# Learning by Importing *

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**Abstract**

This paper asks the following question: does importing from a country have a causal effect on a firm's ability to start exporting there by allowing it to establish trade networks, build distribution channels as well as learn about local consumer preferences, business practices and institutional environment in that market? As micro-level data on firm imports became available, there has been a burgeoning research literature on firm import behavior, which hasn't been intensively studied before. However, most of these studies focus on the connection between imported inputs and firm productivity, not the casual effect of firm-level imports on exports in individual markets. We use one of the most significant trade liberalization episodes, China's accession to the WTO in December 2001, to separate the impact of imported inputs on a firm's productivity from their impact on a firm's ability to enter individual export markets. First, we find that a reduction in import tariffs encourages firms to start importing from new countries. Second, and more interestingly, we find, based on the IV method, that there is a significantly positive causal effect of lagged imports on exports to the same country. That is, having imported from a country in the past increases the probability that a firm starts exporting there. We also find that a firm starts exporting to a country that it has imported from on a larger scale. In addition, the duration of such a trading partnership is longer. These results help to explain why large importers are simultaneously large exporters, and shed some light on what the sunk costs of exporting are and how to mitigate them.

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# 1 Introduction

As micro-level data on firm imports became available, there has been a burgeoning research literature on firm import behavior, which hasn't been intensively studied before in contrary to firm export behavior. However, most of these studies focus on the connection between imported inputs and firm productivity, and conclude that firm productivity goes up as a result of importing foreign intermediate inputs, mainly through three channels: better complementarity of inputs, lower input prices as well as access to inputs of higher quality and access to new technologies embodied in the imported varieties. On the other hand, no one has looked at the causal effect of firm-level imports on exports in individual markets. More specifically, in this paper, we address the following questions: does importing from a country have a causal effect on a firm's ability to start exporting there by allowing it to establish trade networks, build distribution channels as well as learn about local consumer preferences, business practices and institutional environment in that market? If yes, then how important is it quantitatively?

The answers to these questions are important because they help to explain a wide range of economic phenomena that can't be explained by previous literature. For example, it has been observed in the data that large exporters are simultaneously large importers. In Amiti et al. (2014), this pattern is the key to understanding the low aggregate exchange rate pass-through as well as the variation in pass-through across exporters. Similar to the selection into exporting argument, which states that the higher expected export revenues of a more productive firm allow it to bear the fixed costs of exporting and sell to more export markets, one can argue that a more productive firm is also more able to afford the fixed costs of

importing, and thus is both a large exporter and a large importer. However, this does not explain why a lot of Chinese firms both import a lot from and export a lot to the same set of countries, which is what we find in the data. Therefore, the additional channel that is uncovered in this paper: access to imports that generates access for exports, is not only another factor besides firm productivity that can explain the documented stylistic fact, but is also consistent with the high volume of bilateral trade between a Chinese firm and a small set of foreign countries. In addition, the sunk costs that firms have to incur in order to start exporting to a new country are estimated to be quite high in the literature. For instance, Das et al. (2007) structurally estimate the sunk entry costs for Colombian manufacturers of leather products, knitted fabrics, and basic chemicals to be at least $344,000 in 1986 U.S. dollars. So a better understanding of what these sunk costs are and how to mitigate them are very important. This paper helps to shed some light on that issue as well.

To summarize, this paper uses one of the most significant trade liberalization episodes in China, which is China's accession to the WTO in December 2001 that induced learning about foreign markets, to separate the effects of imported inputs on a firm's productivity from their effects on a firm's ability to enter individual export markets. It also estimates empirically the importance of importing for overcoming the sunk costs of entering a new export market. First, we find that import tariff reductions encourage firms to start importing from new countries. This result is intuitive. When deciding which product to import, a firm compares the savings in its marginal cost with the fixed costs of importing that input. Lower tariff rates reduce the costs of importing, and make it beneficial for a firm to import a wider range of intermediate inputs from more foreign countries. Second, and more interestingly, we find, based on the IV method, that there is a significant positive causal effect of lagged imports on

exports to the same country. That is, having imported from a country in the past increases the probability that a firm starts exporting there as well. A plausible explanation for this result is that importing helps a firm to establish trade networks, etc., which lowers the sunk and fixed costs of exporting. Besides looking at the effects of lagged imports on exports at the extensive margin, we also investigate if the intensive margin of exports is affected. We find that a firm starts exporting to a country that it has imported from on a larger scale. In addition, the duration of such a trading relationship is longer. Intuitively, importing helps a firm to resolve some of its market-specific export profitability uncertainty, so that it doesn't need to start by exporting a small amount to a new destination country to find out if it is going to be successful in that market. The better and more complete information provided by its importing experience about a specific market also leads to a firm's better export market selection. Therefore, it is not surprising that a firm's probability of survival is higher in countries where it has already imported from in the past.

## 2 Related Literature

This paper relates to several strands of literature. First, as mentioned in the introduction, evidence has been found in a wide range of countries that firm productivity rises when a firm imports new input varieties. For example, Kasahara and Rodrigue (2008) conclude that becoming an importer of foreign intermediates improves productivity using plant-level Chilean manufacturing panel data. At the same time, Halpern et al. (2015) find that importing all foreign varieties would increase firm productivity by 12 percent, and that during 1993-2002, one-third of the productivity growth in Hungary was due to imported inputs by estimating a

model of importers in Hungarian micro data and conducting counterfactual policy analysis. Bas and Strauss-Kahn (2014), on the other hand, use a firm-level database of imports provided by French Customs for the 1995-2005 period, and find a significant impact of higher diversification and increased number of imported input varieties on firm's TFP and export scope. They argue that importing more varieties of intermediate inputs increases firm productivity, and thereby enables the firm to overcome the fixed costs of exporting. While these papers only look at the impact of the number of imported inputs on the number of exported products and varieties, the number of export destinations and the value of exports, we seek to take this analysis one step further by examining individual firm-country pairs instead of only the total number of such pairs.

Second, a few papers have studied the impact of industry-level reductions in import tariffs on firm productivity growth and expansion in domestic product scope. Amiti and Konings (2007), useing Indonesian manufacturing census data from 1991 to 2001, find that a 10 percentage point fall in input tariffs leads to a productivity gain of 12 percent for firms that import their inputs. While they consider directly the effects of trade reform, we use tariff reductions to build an instrument for identification purposes. Goldberg et al. (2010), using detailed trade and firm-level data from India, find that lower input tariffs explain 31% of the new products introduced by domestic firms on average. While they look at the relationship between new imported inputs and the introduction of new products by domestic firms, we look at the impact of new source countries on firm export market entry.

This paper is most closely related to the literature that studies the impact of imported intermediate inputs on firm exports. Bas (2012) uses detailed firm-level data from Argentina to demonstrate that the probability of entering the export market is higher for firms in

industries that have experienced bigger input tariff reductions. However, she looks at only the relationship between changes in input tariffs and within-firm changes in export status. Instead, Kasahara and Lapham (2013) develop and estimate a stochastic industry model of importing and exporting with heterogeneous firms. Since they focus on cross-sectional steady state implications, they consider only per-period fixed costs but not sunk costs of entry, and the data they use only have information on the export and import status of a firm. Feng et al. (2012) use the same dataset as mine, and find that firms that expand their intermediate input imports increase the volume of their exports as well as their export scope measured by the number of exported varieties. In sum, the few papers that directly study the effects of imported intermediate inputs on firm exports consider only the productivity channel and exports at the aggregate level.

# 3 Data

The first dataset, Chinese Customs Data on imports and exports, provides detailed information on the universe of China's firm-level trade transactions for the years 2000 to 2006. In addition to firm identifiers, this dataset includes information on many important transaction characteristics, including customs regime (e.g. processing trade or ordinary trade), 8-digit HS product code, transaction value, quantity, and source or destination country. By using the firm identifiers that are provided in the dataset, we can construct key variables, which describe firm-level imports and exports. Figure I illustrates the customs declaration form that a firm has to fill out if it intends to import from or export to foreign countries.

Figure I: Customs Declaration Form


In particular, we are able to observe the type of each firm-level trade transaction: whether it is processing trade or ordinary trade. There are altogether 16 specific types of processing trade in China, but two of them are the most common: processing with supplied materials (henceforth, PWSM) and processing with imported materials (henceforth, PWIM). For PWSM, a Chinese firm obtains raw materials and parts from its foreign trading partners without making any payments. After processing or assembly, the product is sold back to the firm which has provided the parts and materials, and it is charged a processing fee. By contrast, for PWIM, the Chinese firm pays for the imported materials. It also has the freedom to choose the export destination of the final processed product. In all of the empirical analyses that follow, we exclude all the transactions that are labeled as processing trade.

The second key dataset is from China's National Bureau of Statistics, which conducts firm-level surveys on manufacturing enterprises. These data collected from Chinese firms

include key operational data, such as firm employment, ownership type (e.g. state-owned enterprise, foreign invested firm, or private firm), sales value, R&D expenditure and industry. The merging of the firm-level data with the transaction-level data is problematic because the firm identifiers used in the two datasets are different. Nevertheless, since both datasets include extensively detailed firm contact information (e.g. company name, telephone number, zip code, contact person), we merge the two datasets using zip codes and the last seven digits of a firm's phone number, following Yu (2015). In this way, we are able to generate firm-level observations that combine information on the trade with the operational activities of Chinese firms. Table I compares some of the main characteristics of the merged and the unmerged firms, and they look very similar on average in terms of employment, sales, value added per worker and TFP, mitigating our concern about sample selection bias.

Table I: Comparing merged and unmerged firms in the data

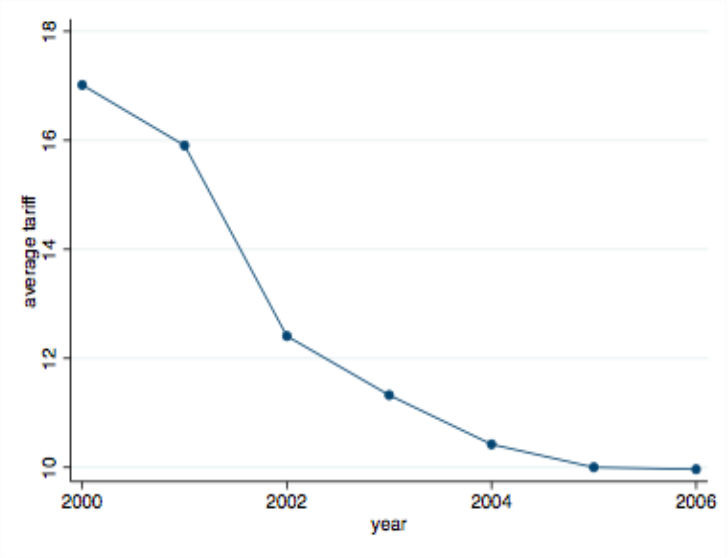
| | Merged Firms | Unmerged Firms |
|---|---|---|
| Log Employment | 5.37<br>[1.13] | 5.27<br>[1.17] |
| Log Sales | 10.6<br>[1.30] | 10.33<br>[1.31] |
| Value Added per Worker | 87.32<br>[203.32] | 71.58<br>[147.69] |
| TFP (Olley Pakes) | 4.22<br>[1.15] | 4.12<br>[1.12] |

# 4 Trade Liberalization and Tariff Reductions in China

Since China joined WTO in December 2001, it lowered its average tariff greatly, from 16% to a little above 12% within one year from 2001 to 2002, and the average tariff kept declining steadily over the entire sample period. The last year in the sample, 2006, saw an average tariff rate of only about 10%. It is indeed one of the most significant trade liberalization

episodes in China's history. As a commitment to its WTO accession, China also agreed to eliminate all quotas, licenses, tendering requirements and other non-tariff barriers to imports of manufactured goods by 2005.

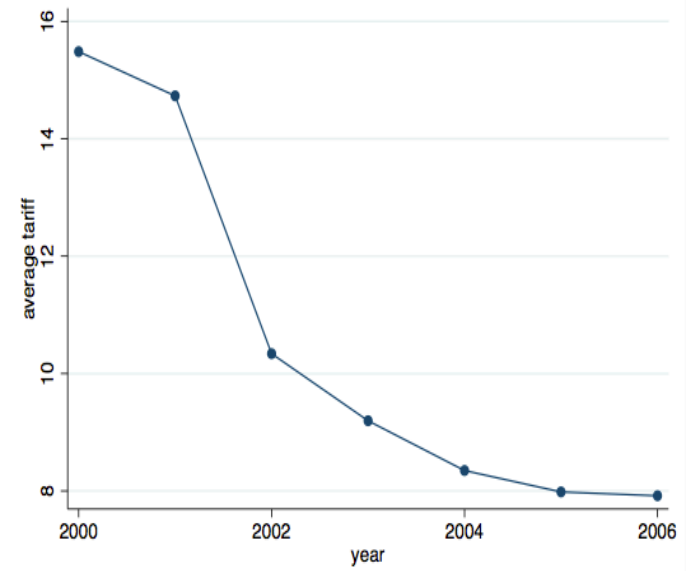
Figure II: Average Tariff at HS-8 Level




Source: Trade Analysis and Information System (TRAINS) and WTO tariff database

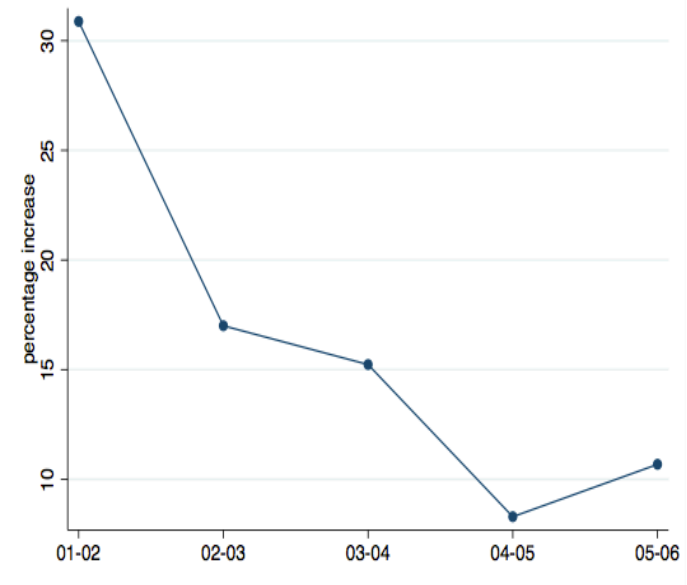
However, to assess how the tariff reductions affect an individual firm's import behavior, we have to consider the set of intermediate inputs that the firm may actually import. To reflect the actual tariff reductions faced by each importer, we construct a firm-specific input tariff following Ge et al. (2011). For a firm $f$ in year $t$ , the tariff rate that it faces is $\tau_{ft} = \sum_{g=1}^{G_f} \tau_{gt}/G_f$, where $\tau_{gt}$ is the tariff rate imposed on product $g$ in year $t$, and $G_f$ is the number of imported inputs by firm $f$ over the entire sample period. Note that equal weights are given to each input for simplicity. More importantly, the import bundle is fixed, so the changes in firm-level tariffs reflect the changes in tariff rates rather than the shift of input bundles.

Figure III: Average Firm-Specific Tariff at HS-8 Level




We find that firm-specific input tariffs follow a similar trend of the aggregate product-level tariffs between 2000 and 2006, with a sharp decline from 2001 to 2002 by almost 30%. In addition, we also find that the biggest increase in firms' new import source countries takes place between 2001 and 2002, as the costs of importing foreign varieties go down.

Figure IV: Increase in Firms' New Import Source Countries



In support of our hypothesis, we also find that the biggest increase in firms' new export destination countries takes place with a lag, between 2003 and 2004. These results are consistent with our learning by importing story. That is, having imported from a bigger set of countries in the past increases a firm's ability to enter more export markets in the future. However, in order to study the causal effect of firm-level imports on exports in individual markets, we have to conduct a more careful analysis that rules out the confounding factors that may increase both the number of import source countries and export destination countries simultaneously. We explain our empirical strategy in more detail in the next section.

Figure V: Increase in Firms' New Export Destination Countries

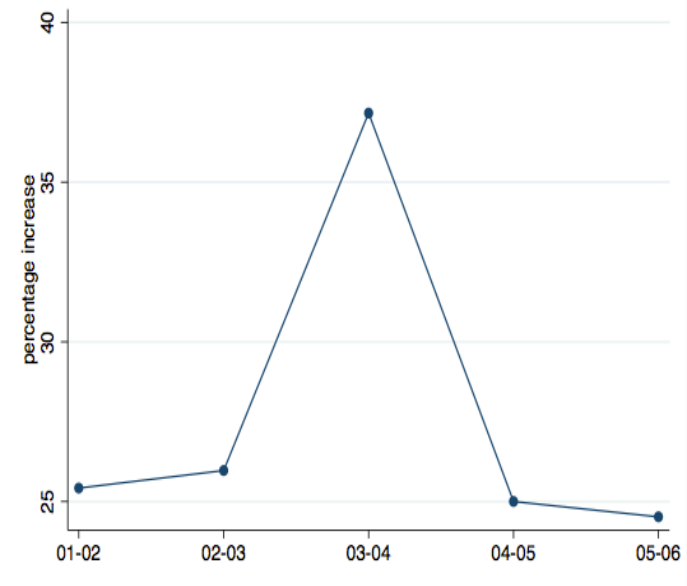
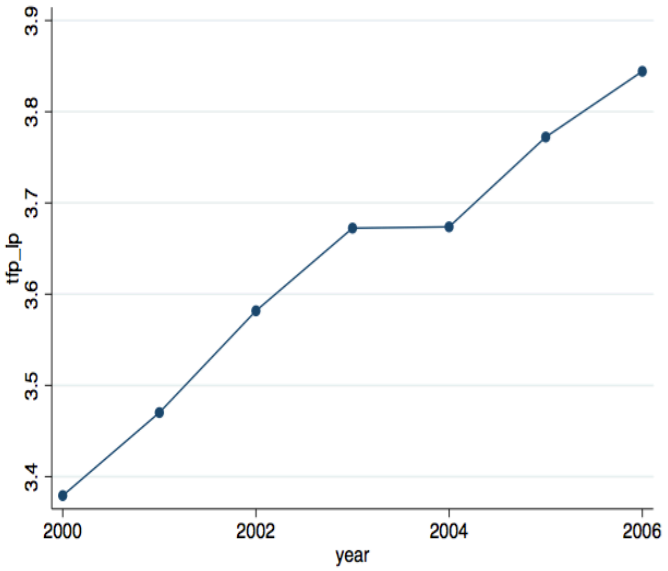


Figure VI: Firm Productivity




In contrast, we find that firm-level productivity growth has been quite uniform throughout the sample period, which suggests that firm productivity alone can't explain why large exporters are simultaneously large importers.

# 5 Empirical Results

As mentioned before, we need to control for the confounding factors that may lead to an increased number of both import source countries and export destination countries in order to study the causal effect of firm-level imports on exports in individual markets. Exports to a new country following imports could also arise from either shocks to a firm's export demand or from the firm's productivity growth. While there is no available measure of firm-specific export demand, it is reasonable to assume that change in a firm's year to year export demand is tied to development at the industry level. Therefore, we include industry-country-year fixed effects in our regressions. We also include firm-year fixed effects to separate the

impact of imported inputs on a firm's productivity from their impact on a firm's ability to enter individual export markets.

$$\begin{aligned}\mathbb{I}(\textit{starting to export to country } c)_{ft} &= \alpha + \beta \mathbb{I}(\textit{starting to import from country } c)_{ft-\tau} \\ &\quad + \gamma_{ict} + \delta_{ft} + \eta_f + \theta_t + \lambda_c + \epsilon_{fct} \end{aligned} \tag{1}$$

The regression results based on the linear probability model are shown in Table II. We find that lagged imports have a significant positive effect on exports to the same country. Quantitatively speaking, if a firm starts importing from country $c$ last period, the probability that it starts exporting there this period goes up by 1.4%. The impact diminishes in magnitude over time, but remains positive and significant.

Table II: Probability of starting to export to a country

| $\mathbb{I}$(starting to export to country $c)_{ft}$ | $\tau = 1$ | $\tau = 2$ | $\tau = 3$ | $\tau = 4$ | $\tau = 5$ |
|---|---|---|---|---|---|
| $\mathbb{I}$(starting to import from country $c)_{ft-\tau}$ | 0.0143549*** | | | | |
| | [0.000991] | | | | |
| | | 0.0078475*** | | | |
| | | [0.0010638] | | | |
| | | | 0.0057375*** | | |
| | | | [0.0011938] | | |
| | | | | 0.0050219*** | |
| | | | | [0.0014895] | |
| | | | | | 0.0030925*** |
| | | | | | [0.002153] |

When we look in the opposite direction, we find that lagged exports also have a positive effect on imports from the same country, although it is not as significant as before. If a firm starts exporting to country $c$ last period, the probability that it starts importing there this

period goes up by 0.8%. Again, the impact diminishes in magnitude over time, but remains positive and significant.

Table III: Probability of starting to import from a country

| $\mathbb{I}$(starting to import from country $c)_{ft}$ | $\tau = 1$ | $\tau = 2$ | $\tau = 3$ | $\tau = 4$ | $\tau = 5$ |
|---|---|---|---|---|---|
| $\mathbb{I}$(starting to export to country $c)_{ft-\tau}$ | $0.0077599^{***}$ [0.0003236] | | | | |
| | | $0.0069602^{***}$ [0.0003625] | | | |
| | | | $0.0061488^{***}$ [0.0004354] | | |
| | | | | $0.0055619^{***}$ [0.0005422] | |
| | | | | | $0.0048813^{***}$ [0.0008257] |

We adopt the simple linear probability model because the nonlinear fixed effects model have two shortcomings: one practical and one methodological. The practical obstacle is related to the difficulty of estimating nonlinear models with possibly thousands of dummy variable coefficients. The more difficult, methodological issue is the incidental parameters problem that raises questions about the statistical properties of the estimator. The fixed effects maximum likelihood estimator is inconsistent when $T$, the length of the panel, is fixed. The estimator is also biased in finite samples. On the contrary, the linear probability model is easy to estimate, and the results are easy to interpret since marginal effects are straightforward. Certain econometric problems are also easier to address within the LPM framework than with probits and logits, for instance, using instrumental variables while controlling for fixed effects.

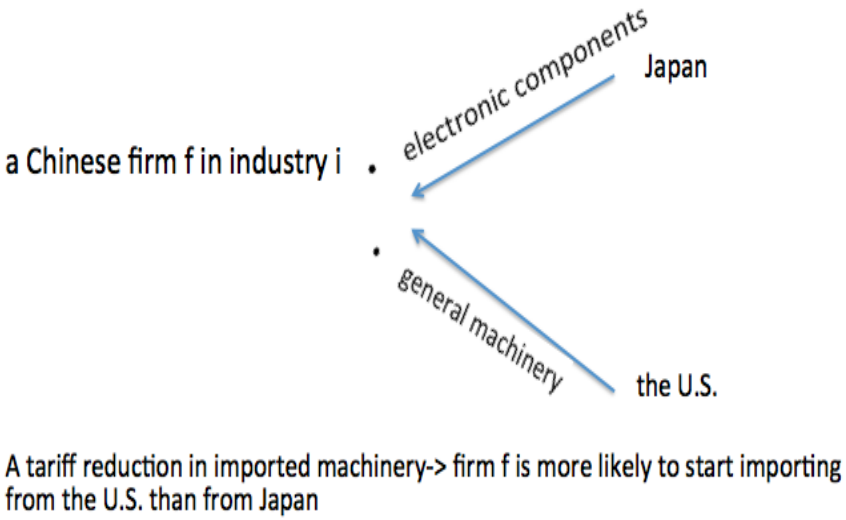
To identify the causality between lagged imports and firm export market entry, another important issue that we need to address is the potential endogeneity bias. The following

scenario can potentially lead to reverse causality: firms that aim at exporting to country $c$ in $t$ import intermediate inputs from $c$ in $t-\tau$ to produce final goods that appeal to the customers in $c$. Alternatively, some arbitrary firm-level shocks that are completely irrelevant to trade may result in the firm's decision to both start importing from and exporting to the same foreign countries. For example, a Chinese firm that has just hired a manager who speaks fluent German and who has business contacts in Germany may very well start bilateral trading relations with Germany. In the absence of a shock to change in the right-hand-side dummy variable, it is difficult to separate cause and effect. Therefore, exploiting the policy change (i.e. tariff liberalization) is important. Brandt et al. (2012) show that the declines in China's tariffs are not correlated with firm and industry characteristics prior to the reform, so tariff changes are a natural instrument for identifying the underlying mechanism. That is, the exogenous reform allows us to establish a causal chain of the two events. Our main identification assumption is that there is no direct effect of changes in tariffs on the unobserved components of our estimating equations.

Because China sets a common tariff to all countries, tariff declines alone cannot explain from which countries a Chinese firm is more likely to start importing products from after the reform. In other words, tariffs alone are not sufficient as an instrument. Our instrument, based on the potential trading partners in the industry a Chinese firm belongs to, attempts to explain, for a given decline in tariffs, which new countries a firm is more likely to start importing from (i.e. new import source countries). Below is a simple motivating example that illustrates our instrument. Consider a Chinese firm $f$ in industry $i$ . The production in industry $i$ typically requires the use of electronic components and general machinery. Japan is assumed to have comparative advantage in the former and the U.S. in the latter. So firms

in industry $i$ generally import electronic components from Japan, and general machinery from the U.S., including firm $f$. When there is a tariff reduction in imported machinery, firm $f$ is expected to be more likely to start importing from the U.S. than from Japan.

Figure VII: A motivating example for the instrument




More specifically, we need an instrument that is strongly correlated with a firm's "starting to import from country $c$" dummy, and is uncorrelated with the error term in the second-stage regression. We construct our instrument as follows:

$$IV_{fct} = \frac{output_{f,2000}}{\sum_{f \in i} output_{f,2000}} \sum_{p \in \Omega_{ic,2000}} tariff_{pt} * \frac{import_{pic,2000}}{import_{pi,2000}}$$

The first ratio is the output share of firm $f$ in industry $i$ in 2000. $import_{pic,2000}$ is the import value of a product $p$ by industry $i$ from country $c$ in 2000, while $import_{pi,2000}$ is the import value of a product $p$ by industry $i$ from all countries in 2000. $\Omega_{ic,2000}$ is the set of all

products imported by industry $i$ from country $c$ in 2000. We choose 2000 as the base year, which is before the trade liberalization episode takes place, so that the import value is not endogenously affected. The second ratio indicates how important country $c$ is in supplying firms in industry $i$ with the products that are important in its production process. We then interact this measure with tariffs. The interaction term serves as our instrument. This instrument is uncorrelated with the residuals because a firm's decision to start exporting to country $c$ does not reversely cause changes in tariffs or its output share and the entire industry's import value of a product from a country in 2000. Consequently, it satisfies the exclusion restriction and is therefore a valid instrument.

The regression results of the first stage and the second stage of the two-stage least squares (2SLS) estimation are shown in Table IV and Table V. Note that our instrument is positively correlated with the "starting to import from country $c$" dummy and is significant in all specifications.

$$\begin{aligned} \mathbb{I}(starting\,to\,import\;from\,country\,c)_{ft-1} &= \alpha + \beta IV_{fct-1} \\ &\quad + \gamma_{ict} + \delta_{ft} + \eta_f + \theta_t + \lambda_c + \epsilon_{fct} \end{aligned} \tag{2}$$

In the second stage, we use the predicted right-hand-side dummy variable from the first stage as an explanatory variable, and include the same set of control variables. A priori, it is difficult to sign the bias of the OLS estimator. If the correlation between the error term and the right-hand-side dummy is positive, the OLS estimate is biased upwards. If the correlation is negative, then it is biased downwards, which is what we find. The OLS estimate of the coefficient on the right-hand-side dummy is about 1.4%, as reported before. However,

when we explicitly address the issue of reverse causality by adopting the IV method, the estimate of the coefficient jumps to 6.6%, implying that there are some unobserved factors in the residuals that increase the probability that a firm starts importing from a country, but decrease the probability that it starts exporting to that country. We find that lagged imports have a significantly positive causal effect on a firm's exports to the same country. Having started to import from country $c$ last year increases the probability that the firm starts to export there this year by 6.6%.

$$\begin{aligned}\mathbb{I}(\textit{starting to export to country } c)_{ft} &= \alpha + \beta \widehat{\mathbb{I}(\textit{starting to import from country } c)}_{ft-1} \\ &\quad + \gamma_{ict} + \delta_{ft} + \eta_f + \theta_t + \lambda_c + \epsilon_{fct} \qquad (3)\end{aligned}$$

Table IV: First Stage of 2SLS

| $\mathbb{I}$(starting to import from country $c)_{ft-1}$ | [1] | [2] | [3] | [4] |
|---|---|---|---|---|
| $IV_{fct-1}$ | $0.0084886^{***}$ [0.0001982] | $0.0096087^{***}$ [0.0001993] | $0.0085048^{***}$ [0.0001983] | $0.0095611^{***}$ [0.0001993] |
| constant | $0.00188983^{***}$ [0.0000989] | $0.00186762^{***}$ [0.00009] | $0.0191476^{***}$ [0.0001199] | $0.0176743^{***}$ [0.0001105] |
| $\gamma_{ict}$ | No | No | Yes | Yes |
| $\delta_{ft}$ | No | Yes | No | Yes |
| Number of observations | 239505 | 239505 | 239505 | 239505 |

Table V: Second Stage of 2SLS

| $\mathbb{I}$(starting to export to country $c)_{ft}$ | OLS | OLS | IV | IV |
|---|---|---|---|---|
| $\hat{\mathbb{I}}$ (starting to import from country $c)_{ft-1}$ | $0.0145882^{***}$ [0.0377323] | $0.0143549^{***}$ [0.0011562] | $0.06803396^{***}$ [0.0019535] | $0.06609415^{***}$ [0.0019618] |
| constant | $0.0377323^{***}$ [0.0001136] | $0.0330329^{***}$ [0.000137] | $0.0240299^{***}$ [0.0004063] | $0.0204728^{***}$ [0.0003932] |
| $\gamma_{ict}$ | No | Yes | No | Yes |
| $\delta_{ft}$ | No | Yes | Yes | Yes |
| Number of observations | 239505 | 239505 | 239505 | 239505 |
| $R^2$ | 0.136 | 0.1371 | 0.1366 | 0.1376 |

So far, we have been focusing on the impact of lagged imports on the extensive margin of exports to the same market. Next, we examine how the intensive margin of exports is affected. We find that if a firm has imported from a country last year, then it starts exporting there this year on a larger scale. On the other hand, having exported to country $c$ does not affect a firm's first-year import value from $c$ by much.

$$log\, fy\, export_{fct} = \alpha + \beta\, import_{fct-1} + \gamma_{ict} + \delta_{ft} + \eta_f + \theta_t + \lambda_c + \epsilon_{fct} \quad (4)$$

where $fy\, export_{fct}$ is the first-year export value of firm $f$ to country $c$ in year $t$. $import_{fct-1}$ takes a value of 1 if firm $f$ has imported from country $c$ during or before $t-1$.

Table VI: First-Year Export Value

| | | | | | N of observations = 546455 |
|---|---|---|---|---|---|
| | | | | | N of clusters = 137757 |
| | | | | | $R^2 = 0.6725$ |
| $log\, fy\, export_{fct}$ | Coef. | Robust Std. Err. | $t$ | $P > \|t\|$ | 95% Confidence Interval |
| $import_{fct-1}$ | 0.2641031 | 0.0269465 | 9.8 | 0 | [0.2112887,0.3169175] |

$$log\, fy\, import_{fct} = \alpha + \beta\, export_{fct-1} + \gamma_{ict} + \delta_{ft} + \eta_f + \theta_t + \lambda_c + \epsilon_{fct} \quad (5)$$

where $fy\,import_{fct}$ is the first-year import value of firm $f$ to country $c$ in year $t$. $export_{fct-1}$ takes a value of 1 if firm $f$ has exported to country $c$ during or before $t-1$, and 0 otherwise.

Table VII: First-Year Import Value

| | | | | | N of observations = 127349 |
|---|---|---|---|---|---|
| | | | | | N of clusters = 69316 |
| | | | | | $R^2 = 0.8929$ |
| $log\,fy\,import_{fct}$ | Coef. | Robust Std. Err. | $t$ | $P > \|t\|$ | 95% Confidence Interval |
| $export_{fct-1}$ | -0.0310793 | 0.0774445 | -0.4 | 0.688 | [-0.182869,0.120710] |

The asymmetric effects of importing on exporting and exporting on importing are explained in Blaum et al. (2013): holding the extensive margin fixed, expenditure shares across imported products and varieties are fully determined by price-adjusted qualities, that is, by characteristics of the supplying country. Intuitively, our reults suggest that importing helps a firm to resolve some of its market-specific export profitability uncertainty, so that it does not need to start by exporting a small amount to a new destination country to find out if it is going to be successful in that market or not.

Additionally, we find that for the set of countries that a firm has imported from before, the firm is able to keep exporting there for a longer period of time. That is, the survival rate of such a trading relationship is higher. This result suggests that the better and more complete information provided by the importing experience about a specific market also leads to a firm's better export market selection. Therefore, it is not surprising that a firm's probability of survival is higher in the countries that it has already imported from in the past.

Figure VIII: Kaplan-Meier Survival Estimates

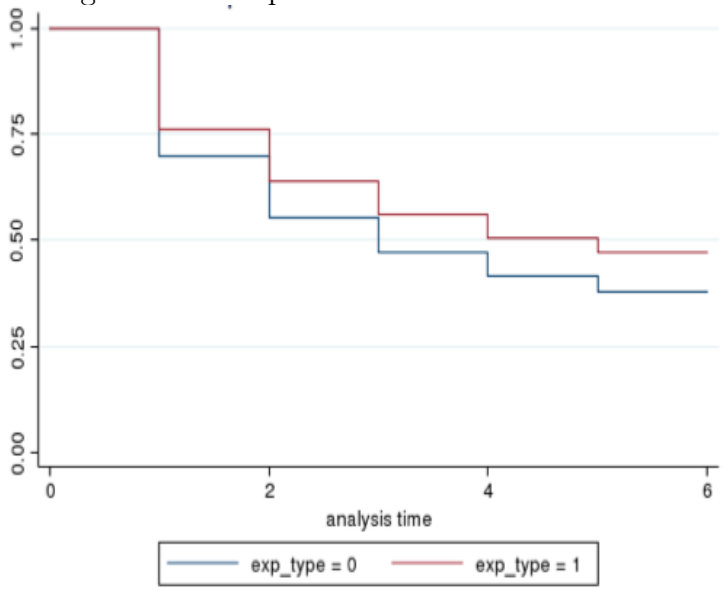
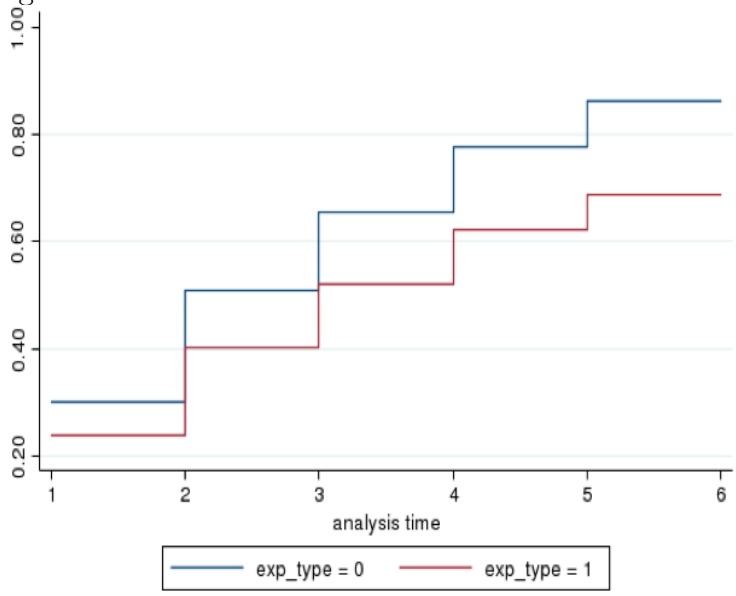



Figure IX: Nelson-Aalen Cumulative Hazard Estimates




The regression results based on Cox proportional hazards model are very similar: having imported from a country reduces the hazard rate of a firm exiting significantly.

Table VIII: Cox Proportional Hazards Model

| N of subjects = 2081047 | | | | | N of observations = 2081047 |
|---|---|---|---|---|---|
| N of failures = 882409 | | | | | |
| Time at risk = 3664374 | | | | | |
| | | | | | LR chi2(1) = 2494.5 |
| Log likelihood = -12504447 | | | | | Prob > chi2 = 0 |
| | Coeffient | Standard Error | $z$ | $P > \|z\|$ | 95% Confidence Interval |
| $import_{fct-1}$ | -0.2305154 | 0.0047779 | -48.25 | 0 | [-0.23988,-0.22115] |

# 6 Conclusions and Future Work

This paper uses one of the most significant trade liberalization episodes in China, which is China's accession to the WTO in December 2001 that induced learning about foreign markets, to separate the effects of imported inputs on a firm's productivity from their effects on a firm's ability to enter individual export markets. It also estimates empirically the importance of importing for overcoming the sunk costs of entering a new export market. First, we find that import tariff reductions encourage firms to start importing from new countries. Second, and more interestingly, we find, based on the IV method, that there is a significant positive causal effect of lagged imports on exports to the same country. That is, having imported from a country in the past increases the probability that a firm starts exporting there as well. Besides looking at the effects of lagged imports on exports at the extensive margin, we also investigate if the intensive margin of exports is affected. We find that a firm starts exporting to a country that it has imported from on a larger scale. In addition, the duration of such a trading relationship is longer. These results help to explain why large exporters are simultaneously large importers, and shed some light on what the large estimated sunk costs and fixed costs of exporting are and how to mitigate them.

Besides developing a model that incorporates firm import behavior, their export decisions

facing uncertainty and learning in a foreign market, it is also interesting to look at the effects of imports on a firm's foreign sales growth conditional on survival. We should also take into account the intensity in learning. Intuitively, importing a larger value of products should generate more learning about a market. Meanwhile, we can also look at exports by product or by industry: if a firm imports some product $p$ from country $c$, then it probably acquires more market knowledge of that product and some related products in the same industry. We can test this hypothesis by investigating whether the effects are stronger for exports of products that are more closely related to imports. Finally, another related question that is quite interesting in itslef is the following: how important is learning by importing compared to learning from others and learning by actual engagement in exporting that have been studied in the literature? While learning by doing (exporting) may be more informative about potential export profitability, it may also be more costly. Fernandes and Tang (2014) ask whether export activities in the neighborhood reveal information about export profitability and thus enhance new exporters' performance. However, they only look at if the information externalities from existing exporters lead to a higher rate of survival after the first year of exporting and a larger volume of initial sales, instead of export market entry. In addition, they only include city-year and market-year fixed effects to control for all unobserved factors that affect both the prevalence of exporters and export survival instead of using an IV strategy for identification. At the same time, Albornoz et al. (2012) develop a model in which a firm discovers its profitability as an exporter only after exporting takes place. It may be interesting to compare the benefits and costs of these three channels of learning, which has important policy implications.

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