Scale, Scope, and Trade Dynamics of Export Processing Plants*

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Abstract

Export processing (EP) accounts for a significant share of aggregate exports from many developing nations. It is the kind of trade through which many countries start participating in global trade. Without a clear understanding about how EP differs from non-processing trade, directly comparing export performance between countries with different dependence on EP may lead to misguided policies. This paper compares and contrasts export patterns and dynamics of EP firms with those of ordinary (non-processing) exporters. Using transaction-level data for the universe of Chinese trading firms over 2000-2006, we establish five stylized facts: compared to ordinary exporters, EP firms (1) are larger but less diversified in both products and destinations within the same industry; (2) start exporting with a larger volume but exhibit less upward mobility; (3) grow less both in the first year of entry and over time (within a market); (4) are less likely to move up to higher sales quintiles over time; (5) are more likely to start selling to more distant markets but less likely to penetrate into new markets after the first year of exporting. We confirm that these facts are observed within firms' ownership types (e.g., foreign versus domestic), industries, destination countries, or geographic regions. Among other alternatives, we propose that incorporating uncertainty in export sales in the standard heterogeneous-firm model is a natural way to explain these facts.

Key Words: export processing, export dynamics, multi-product exporters, margins of trade
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1 Introduction

Many developing countries begin their engagement in global trade by assembling imported intermediates into final products for export. This type of trade, which is often referred to as export processing (EP), has been a pivotal part of the East Asian Miracle growth experience and is still widespread around the world. In 2006-2007, EP plants employed an estimated 63 million people worldwide, accounting for the majority of exports from countries like China, Mexico, the Philippines, Vietnam, and more recently sub-Saharan African nations (ILO, 2007; 2008).[1] For instance, EP persistently accounted for over half of exports of China (see Figure 1) and Mexico (Bergin et al., 2009) in recent years, despite stellar export growth in both countries. Observing the successes of other countries, many governments consider EP as a fast and safe path to industrialization and have used various policies to promote it (Farole, 2011).

Despite its importance for many countries, empirical evidence and analysis about EP firms are scant. While the existing literature has cumulated a rich stock of knowledge about exporting firms using firm and transactions-level data (e.g., Bernard et al., 2007; Manova and Zhang, 2009; Arkolakis and Muendler, 2012; Eaton, Kortum, Sotelo, 2012), the focus has been on non-processing exporters, with interpretations guided mostly by a heterogeneous-firm model about whether, what, and where firms export. While the existing evidence is very useful for understanding export performance of many countries, the framework may not be directly applicable for countries that rely heavily on processing trade (see Table A1 in the appendix). Different from non-processing firms, EP firms often passively receive orders and sometimes even intermediate inputs from foreign buyers. Because of their passive nature, EP firms' export performance can differ substantially from the "active" exporters analyzed in the existing literature. How different they are is unknown. Comparing export performance between countries with different dependence on EP without taking into account their fundamental differences could lead to misguided policies.

The goal of the paper is to provide systematic evidence about the export patterns and dynamics of EP firms, using transaction-level data for all Chinese trading firms over 2000-2006. In China, an EP firm is entitled to a host of tax concessions and other benefits. To operate in the EP regime, a firm needs to apply and obtain approval from the Chinese customs authorities. The unique feature of our data is that we can distinguish EP firms from non-processing exporters based on their registration types.[2] Throughout the paper, we compare and contrast several export outcomes of EP firms with those of ordinary (non-processing) exporters (OE). By highlighting the

[1] See Table A1 in the appendix for details.

[2] EP firms are widespread in other countries but to our understanding, firm-level data for most countries do not separately report EP firms and OE firms, prohibiting researchers from studying the differences between the two types of exporters.

key differences between the two types of exporters, we aim to assess the direction of the potential bias in the aggregate trade statistics when EP trade is the dominant type of a country's exports. In particular, we provide a detailed account of exporters' scale, scope, growth, entry, and transition dynamics, for both types of exporters. Based on these five aspects of exporters' performance, we summarize the main findings in five stylized facts, which provide some guidance for future work on processing trade. These facts show that relative to OEs, EP firms:

1. are larger in terms of sales, but are less diversified in terms of products and destinations.
2. start exporting with a larger volume.
3. grow less, at both the intensive and extensive margins, in the first year of entry and over time (within a market).
4. have a lower probability of moving up to higher sales quintiles over time.
5. are more likely to start selling to more distant markets, but less likely to penetrate into new markets after the first year. In other words, they are much more likely to export to the same set of countries they exported before.

We establish these five facts by regressing different measures of firm export performance on an indicator of whether the firm is a registered processing firm, controlling for a wide range of fixed effects. In particular, we verify that the above five facts are not due to different compositions of ownership types, industries, destination countries, or geographic locations between the two types of exporters. Of note, despite the fact that a significant fraction of EP firms are foreign-owned, the above five facts remain robust and quantitatively similar after controlling for foreign firm fixed effects.

After establishing the stylized facts about EP firms, we discuss how far one can use the standard heterogeneous-firm models to explain these facts. The first two facts about exporters' scale and scope can be readily rationalized by recent multi-product firm models (Feenstra and Ma, 2008; Bernard, Redding and Schott, 2010 and 2011; Eckel and Neary, 2010; Arkolakis and Muendler, 2012; Mayer, Melitz, Ottaviano, 2012). A common theme in this literature is that a firm with a given capability decides whether to export or not, and conditional on exporting, what products and where to export.[3] Trade is associated with fixed costs and only the more productive firms find it

[3] See an extensive review of this literature by Melitz and Redding (2012).

profitable to do it. If exporting an additional product entails extra fixed costs, an exporter chooses to export its "best performing" products. Since EP firms typically receive orders and in some cases even intermediate inputs from foreign buyers for processing, they may not need to invest as much to understand the foreign markets and outreach to potential foreign buyers. Thus, EP firms are likely to be associated with lower fixed costs. Based on Bernard, Redding and Schott (2010 and 2011), if export costs are generally lower for EP, EP firms should be on average less productive than OEs.[4] This can explain why EP firms export fewer products (part of Fact 1); and if fixed export costs are increasing in distance but at a lower rate for EP firms, lower fixed costs can also rationalize why EP firms start exporting to more distant markets (Fact 4).

However, lower fixed export costs for EP firms are insufficient to explain all five facts. If EP firms face lower fixed export costs, they should have lower average export sales (against Fact 1). If we consider the dynamic version of Bernard, Redding, and Schott (2010) (see their online appendix) with fixed export costs incurred every period, there should be more dynamic transition of EP firms across sales quintiles (against Fact 4) and destination markets (against Fact 5). Lower fixed costs for EP firms are also inconsistent with their slower growth after the first year of exporting (against Fact 3).

Thus, in addition to lower fixed costs, we need to consider more model features to explain all five facts pertaining to EP firms. While there can be several alternative explanations, we choose to focus on uncertainty in export profits as the key model feature as most of the differences between the two types of exporters involve diversification (product and country scope) and export dynamics. Existing research finds that exporters often enter a new export market with small export sales before expanding substantially (Eaton et al., 2008 and Iacovone and Javorcik, 2009). Researchers have developed dynamic models that feature demand and supply uncertainties facing new exporters to reconcile these facts (Rauch and Watson, 2003; Segura-Cayuela and Vilarrubia, 2008; Eaton et al., 2009; Freund and Pierola, 2010; Albornoz et al., 2011, among others). The general idea is that when firms (or buyers) are uncertain about their performance as exporters, they enter export markets with small orders, usually nearby, to learn about their present and future profits.[5] After uncertainty is lifted, firms rapidly increase exports. Given that EP firms passively receive orders from foreign buyers, they face less uncertainty about export sales and need not "test the ground" as much as OEs do. They then start exporting with a larger order but grow slower over time.

[4] Dai et al. (2011) and Manova and Yu (2012) find that EP firms are less productive than OE firms in China.

[5] Instead of learning about self export performance, early work by Rauch and Watson (2003) develop a theoretical model to rationalize small exports by considering foreign buyers who are unfamiliar with the suppliers' ability. Araujo, Mion, and Ornelas (2012) instead focus on exporters' learning about foreign distributors. In a model that features Bayesian updating, they show that exports grow over time when exporters become more certain about the probability of distributors' default.

This hypothesis can explain EP firms' larger initial export volume (Fact 2). To the extent that export uncertainty is positively related to physical and cultural distances from the destination countries, incorporating export sales uncertainty in the model can also explain why they tend to start exporting to the more distant markets (Fact 5).

As initially proposed by Rauch and Watson (2003) and recently empirically verified by Albornoz et al. (2012), new exporters learn about their export profitability by exporting. This "learning by exporting" hypothesis predicts that after revealing much of the actual export profitability, exporters either exit if export profits are low or surge if export profits are high. This hypothesis can be used to rationalize that EP firms are less likely to move up sales quintiles (Fact 4) and expand to other markets after initial foreign sales (Fact 5). In other words, EP firms exhibit less pronounced sequential export pattern than OEs as documented by Albornoz et al. (2012) for Argentine exporters.

We confirm that the larger average export sales of EP firms is due to higher quantities, not higher prices. Furthermore, by estimating a set of gravity-type equations, we find the usual negative effects of distance (both physical and cultural) on both firm foreign sales and product scope; but the effects tend to be weaker for EP firms, even after controlling for the exporters' foreign ownership status. These results are consistent with the hypothesis that learning and experimentation appear to be more important for OEs than EP firms. After firm-market uncertainties are unveiled, export grows significantly, conditional on survival. This conjecture also explains why OEs grow faster than EP firms after the first year of exporting and in subsequent years (Fact 3).

The rest of the paper is organized as follows. The next section reviews the related literature. Section 3 describes the data for our analysis. Section 4 documents the five stylized facts. Section 5 interprets the stylized facts in the light of the multi-product firm models that feature export profit uncertainty. The last section concludes.

2 Related Literature

Our paper relates to several strands of literature. As is discussed in the introduction, it relates to a growing literature that incorporates search and learning by exporters in foreign markets to understand initial small-scale exporting to neighboring countries (Rauch and Watson, 2003; Segura-Cayuela and Vilarrubia, 2008; Eaton et al., 2009; Freund and Pierola, 2010; Albornoz et al., 2011, among others).[6] This literature also documents novel facts about firms' internationalization

[6] Among others, Eaton et al. (2008) find that over 60% of new exporters in Colombia do not survive into the next year, but those that do account for a significant share of the country's aggregate export volume. Consistently, Albornoz et al. (2011) find that about half of new exporters in Argentina export only for one year. By focusing on agricultural exports from Peru, Freund and Pierola (2010) find evidence of very large entry and exit in the export

strategies. Albornoz et al. (2010) build a model where a firm discovers its export profitability only after exporting, and decides whether to enter new markets. They show evidence consistent with firms' export profitability correlated across destination countries and time, and that firms exhibit "sequential exporting" behavior. Similarly, Morales et al. (2011) study firms' sequence of exporting, focusing on the idea of "extended gravity". Using the moment inequalities approach, they show that firms are more likely to export to a new destination that shares similar characteristics to their existing destinations. On the theoretical front, Chaney (2011) builds a network-based model in which firms can only export to markets where they have contacts. As firms acquire more foreign contacts, they can expand into more remote countries. Our paper provides a detailed account about the dynamics of EP exporters' penetration sequence, and compares them with those of OEs.

This paper also complements a growing body of empirical studies that examine firm export dynamics. This literature uncovers a number of facts: large number of single-year exporters; a predominance of small-scale exporting to neighboring countries; continuous exporters' entering and exiting individual foreign markets; export surge conditional on surviving the first year of exporting (Eaton et al., 2008; Eaton et al., 2009; Lawless, 2009; Albornoz et al., 2012, among others). By focusing on export dynamics of EP firms, our paper contributes to this literature, which has focused primarily on non-processing exporters or unintentionally mixing EP firms with non-processing firms in the sample.

By documenting the scale and scope of multi-product exporters, our paper contributes to the literature that uses transactions-level data to describe exporters' trade patterns. In particular, our work is closely related to Manova and Zhang (2009), who also use Chinese transactions-level trade data to examine cross-sectional patterns and the margins of trade of Chinese exporters. There are several important differences between our work and theirs. First, we focus on the pattern of EP firms, which account for over half of Chinese exports. In addition to their findings, we provide evidence on exporter transition dynamics across time, sales quintiles and markets to highlight the role of learning that may differ between OE and EP firms. In that regard, our paper is related to Eaton et al., (2008) and Bernard et al. (2009) who study export dynamics and margins of exports of Colombian and US exporters, respectively.[7]

sector and in new destinations, with high exit rates after just one year (above 50% on average), especially among small starters.

[7] It is also related to a growing literature that studies the interactions between processing and ordinary exporters in China (e.g., Jarreau and Poncet, 2012; Manova and Yu, 2013).

3 Data

Our analysis uses transactions-level data that cover the universe of Chinese importers and exporters in each month between 2000 and 2006.[8] The data report values of firm exports and imports in US dollars by product and trading partner for over 200 destination and source countries, and over 7000 different products in the 8-digit Harmonized System classification. Thus, we have the finest possible unit of observation for empirical research in international trade – i.e., at the firm-product-country-month transaction level. The HS 8-digit product classification is country-specific and is subject to changes over time, we therefore aggregate the observations to the HS 6-digit level which is stable across time and countries. We also perform our analysis using data at the HS8-digit level of disaggregation, obtaining qualitatively identical results.

For each transaction reported by an exporting firm, our data contain information on quantities, country of destination, ownership type of firm (e.g. foreign, private, state-owned, collectively owned), region or city in China from where the product was exported, and most importantly, customs regime (e.g., processing and non-processing). In this paper we use data for processing plants which are classified according to the special customs regimes "Processing and Assembling" (pure-assembly) and "Processing with Imported Materials" (import-and-assembly). Non-processing trade is classified by China Customs Statistics according to the regime "Ordinary Trade".[9]

While the data are available at monthly frequency, we focus on annual trade flows.[10] Since we are interested in highlighting differences in export patterns and dynamics between EP and OEs, we only consider firms that engage exclusively in ordinary exports or export processing in a year. We drop firms that operate in both trade modes in the same year,[11] but we include those that operate exclusively in a single regime in a year and in another regime in a different year. We verify that our empirical results are not driven by the exclusion of the hybrid exporters from the sample. Furthermore, since we are interested in studying the export patterns of firms that produce and export goods, we do not consider intermediaries, which are pure import-export companies and do not engage in manufacturing goods. As in Ahn et al. (2011), we identify intermediaries by looking

[8] The same data set has been used by Manova and Zhang (2010) and Ahn, Khandelwal and Wei (2010).

[9] According to Yu (2011), there are 15 other customs regimes, such as compensation trade and border trade. Total exports of these 15 regimes accounted for less than 3 percent of Chinese aggregate export value over the 2000-2006 period.

[10] The data contain a number of additional variables which we do not exploit in this paper. For each (firm, trade partner, product) triplet, we observe the means of transportation (out of 19 options such as air, ship, etc.), the customs office where the transaction was processed (out of 42 offices), the region or city in China where the product was exported from or imported to (out of 710 locations), and any potential transfer country or region (such as Hong Kong). The data set also provides information on the quantities traded in one of 12 different units of measure (such as pieces, kilograms, square meters, etc.).

[11] Around 25% of firms across the sample years operate in both EP and ordinary-trade regimes in the same year. We leave the study of firm transition dynamics between OE and EP for future research.

for certain keywords in companies' names.

4 Stylized Facts

This section documents empirical regularities about the export patterns and dynamics of EP exporters, compared to OEs, which have been the focus of existing literature. We first establish the five stylized facts about EP firms, and then we discuss how extensions of the existing multi-product model can help rationalize all five sets of facts.

4.1 Scale and Scope

We first report cross-sectional patterns of the scale and scope of multi-product and multi-destination exporters. Table 1 reports statistics on the number of products, the number of destinations, and the average export value at the firm level in our sample. The first four columns report the numbers for OEs, while the last four columns are for EP firms. As revealed in the upper panel, the total number of OEs in China grew by 370% between 2000 and 2006, while that of EP plants grew by a much lower rate of 113% over the same period. Aggregate exports by both types of exporters also grew substantially over time. Despite faster growth of OE sales, the contribution of EP exporters to Chinese exports still remained significant in 2006, accounting for around 55% of China's total exports.

Figure 1 shows that EP has consistently accounted for over half of China's aggregate exports between 2000 and 2006. This prominence of EP is widespread across destination countries. Figure 2 shows the share of processing exports in each top-10 destination for 2000 and 2006. The share of processing exports accounted for 63 percent of Chinese exports to the US in 2006. It was 74 percent for Hong Kong, the highest among the top 10 destinations, and was 28 percent for Italy, the lowest among the top 10. In sum, processing exports is a major part of China's overall exports, as well as exports to its major destinations.[12]

As is reported in the lower panel of Table 1, OEs on average export more products and to more destinations. The average number of products per OE ranges between 6 and 9, while that by an EP firm ranges between 4 and 5 across the sample period.[13] We also find that OEs sell in slightly more markets. OEs export to 4 to 6 destinations on average, while EP exporters export to 4 to 5 destinations.[14] In terms of firm export value, despite the faster growth of OEs' foreign sales, the

[12] These aggregate statistics include hybrid exporters that engage in both ordinary and processing exports.

[13] We find the same pattern when looking at the median number of products, with a smaller difference. The median OE firm exports 2 to 3 products, versus 2 by EP firms

[14] The median OE firm exports to 2 to 3 destinations instead of 1 to 2 by EP exporters.

median EP firm is still about twice as big in terms of foreign sales as the median OE firm in 2006. Behind the stability of these trade patterns, there could be considerable differences in firm entry, exit, and within-firm dynamics between the two types of firms. These firm-level patterns will be further explored in section 4.2.

Let us take a closer look into the product and destination scope of each type of exporters. Figure 3, which plots the kernel density of the (log) number of products (over 5000 HS6 categories), shows that OEs sell more products than EP firms on average. As is shown in Tables A1 and A2 in the appendix, multi-product exporters in China account for over 80% of total exports in the sample period. Consistent with Table 1, we find that proportionally more OEs are multi-product firms. In 2006, 69% of OEs are multi-product firms, compared to 63% for EP. Single-product OE exporters account for 14% of total export value in 2006, compared with around 12% for EP. For both types of exporters, the share of single-product exporters in total exports has decreased over the sample period.[15]

In terms of destination scope, Figure 4 shows that OEs tend to export to more destinations. Tables A3 and A4 in the appendix show that for both types of exporters, over half of the firms export to multiple destinations. Relatively more EP firms export to a single destination, consistent with Figure 4. More specifically, in 2006, 32% of OEs are single-country exporters, mediating around 8% of exports; while 41% of EP firms are single-country exporters, accounting for around 7% of total export value.

To examine more systematically the product and destination scope of each type of exporters, we regress the number of products exported and the number of destinations served by the firm in each year between 2000 and 2006, on an export-processing firm dummy, controlling for a range of fixed effects. Given that the dependent variable is a count variable, we estimate the following specification using a negative binomial model:

$$\#products_{it} = \beta_1 EP_i + \beta_2 \ln X_{it-1} + \{FE\} + \epsilon_{it}, \tag{1}$$

The dependent variable is the number of HS 6-digit categories at the firm-year level. EP_i is an indicator variable for whether firm i is an EP firm. We also control for the (log) firms' lagged total exports (X_{it-1}) to proxy for the firm's capability to expand its product scope. We include a wide range of fixed effects, denoted by $\{FE\}$, which will be discussed below. Standard errors are bootstrapped.

Table 2 reports the results. In column (1), without including any fixed effects, the coefficient

[15] The distribution of export flows is skewed but significantly less so than in the US. Bernard, Jensen and Schott (2009) report that 38% of single-product exporters accounted for less than 1% of export value in the US.

on the EP dummy is negative and statistically significant at the 1% level. The magnitude of the coefficient implies that EP firms on average export about 50% ($= \exp(-0.701) - 1$) fewer products than OEs. This negative correlation can arise from different compositions of industries or varying prevalence of foreign ownership between the two types of exporters. To address the composition effects, we include a variety of fixed effects in the regression. In columns (2) to (4), we include ownership type fixed effects (state-owned, joint-ventures, private-domestic or foreign-owned) to control for the fact that firms with different ownership types face different market conditions, such as financial constraints as is highlighted by Manova, Wei, and Zhang (2012). Conditioning on ownership type is important to account for the fact that foreign-owned firms, which prevail in EP trade in China, may have different characteristics than domestic companies which may affect our outcomes. This ensures that the estimated difference in product scope between EP and OE firms is the result of firm organizational form and not ownership type.

Column (2) also includes industry-year fixed effects, where an industry is defined as an HS 2-digit category, to control for industry idiosyncrasies in a given year.[16] The coefficient declines significantly in size (from -0.70 to -0.19 log points) but remains statistically significant. These results show that EP and OEs are concentrated in different industries, which are intrinsically associated with different numbers of product varieties. Nevertheless, while different compositions of firm ownership types and industries explain a bulk of the difference in product scope, within an industry-year and ownership type, we still observe significantly lower product scope among EP firms. The coefficients on the EP dummy suggest that EP firms export 18% to 50% (0.19 to 0.70 log points) fewer products on average.

In column (3), we include province-year fixed effects to control for province-level trends such as changes in the business environment or policies in a province that affect both types of exporters. In column (4), we control for province-industry-year fixed effects to account for time-varying systematic differences across provinces that have differential effects across industries (e.g., differences in business environments or policies that may impact certain industries more). By controlling for the unobserved province-specific time-varying factors that may affect product scope of exporters, we continue to find a lower product scope for EP firms. Repeating the analysis using OLS and $\ln(\#products_{it})$ as dependent variable yields similar results.[17]

Next we examine whether EP firms have a smaller destination scope. We estimate the following specification:

$$\#destinations_{it} = \gamma_1 EP_i + \gamma_2 \ln X_{it-1} + \{FE\} + \epsilon_{it}, \tag{2}$$

[16] For firms that operate in multiple HS2 sectors, we consider the HS2 of the firm's main line of business.

[17] These results are available upon request.

The dependent variable is the number of destinations served by firm i in year t. Similar to eq. (1), we control for the (log) firms' lagged exports (X_{it-1}) to proxy for the firm's capability to export to multiple countries. We include the same set of fixed effects and regressors as above. As reported in columns (5) through (8) of Table 2, we find that EP firms export to fewer destinations than OEs. The coefficient on the EP dummy is always negative and statistically significant at the 1% level. This result is again obtained across as well as within industry-years, province-years, province-industry-years, and ownership types. The coefficients on EP_i suggest that EP firms serve 26% to 44% (0.31 to 0.58 log points) fewer foreign markets on average, depending on the set of fixed effects included. OLS regressions using $\ln(\#destinations_{it})$ as the dependent variable yield similar results.

Next we examine exporters' scale. As reported in Table 1, EP exporters are on average four to seven times larger in terms of export value than OEs, while the median EP firm is still over twice as large as the median OE firm. Figure 5, which plots the kernel density of (log) firm exports, shows that EP firms have a thicker right tail. To verify that larger EP sales are observed both across and within industries, provinces and different ownership types, we regress the log of firm exports on the EP dummy along with an exhaustive set of fixed effects. We estimate the following linear regression for exports at the firm-year and firm-product-country-year level over the 2000-2006 period:

$$\ln(Exports)_{it} = \theta_1 EP_i + \{FE\} + \epsilon_{it}, \tag{3}$$

where i and t stand for firm and year, respectively. Table 3 reports the regression results at the firm-year level and includes the same set of fixed effects $\{FE\}$ as in Table 2. Standard errors are robust and clustered by firm in column (1) and at the same level of the fixed effects added (other than ownership) in each remaining specification. We find a positive and statistically significant coefficient (at the 1% level) on the EP dummy, suggesting that EP firms are on average larger than OEs. This difference is observed across all firms (column 1) as well as within industry-years (column 2), province-years (column 3) and province-industry-years (column 4). In columns (2) through (4) we also condition on ownership type. This accounts for the fact that foreign-owned firms, may have different characteristics from domestic companies which may affect exports. The difference in size between EP and OE firms is estimated above and beyond the effect of foreign ownership, which is a common ownership type in EP trade.

In columns (5) through (8) of Table 3, we further explore the relationship at the firm-product-country level, controlling for the firm's lagged total exports. In addition to the controls and fixed effects above, we include industry-destination-year fixed effects (column 6) which encompass all

unobserved industry-country-specific shocks. We also include province-country-year fixed effects which absorb all unobservable province-country characteristics (e.g. comparative advantage of the province in exporting to a specific destination country).[18] The larger average size of EP firms are found within an industry-country-year (column 6), province-year (column 7) and among firms in a province exporting to the same destination in a year (column 8). Specifically, the results from column (8) show that an EP firm on average exports 19 percent more than an OE that exports to the same destination, from the same province, in the same industry (HS2) and ownership type.

The main message of the results in this section is summarized as follows:

Fact 1: Within the same industry, province, and ownership type, processing exporters are larger in terms of sales, but are less diversified in terms of the number of products and destinations, relative to ordinary exporters.

4.1.1 Potential Reasons for Fact 1

The fact that EP firms have a larger scale could result from charging higher export prices. To examine whether EP firms charge more per unit of sales, Table 4 regresses the (log) unit value at the firm-product-country level on the EP dummy. Following the literature, a product is defined as an HS-8 category.[19] Ownership type fixed effects are always included in the light of the recent findings that foreign-owned exporters sell at a price premium compared to domestic exporters in China (Ge, Lai, and Zhu, 2012). In column (1), we find that EP firms' export prices are lower than OEs' within the same ownership type, year, and province-country-product. The difference is about 12%. The province-country-product fixed effects control for all unobserved determinants of prices specific to the province (e.g., different wages across regions), to the country (e.g., higher prices to richer countries as is documented by Manova and Zhang, 2012), and to the product (e.g., different units of measurements) all at once. We continue to find lower prices among EP firms when product-country-year fixed effects are controlled for, which capture any unobserved determinants of prices that vary across products, countries, and years. The price gap between the two types of exporters increases when exporters' total sales are controlled for. In sum, the results in Table 4 show that the larger sales of EP firms are not due to higher prices, but higher export quantity.

Fact 1 may arise from a different mix of destination countries between EP and OEs. To examine this possibility and shed some light about the reasons behind the observed differences, Table 5

[18] A recent paper by Keller, et al. (2012) shows that the distribution of trading partners of Shanghai at the turn of the 20th century continues to affect the city's export patterns today.

[19] The unit of measurement is the same within the same HS-8 category, which may not be true at the HS-6 level. Thus, to make the unit value comparable across firms, we conduct our analysis at the most disaggregated product level.

investigates the relation between exporters' scope, scale and distance to the destinations.[20] We consider both physical and cultural distances. We use the genetic distance measure proposed by Spolaore and Warziarg (2009) as an exogenous measure of the cultural dissimilarity between the Chinese and the destination country's populations.[21] In addition to the distance measures, we also include interaction terms between the distance to the destination and the EP dummy. We also control for ownership type and province-industry-year fixed effects. The coefficient on the stand-alone distance variables is interpreted as the distance effect on OE's product scope or scale, while the coefficient on the interaction term is the differential effect of distance on EP firms.

In columns (1) and (2), we find that the coefficients on the stand-alone distance measures are statistically significant and take the expected sign – negative for the measures of both physical distance and genetic (cultural) distance. That is, exporters sell fewer products to more distant countries (both geographically and culturally).[22]

More importantly, we find a positive and significant coefficient on the interaction terms between the EP dummy and the distance measures, suggesting that while distance is associated with a smaller exporters' product scope, this negative effect of distance is weaker for EP firms than for OEs. We also investigate the role of distance on firm export value. In columns (3) and (4), we find that for OEs, we obtain the standard result that bilateral exports decline with distance (both geographic and cultural) to the destination. For EP firms, once again we find a positive coefficient on the interaction terms, suggesting that the negative effect of distance on export volume is weaker for EP firms. A possible explanation for the weaker distance effects for EP firms is that while uncertainty about the destination is increasing in physical and cultural distance, EP firms are affected less as they are approached directly by foreign buyers and need not invest as much in knowing and outreaching customers. We will elaborate this explanation in section 5 after presenting the rest of the stylized facts.

Table A6 in appendix in addition to the interaction terms between the EP dummy and the distance measures, further includes interaction terms between a foreign ownership dummy and distance. We continue to include province-industry-year FE. Since foreign ownership prevails in export processing, this table investigates if the differential effect of distance on EP firms remains beyond the differential effect of foreign-ownership. The coefficients on the interaction terms between the EP dummy and the distance measures remain positive and statistically significant. This suggests

[20] In our investigation of how country characteristics affect exporters' outcomes, we drop exports to Hong Kong and Macau as their geographic and cultural distance to China are essentially zero.

[21] Genetic distance is a measure based on differences in the distribution of gene variants across populations between two countries. It has been used in existing literature to study the impact of cultural differences on exchanges (Guiso, Sapienza, and Zingales, 2009) and technology diffusion (Spolaore and Warziarg, 2009).

[22] These results are consistent with Bernard et al (2011) who also find a negative (positive) relationship between the extensive margin of exported products and distance (GDP).

that the negative effect of distance (physical and cultural) on product scope and export value is weaker for EP firms, even after controlling for differential effects for foreign owned firms. In these specifications the coefficient on the stand-alone distance variables remains negative and statistically significant and measures the effect of distance on domestic OE's (the omitted category) product scope or scale. While the coefficient on the interaction term between the EP dummy and distance measures the differential effect of distance on EP firms. The coefficient on the foreign-distance interaction term is the differential effect of distance on foreign-owned firms. In sum, the weaker distance effects for EP firms remains after controlling for differential effects for foreign-owned firms.

4.2 Export Dynamics

Recent research shows that there is a prevalence of exporters that start exporting with a small volume, with a large fraction of them exiting after the first year of exporting. Export sales of surviving exporters surge in the second year with stabilized growth in subsequent years (Eaton et al., 2008; Lawless, 2009; Eaton et al., 2010; Albornoz et al., 2012, among others). Based on the findings of this literature, we examine whether EP firms have a different size on entry in a new market, different growth rates conditional on survival, and different transition dynamics across sales quantiles.

4.2.1 Entry Size

To investigate the size on entry in export markets of EP versus OEs, in Table 6 we regress the log value of firm exports in the first year of exporting on the EP dummy variable, and a set of fixed effects, as explained in the previous section. We estimate a linear regression for exports at entry, similar to eq. (3). Columns (1) through (4) report regression results at the firm level. Column (1) reports results across all firms. Column (2) includes industry-year fixed effects, while columns (3) and (4) include province-year and province-industry-year fixed effects. We also control for ownership type of the firm in columns (2) to (4). By including these fixed effects, we are estimating the difference between OE and EP firms in the same entry cohort within an industry or province. Standard errors are robust and clustered by firm in column (1) and at the same level of the fixed effects added (other than ownership) in each remaining specification. We obtain a positive and statistically significant coefficient (at the 1% level) on the EP dummy across all four specifications. The results show that EP firms start exporting with a larger volume than OEs within the same industry-province-year, confirming that the findings of larger initial export sales is not driven by different industry mixes or any industry-specific or province-specific shocks in a year. Columns (5) through (8) report results at the firm-country level. Controlling for a wide range of fixed effects,

we find that EP firms sell more in a new country, compared to OEs.

The evidence from Table 6 can be summarized by the following fact:

Fact 2: Processing exporters start exporting with a larger volume, relative to ordinary exporters.

4.2.2 Export Growth

Next we investigate the differential export growth for EP firms versus OEs. Table 7 regresses firm export growth on the EP dummy and a comprehensive set of fixed effects. Columns (1) through (4) investigate year-on-year export growth at the firm level. The EP dummy is negative and statistically significant across all specifications, implying a lower average growth of EP firms than OEs. Columns (5) to (8) are for export growth between the first and the second year in export markets, conditional on survival. We find that EP entrants grow less between the first and the second year in export markets than OEs. By including industry-year (columns 2 and 6) and province-year (columns 5 and 7) fixed effects, we confirm these findings within industries and provinces for firms in the same entry cohort. When province-industry fixed effects are included in column (8), the EP dummy continues to be negative but loses significance. Overall, the results in Table 7 can be summarized as follows:

Fact 3: Processing exporters grow less than non-processing exporters at both the intensive and extensive margins, in the first year of entry and over time (within a market).

4.2.3 Firm Transition Dynamics

Next we study how firms transit between export quintiles across time, as is reported by Eaton et al. (2008). We divide firms into quintiles according to their previous year's export volume (pooled across all destinations). Table 8 reports year-to-year transitions for both EP and OE exporting firms, the conditional probability of transiting from export sales quintile x in $t-1$ to quintile y in t is shown. We also report the probability of entry into exporting (exit from exporting) for each quintile in the last row (column) of the table.

For both types of exporters, the diagonal entries take the highest values in each row or column, implying that firms have higher probability of staying in the same quintile than moving to any other quintile in the following year. Importantly, EP firms consistently have a higher probability to stay in the same quintile than OEs, which exhibit more potential to move up to higher sales quintiles. For instance, EP firms in the lowest quintile have 64% chance to continue to sell in the

same quintile, compared to 46% chance for OEs. This is consistent with the findings from Table 7 that EP firms' growth is slower than OEs. In terms of entry, both types of exporters exhibit surprisingly similar quintile distribution. About 29% of the entrants in each regime enter small (in the lowest sales quintile).[23] For OEs, 11% of the new exporters start exporting directly in the top sales quintile, while 13%, of EP exporters start in the highest sales quintile.

Exporters from the lowest sales quintile have the highest probability of moving up to higher sales quintiles. Eaton et al. (2008) also find the same pattern for Colombian exporters and use it as suggestive evidence that exporters go through a learning period during which foreign clients place small orders initially to learn about the firms products and capability for fulfilling larger orders in the future (Rauch and Watson, 2003). Once the trial stage is completed, surviving firms' exports grow rapidly as much uncertainty is lifted.

Across all sales quintiles, EP firms have lower probability of moving up to higher sales quintiles than OEs. This is consistent with the findings above that EP firms enter exports larger than OEs and grow less subsequently. These results suggest that perhaps learning plays a more important role for OEs, compared to EP firms. Many EP firms are subsidiaries of foreign firms and assemble inputs into finished goods for their parent companies, and therefore the need for them to place small orders to learn about the foreign markets before committing a large amount of resources is much less important.

In Table 9, we examine the relationship between the entry size in any given year, and export growth in the immediate following year (i.e., the second year of exporting). The bottom row reports the share of entrants in each quintile in the year of entry. The diagonal entries are smaller than those in Table 8. This means that firms have a higher probability to move to other quintiles in the year right after entry than in subsequent years. In other words, it becomes significantly more difficult to move to other quintiles if firms do not do it in the year of entry. Another interesting finding is that consistently with the long-run results in Table 8, EP entrants are more likely to stay put than OE entrants; that is, mobility right after entry is also lower for EP firms right after entry, similar to the year-to-year transition.

OE (EP) firms that enter in the lowest quintile, conditional on staying, have 65% (53%) chance to transit to higher sales quintiles in the following year, while OE (EP) firms that start exporting in the third quintile, face a 53% (41%) chance of growing to the top two quintiles in the following year. In sum, firms that start smaller, conditional on survival, have a higher probability to move up sales quintiles. These results defy Gibrat's Law, which postulates no relationship between firm size and growth. In terms of transition dynamics across quintiles, the pattern is quite similar to that

[23] This is similar to the evidence from Colombia, where one third of the new exporters enter the lowest quintile (Eaton, et al., 2008).

in Colombia, as reported by Eaton et al. (2008), with the exceptions that Chinese new exporters have higher probability to start selling in higher sales quintiles, and that EP firms are more likely to stay put than OEs. Summarizing the results in this section gives us the following fact:

Fact 4: Processing exporters have a lower probability to move up to higher sales quintiles over time, compared with ordinary exporters.

4.3 Firms' Internationalization Strategies

We now turn to examining the transition dynamics of cross-market entry and exit. Table 10 splits the sample into firms that export to 1, 2, ... 30+ destinations, and shows the year-to-year transition probabilities of changing the number of destinations (i.e., conditional probability of transiting from exporting to x destinations in $t-1$ to y destinations in t). The upper panel reports the numbers for OE, while the lower panel is for EP.[24] By construction, the entries in each column add up to 1. For OEs, the probability of exporting to the same number of destinations in the following year is almost always higher than the probability of transiting to exporting to a different number of countries, except for cases involving initially exporting to 4-5 destination countries.

The bottom row of the table shows the share of firms that start exporting to different number of destinations. For both types of firms, new exporters are most likely to start serving a single market. 45% (56%) of OE (EP) firms started exporting to one destination and only about 1% (1%) started exporting to more than 30 destinations. When firms expand market penetration, they tend to do so gradually rather than in big jumps. This pattern is evidenced by the fact that the probability of expanding to y destinations is generally decreasing in y (with a few exceptions). The same is true for firms dropping markets. The probability of dropping markets is decreasing in the number of markets served for firms that serve more that 5 countries.

The probability of exporting to the same number of destinations in the following year is almost always higher than the probability of transiting to exporting to a different number of countries.[25] Notably, the diagonal entries for EP firms are always higher than the corresponding ones for OEs, suggesting that EP firms are relatively more stagnant in terms of exporting to more countries over time. In other words, EP firms are less mobile in terms of exporting to more countries.

Table 11 reports the conditional probability of transiting from exporting to destination group x in year $t-1$ (column) to destination group y in year t (row). We consider 4 groups of destinations – the European Union (EU), US, neighbors (NE), and the rest of the world (RW), spanning 15

[24] The table reports the percentage of firms that started exporting to the number of destinations specified in the column that transited to exporting to the number of destinations specified in the row, conditional on survival.

[25] Except for the case involving initially selling in 5 markets

possible destination combinations.[26] The table examines transitions between these 15 combinations of countries from $t-1$ to t. The entries in each column sum up to 1.[27] The bottom row reports the initial fraction of firms serving the country combination specified in the column. The diagonal entries have the largest values for both EP and OEs, showing large persistence in the groups of destinations served. EP firms show larger diagonal values than OEs in most cases, suggesting that EP firms are more stagnant in market penetration.

The most common destination for OEs is the "neighbor" (NE) group (23%) (which includes Korea, Taiwan and Russia, etc.), followed by the rest of the world (RW) (20%). The fact that the numbers in any rows are drastically different across columns implies that a firm's probabilities of moving into different markets depend on its previous-year market position. For instance, firms previously exporting to the "neighbor" group are more likely to move to NE+RW (5%) than to any other country groups. Of note, for OEs, exporting to EU offers the greatest probability of launching to multiple markets. These results contrast with Eaton et al. (2008), who find in Colombia that exporting to neighbors first is most promising for reaching more markets. In China, starting to export to neighbors offers the greatest probability of staying put among OEs (87%).

For EP firms, the most common destination is also the "neighbor" (NE) country group. The fraction of firms (pooled across sample years) that start exporting to neighbor countries only is 26%. The second most popular group is the rest of the world (RW) (17%). Similar to OEs, EP exporters have the EU as the best platform for launching to a larger number of markets. Specifically, an EP firm that exported to EU in the previous year has about 20% chance to export to more than one country group, compared with 7% if it exported to "neighbor" only or 18% if it exported to the US only.

The probabilities of transiting to more markets are smaller for EP firm than OEs, suggesting that market penetration is less dynamic for EP firms. Exporting to neighbors is very sticky in terms of market transitions. 92% of EP firms that exported to neighbors in the previous year would continue to export to neighbors only in the current year, larger than 87% for OEs in the same situation. In sum, we find that the sequential export patterns, a focus of recent studies (e.g., Albornoz et al., 2012), are quite different between EP and OEs.

To more systematically investigate exporters' market penetration dynamics, we estimate a linear probability model of market entry. We first define a binary variable $Entry_{ict}$, which takes the value

[26] Neighbor country group includes AF: Afghanistan, BT: Bhutan, IN: India, JP: Japan, KZ: Kazakhstan, KP: Korea DPR, KR: Korea Rep., LA: Laos, MN: Mongolia, MM: Myanmar, NP: Nepal, PK: Pakistan, PH: Philippines, RU: Russia, TJ: Tadzhikistan, and VN: Vietnam. The sample includes all firms that export for at least 2 years to a country.

[27] This implies that each entry within a column is a mutually exclusive event (i.e., the row RW implies serving the rest of the world only, excluding those that serve the rest of the world and any other country group).

of 1 if firm i enters a new country c at period t and zero otherwise. Therefore, in each period firm i chooses to enter one or more new export destinations. We drop the firm-country pair from the sample for period $t+1$ and onwards if $Entry_{ict} = 1$ at t. The estimation sample includes all firms that export to a country for at least 2 years. We estimate the following specification for the entry probability:

$$\Pr(Entry_{ict} = 1) = \eta_1 EP_{it} + \eta_2 \ln X_{it-1} + \{FE\} + \epsilon_{ict}, \tag{4}$$

We include the same set of regressors as described in previous specifications. Among other fixed effects, we always control for ownership type of the firm to account for the fact that foreign-owned firms, which prevail in EP trade, may have different characteristics than domestic companies that may affect entry. EP_{it} is a dummy variable for EP firms. If $\eta_1 < 0$, EP firms are less likely to enter new export destinations than OEs in year t. Table 12 reports results from estimating equation (4). The coefficient on the EP dummy is negative and statistically significant at 1% level across all specifications with different fixed effects. This suggests that the probability of entering a new market is lower for EP firms than for OE's. This result is observed within the same country-year and firm ownership type (column 2), within the same country-province-year and ownership type (column 3), as well as within the same year, country-industry-province group, and ownership type (column 4). Columns (5) and (6) include (log) firm total exports in the previous year, which partly accounts for any supply shocks in year $t-1$ that may affect the firm's decision to enter a new destination in year t.

Table 13 investigates the effect of distance to the destination on the entry probability. In columns (1) and (2) we include measures for geographic and cultural distance as well as interaction terms between the distance measures and the EP dummy, to investigate the differential effect of distance on the entry probability for EP relative to OEs. We find that OEs are less likely to enter more distant destinations (geographically and culturally). The positive and significant coefficient on lagged firm exports suggests that larger exporters are more likely to enter new destinations. More importantly, we find positive and significant coefficients on the interaction terms between the EP dummy and distance (both geographic and cultural), which suggest that EP firms are more likely to start exporting to distant countries relative to OEs. In other words, the negative effect of distance on the entry probability is weaker for EP firms. If fixed costs of trade are higher for more distant markets, new exporters (or exporters to new countries) tend to use closer markets as "testing grounds". If the fixed costs of trade are lower for EP firms and the distance effects are smaller, EP firms are less likely to sell to proximate markets before serving more distant markets.

In columns (3) and (4) we further include interaction terms between a foreign-ownership dummy

and distance. This investigates if the weaker effect of distance on EP firms' entry probability that we estimate above is robust to considering differential effects for foreign-owned companies. The coefficient on the stand-alone distance variables now measures the effect of distance on entry probability for domestic OE firms. The effect remains negative and statistically significant. Importantly, the coefficients on the interaction between the EP dummy and distance remain positive and statistically significant, confirming that EP firms are more likely to start exporting to distant countries relative to OEs. This weaker effect of distance on the entry probability on EP firms is estimated above and beyond the differential effect of distance on foreign-owned firms, measured by the interactions between the foreign dummy and the distance variables. The findings in this section can be summarized by the following fact:

Fact 5: Compared to ordinary exporters, processing exporters are more likely to start selling to more distant markets, but less likely to penetrate into new markets after the first year. In other words, they are much more likely to export to the same set of countries they exported before.

5 Interpretation of the Stylized Facts

What accounts for the observed differences between OE and EP firms? In this section, we interpret the stylized facts in the light of existing models. We provide several directions to extend the standard heterogeneous-firm model to explain the facts documented. Let us first summarize the stylized facts as follows: Compared to OEs,

Fact 1: EP firms are larger in terms of sales (within the same industry, province, destination, and ownership), but are less diversified in terms of products and destinations.

Fact 2: EP firms start exporting with a larger volume.

Fact 3: EP firms grow less, at both the intensive and extensive margins, in the first year of entry and over time (within a market).

Fact 4: EP firms have a lower probability of moving up to higher sales quintiles over time.

Fact 5: EP firms are more likely to start selling to more distant markets, but less likely to penetrate into new markets after the first year.

The first two facts are related to exporters' scale and scope, which can be in part rationalized by the recently proposed multi-product firm models. Bernard, Redding and Schott (2010) and (2011) develop a general equilibrium model of multiple-product firms, which features heterogeneity in firm productivity and within-firm product attributes. Firms have to pay fixed costs to serve each additional market and to produce each additional product. In addition to the country-specific

productivity cutoff above which a firm exports, as in Melitz (2003), there is a product cutoff above which a firm can profitably export the product. More productive firms have lower product cutoffs as they can generate sufficient operating profits to cover the product fixed costs even when the product attributes are low. Therefore, more productive firms supply a wider range of products.[28] Eaton, Kortum, and Kramarz (2011), on the other hand, develop an extension of the Melitz (2003) model to study exporters' scope of destination markets. Their model features heterogeneous firm productivity, a fixed measure of potential firms as in Chaney (2008), and a fixed market entry cost that is increasing in the fraction of potential consumers reached as in Arkolakis (2010). Their model shows that the more productive firms sell to more destinations.

This literature postulates that more productive exporters have larger foreign sales, a wider product range, and serve more countries. To the extent that EP firms are approached by foreign buyers, instead of investing to reach out to foreign buyers, they incur a lower fixed market cost, as modeled by Arkolakis (2010). The productivity cutoff for exporting would then be lower for EP firms, compared to OEs, resulting in a lower average productivity and smaller product and country scopes for EP firms. Thus, Fact 1 can be rationalized by the simple fact that EP firms face lower fixed costs. Furthermore, if fixed export costs are increasing in distance but at a lower rate for EP firms, lower fixed costs can also rationalize why EP firms start exporting to more distant markets (Fact 4).

Do lower fixed export costs for EP firms suffice to explain all five facts? In the multi-product heterogeneous-firm discussed above, lower fixed costs for EP firms would imply lower average export sales, not higher as is stated by Fact 1. Furthermore, if fixed export costs are incurred every period, lower fixed costs for EP would imply more dynamic transition of EP firms across destination markets and sales quintiles, not less as is described by Facts 4 and 5. Lower fixed costs for EP firms also cannot explain their slower growth in the first year of exporting and in subsequent years (against Fact 3).

Thus, we need to consider other dynamic aspects of exporting, in addition to lower fixed costs, to explain all observed differences between EP firms and OEs. While there can be several alternative explanations, we choose to focus on uncertainty of export profits as the key model feature to include, as most of the differences between the two types of exporters involve diversification (product and country scope) and export dynamics. Existing research finds that exporters often enter a new export market with small export volume before expanding substantially (Eaton et al., 2008 and Iacovone and Javorcik, 2009). Research has developed dynamic models featuring demand and supply uncertainties facing new exporters to reconcile these facts (Rauch and Watson, 2003; Segura-

[28] See Nocke and Yeaple (2006), Eckel and Neary (2010), Arkolakis and Muendler (2012) and Mayer et al. (2012) for other models of multi-product firms.

Cayuela and Vilarrubia, 2008; Eaton et al., 2009; Freund and Pierola, 2010; Albornoz et al., 2011, among others).[29] Another strand of work studies how relationships between foreign buyers and suppliers develop over time and across destinations, as in Rauch and Watson (2003), Araujo, Mion, and Ornelas (2012), Chaney (2012), and Eaton et al. (2012).

The main idea of this literature is that when firms or foreign buyers are uncertain about export profitability, new export transactions will be small and usually happen in neighboring markets. After learning about export profitability from initial sales, firms either exit if realized profits are low or surge in exports once uncertainty is unveiled. Conditional on survival, export growth from the first year to the second year is usually high. This literature receives empirical support from Albornoz et al. (2012), Eaton et al. (2008, 2010), and Iacovone and Javorcik (2009). While it is relatively silent about product and market scopes, a natural extension of the existing models by incorporating these features would predict that exporters will first export the best performing products to destinations that are easier to penetrate, before expanding exports to other products and markets.

Given that EP firms passively receive orders from foreign buyers and need not "test the ground" as OEs do, it is conceivable that they face lower uncertainty about export sales, and not just lower fixed export costs. If EP firms face lower uncertainty about foreign sales, they may start exporting with a larger volume, as is described by Fact 2. In terms of how uncertainty affects the scope of an exporter, three partial effects are in order. First, according to the multi-product models discussed above, a higher average productivity of OEs imply that they will have a wider product scope and country scope on average. Second, due to higher risks, OEs have stronger incentives to diversify over products and countries. Countervailing these forces is the need to experiment exporting sequentially, especially in the first year, by selling the best performing products (to the safest markets) first. The net effect of all these three forces is theoretically ambiguous. Fact 1 shows that EP firms have smaller product and country scopes on average, suggesting that by pooling all cohorts of exporters (entrants and continuing exporters) together, the productivity and diversification effects seem to dominate the experimentation effects on average. Furthermore, to the extent that demand and supply uncertainties increase with physical and cultural distance to the destination countries, lower uncertainties facing EP firms can explain why EP firms tend to start exporting to more distant markets (Fact 5).

Different export uncertainties facing the two types of exporters are also revealed in their export dynamics. Based on the model by Rauch and Watson (2003), Albornoz et al. (2012), or Akhmetova and Mitaritonna (2012), exporters enter a market with small orders when facing large uncertainty;

[29] Segura-Cayuela and Vilarrubia develop a dynamic general equilibrium model, which features uncertainty and learning about country-specific fixed export costs.

but after uncertainty is lifted, firms either exit if profits are low or increase exports rapidly. Suppose foreign buyers do not default on their payments, there is much less export profit uncertainty facing EP firms, who receive orders directly from foreign buyers. In other words, OEs have much more to learn about their export potential from their first year in export markets. The longer time OEs take to realize their export profitability can explain the last three facts about EP firms. In summary, our findings of more pronounced "sequential exporting" of OEs provide indirect support to Albornoz et al. (2012), who emphasize learning and experimentation as the driver of exporter dynamics.

6 Conclusions

Despite the importance of export processing (EP) in many developing countries, existing research has not provided a systematic description of EP firms. Using transaction-level data for the universe of Chinese trading firms, we provide evidence on export patterns and dynamics of this type of exporters. We compare and contrast these findings with those of ordinary (non-processing) exporters (OE), the focus in the existing literature, to understand how EP firms are different. Due to the passive nature of EP firms, they can behave quite differently from OEs. As such, their varying prevalence of EP across countries should be taken into account when one wants to assess countries' export performance using aggregate trade data.

We establish five stylized facts about EP firms: compared to OEs, EP firms (1) are larger but less diversified in both products and destinations within the same industry; (2) start exporting with a larger volume but exhibit less upward mobility; (3) grow less both in the first year of entry and over time within a market; (4) are less likely to move up to higher sales quintiles over time; (5) are more likely to start selling to more distant markets but less likely to penetrate into new markets after the first year of exporting.

We discuss how incorporating export profit uncertainty into the existing multi-product firm models can explain all five facts. These findings suggest that countries relying heavily on processing exports would appear to have more stable (less volatile) export dynamics at the aggregate. Our findings that EP firms start exporting with a large volume confirm the common belief that EP is a safe path for a country to engage in global trade. However, the lower upward mobility of EP firms highlights a trade-off between having a high survival rate of new exporters and benefiting from potentially more dynamic long-run growth supported by established exporters who go through learning.

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8 Figures and Tables

Figure 1:

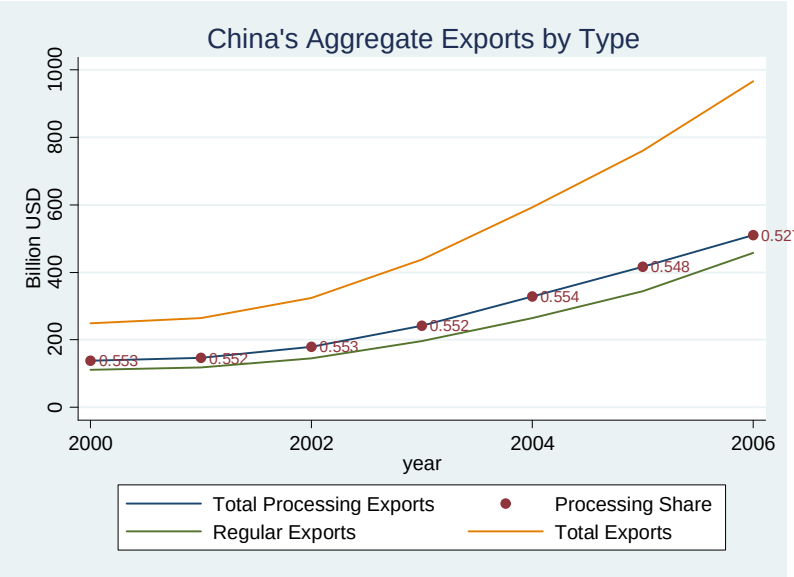

Figure 2:

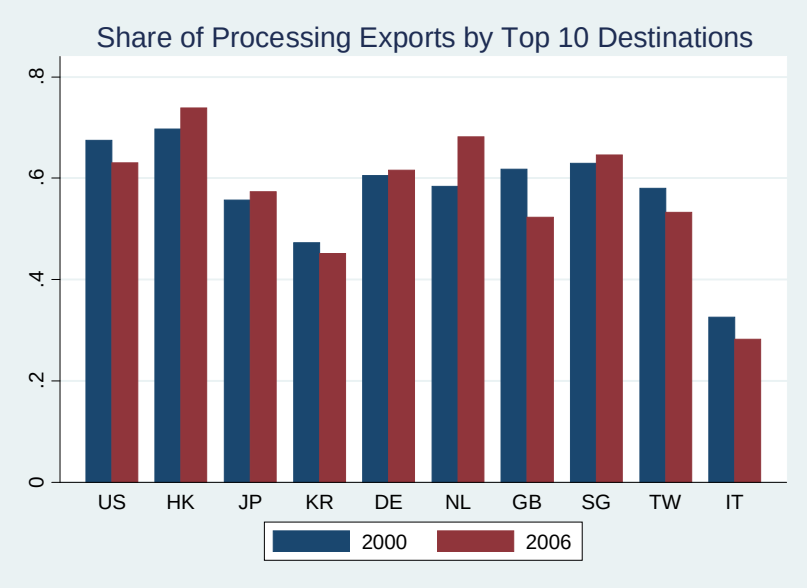

Figure 3:

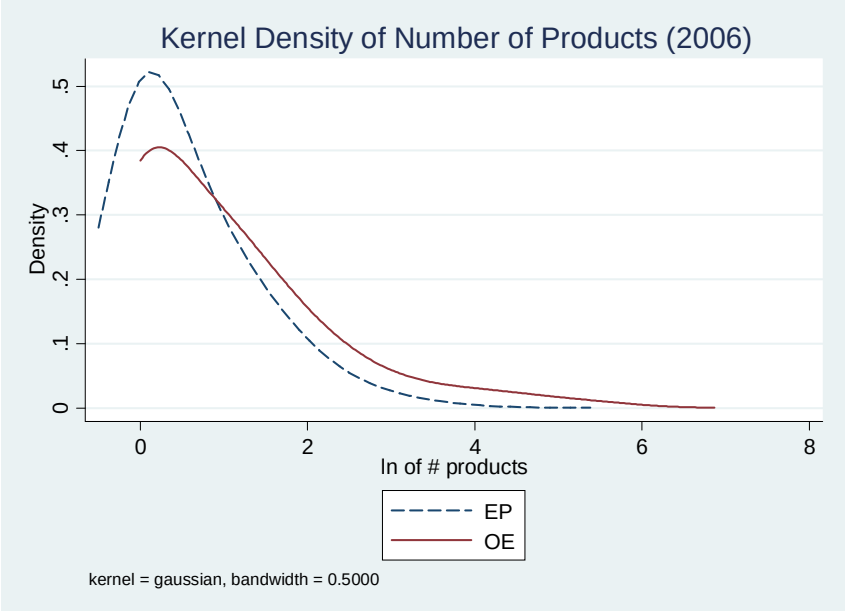

Figure 4:

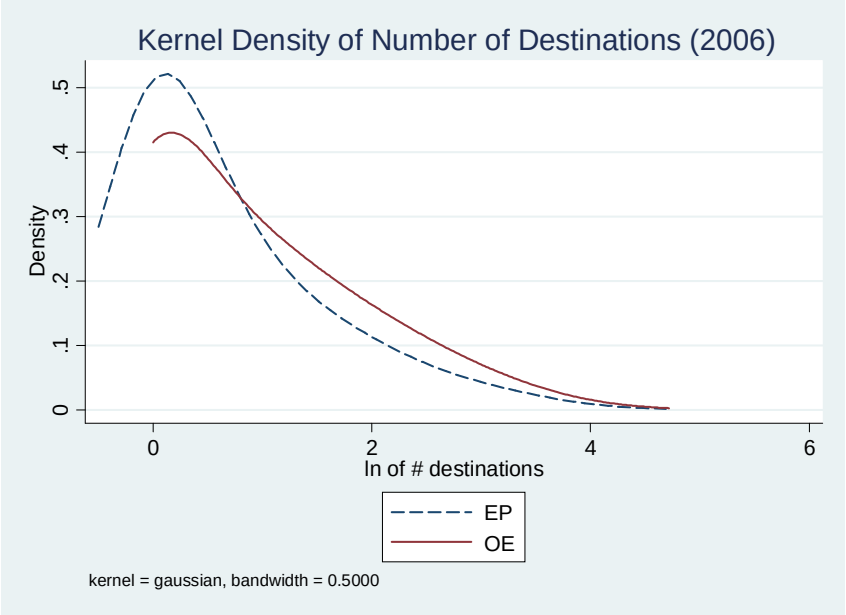

Figure 5:

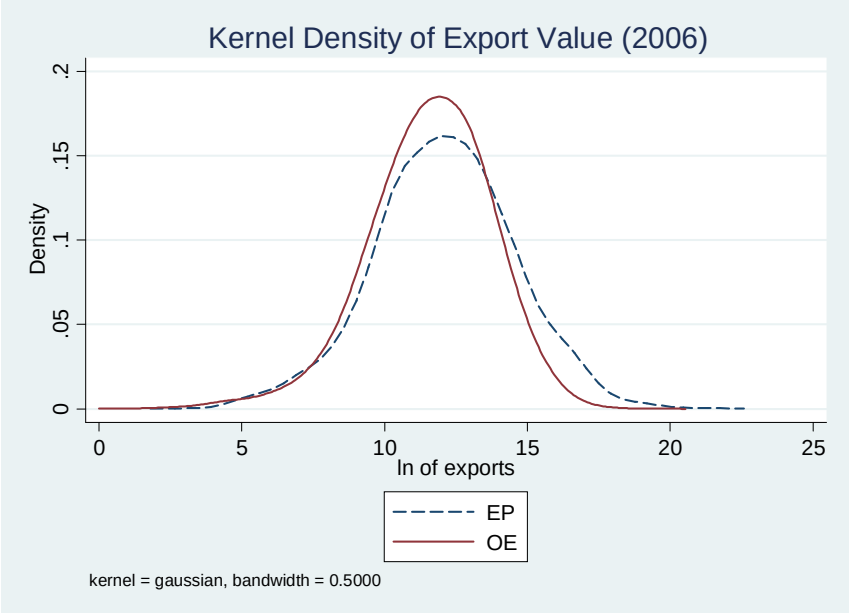

Table 1: Firm-level Trade Patterns

	Ordinary Exporting				Export Processing			
	2000	2002	2004	2006	2000	2002	2004	2006
Agregate level								
Number of firms	24150	34727	62291	89328	14078	14436	16210	15958
Number of products	4392	4658	4749	4789	2735	2835	2842	2789
Number of destinations	202	204	211	215	184	195	197	197
Exports (US$ millions)	22713	38286	86197	158089	48024	70211	127122	196808
Firm level								
Number of products								
Mean	6	8	9	9	4	4	5	5
Median	2	2	2	3	2	2	2	2
Stand. Dev	17	29	29	25	11	16	15	15
Number of destinations								
Mean	4	5	6	6	4	4	5	5
Median	2	2	3	3	1	2	2	2
Stand. Dev	7	8	9	9	6	7	8	8
Exports (US$ thousands)								
Mean	940	1102	1384	1770	3411	4864	7842	12333
Median	162	230	272	351	432	482	559	712
Stand. Dev	8886	7686	10319	14967	19015	67172	108926	148235

Table 2: Product and Destination Scope

Dep. Variable:	#products$_{it}$				#destinations$_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Processing	-0.701***	-0.193***	-0.257***	-0.314***	-0.580***	-0.363***	-0.306***	-0.321***
	(-50.33)	(-12.45)	(-10.99)	(-22.39)	(-61.19)	(-19.04)	(-21.67)	(-23.73)
ln(firm exports)	0.230***	0.103***	0.104***	0.113***	0.258***	0.195***	0.165***	0.182***
	(63.79)	(27.47)	(36.50)	(72.04)	(159.70)	(64.26)	(58.18)	(93.34)
ownership FE		yes	yes	yes		yes	yes	yes
industry*year FE		yes				yes		
province*year FE			yes				yes	
province*ind.*year FE				yes				yes
N	286209	286205	251048	248423	286209	286205	251048	248423
ll	-842757	-834731	-643216	-584843	-803466	-798729	-678656	-622334

This table examines product and destination scope. The dependent variable is number of HS 6-digit categories exported at the firm-year level in columns (1) to (4) and the number of destinations served in columns (5) to (8). Processing is an indicator variable for whether firm i is an EP firm. log of firm aggregate exports, included as control are lagged one year. Given that the dependent variable is a count variable, we use a negative binomial model. t statistics are reported in parentheses. All regressions include a constant term. Standard errors are bootstrapped. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 3: Export Value

Dep. Variable:	ln(Exports$_{it}$)				ln(Exports$_{ipct}$)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Processing	0.732***	0.856***	0.832***	0.869***	0.649***	0.404***	0.315***	0.186***
	(51.02)	(16.03)	(16.40)	(25.99)	(16.52)	(16.09)	(5.30)	(4.52)
ln(firm exports)					0.112***	0.118***	0.186***	0.202***
					(9.57)	(53.49)	(21.80)	(64.63)
ownership FE		yes	yes	yes		yes	yes	yes
industry*year FE		yes						
industry*country*year FE						yes		
province*year FE			yes				yes	
province*industry*year FE				yes				
province*country*year FE								yes
Nb. Obs.	473115	473115	416330	416330	4910131	4910131	2880367	2880367
R-sq	.0187	.0446	.0437	.0479	.026	.0405	.032	.0334

This table examines exporters' scale. The dependent variable is export volume at the firm-year level in columns (1) to (4) and export volume at the firm-product-country-year level in columns (5) to (8). Processing is an indicator variable for whether firm i is an EP firm. log of firm aggregate exports included as control are lagged one year. We include different sets of fixed effects in the columns of the table. t statistics are reported in parentheses. Standard errors are robust and clustered by firm in columns (1) and (5), and at the level of the fixed effects included, other than ownership, in the remaining columns. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 4: Export Prices

Dep. Variable:	ln(price$_{ipct}$)			
	(1)	(2)	(3)	(4)
Processing	-0.125***	-0.150***	-0.285***	-0.270***
	(-13.82)	(-30.64)	(-37.70)	(-63.56)
ln(firm exports)			0.0232***	0.0196***
			(25.20)	(30.21)
ownership FE	yes	yes	yes	yes
year FE	yes		yes	
province		yes		yes
country*product*province	yes		yes	
country*product*year		yes		yes
N	4263343	4263343	2962604	2962604
R-sq	.0155	.0471	.0234	.0495

This table examines whether EP firms charge more per unit of sales than OE firms. We regress the (log) unit value at the firm-product-country level on the EP dummy (Processing). A product is defined as an HS-8 category. In columns (3) and (4) we control for the log of firm aggregate exports lagged one year. We include different sets of fixed effects in the columns of the table. t statistics are reported in parentheses. Standard errors are robust and clustered by country-product-province in columns (1) and (3) and by country-product-year in columns (2) and (4). Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 5: Product Scope, Export Value and Destination Country Characteristics

Dep. Variable:	#products$_{ict}$		ln(Exports$_{ict}$)	
Country Char. (Z)	ln(dist)	ln(g. dist)	ln(dist)	ln(g. dist)
	(1)	(2)	(3)	(4)
Processing*Z	0.0258***	0.0361***	0.0569***	0.0555***
	(4.11)	(4.82)	(3.26)	(2.85)
Z	-0.0556***	-0.0350***	-0.114***	-0.00727
	(-20.90)	(-13.93)	(-18.55)	(-1.16)
Processing	-0.328***	-0.345***	-0.571***	-0.425***
	(-5.77)	(-6.55)	(-3.34)	(-2.74)
ln(firm exports)	0.0476***	0.0458***	0.300***	0.295***
	(28.97)	(26.21)	(65.12)	(65.21)
ownership FE	yes	yes	yes	yes
province*industry*year FE	yes	yes	yes	yes
Nb obs.	1198476	1061020	1152073	1016525
ll or R-sq	-2015434	-1786849	.0669	.0644

This table examines the relation between exporters' scope and scale and (physical and cultural) distance to the destinations. We drop exports to Hong Kong and Macao as their geographic and cultural distance to China is essentially zero. In addition to the distance measures, we also include interaction terms between the distance to the destination and the EP dummy (Processing) to assess whether there are differential effects of distance on EP firms. We control for ownership and province-industry-year fixed effects. In columns (1) and (2) the dependent variable is the number of HS 6-digit categories exported at the firm-year level. We use negative binomial in estimation and bootstrap standard errors. In columns (3) and (4) the dependent variable is export volume at the firm-year level. In these columns, we do not consider firms that export to a single destination in a given year, to allow us to include the log of firm aggregate exports, lagged one year, as control. t statistics are reported in parenthesis. Standard errors are robust and clustered by province-industry-year. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 6: Export Value at Entry

Dep Variable:	ln (Exports$^0_{it}$)				ln (Exports$^0_{ict}$)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Processing	0.764***	0.758***	0.756***	0.752***	0.385***	0.290***	0.305**	0.257***
	(56.48)	(10.92)	(8.80)	(17.83)	(28.84)	(6.96)	(2.30)	(11.16)
ownership FE		yes	yes	yes		yes	yes	yes
industry*year FE/		yes						
country*year FE						yes		
province*year FE			yes				yes	
province*ind.*year FE/				yes				
province*country*year FE								yes
N	186906	186906	165282	165282	1451015	1451015	1044881	1044881
R-sq	.0183	.0381	.0372	.0408	.0046	.0042	.0028	.0029

In this table we regress the log value of firm exports in the first year of exporting on the EP dummy variable (Processing), and a set of fixed effects. We estimate a linear regression for exports at entry. In columns (1) to (4) observations are at the firm-year level, while in columns (5) to (8) they are at firm-country-year level. t are reported in parenthesis. Standard errors are robust and clustered by firm in columns (1) and (5), and at the level of the fixed effects included, other than ownership, in the remaining columns. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 7: Export Growth

Dep. variable:	Export growth$_{it}$				Initial Year Export growth$^0_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Processing	-25.20***	-27.24***	-22.92**	-15.79**	-38.17***	-39.37**	-44.95*	-21.41
	(-4.83)	(-3.62)	(-2.15)	(-2.16)	(-3.73)	(-2.43)	(-1.70)	(-1.26)
ownership FE		yes	yes	yes		yes	yes	yes
industry*year FE		yes				yes		
province*year FE			yes				yes	
province*industry FE				yes				yes
year FE				yes				yes
Nb obs.	271545	271545	237625	237625	105277	105277	91672	91672
R-sq	.00003	.0064	.0007	.0101	.00004	.0213	.0023	.0364

This table investigates the differential export growth for EP firms versus OE firms. We regress export growth at the firm level on the EP dummy (Processing) and the comprehensive set of fixed effects. Columns (1) to (4) report results for year-on-year growth, while columns (5) to (8) are for export growth between the first and the second year in export markets, conditional on survival. t statistics are reported in parenthesis. Standard errors are robust and clustered by firm in columns (1) and (5), and at the level of the fixed effects included, other than ownership and year, in the remaining columns. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 8: Transition Matrix across Quintiles of Export Value between consecutive years

Ordinary Exporters						
	Quintile in t-1 (x)					
Quintile in t (y)	1	2	3	4	5	P(exit in quintile y)
1	46.48	19.26	6.86	3.00	1.35	30.63
2	28.08	36.68	18.10	6.00	2.09	23.24
3	15.02	26.29	38.98	17.12	3.94	17.79
4	7.51	13.19	27.59	48.96	14.21	14.34
5	2.92	4.57	8.47	24.92	78.41	14.00
P(entry in quintile x)	29.33	24.32	19.85	15.27	11.24	
Export Processing						
	Quintile in t-1 (x)					
Quintile in t (y)	1	2	3	4	5	P(exit in quintile y)
1	64.04	20.39	4.85	1.51	0.47	30.96
2	23.07	51.36	19.52	3.71	0.85	22.72
3	8.20	20.57	54.56	17.46	1.75	18.34
4	3.49	6.09	18.03	63.67	12.54	15.34
5	1.19	1.60	3.05	13.64	84.39	12.65
P(entry in quintile x)	29.30	23.23	18.50	15.54	13.43	

This table reports year-to-year transitions for both EP and OE exporting firms, the conditional probability of transiting from export sales quintile x in t-1 to quintile y in t is shown. We also report the probability of entry into exporting (exit from exporting) for each quintile in the last row (column) of the table. The table reports the number of firms which transited from quintile of exports x in t-1 to quintile y in t, divided by the number of firms in quintile x in t-1. 1 is the lowest quintile and 5 the highest.

Table 9: Transition Matrix from the Entry Quintile to other Quintiles in Subsequent Year

	Ordinary Exporters				
	Quintile in t-1 (x)				
Quintile in t (y)	1	2	3	4	5
1	35.24	14.63	5.86	3.00	1.55
2	27.13	25.59	13.37	5.50	2.66
3	19.48	27.58	27.55	13.07	4.69
4	11.93	21.45	33.37	36.23	12.32
5	6.23	10.76	19.85	42.20	78.78
P(firm in entry cohort t-1 start exporting in quintile x)	24.28	22.5	20.34	17.99	14.89
	Export Processing				
	Quintile in t-1 (x)				
Quintile in t (y)	1	2	3	4	5
1	46.93	15.35	4.56	1.58	0.64
2	26.50	36.60	14.57	3.79	0.93
3	15.05	26.46	39.79	14.51	1.76
4	8.50	16.40	30.06	51.80	10.73
5	3.02	5.19	11.03	28.31	85.95
P(firm in entry cohort t-1 start exporting in quintile x)	24.10	22.13	20.01	17.61	16.15

This table investigates the relationship between the size of entry in any given year, and export growth in the immediate following year. The bottom row reports the share of entrants in each quintile in the year of entry. The table reports number of firms which transited from quintile of exports x in t-1 to quintile y in t, divided by the number of firms in quintile x in t-1. 1 is the lowest quintile and 5 the highest.

Table 10: Transition Matrix across the Number of Destinations an Exporter Sells to

	Ordinary Exporters							
	Initial number of destinations (x)							
Final number of destinations (y)	1	2	3	4	5	6-10	11-30	>30
1	62.64	27.65	14.06	8.28	5.42	3.09	1.53	1.67
2	18.38	31.35	20.28	12.74	7.37	3.52	1.15	1.10
3	7.48	15.79	20.72	16.24	10.94	4.91	1.10	0.66
4	3.66	8.69	14.05	16.68	14.19	6.53	1.23	0.93
5	2.21	4.97	9.53	12.66	14.18	8.30	1.48	0.68
6-10	3.93	8.41	15.98	25.49	35.70	43.86	13.38	2.64
11-30	1.56	2.92	5.06	7.48	11.64	28.82	71.02	22.08
31+	0.13	0.23	0.32	0.43	0.56	0.97	9.09	70.23
P(start exporting to x number of destinations)	44.75	16.94	8.98	5.68	4.10	10.03	8.10	1.41
	Export Processing							
	Initial number of destinations (x)							
Final number of destinations (y)	1	2	3	4	5	6-10	11-30	>30
1	77.91	31.16	14.37	7.82	4.49	2.23	0.89	0.23
2	14.23	41.38	25.34	13.42	9.39	3.45	0.88	0.30
3	3.48	13.92	27.63	20.12	12.51	5.42	0.89	0.23
4	1.57	5.43	13.49	20.44	17.25	6.99	0.95	0.23
5	0.90	3.07	6.75	13.51	17.83	9.46	1.18	0.30
6-10	1.30	3.65	9.82	19.98	30.63	49.26	14.08	0.83
11-30	0.56	1.29	2.53	4.37	7.48	22.71	75.28	21.07
31+	0.05	0.09	0.07	0.34	0.42	0.48	5.85	76.81
P(start exporting to x number of destinations)	55.74	17.30	7.00	4.18	2.79	6.71	5.47	0.80

This table splits the sample into firms that export to 1, 2, ... 30+ destinations, and shows the year-to-year transition probabilities of changing the number of destinations (i.e., conditional probability of transiting from exporting to x destinations in t-1 to y destinations in t), The upper panel is for OE, while the lower panel is for EP. The bottom row of the table shows the share of firms that start exporting to different number of destinations. The table reports number of firms which transited from exporting to x destinations in t-1 to y destinations in t, divided by the number of firms exporting to x destinations in t-1.

Table 11: Transition Matrix for Groups of Destinations an Exporter Sells to

A. Ordinary Exporting	**Initial group of destinations(x)**														
Final group of destinations (y)	RW	NE	US	EU	US, RW	EU, RW	NE, RW	NE, US	NE, EU	US, EU	NE, EU, US	US, EU, RW	US, NE, RW	EU, NE, RW	NE, EU, US, RW
RW	**79.31**	0.64	1.10	0.93	7.62	7.28	7.41	0.35	0.37	0.26	0.16	1.20	1.66	1.54	0.49
NE	0.82	**87.16**	0.62	0.70	0.20	0.17	7.13	**10.86**	9.36	0.05	1.86	0.01	1.70	0.94	0.26
US	0.39	0.25	**76.20**	0.50	7.46	0.16	0.09	7.73	0.25	7.59	2.06	1.13	1.28	0.03	0.29
EU	0.38	0.20	0.63	**73.65**	0.15	5.41	0.06	0.26	7.57	6.38	2.06	1.18	0.05	0.84	0.32
US, RW	2.77	0.05	**6.97**	0.17	**61.17**	0.65	0.41	1.43	0.10	1.19	0.48	3.86	5.82	0.12	0.46
EU, RW	3.96	0.10	0.20	**8.14**	0.89	**59.28**	0.65	0.00	1.76	1.42	0.44	5.40	0.17	4.77	0.76
NE, RW	**6.97**	**5.43**	0.22	0.30	1.27	1.04	**67.11**	1.67	1.29	0.08	0.24	0.15	8.62	6.12	0.70
NE, US	0.06	1.67	3.33	0.06	0.57	0.01	0.34	**55.06**	0.45	0.32	4.73	0.04	3.64	0.07	0.26
NE, EU	0.04	1.80	0.12	3.87	0.07	0.49	0.43	0.88	**52.87**	0.74	5.01	0.13	0.17	2.44	0.36
US, EU	0.05	0.04	3.95	3.48	0.67	0.69	0.01	0.56	0.79	**56.35**	6.02	3.89	0.08	0.08	0.42
NE, EU, US	0.02	0.34	0.63	0.80	0.09	0.14	0.11	5.04	5.59	4.77	**47.86**	0.58	0.63	0.30	1.21
US, EU, RW	1.13	0.04	2.70	2.82	**8.94**	8.86	0.17	0.61	0.45	**14.26**	2.26	**62.65**	1.48	1.07	4.69
US, NE, RW	0.97	0.67	1.56	0.04	6.01	0.15	4.97	10.22	0.35	0.32	1.13	0.57	**54.72**	0.89	2.10
EU, NE, RW	1.91	1.02	0.07	2.69	0.29	**10.24**	**8.01**	0.35	**13.27**	0.55	2.30	1.33	2.06	**62.37**	5.28
NE, EU, US, RW	1.20	0.61	1.67	1.84	4.60	5.43	3.11	4.98	5.54	5.72	**23.38**	**17.87**	**17.92**	**18.43**	**82.41**
P(start exporting to group of destinations x)	19.85	23.16	8.14	7.74	3.42	4.88	7.45	1.64	2.00	2.06	0.95	4.14	2.17	4.52	7.89

B. Export Processing	**Initial group of destinations(x)**														
Final group of destinations (y)	RW	NE	US	EU	US, RW	EU, RW	NE, RW	NE, US	NE, EU	US, EU	NE, EU, US	US, EU, RW	US, NE, RW	EU, NE, RW	NE, EU, US, RW
RW	**84.42**	0.37	0.64	1.00	7.65	7.83	7.62	0.10	0.57	0.22	0.25	1.16	1.45	1.28	0.23
NE	0.74	**92.22**	0.26	0.41	0.10	0.09	**8.89**	9.84	8.32	0.00	1.76	0.00	1.61	0.98	0.15
US	0.84	0.25	**80.55**	1.12	9.96	0.27	0.08	**9.94**	0.00	10.90	2.76	1.66	1.13	0.08	0.50
EU	0.38	0.10	0.52	**77.92**	0.21	6.57	0.04	0.00	6.99	4.78	1.63	0.70	0.00	1.05	0.23
US, RW	3.21	0.03	**5.79**	0.29	**59.64**	0.90	0.45	0.88	0.00	1.57	0.13	4.58	5.80	0.30	0.61
EU, RW	2.13	0.05	0.06	**4.42**	0.68	**55.81**	0.34	0.10	0.57	1.27	0.25	3.92	0.08	5.49	0.29
NE, RW	**4.42**	**3.20**	0.08	0.06	0.31	0.90	**71.07**	0.88	0.95	0.07	0.13	0.07	6.52	6.32	0.25
NE, US	0.02	1.42	2.35	0.12	0.52	0.00	0.34	**57.31**	0.95	0.90	5.78	0.13	5.23	0.08	0.25
NE, EU	0.07	0.76	0.00	2.12	0.00	0.72	0.23	0.39	**55.20**	0.37	4.02	0.03	0.40	2.26	0.26
US, EU	0.17	0.05	3.82	5.30	1.26	1.44	0.00	0.78	0.95	**53.88**	5.03	4.74	0.32	0.08	0.54
NE, EU, US	0.00	0.27	0.72	1.06	0.31	0.09	0.04	5.75	7.75	4.25	**50.63**	1.03	0.89	0.75	1.43
US, EU, RW	1.29	0.02	2.61	2.89	**10.17**	**11.25**	0.08	0.58	0.19	**14.63**	3.52	**61.84**	2.25	1.20	**5.29**
US, NE, RW	0.58	0.54	0.88	0.06	4.61	0.27	4.35	7.02	0.38	0.45	0.75	0.60	**57.00**	1.05	1.62
EU, NE, RW	0.67	0.37	0.02	1.59	0.16	7.74	4.24	0.39	**10.40**	0.30	1.51	0.70	0.89	**60.15**	1.82
NE, EU, US, RW	1.07	0.36	1.71	1.65	4.40	6.12	2.25	6.04	6.81	6.42	**21.86**	**18.85**	**16.43**	**18.95**	**86.51**
P(start exporting to group of destinations x)	16.69	26.21	13.18	5.32	3.62	2.45	4.99	2.07	1.07	2.82	1.31	4.69	2.08	2.16	11.34

This table reports the conditional probability of transiting from exporting to destination group x in t-1 (column) to destination group y in t (row). We consider 4 groups of destinations, the European Union (EU), US, neighbors (NE), and the rest of the world (RW), spanning 15 possible destination combinations. To have a comparable sample to that used in tables 12 and 13 below, we drop exports to Hong Kong and Macao as their distance to China is essentially zero, and we include all firms that export to a country for at least 2 years. The table examines transitions between these 15 combinations of countries from t-1 to t. The bottom row reports the initial fraction of firms serving the country combination specified in the column.

Table 12: Probability of Exporting to a New Country

Dep. Variable:	$Entry_{ict}$ (Binary)					
	(1)	(2)	(3)	(4)	(5)	(6)
Processing	-0.0043***	-0.0021***	-0.0025***	-0.0024***	-0.0036***	-0.0039***
	(-67.76)	(-8.98)	(-22.26)	(-27.45)	(-26.85)	(-39.46)
ln(firm exports)					0.0011***	0.0013***
					(50.29)	(78.79)
ownership FE		yes	yes	yes	yes	yes
country*year FE		yes				
country*province*year FE			yes		yes	
country*industry*province FE				yes		yes
year FE				yes		yes
N	113023768	113023768	104860407	104860407	52538615	52538615
R-sq	.000449	.00182	.00108	.00153	.00175	.00248

This table estimates a linear probability model of market entry. The dependent variable is a binary variable which takes the value of 1 if firm i enters a new country c at period t and zero otherwise. Therefore, in each period firm i chooses to enter one or more new export destinations. We drop the firm-country pair from the sample for period t+1 and onwards if Entryict = 1 at t. The estimation sample does not include single-year firms or firm-country pairs. Processing is an indicator variable for whether firm i is an EP firm. We include different sets of fixed effects in the columns of the table. In columns (5) and (6) we control for the log of firm aggregate exports lagged one year. t statistics are reported in parentheses. Standard errors are robust and clustered by firm in column (1), and at the level of the fixed effects included, other than ownership and year, in the remaining columns. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

Table 13: Probability of Exporting to a New Country and Country Characteristics

Dep. Variable:	Entry$_{ict}$ (Binary)		Entry$_{ict}$ (Binary)	
Country Char. (Z)	ln(dist)	ln(g. dist)	ln(dist)	ln(g. dist)
	(1)	(2)	(3)	(4)
Processing*Z	0.00466***	0.00544***	0.00316***	0.00357***
	(23.44)	(19.65)	(16.89)	(13.94)
Foreign*Z			0.00345***	0.00428***
			(22.66)	(21.86)
Z	-0.00814***	-0.0102***	-0.00990***	-0.0124***
	(-56.42)	(-49.88)	(-53.19)	(-46.23)
Processing	-0.0467***	-0.0433***	-0.0334***	-0.0302***
	(-25.69)	(-21.81)	(-19.66)	(-16.63)
Foreign			-0.0362***	-0.0356***
			(-24.67)	(-23.42)
ln(firm exports)	0.00130***	0.00127***	0.00126***	0.00123***
	(33.05)	(32.85)	(32.86)	(32.66)
ownership FE	yes	yes		
Province*industry*year FE	yes	yes	yes	yes
N	37415780	34105716	37415780	34105716
r2	.00305	.00451	.00283	.00436

This table investigates the effect of distance to the destination on the entry probability. We drop exports to Hong Kong and Macao as their geographic and cultural distance to China is essentially zero. We include measures for geographic and cultural distance as well as the interaction terms between the distance measures and the EP dummy (Processing). We control for the log of firm aggregate exports lagged one year. In columns (3) and (4) we further include interaction terms between a foreign ownership dummy and distance to account for the fact that foreign ownership prevails in EP trade, and investigate if the differential effect of distance on EP firms remains beyond that of foreign ownership. t statistics are reported in parentheses. Standard errors are robust and clustered by province-industry-year. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.

A Appendix

A.1 Tables

Table A1: Percentage of EP in total exports (2002, 2006)

Country	2002	2006
Philippines	87	60
Malaysia	83	83
Mexico	83	47
Gabon	80	80
Macao, China	80	80
Zimbabwe	80	80
Vietnam	80	80
Dominican Republic	80	80
Tunisia	80	52
Kenya	80	86.9
Senegal	80	-
Mauritius	77	42
Morocco	61	61
Bangladesh	60	75.6
Costa Rica	50	52
Haiti	50	50
Madagascar	38	80
Sri Lanka	33	38
Cameroon	32	33
Maldives	13.2	47.7
Colombia	9.3	40

Source: ILO (2008)

Table A2: Percentage of Multiproduct Firms

	Ordinary Exporting				Export Processing			
Number of products	2000	2002	2004	2006	2000	2002	2004	2006
1	37.61	34.38	32.90	31.02	37.68	36.89	36.95	37.15
2	19.28	18.63	17.78	17.53	18.78	18.65	18.55	18.63
3	10.86	11.26	10.77	11.08	11.13	11.32	11.15	11.10
4	6.99	7.47	7.44	7.61	7.34	7.81	7.33	7.33
5	4.94	5.13	5.29	5.45	5.33	5.62	5.19	5.30
6-10	10.23	11.95	12.11	13.00	11.17	11.19	12.06	11.54
11-30	6.99	7.77	8.62	9.26	7.66	7.52	7.72	7.74
>30	3.11	3.42	5.08	5.06	0.90	1.00	1.05	1.22

This table reports the distribution of exporting firms according to the number of products they export in selected years of our sample, for regular exporters and for export processing firms. The entries in each column sum to 100.

Table A3: Percentage of Exports by Multiproduct Firms

	Ordinary Exporting				Export Processing			
Number of products	2000	2002	2004	2006	2000	2002	2004	2006
1	21.91	15.99	15.49	13.99	17.17	11.36	11.95	11.52
2	13.7	13.64	12.12	11.58	13.93	13.86	9.35	10.63
3	8.01	8.74	9.35	8.97	10.83	9.02	6.35	9.51
4	6.53	8.58	6.67	6.95	7.07	8.11	9.95	5.56
5	4.85	5.39	5.19	5.8	6.94	7.38	5.02	4.54
6-10	14.2	15.41	16.6	18.26	19.31	16.5	16.96	15.05
11-30	15.75	16.91	18.84	18.71	17	15.06	15.83	14.42
>30	15.04	15.34	15.74	15.74	7.75	18.72	24.6	28.76

This table reports the distribution of exports of multiproduct firms according to the number of products they export in selected years of our sample, for regular exporters and for export processing firms. We report the percent share of total exports that firms in each product bin capture. The entries in each column sum to 100.

Table A4: Percentage of Exports by Multidestination Firms

	Ordinary Exporting				Export Processing			
Number of destinations	2000	2002	2004	2006	2000	2002	2004	2006
1	42.25	35.64	33.80	31.58	52.12	48.34	46.42	40.67
2	17.45	16.34	15.09	14.86	17.63	17.19	16.97	17.51
3	8.81	9.49	9.18	9.12	7.59	7.83	7.62	8.37
4	5.81	6.38	6.44	6.47	4.43	4.83	4.82	5.06
5	4.20	4.84	4.92	5.01	2.93	3.23	3.42	4.26
6-10	10.52	12.78	13.97	14.47	7.27	8.40	9.20	10.44
11-30	9.52	12.44	14.02	15.56	6.93	8.69	9.67	11.37
>30	1.43	2.08	2.59	2.94	1.10	1.48	1.89	2.33

This table reports the distribution of exporting firms according to the number of destinations they export to in selected years of our sample, for regular exporters and for export processing firms. The entries in each column sum to 100.

Table A5: Percentage of Exports by Multi-destination Firms

	Ordinary Exporting				Export Processing			
Number of destinations	2000	2002	2004	2006	2000	2002	2004	2006
1	14.74	10.84	9.60	7.80	19.37	14.34	11.99	7.21
2	8.29	7.82	6.38	6.26	12.71	9.70	11.32	8.22
3	6.33	6.24	5.17	5.25	6.02	7.91	3.20	3.61
4	5.13	4.64	4.51	4.56	5.25	4.89	3.12	2.48
5	4.05	4.22	4.12	3.95	4.48	4.00	3.26	2.84
6-10	20.47	16.11	18.24	17.92	14.16	9.79	10.40	11.62
11-30	29.50	33.14	32.83	33.76	25.68	26.43	30.77	33.14
>30	11.48	17.00	19.15	20.49	12.33	22.93	25.95	30.88

This table reports the distribution of exports of multi-destination firms according to number of destination countries they export to in selected years of our sample, for regular exporters and for export processing firms. We report the percent share of total exports that firms in each destination bin capture. The entries in each column sum to 100.

Table A6: Product Scope, Export Value and Destination Country Characteristics

Dep. Variable:	#products$_{ict}$		ln(Exports)$_{ict}$	
Country Char. (Z):	ln(dist)	ln(g. dist)	ln(dist)	ln(g. dist)
	(1)	(2)	(3)	(4)
Processing*Z	0.0383***	0.0403***	0.0449**	0.0475**
	(5.90)	(5.14)	(2.54)	(2.45)
Foreign*Z	-0.0256***	-0.00773**	0.0197**	0.0108
	(-8.19)	(-2.05)	(2.49)	(1.25)
Z	-0.0436***	-0.0317***	-0.122***	-0.0104
	(-14.31)	(-11.77)	(-17.74)	(-1.37)
Processing	-0.438***	-0.374***	-0.467***	-0.373**
	(-7.51)	(-6.78)	(-2.71)	(-2.42)
Foreign	0.217***	0.0487*	-0.153**	-0.0480
	(7.34)	(1.90)	(-2.22)	(-0.82)
ln(firm exports)	0.0481***	0.0462***	0.296***	0.291***
	(31.08)	(26.54)	(67.03)	(67.00)
province*industry*year FE	yes	yes	yes	yes
N	1198476	1061020	1152073	1016525
ll or R_sq	-2015550	-1786976	.0663	.0638

This table examines the relation between exporters' scope and scale and (physical and cultural) distance to the destinations. We drop exports to Hong Kong and Macao as their geographic and cultural distance to China is essentially zero. In addition to the distance measures, we also include interaction terms between the distance to the destination and the EP dummy (Processing) to assess whether there are differential effects of distance on EP firms. We also include interaction terms between a foreign ownership dummy and distance, to account for the fact that foreign ownership prevails in EP trade. We control for province-industry-year fixed effects. In columns (1) and (2) the dependent variable is the number of HS 6-digit categories exported at the firm-year level. We use negative binomial in estimation and bootstrap standard errors. In columns (3) and (4) the dependent variable is export volume at the firm-year level. In these columns, we do not consider firms that export to a single destination in a given year, to allow us to include the log of firm aggregate exports, lagged one year, as control. t statistics are reported in parenthesis. Standard errors are robust and clustered by province-industry-year. Results are robust to alternative levels of clustering. ***, **, and * indicate significance at the 1, 5, and 10 percent level, respectively.