Amiti and Freund (2010) notes that between 2000 and 2006 Chinese exports shifted substantially away from low-tech products towards high-tech products. Alternatively, Khandelwal, Schott and Wei (2013) shows removal of quotas on Chinese textile and clothing exports and related institutional changes in China caused China's textile and apparel exports to grow at a high pace. To check whether our results are mainly driven by these special industries, we run regressions for a subset of sectors excluding the high-tech machinery and instrument sector and previously quota-restricted textile and apparel sector. We find similar results to those in Table 4 for this subsample (see Appendix Table 3), and thus conclude that our results are not restricted to these particular sectors.

In sum, we provide evidence on the simultaneous export entry and export exit effects predicted by our model, since we find that the strongest changes on both the export entry and exit margins were noted in the product sectors which experienced the greatest reductions in tariff policy uncertainty.

4.3 Robustness

As we evaluate our baseline regression it is important to ask whether there were omitted factors that were correlated with uncertainty reduction, which might have also affected export entry and exit by firms. In our initial regressions, we include variables such as applied tariff level, changes in applied tariff, measures of fixed costs and even HS 2-digit fixed effects to control for other confounding factors. However, to address the relevance of omitted variable bias, we employ the technique of using a control group which was not subject to comparable uncertainty reduction during our sample period. Thus, we study and compare the outcomes of U.S. and the control group. One candidate for the control group is the European Union. In contrast to the United States, the European Union granted permanent MFN status to China long before 2000 (in 1985).[26] China's accession to the WTO, therefore, had little effect on either the applied tariff or the policy uncertainty of the EU imports from China.

We thus take Chinese exports to the EU countries and the US to form a sample and estimate the following specification:[27]

$$dln\mathrm{EXNum}_{\mathrm{mhct}} = \sum_{j=2001}^{2006} \beta_j 1\{j=t\}1\{c=us\}dgap_h + \sum_{j=2001}^{2006} \delta_j 1\{j=t\}1\{c=us\} + \sum_{j=2001}^{2006} \gamma_j 1\{j=t\}1\{c=us\}X_h + \delta_{ht} + \varepsilon_{hct} \quad (16)$$

The definition of the dependent variable for each margin m is similar to our previous regressions, though it is now separately derived for each country c. The triple interaction term between the uncertainty reduction, $dgap_h$, the indicator for the US, $1\{c = us\}$, and year dummies, $1\{j = t\}$, is our coefficient of interest. This coefficient indicates whether differences in the U.S. realizations of the dependent variables compared with those for the EU countries in year t were correlated with our measures of U.S. tariff uncertainty reduction.

To see the value of this estimation approach, suppose there is a variable that is correlated with uncertainty reduction and also affects the dependent variable. Through our use of a control group, we are now able to account for effects that might be driven by factors such as Chinese industrial policies, technological advances, or any other variables originating from China which affected trade outcomes, and might also be correlated with trade policy uncertainty reduction. As long as these omitted factors had a common effect on trade, regardless of destination, our strategy will provide unbiased estimates of $\beta_j s$.

Nonetheless, to provide further certainty, we include further triple interaction term, $1\{j = t\}1\{c = us\}X_h$, which explicitly controls for some observable factors. In this term, X is an array of product specific characteristics. In our reported results, we include the

[26] http://europa.eu/legislation_summaries/external_relations/relations_with_third_countries/asia/r14206_en.htm
[27] The derivation of this estimation equation can be found in Appendix A2.

applied tariff level, the change of the applied tariff and the measures of fixed costs in the vector *X*.

Finally, as we now have introduced cross-country variation, we can include much stronger fixed effects in the estimation equation. In contrast with Eq. (15), which included controls for HS 2-digit fixed effects, now we include HS 6-digit *product*year* fixed effects. HS 6-digit *product*country* fixed effects are also implicitly included, as shown in Appendix A2.

Before we turn to the estimation results, two important points should be noted. First, although there is no policy uncertainty reduction in the EU market, our identification is based on the assumption that the uncertainty reductions in the US market have *no* impact on the EU outcomes. This assumption might be violated if there were spillover across markets. I.e., multi-market firms' views of the benefits of serving the EU market might be influenced by developments in the U.S. market (for example due to capacity constraints).

Although this is a valid concern, if present, it will lead to a *downward* bias to our estimated coefficients. Thus, this additional factor, if present, will not invalidate our results. However, to alleviate concerns about cross-market spillovers, in our EU sample of firms, we drop all firms that also exported to the US market.

Second, we need to take care in selecting our control group countries, so any omitted variables would have the *same* impacts on the US as on the control group countries. First, we limit our definition of EU countries to countries that were EU members by the year 2000.[28] Next, to provide a more stringent control group, we create a second country group with includes the EU members with import structures that were the most similar to those of the US. Based on the import structure similarity index introduced in Appendix A3, the stringent EU control group includes the United Kingdom, France and Germany.

Table 5 shows the results when we use the full EU sample. Columns 1-4 are for the new entrant margin and 5-8 for the exiter margin. For parsimony, we only report the coefficients for the triple interaction term between uncertainty reduction, $dgap_h$, the indicator for the US, $1\{c = us\}$, and the year dummies, $1\{j = t\}$.

As shown in column 1, the coefficients are positive and highly significant for all years. It indicates that, for products experienced larger uncertainty reductions, there are an even greater number of firms entering into the US market than the number of new

[28] These countries are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

entrants for the EU market. In other words, changes in U.S. trade policy uncertainty differentially affected China's exports to the U.S., compared with China's exports to the EU. Moreover, the coefficient grows over time, consistent with results reported in Table 3, which implies that the export effects stimulated by developments in trade policy uncertainty take time to be fully realized. These patterns are preserved when we include more control variables in the vector *X*, as shown in columns 2 to 4. Finally, when we turn to the exiter margin, columns 5-8, we find the coefficient of the triple interaction terms positive and highly significant. This again confirms the findings in Table 4.

Due to our concerns about the use of the full EU sample as a control group for the US, we also ran our robustness check on the more stringently selected control groups which encompasses the United Kingdom, Germany and France. Table 6 reports the results we attain when we use this control group instead. We observe here that the coefficients of the triple interaction terms become slightly smaller than those in Table 5. Nonetheless, the coefficients, whether for the new entrant margin or for the exiter margin, remain positive and highly significant, giving us further confidence that our coefficient results are not driven by omitted variable bias.

5. Uncertainty Reductions and a more Competitive Market

Our theory predicts that following reductions in tariff policy uncertainty, some exporting firms will be driven out of the market due to the effects of market congestion on the costs of export. Moreover, the theory is clear that the firms which are induced to leave the export market, will have lower productivity compared with the new export market entrants. While section 4 has confirmed the presence of strong reallocation effects tied to product-level tariff uncertainty reduction, we now turn to the second prediction. In particular, we now seek to confirm whether the new export entrants were more productive than the exiting exporters and whether tariff uncertainty reduction intensified market competition.

To address these questions, we now compare the price and the quality of HS 6-digit products sold by new exporters and exiting exporters in the US market.[29] Further, we analyze whether there were any differences between the characteristics of goods sold by the two groups of firms, and whether the differences were related to uncertainty reduction.

[29] We also provide a comparison on the transaction characteristics of exporting adder firms and export exiters in Appendix A4, which highlights similar reallocation effects on prices and qualities.

Finally, although our comparison of the price and quality of exported goods shipped by new exporters and export exiters provides indirect evidence on the relative efficiency of these two types of firms, price and quality are not direct measures of firm productivity. Thus to provide direct evidence on this topic, we also compare the productivities of new exporters and export exiters in Appendix A5.[30] There, consistent with the price and quality results presented in this section, we further document that new exporters were generally more productive than were exiting exporters.

5.1 Price

We begin by testing whether the degree of uncertainty reduction had an influence on aggregate product prices. If the reallocations due to uncertainty reduction intensified competition, we expect smaller aggregate price increases in products that experienced larger declines in trade policy uncertainty.

In this exercise we first calculate the weighted average price for each HS 6-digit product *h* in each year *t* across all firms exporting the product, using each firm's export quantity share, θ_{fht}, as weights, $\overline{P}_{ht} = \sum_f \theta_{fht} p_{fht}$. In this expression firm export quantity shares are given by $\theta_{fht} = q_{fht} / \sum_f q_{fht}$, where the quantity of product *h* exported by firm *f* in year *t* is q_{fht}. We then compute the percentage change in average product price for each product *h* between year *t* and year 2000, using the formula $\Delta\bar{P}_{ht} = (\bar{P}_{ht} - \bar{P}_{h2000})/\bar{P}_{h2000}$. In the final step we regress the product price change measures on the product-level measures of uncertainty and applied tariff reductions.[31]

Table 7 displays the results for the regressions of product level price changes between 2000 to year *t* (*t*=2002, 2004 and 2006) on the magnitude of trade policy uncertainty reductions. For reference, column 1 of Table 7 regresses our measures of product price changes on a constant only, to uncover the average change in unit export

[30] Due to a number of practical considerations, TFP comparison involves a subset of the firms from our full sample of trade transactions. First, estimating TFP requires data that are collected through China's manufacturing census and thus we are only able to provide TFP measures for manufacturing firms. Second, before we estimate TFP for manufacturing firms, through firm-level information contained in the Chinese manufacturing census dataset, we must first match the firms with the custom's data, which use a different set of numerical identifiers. (For details of the manufacturing census dataset, TFP estimation and matching of datasets see Feenstra, Li and Yu (2014) and Feng, Li and Swenson (2012)). The third and most important problem with using TFP estimates for this project is that the TFP measures are firm-specific as is standard in the literature, rather than market or product specific. Since firms may export multiple products and a single firm may have different productivities for the products it produces, the use of a single productivity estimate, TFP, for all products produced by the same firm, masks important information of firm productivity at product level. Since we are unable to compare firm efficiency at product level using TFP, as we do using prices and qualities, we relegate our TFP results to the appendix.

[31] We drop products whose prices change measures were either below the first or above the ninety-ninth percentile.

prices for all products. We find that average product prices increased by roughly 29% between 2000 and 2002. When we add the trade policy measures to the regression, our results in column 2 reveal a negative and significant coefficient on uncertainty reductions, which indicates that products that experienced larger tariff uncertainty reduction were characterized by smaller price increases. If we apply this regression framework to the longer time spans running to 2004 or 2006, the data reveal the same dampening effect of uncertainty reductions on export product prices.

The Table 7 observation that products that experienced larger tariff uncertainty reductions were characterized by smaller unit export price increases, could arise if market reallocation induced entry by more productive new exporters, who were capable of exporting products at lower prices than were the firms that decided to exit from export. To search for evidence of this mechanism, we compare the product-level prices charged by new exporters with the prices charged by exiting exporters.

Since new exporters and exiters do not coexist in any year, the comparison involves a comparison of new exporter prices in a post-entry year *t* (*t*=2002, 2004 and 2006) with the prices of exiters in year 2000, prior to their exit from export. We thus pool new exporters and exiters in a single sample and then run the following regression:

$$lnp_{foh} = \alpha + \beta_1 1\{NewExp\}_f + \beta_2 1\{NewExp\}_f dgap_h + \beta_3 1\{NewExp\}_f d\tau_h + \delta_h + \delta_o + \varepsilon_{foh} \quad (17)$$

where lnp_{foh} is the log price of product *h*, sold by firm *f* of ownership type *o*. As stated above, the dependent variable is the log price in year *t* for new exporters, but the log price in 2000 for exiting firms. The dummy variable, $1\{NewExp\}_f$, is an indicator which denotes whether a firm is a new exporter. While this variable is likely to capture differences related to firms by age cohort, it also captures differences that arise due to the fact that our observation of firm prices for export exiters are necessarily observed at a point in time prior to our observed prices for new entrants. The interaction terms interact the new exporter indicator variables with the product-level policy variables capturing reductions in tariff uncertainty and the applied tariff. To account for inherent product-specific variation in prices we include HS *6-digit* product fixed effects. In addition, to capture any systematic price variation that is due to the form of firm ownership, we also include fixed effects for the different forms of ownership.

Our new regressions, which are reported in Table 8, test whether new exporters' products had lower prices than the products previously exported by exiting exporters, and whether any differences were related to products-level reductions in uncertainty. The first set of results, included in columns 1 and 2, are based on comparison of new exporters who did not export in 2000 but appeared by 2002, with exiters who exported in 2000 but ceased export by 2002. The coefficient on the new exporter indicator variable in column 1 is negative and highly significant, which demonstrates that controlling for product fixed effects, new exporters' prices in *2002* were lower than the exiters' export prices in *2000*.

This result is strong and surprising since we would generally expect to see some price inflation over the two-year interval. Indeed, as shown by column 1 of Table 7, average export prices rose between 2000 and 2002. Thus, the negative coefficient in column 1 of Table 8 suggests that, on average new exporter charged lower prices in 2002 than did the average exiters in 2000. Taken together, the relatively low prices offered by new exporters reflect an even larger price gap if one accounts for the inflation that took place over the two-year interval.

Column 2 of Table 8 augments the regression with policy interaction terms. Further, since firms of different ownership may charge different prices, we also add firm ownership fixed effects to the regression. The coefficient on the regressor that interacts the new exporter dummy with tariff uncertainty reduction is negative and highly significant. This suggests that new exporters charged lower prices than exiters, and that the price difference war particularly pronounced for products that experienced larger tariff uncertainty reduction.

To check the robustness of our results, we perform a second set of comparisons, which define new entry and exit using changes between 2000, and the later years 2004 and 2006. Since the comparisons extend across a larger number of years, it is not surprising that columns 3 and 5 now suggest that new exporter unit values, controlling for HS6 product effects, were higher on average than the export prices charged in 2000 by firms that exited from export. Since these prices were observed four to six years after 2000, they would have been affected by any underlying inflation in China’s production costs. Nonetheless, the relative price premium for new exporters relative to exiters' 2000 prices (4.2% in 2004 and 18% in 2006) is small relative to the export price inflation that was revealed in Table 7 (48% in 2004 and 72% in 2006). More important, if we add interactions between the tariff policy uncertainty reduction and the new exporter dummy, our result show that products which experienced larger policy uncertainty reductions had lower relative prices charged by new entrants when compared with exiter prices than products that experienced smaller changes in policy uncertainty. Thus, our results suggest that, due to the role of policy uncertainty reduction in encouraging entry by new exporters who charged relatively lower prices, uncertainty reductions increased market competition.

5.2 Quality

Although we conjecture that the lower price of new entrants relative to exiters were driven by higher productivity, an alternative explanation could be that the lower price for new exporters arose since new exporters chose to produce and sell lower quality products. To investigate whether this alternative is consistent with the data, we adopt the approach used by Khandelwal, Schott and Wei (2013) to gain evidence regarding the relative quality of exports that were sold by new exporters compared with the quality provided by firms that exited from export.

Following Khandelwal, Schott and Wei (2013), we incorporate the quality levels in the utility function and use data on sales to estimate quality levels. For this exercise, we assume the CES utility function: $U = (\int (\eta q)^{\frac{\sigma-1}{\sigma}} d\omega)^{\frac{\sigma}{\sigma-1}}$, where η represents the quality of the variety. The demand function for each variety is then $q = \eta^{\sigma-1} p^{-\sigma} P^{\sigma-1} Y$, where p is the variety's price, P is the aggregate price level and Y is the aggregate expenditure on the good. Taking logs of the demand equation, we obtain $lnq = -\sigma lnp + \ln(P^{\sigma-1}Y) + (\sigma-1)ln\eta$. This provides us with the following regression specification,

$$lnq_{fht} = -\sigma lnp_{fht} + \alpha_{ht} + \mu_{fht}$$

which applies to individual firm f exports of HS 6-digit products, h. In this regression equation product-year fixed effects, α_{ht} capture the effects of aggregate price (P), aggregate expenditure (Y) as well as other year specific unobservable that generally affect product-level export costs or demand.

Following estimation of the demand equation, we could potentially back out the quality levels using the estimated residual $\eta_{fht} = e^{\hat{\mu}_{fht}/(\sigma-1)}$. However, since we plan to compare quality differences across firms *within* the same HS 6-digit product and the estimation for quality is performed for *each* HS 6-digit product, we could simply use the estimated residual term as the measure of quality. That is, for a pooled sample of new exporters and exporting exiters, we regress the estimated residual term, which we call "quality", on the new exporter dummy and its interactions with our measure of tariff uncertainty reduction and/or the applied tariff reduction. The specification for this regression is identical to Eq. (17), but with the dependent variable replaced by our firm-product quality measures derived from estimation of the demand equation.

Table 9 displays the quality regression results. Columns 1, 3 and 5 show that the quality of products exported by new exporters exceeded the quality of exports shipped by exiters, regardless of the time horizon we use for comparison. In columns 2, 4 and 6 we do not find that the magnitude of the quality premium provided by new exporters was related to the magnitude of the trade policy uncertainty reduction. Nonetheless, since our evidence suggests that new exporters provided higher, not lower, quality exports, we do not believe the lower prices associated with new firm exports were attributable to a choice to provide new exports of inferior quality. Instead, our results suggest that new exporters were more productive, produced higher quality goods and charged lower prices than exiting exporters. In turn, this trend may explain Mandel's (2013) observation that U.S. exports from other countries responded to Chinese competition by reducing mark-ups by a magnitude of 30%, and increasing marginal costs by 50% (presumably in a move to provide distinctly higher quality products compared with China).

Combining the results in Table 8 and Table 9 with the fact that market share reallocations associated with the activities of new exporters and exiting exporters were the most important driver of changes in extensive margin market share reallocation, shown in Table 1, we find that trade policy reductions induced the reallocation of export market share from high-price low-quality exiting exporters to low-price high-quality new exporters. Moreover, products which experienced larger policy uncertainty reductions had lower relative prices charged by new entrants when compared with exiting exporter prices, than was the case for the relative price differences for products that experienced smaller changes in tariff policy uncertainty. Taken together, these features of China's export market reallocation suggest that reductions in tariff policy uncertainty intensified product market competition.

6. Conclusion

In this paper, we document two salient features of Chinese exports to the United States in the early 2000's. The first notable feature is that at the fine product-level there was a dramatic reallocation of export activities across firms following China's WTO accession. In particular, within product-level export liness, substantial export market share expansions by new exporters coincided with similar magnitude export market share losses by exiting exporters. The second important development at this time was the sizeable reduction in U.S. trade policy uncertainty which was provided by China's WTO entry in 2001.

We argue that these two facts are related since these aggregate reallocations can be explained by the reductions in trade policy uncertainty. To make the connection explicit, we develop a model of heterogeneous firms which incorporates trade policy uncertainty. Due to general equilibrium effects that operate through changes in the mass of exporting firms, our model generates simultaneous export entries and exits by firms within sectors when trade policy uncertainty is reduced – a reallocation effect on which current literature is typically silent.

Empirically, we exploit the rich firm-level Chinese Customs dataset to test how the uncertainty reductions associated with China's WTO entry contribute to exporter dynamics. We find very strong export entry and exit responses by firms, in response to reductions in trade policy uncertainty. More importantly, when we compare the price and quality of exported products for new exporters versus exiting exporters, we find strong evidence that the new exporters charged lower prices even though they exported higher quality goods than did exiting exporters. Further, the degree to which new exporter prices were lower than those of exiters was larger for products that experienced larger uncertainty reductions.

When considered as a whole, our results suggest that tariff policy uncertainty reductions contributed to the aggregate reallocation of Chinese exports. In particular, tariff uncertainty reduction led to churning at the fine product level, and encouraged the entry of high-productivity low-price new exporters at the expense of low-productivity high-price exiting exporters. Overall, since trade policy uncertainty reduction for Chinese exporters may have intensified the competitiveness of China's U.S. exports, through increased quality and reduced prices, this change in policy may help explain the potency of the effects of China's increased exports to the U.S. on the US manufacturing sector and labor market.

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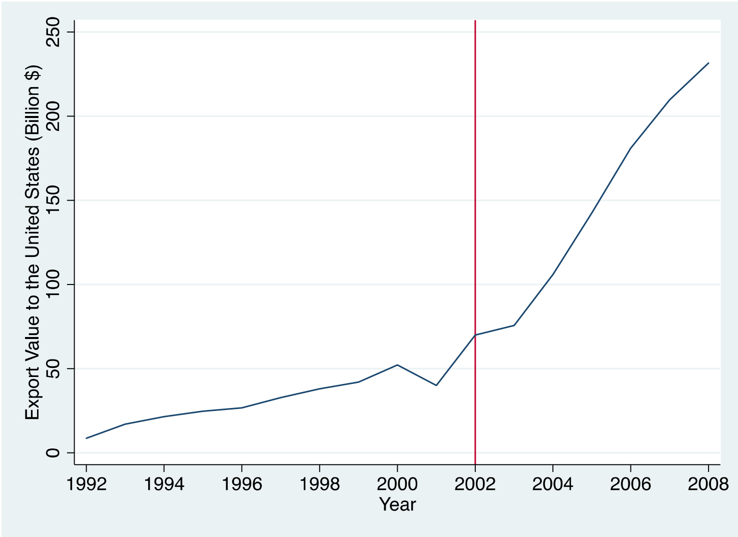
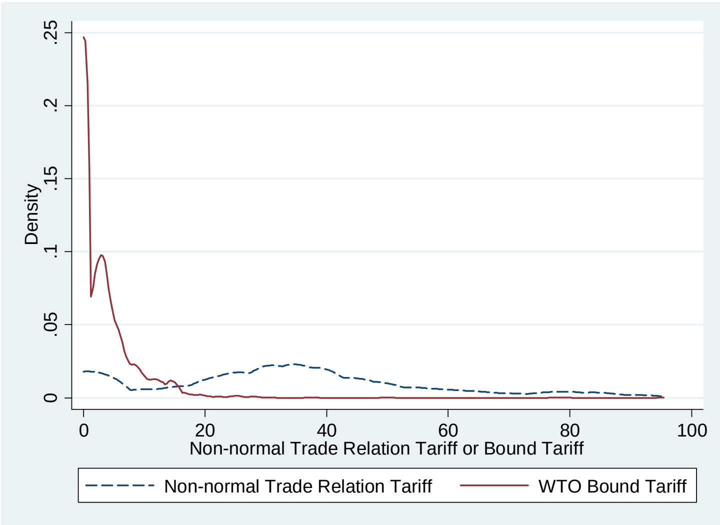
Figure 1: China's Exports to the United States, 1992-2008



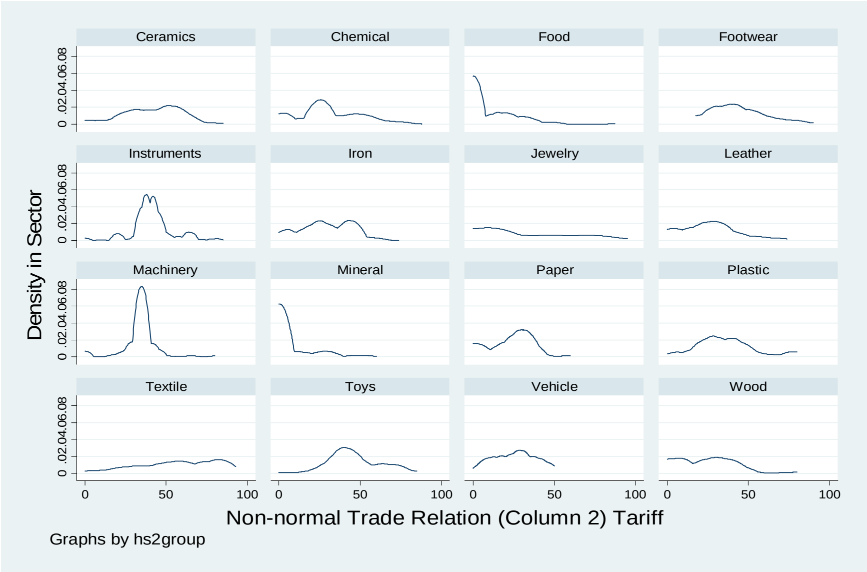
Data source: Chinese customs data obtained from UC Davis CID.

Figure 2: Distribution of Worst-case Tariffs across Tariff (Lines before and after China's WTO Accession)



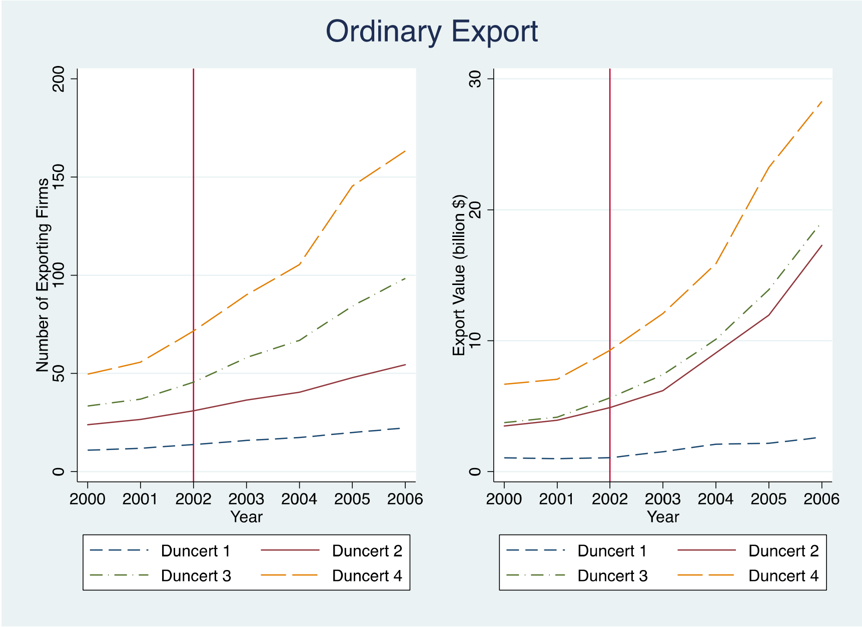
Note: This figure displays the kernel density of non-normal trade, or non-MFN tariffs (the worst-case tariff for China prior to its WTO accession) and the bound tariffs (the worst-case tariff following China's WTO accession) imposed by the United States across HS 6-digit tariff lines.

Figure 3: Distribution of Worst-case U.S. Tariffs before China's WTO Accession, by Sector



Note: Figures show the kernel density of non-normal trade relation tariffs across HS 6 digit product lines by sector. Sectors are defined according to HS classification (See Appendix Table 2). Some sectors, such as art products and ammunition, are dropped due to small export values.

Figure 4: Tariff Uncertainty Reduction and Export Growth: Export Firm Numbers and Export Value



Notes: Each figure is based on China's ordinary exports to the U.S.. Products were assigned to the four groups, based on the degree of trade policy uncertainty reduction for China's U.S. exports following China's WTO accession. At the one end of the spectrum, products in Duncert1 experienced zero uncertainty reduction. In contrast, products in the group Duncert4 benefited from the largest reduction in U.S. trade policy uncertainty. The vertical axis of the left figure is the number of exporting firms averaged across HS 6-digit products within each group and the vertical axis for the right figure is the total export value for products in each group. Results for processing exports are similar.

Table 1: Market Share Changes 2000-2006, Overall and by Firm Ownership

Margin	All	SOE	FIE	Dom
	(1)	(2)	(3)	(4)
(1) Incumbents	-10.484***	-5.484***	-4.663***	-0.336***
Net entry				
(2) Exiters	-75.995***	-52.107***	-19.761***	-4.127***
(3) New Exporters	67.144***	9.906***	26.836***	30.402***
(4) Adders	19.335***	11.468***	5.989***	1.879***
(5) Total Net Entry	10.484***	-30.734***	13.064***	28.154***
(6) Total	0	-36.218***	8.401***	27.817***

Note: This table reports the average market share changes for different margins for the period 2000 to 2006. The data are averaged across HS 6-digit products, according to the margins of adjustment and the form of firm ownership. In each column, the contributions due to exiters, new exporters, and adders (displayed in rows 2 to 4) sum up to the values reported in row 5 (total net entry). Similarly, the market share changes due to incumbents (row 1) can be summed with the market share changes caused by total net entry (row 5) to compute the value displayed in row 6. Since the data are also disaggregated to show changes by ownership (SOE, FIE and Domestic), the values in the associated rows for columns 2 to 4, can be summed to arrive at the overall change by margin, displayed in column 1. Results are generated by regressing the changes in market shares for HS 6-digit products on a constant. Triple-stared values represent statistical significance at 1% level.

TABLE 2: Tariff Measure Summary Statistics

Variable	**Obs. #**	**Mean**	**Std. Dev.**	**Min**	**Max**
Tariff Policy Uncertainty Reduction					
dgap (percentage points)	4721	29.99	20.37	-56.56	145.5
Change in Average Tariff Rate					
dat (percentage points)	4721	0.16	7.10	-262.5	35
Average Tariff Rate					
avt (percentage points)	4721	3.65	7.39	0	218.75

Notes: Tariffs are measured at the HS 6-digit product level. The variable “avt” measures U.S. tariff rates averaged over the years 2000 and 2002. The definition for the variable measuring changes in applied tariffs, or “dat”, is *dat* = the year 2000 (before WTO accession) applied tariff - the year 2002 (after WTO accession) applied tariff. Positive values reflect the reductions in applied tariffs. We define “gap” as the difference between the worst-case tariff and the applied tariff. The reduction in uncertainty “dgap” is then defined as dgap=(gap_2000, before WTO accession)-(gap_2002, after WTO accession). Positive values of the variable dgap imply that tariff uncertainty fell after China’s WTO accession.

Table 3: Trade Policy and Number of New Entrants by Product: Main Specification

Dependent	Log number of new entrants in year t (new exporters *and* adders in year t)					
		T=2006		T=2002	T=2004	T=2006
	(1)	(2)	(3)	(4)	(5)	(6)
dgap	0.041***	0.034***	0.030***	0.016***	0.019***	0.018***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
dat	-0.003	-0.024	-0.021	0.012	0.014	0.029**
	(0.022)	(0.034)	(0.034)	(0.017)	(0.015)	(0.014)
avt	-0.006	-0.001	0.004	0.004	0.002	0.022*
	(0.027)	(0.026)	(0.025)	(0.011)	(0.011)	(0.011)
fixed_ass		-1.542***	-1.523***	-0.815***	-0.952***	-0.906***
		(0.213)	(0.206)	(0.153)	(0.167)	(0.173)
imshare			-0.810***	-0.273**	-0.405***	-0.504***
			(0.160)	(0.120)	(0.141)	(0.156)
Constant	1.327***	2.358***	2.958***	2.205***	2.610***	2.961***
	(0.152)	(0.196)	(0.214)	(0.131)	(0.140)	(0.160)
HS 2d FE	No	No	No	Yes	Yes	Yes
N	4685	3807	3572	3572	3572	3572
R^2	0.156	0.152	0.145	0.349	0.358	0.362
adj. R^2	0.155	0.151	0.144	0.330	0.340	0.344
Log lik.	-9677.971	-7665.135	-7071.975	-6105.080	-6367.491	-6548.150
F	36.822	40.836	36.130	13.709	15.210	15.052

Notes: Standard errors in () are clustered at HS 2digit level. The change in tariff uncertainty is labelled with ($dgap$), while the average applied import tariff is given by (*avt*), and the change in the applied tariffs is given by (*dat*). Industry fixed_assets relative to sales is measured by (*fixed_ass*), while the intermediary share of trade at the 6-digit level is given by (*imshare*). Statistical significance denoted by: * p < 0.10, ** p < 0.05, *** p < 0.01.

TABLE 4: Trade Policy and Number of Firms: New Exporters, Adders and Exiters

Dependent	Log firm number (year t) new exporters			Log firm number (year t) adders			Log firm number at year 2000 exiters (exit by year t)		
	t=2002	t=2004	t=2006	t=2002	t=2004	t=2006	t=2002	t=2004	t=2006
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
dgap	0.014***	0.018***	0.018***	0.014***	0.015***	0.014***	0.013***	0.014***	0.015***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
dat	0.005	0.010	0.026*	0.013	0.014	0.026**	0.009	0.008	0.008
	(0.017)	(0.018)	(0.015)	(0.016)	(0.014)	(0.012)	(0.017)	(0.019)	(0.018)
avt	-0.000	-0.001	0.017	0.001	0.003	0.016*	0.005	0.007	0.006
	(0.011)	(0.012)	(0.011)	(0.010)	(0.010)	(0.009)	(0.012)	(0.013)	(0.012)
fixed_ass	-0.818***	-0.872***	-0.944***	-0.811***	-0.771***	-0.800***	-0.755***	-0.658***	-0.810***
	(0.155)	(0.160)	(0.170)	(0.143)	(0.128)	(0.154)	(0.148)	(0.148)	(0.156)
imshare	-0.190	-0.181	-0.391**	-0.113	-0.064	-0.160	-0.026	0.095	0.018
	(0.128)	(0.161)	(0.152)	(0.115)	(0.143)	(0.110)	(0.137)	(0.155)	(0.126)
Constant	1.535***	2.137***	2.679***	1.796***	1.635***	1.549***	1.868***	1.809***	1.849***
	(0.134)	(0.136)	(0.152)	(0.127)	(0.124)	(0.128)	(0.125)	(0.128)	(0.127)
HS 2d FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3254	3350	3474	3254	3350	3474	3254	3350	3474
R^2	0.301	0.322	0.342	0.327	0.336	0.354	0.309	0.308	0.321
adj. R^2	0.279	0.302	0.323	0.306	0.316	0.335	0.287	0.287	0.301
Log lik.	-5383.72	-5941.62	-6381.91	-5349.44	-5516.71	-5641.60	-5423.14	-5703.70	-5966.79
F	12.716	13.781	15.261	14.061	13.071	16.026	9.986	8.425	11.046

Notes: Standard errors in () are clustered at HS 2digit level. The change in tariff uncertainty is labelled with (*dgap*), while the average applied import tariff is given by (*avt*), and the change in the applied tariffs is given by (*dat*). Industry fixed_assets relative to sales is measured by (*fixed_ass*), while the intermediary share of trade at the 6-digit level is given by (*imshare*). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 5: Trade Policy Uncertainty and the Number of Firms, Difference in Differences Estimates: US comparison with the EU as the Control Group

Dependent	Log firm number (year t) new entrants (new exporter *and* adders)				Log firm number at year 2000 exited by year t exiters			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
US*dgap*2001	0.012***	0.014***	0.013***	0.012***	0.012***	0.014***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2002	0.015***	0.017***	0.015***	0.015***	0.012***	0.014***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2003	0.016***	0.018***	0.016***	0.016***	0.011***	0.013***	0.012***	0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2004	0.017***	0.021***	0.019***	0.018***	0.012***	0.014***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2005	0.021***	0.022***	0.020***	0.019***	0.012***	0.014***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2006	0.020***	0.022***	0.019***	0.018***	0.012***	0.014***	0.013***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.244***	0.244***	0.259***	0.264***	0.169***	0.169***	0.180***	0.183***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
HS6*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
US*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X in US*Year*X								
dat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
avt		Yes	Yes	Yes		Yes	Yes	Yes
fixed_ass			Yes	Yes			Yes	Yes
imshare				Yes				Yes
N	278446	278446	259476	254968	278446	278446	259476	254968
R^2	0.738	0.738	0.747	0.749	0.724	0.725	0.734	0.736
adj. R^2	0.738	0.738	0.747	0.749	0.724	0.725	0.734	0.736
F	6138.980	4646.850	4083.272	3520.625	4309.669	3249.056	2689.484	2264.383

Notes: Standard errors in () are clustered at HS 6digit level. The change in tariff uncertainty is labelled with ($dgap$). Coefficients for the triple interaction with ($dgap$) by year (2001-2006) are reported, while other variables are suppressed. The average applied import tariff is given by (*avt*), and the change in the applied tariffs is given by (*dat*). Industry fixed_assets relative to sales is measured by (*fixed_ass*), while the intermediary share of trade at the 6-digit level is given by (*imshare*). Statistical significance denoted by: * p < 0.10, ** p < 0.05, *** p < 0.01.

TABLE 6: Trade Policy Uncertainty and the Number of Firms, Difference in Differences Estimates: US comparison with the UK, Germany, France as Control Group

Dependent	Log firm number in year t new entrants (new exporter *and* adders)				Log firm number at year 2000 exited by year t Exiters			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
US*dgap*2001	0.009***	0.012***	0.010***	0.010***	0.010***	0.012***	0.011***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2002	0.012***	0.014***	0.013***	0.012***	0.010***	0.011***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2003	0.012***	0.015***	0.013***	0.013***	0.009***	0.011***	0.010***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2004	0.013***	0.017***	0.015***	0.014***	0.010***	0.012***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2005	0.016***	0.018***	0.016***	0.015***	0.009***	0.011***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
US*dgap*2006	0.015***	0.016***	0.014***	0.013***	0.010***	0.012***	0.011***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.455***	0.455***	0.485***	0.493***	0.319***	0.319***	0.339***	0.345***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
HS6*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
US*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X in US*Year*X								
dat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
avt		Yes	Yes	Yes		Yes	Yes	Yes
fixed_ass			Yes	Yes			Yes	Yes
imshare				Yes				Yes
N	79556	79556	74136	72848	79556	79556	74136	72848
R^2	0.864	0.865	0.874	0.876	0.830	0.831	0.839	0.841
adj. R^2	0.864	0.865	0.874	0.876	0.830	0.831	0.839	0.841
F	6601.847	5032.622	4378.683	3774.275	4567.925	3456.139	2840.160	2393.718

Notes: Standard errors in () are clustered at HS 6digit level. The change in tariff uncertainty is labelled with ($dgap$). Coefficients for the triple interaction with ($dgap$) by year (2001-2006) are reported, while other variables are suppressed. The average applied import tariff is given by (*avt*), and the change in the applied tariffs is given by (*dat*). Industry fixed_assets relative to sales is measured by (*fixed_ass*), while the intermediary share of trade at the 6-digit level is given by (*imshare*). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Aggregate Price Changes at the 6-digit Product Level

Dependent	Percentage change of aggregate unit price (from year 2000 to year t) for HS 6-digit products					
	T=2002 (1)	T=2002 (2)	T=2004 (3)	T=2004 (4)	T=2006 (5)	T=2006 (6)
Constant	0.291***	0.422***	0.485***	0.712***	0.720***	0.967***
	(0.049)	(0.078)	(0.0603)	(0.080)	(0.098)	(0.130)
dgap		-0.004***		-0.007***		-0.007***
		(0.001)		(0.002)		(0.002)
dat		0.002		-0.003		-0.009
		(0.002)		(0.006)		(0.011)
N	3244	3244	3255	3255	3290	3290
adj. R2	0.000	0.002	0.000	0.005	0.000	0.004

Notes: The change in tariff uncertainty is labelled with ($dgap$), while the change in the applied tariffs is given by (*dat*). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Price Difference between New Exporters and Exiters

Dependent	Ln (Unit price) in year t (for new exporters) or in year 2000 (for exiters)					
	T=2002		T=2004		T=2006	
	(1)	(2)	(3)	(4)	(5)	(6)
NewExp	- 0.107***	0.114***	0.042***	0.346***	0.180***	0.584***
	(0.006)	(0.016)	(0.005)	(0.013)	(0.004)	(0.012)
NewExp*dgap		-0.002***		-0.003***		-0.005***
		(0.000)		(0.000)		(0.000)
NewExp*dat		0.004		-0.004		-0.017***
		(0.004)		(0.004)		(0.004)
Constant	0.946***	0.911***	0.972***	0.943***	1.012***	0.994***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
HS 6-digit FE	Yes	Yes	Yes	Yes	Yes	Yes
Ownership FE	No	Yes	No	Yes	No	Yes
N	149561	149561	274347	274347	448174	448174
adj. R2	0.561	0.573	0.559	0.570	0.547	0.559

Notes: The change in tariff uncertainty is labeled with ($dgap$), while the change in the applied tariffs is given by (*dat*). New export transactions are denoted by an indicator variable (NewExp). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Quality Difference between New Exporters and Exiters

Dependent	Quality in year t (for new exporters) or in year 2000 (for exiters)					
	T=2002		T=2004		T=2006	
	(1)	(2)	(3)	(4)	(5)	(6)
NewExp	0.261***	0.369***	0.161***	0.383***	0.087***	0.432***
	(0.012)	(0.030)	(0.009)	(0.024)	(0.008)	(0.022)
NewExp*dgap		-0.000		-0.000		0.000
		(0.001)		(0.001)		(0.000)
NewExp*dat		-0.001		-0.008		-0.014**
		(0.009)		(0.007)		(0.007)
Constant	-0.569***	-0.640***	-0.348***	-0.437***	-0.232***	-0.315***
	(0.008)	(0.009)	(0.007)	(0.008)	(0.007)	(0.008)
HS 6digit FE	Yes	Yes	Yes	Yes	Yes	Yes
Ownership FE	No	Yes	No	Yes	No	Yes
N	147640	147640	271508	271508	443497	443497
R2	0.024	0.033	0.009	0.027	0.004	0.028
adj. R2	0.005	0.015	-0.002	0.017	-0.003	0.022
Log lik.	-3.22e+05	-3.22e+05	-6.08e+05	-6.05e+05	-9.99e+05	-9.94e+05
F	496.831	240.543	290.948	589.570	108.331	1234.143

Notes: The change in tariff uncertainty is labeled with ($dgap$), while the change in the applied tariffs is given by (*dat*). New export transactions are denoted by an indicator variable (NewExp). Statistical significance denoted by: * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix

A1 Proof of existence and uniqueness of equilibrium solution

We can rewrite the ZCP and FE conditions as $j(\varphi^*) = \frac{(1-\rho)f_e}{M^\eta f}$, where $j(\varphi) \equiv [\left(\frac{\tilde{\varphi}(\varphi)}{\varphi}\right)^{\sigma-1} - 1][1 - G(\varphi)]$. As shown by Melitz (2003), $j(\varphi)$ goes from ∞ to 0 when φ goes from 0 to ∞. This proves the existence and uniqueness of the solution φ^* and $\bar{\pi}_p$ for any given value of M. This property of $j(\varphi)$ also necessarily implies that the solutions of φ^* and $\bar{\pi}_p$ are increasing functions of M. Specifically, when M goes to infinity, $\varphi^*(M)$ goes to infinity. When M goes to zero, $\varphi^*(M)$ goes to zero. The same applies to $\bar{\pi}_p(M)$.

A2 Derivation of estimating equation (16)

The full empirical specification is as follows:

$$lnEXNum_{\mathrm{m}h\mathrm{ct}} = \alpha + \sum_{j=2001}^{2006} \beta_j 1\{j=t\}1\{c=us\}dgap_h + \sum_{j=2001}^{2006} \gamma_j 1\{j=t\}1\{c=us\}X_h$$

$$+\sum_{j=2001}^{2006} \delta_j 1\{j=t\}1\{c=us\} + \sum_{j=2001}^{2006} \delta_{2j} 1\{j=t\} + \sum_{j=2001}^{2006} \delta_{3j} 1\{j=t\}dgap_h$$

$$+\sum_{j=2001}^{2006} \delta_{4j} 1\{j=t\}X_h + \delta_5 1\{c=us\}dgap_h + \delta_6 1\{c=us\}X_h + \delta_{ch} + \delta_{ht} + \varepsilon_{hct}$$

Note we have included *very* comprehensive fixed effects: product*year fixed effects and country*product fixed effects.

Further note that terms $\sum_{j=2001}^{2006} \delta_{2j} 1\{j=t\}$, $\sum_{j=2001}^{2006} \delta_{3j} 1\{j=t\}dgap_h$ and $\sum_{j=2001}^{2006} \delta_{4j} 1\{j=t\}X_h$ are all absorbed by the product*year fixed effects, δ_{ht}. Similarly, the terms $\delta_5 1\{c=us\}dgap_h, \delta_6 1\{c=us\}X_h$ are absorbed by the country*product fixed effects, δ_{ch}. Thus, we can simplify the estimation equation as:

$$lnEXNum_{\mathrm{m}h\mathrm{ct}} = \alpha + \sum_{j=2001}^{2006} \beta_j 1\{j=t\}1\{c=us\}dgap_h + \sum_{j=2001}^{2006} \gamma_j 1\{j=t\}1\{c=us\}X_h$$

$$+\sum_{j=2001}^{2006} \delta_j 1\{j=t\}1\{c=us\} + \delta_{ch} + \delta_{ht} + \varepsilon_{hct}$$

Taking differences across periods, the equation can then be written as

$$dlnEXNum_{\mathrm{m}h\mathrm{ct}} = \sum_{j=2001}^{2006} \beta_j 1\{j = t\}1\{c = us\}dgap_h + \sum_{j=2001}^{2006} \gamma_j 1\{j = t\}1\{c = us\}X_h + \sum_{j=2001}^{2006} \delta_j 1\{j = t\}1\{c = us\} + \delta'_{ht} + \varepsilon'_{hct}$$

which is estimation equation (16).

A3 Import structure similarity

We construct the import similarity index based on the approach of Finger and Kreinin (1979). We first calculate the import share of product h in a country c's total imports from China in year t, $s_{hct} = EX_{hct}/(\sum_h EX_{hct})$. We then construct the similarity index by comparing these shares to the shares in the reference country, which is US in our case, $SI_{ct} = 100\sum_h \min\left(s_{hct}, s_{ht}^{US}\right)$. This index is bounded by zero and one hundred, with higher values indicate higher similarity. Appendix Table 4 shows the similarity index for the EU countries.

A4 Adders vs Exiters

In this section, we compare prices and qualities of adders against those of exiting exporters. The estimation equation and approach are similar to those in text when we compare new exporters and exiters.

Appendix Table 5 reports the results comparing adders' price with exiters' price. As shown by columns 1, unlike new exporters in year 2002, adders on average charged higher prices in 2002 than did exiters in 2000. For years 2004 and 2006, we also find adders charged higher prices in these years than the exiters' price in 2000. For year 2002 and 2004 (columns 2 and 4), we do not find that the price difference between adders and exiters was significantly correlated with uncertainty reduction, though we do find negative significant correlation in year 2006.

Appendix Table 6 reports the quality results comparing adders against exiters. As shown by columns 1, 3 and 5, we find that adders on average have higher quality than exiters in all years. Moreover, for years 2004 and 2006 (columns 4 and 6), we find that the quality difference between adders and exiters are significantly larger if the product experienced higher uncertainty reduction.

Overall, although we do not find strong evidence that adders charged lower prices than exiters, we do find that they export goods with higher qualities than the exiters. Moreover, we find some evidence that the price and quality premium of adders relative to exporting exiters were related to the products' uncertainty reduction.

A5 Productivity Comparison of New Exporters and Exiters

We estimate manufacturing firms' TFP based on the Chinese Manufacturing census, following Feenstra, Li and Yu (2014). We then matched the firms in the Chinese Manufacturing census with the firms in the Customs dataset. Details of the matching procedure can be found in Feng, Li and Swenson (2012). Since we only have one productivity measure for each firm, we assign this productivity to each product exported by the firm. We thus have *firm*product* level information of firm productivity for new exporters in the years (2002, 2004 and 2006) and for exiters in the year (2000). Note, since all nominal values are deflated when we estimate firm TFP, productivity measures in different years are comparable. Note also that we maintain the dataset at *firm*product* level in order to compare productivities of firms that were exporting the same HS 6-digit products.

For the pooled sample of new exporters and exporting exiters, we regress the productivity measure, our TFP estimate, on the new exporter dummy and its interactions with our measure of uncertainty reductions and/or with the applied tariff reductions. The specification for this regression is identical to Eq. (17), but with the dependent variable replaced by the productivity measure.

Appendix Table 7 displays the productivity regression results. Columns 1, 3 and 5 show that, for exporters which exported the same HS 6-digit products, the productivity of new exporters exceeded the productivity of exiters in 2004 and 2006, but not immediately after WTO accession in 2002. In columns 2, 4 and 6 we do not find that the magnitude of the productivity premium of new exporters was related to the magnitude of the trade policy uncertainty reductions.

APPENDIX TABLES

Appendix Table 1: Market Share Changes 2000-2002, Overall and by Firm Ownership

Margin	All	SOE	FIE	Dom
	(1)	(2)	(3)	(4)
(1) Incumbents	-6.479***	-3.808***	-2.677***	0.006
Net entry				
(2) Exiters	-53.489***	-38.069***	-12.418***	-3.002***
(3) New Exporters	25.845***	8.826***	10.196***	6.824***
(4) Adders	34.123***	24.756***	6.812***	2.555***
(5) Total Net Entry	6.479***	-4.487***	4.589***	6.377***
(6) Total	0	-8.295***	1.912***	6.383***

Note: This table reports the average market share changes for different margins for the period from 2000 to 2002.

Appendix Table 2: Sectors in HS Classification

Sector Name	HS 2 digit	Sector Name	HS 2 digit	Sector Name	HS 2 digit
Food	1-24	Paper	47-49	Machinery	84-85
Minerals	25-27	Textiles	50-63	Vehicles	86-89
Chemicals	28-38	Footwear	64-67	Instruments	90-92
Plastics	39-40	Ceramics	68-70	Arms	93
Leather	41-43	Jewelry	71	Toys	94-96
Wood	44-46	Iron	72-83	Arts	97

Appendix Table 3: Trade Policy and Number of Firms: New Exporters, Adders and Exiters, Sample excluding the Textile, Machinery and Instrument Industries

Dependent	Log firm number (year t) new exporters			Log firm number (year t) adders			Log firm number (year 2000) exiters (exit by year t)		
	T=2002	T=2004	T=2006	T=2002	T=2004	T=2006	T=2002	T=2004	T=2006
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
dgap	0.016***	0.019***	0.020***	0.017***	0.016***	0.015***	0.017***	0.018***	0.017***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
dat	-0.000	0.007	0.015	0.007	0.016	0.018	-0.002	-0.002	-0.001
	(0.022)	(0.023)	(0.021)	(0.022)	(0.019)	(0.016)	(0.022)	(0.023)	(0.023)
avt	-0.002	0.000	0.007	-0.003	0.005	0.005	-0.004	-0.003	-0.002
	(0.016)	(0.017)	(0.017)	(0.016)	(0.015)	(0.014)	(0.017)	(0.018)	(0.018)
fixed_ass	-0.632***	-0.806***	-0.807***	-0.649***	-0.710***	-0.643***	-0.651***	-0.659***	-0.671***
	(0.132)	(0.166)	(0.175)	(0.152)	(0.135)	(0.151)	(0.159)	(0.161)	(0.166)
imshare	-0.067	-0.278*	-0.391**	-0.105	-0.131	-0.151	-0.057	-0.083	-0.055
	(0.128)	(0.158)	(0.166)	(0.135)	(0.125)	(0.120)	(0.144)	(0.156)	(0.154)
Constant	1.496***	2.203***	2.659***	1.698***	1.664***	1.597***	1.807***	1.927***	1.966***
	(0.146)	(0.159)	(0.175)	(0.135)	(0.135)	(0.137)	(0.136)	(0.146)	(0.145)
HS 2d FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2124	2124	2124	2124	2124	2124	2124	2124	2124
adj. R2	0.343	0.357	0.354	0.363	0.366	0.371	0.357	0.350	0.351
F	8.830	10.996	11.656	9.155	12.383	10.689	7.574	7.895	7.605

Note: This table reports regression results based on the exclusion of the textile, apparel, machinery and instrument sectors from our full sample. Standard errors in () are clustered at HS 2digit level. The change in tariff uncertainty is labelled with (*dgap*), while the average applied import tariff is given by (*avt*), and the change in the applied tariffs is given by (*dat*). Industry fixed_assets relative to sales is measured by (*fixed_ass*), while the intermediary share of trade at the 6-digit level is given by (*imshare*). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table 4: Similarity Index of EU Countries

Country	Similarity	Country	Similarity	Country	Similarity
United Kingdom	.71	Sweden	.52	Finland	.48
Germany	.64	Austria	.52	Denmark	.46
France	.64	Belgium	.50	Greece	.46
Spain	.56	Italy	.50	Ireland	.33
Netherlands	.55	Portugal	.49	Luxembourg	.17

Appendix Table 5: Price Difference between Adders and Exiters

Dependent	Ln (Unit price) in year t (for adders) or in year 2000 (for exiters)					
	T=2002		T=2004		T=2006	
	(1)	(2)	(3)	(4)	(5)	(6)
Adder	0.055***	0.053***	0.191***	0.212***	0.385***	0.488***
	(0.006)	(0.016)	(0.006)	(0.015)	(0.006)	(0.015)
Adder*dgap		0.000		-0.000		-0.002***
		(0.000)		(0.000)		(0.000)
Adder*dat		-0.001		-0.011**		-0.038***
		(0.004)		(0.005)		(0.006)
Constant	0.983***	0.946***	1.002***	0.964***	1.027***	0.988***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
HS 6d FE	Yes	Yes	Yes	Yes	Yes	Yes
Ownership FE	Yes	Yes	Yes	Yes	Yes	Yes
N	158373	158373	177996	177996	186350	186350
adj. R2	0.545	0.548	0.557	0.559	0.566	0.569

Notes: The indicator variable, Adder, is set to one for all new product exports that were added by existing exporters of other products. Notes: The change in tariff uncertainty is labeled with ($dgap$), while the change in the applied tariffs is given by (*dat*). Statistical significance denoted by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table 6: Quality Difference between Adders and Exiters

Dependent Variable	Quality in year t (for adders) or in year 2000 (for exiters)					
	T=2002		T=2004		T=2006	
	(1)	(2)	(3)	(4)	(5)	(6)
Adder	0.052***	0.048*	0.112***	0.063**	0.298***	0.238***
	(0.011)	(0.028)	(0.012)	(0.029)	(0.012)	(0.030)
Adder*dgap		0.000		0.001*		0.001**
		(0.001)		(0.001)		(0.001)
Adder*dat		-0.007		-0.012		-0.015
		(0.008)		(0.009)		(0.012)
Constant	-0.543***	-0.572***	-0.333***	-0.386***	-0.232***	-0.291***
	(0.008)	(0.009)	(0.007)	(0.008)	(0.007)	(0.008)
HS 6d FE	Yes	Yes	Yes	Yes	Yes	Yes
Ownership FE	Yes	Yes	Yes	Yes	Yes	Yes
N	156070	156070	175676	175676	183805	183805
Log lik.	-3.41e+05	-3.41e+05	-3.91e+05	-3.91e+05	-4.11e+05	-4.11e+05
adj. R2	0.006	0.007	-0.001	0.001	0.000	0.002

Notes: The indicator variable, Adder, is set to one for all new product exports that were added by existing exporters of other products. Notes: The change in tariff uncertainty is labeled with ($dgap$), while the change in the applied tariffs is given by (*dat*). Statistical significance denoted by: * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 7: Productivity Difference between New Exporters and Exiters

Dependent	Productivity (TFP) in year t (for new exporters) or in year 2000 (for exiters)					
	T=2002		T=2004		T=2006	
	(1)	(2)	(3)	(4)	(5)	(6)
NewExp	0.006	0.025	0.034***	0.080***	0.034***	0.074***
	(0.011)	(0.027)	(0.008)	(0.019)	(0.006)	(0.015)
NewExp*dgap		-0.000		-0.000		-0.000
		(0.001)		(0.000)		(0.000)
NewExp*dat		-0.001		-0.010		-0.004
		(0.008)		(0.006)		(0.006)
Constant	3.689***	3.766***	3.685***	3.726***	3.704***	3.735***
	0.006	0.025	0.034***	0.080***	0.034***	0.074***
HS 6digit FE	Yes	Yes	Yes	Yes	Yes	Yes
Ownership FE	No	Yes	No	Yes	No	Yes
N	12963	12963	27682	27682	61282	61282
adj. R2	0.268	0.273	0.294	0.296	0.268	0.271

Notes: The change in tariff uncertainty is labeled with ($dgap$), while the change in the applied tariffs is given by (*dat*). New export transactions are denoted by an indicator variable (NewExp). Statistical significance denoted by: * p < 0.10, ** p < 0.05, *** p < 0.01.