Sorting in Exporting Market Selection: Evidence from China

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Abstract

This paper is motivated by concerns about what China has been exporting to the world and whether quality upgrade has happened along with the tremendous export growth, especially following the entry into WTO in the December of 2001. The major difficulty in investigating quality upgrade is that product quality is rarely observed. This paper tries to infer a firm's ability of producing higher quality products from the markets to which the firm chooses to ship its products, utilizing the fact that consumers on different markets have different degrees of sensitivity towards quality relative to price. A second dimension of heterogeneity is introduced to the heterogeneous firms trade models initiated by Melitz (2003) in a specific way to illustrate the sorting of firms more capable of improving quality into more quality sensitive markets. The model also predicts that trade liberalization strengthens firms' incentives to carry out quality-improving investment and enter more markets.

1 Introduction

Chinese economy has been growing rapidly in recent decades and the increase in exports has been a key contributor. Brandt and Rawski (2008) show that more than half of the GDP growth from 2003 to 2005 comes from export growth. The total export volume has tripled from 250 billion USD in the year 2000 to more than 760 billion USD in 2005, around half through processing trade and half through ordinary trade. Besides the remarkable growth in volume, studies also find significant expansion of product lines and fast growing overlapping with OECD countries in Chinese exports, Wang and Wei (2008), Rodik (2006) and Schott (2007). However, the quality aspect of Chinese exports does not progress as fast, if improved at all. Hallak and Schott (2009) find China is one of the countries with the sharpest quality decline during the period of 1989 to 2003.

Given quality's importance to firms' viability on international market and its implication for sustained economic growth in developing countries, this phenomenon deserves attention. The study of Hallak and Schott is based on cross country aggregate data, so from their finding it is not clear whether Chinese firms in general are falling behind in appealing to oversea consumers or it is a composition effect as there have been enormous start-up exporters and new exporters are probably not as good as the existing ones in in quality products[1]. The second scenario is more optimistic than the first one if export experience helps firm climb up quality ladder. Micro level data is necessary for getting better understanding of the aggregate declining quality. However, as with the aggregate data, quality is rarely well measured at micro level. Good quality measure has been developed for very special industries[2] but not economy wide. Adopting unit value as a quality proxy is problematic since unit value also contains cost information which means lower unit value does not necessarily imply inferior quality, it could be that the firm charging lower price is more efficient in costs. This has been confirmed in many studies, including Hallak and Schott (2009).

This paper proposes an alternative way of inferring firms' product quality by utilizing the as-

[1] New exporters are generally smaller than the existing exporters and sell their products cheaper.

[2] One example is French Wine. See Crozet, Head and Mayer (2009)

sociation between firms and the specific markets they choose to ship their products to. As long as both firms and markets are heterogeneous and there are fixed costs for firms to export to a market, firms and markets should not match up in a random way. The specific sorting mechanism depends on how we believe firms and markets are differentiated. Firm heterogeneity has received a lot of attention in the literature since Melitz (2003). In Melitz model, firms are differentiated by marginal cost and the sorting results in a strict hierarchy market structure with the most productive firms start exporting earlier and export to the largest number of markets and less productive firms export to a subset of markets later when trading costs become lower. The introduction of additional dimensions of heterogeneity is usually motivated by the lack of such hierarchy structure in the data, as in Lileeva and Trefler (2007) and Bernard, Redding and Schott (2009). Kuegler and Verhoogen(2008) and Johnson(2008) literally have firms differentiated along two dimensions but have one parameter govern both. Hallak and Sivadasan(2007) differentiate firms by productivity (ability to produce at lower marginal cost) and caliber (ability to upgrade quality with lower fixed cost) and show that one dimension heterogeneity is enough as long as a fixed cost to export is the only market threshold to overcome since under this scenario these two abilities are substitutable from a firm's perspective. However, when a minimum quality requirement is introduced as a second threshold, the two abilities have different roles.

For empirical consideration, with only one entry or not observation, it is hard to identify two thresholds in Hallak and Sivadasan (2007). This paper sets up a model which substitutes their minimum quality requirement with consumers' intensity of preference for quality which can be estimated when micro trade data is available. The model shows that when markets are differentiated along dimensions of relative quality-sensitivity and fixed entry costs, high calibre firms will self-select into more quality-sensitive markets while low calibre but marginal cost efficient exporters can make profits from less quality-sensitive markets with higher entry costs. In addition to generating a non-hierarchy sorting pattern, this model also gives predictions on firms' investment and market entry behaviour following trade liberalization, no matter in the form of lowering variable trading costs or fixed trading costs. The increase of quality premium after trade liberalization provides firms more incentive to invest in quality upgrading and simultaneously

enter more markets. This is related to the literature on the relationship between exporting and productivity growth, as reviewed in Lileeva and Trefler (2007).

Utilizing exporting data of Chinese firms (2000 - 2005) from China's Customs and annual survey data(1999 - 2005), this paper also provides some tentative tests on the predictions of the model. As a tentative study, this paper only looks at a small group of products that are coded 51 and 522 in Broad Economic Categorization system. These are motor cars and non-industrial transport equipments. The first step is to estimate the market specific preference with the customs transaction data. The demand estimation shows significant difference in consumers preference across markets, with the estimates of 19 out of 45 market specific price coefficients being significantly different from the one of a restricted model. The second step is to check whether the interaction of the market attributes with firms' quality related attributes is significantly correlated with a firm's presence on a market, the firm's decision on whether to enter a market, and whether the correlation with the entry decisions has changed after becoming a WTO member. Since both firm attributes and market attributes are needed to test sorting, we can only the matched sample of the two data sets. Based on the belief that a firm's usage of capital is positively correlated with its products' quality, I interact the estimated market attributes with firms' real capital stocks then I find positive correlation between the interaction term and the status of the firm and market pair being active. Regarding the entry decision, I include both the the change in a firm's real capital stock in two consecutive years and its interaction with the difference in the attributes of the potential market and the firms' existing markets. I find positive correlation between entry and both the level of investment and the constructed interaction term. Furthermore, the correlations become strong after the entry into WTO.

The remaining part is organized as follwing: section 2 sets up the model and derives predictions regarding sorting and entry; section 3 shows the empirical work which is composed of data description, demand estimation and correlation tests. Section 4 concludes.

2 Model

2.1 Demand Specification

Assume the utility of a representative consumer in country m is of the CES form,

$$U_m = (\int_{i \in V_m} [\lambda_{(i)}^{\gamma_m} x_{m(i)}]^{\frac{\sigma-1}{\sigma}} d_i)^{\frac{\sigma}{\sigma-1}} \tag{1}$$

As in a standard Dixit-Stiglitz utility specification, i denotes varieties; V_m is the set of varieties available to consumers on market m; and σ is the elasticity of substitution among varieties. γ_m is a parameter added to the standard setting to represent consumers' intensity of preference for quality as in Hallak (2006). The variation in γ across markets captures the fact that consumers' appreciation of the same product improvement may not be uniform everywhere.

Given budget E_m, each variety's price $p_{m(i)}$ and quality $\lambda_{(i)}$, consumers' utility maximization leads to the following demand function for variety i on market m

$$x_{m(i)} = \lambda_{(i)}^{\gamma_m(\sigma-1)} p_{m(i)}^{-\sigma} P_m^{1-\sigma} E_m \tag{2}$$

where $P_m = (\int_{i \in V_m} \widetilde{p}_{m(i)}^{1-\sigma} di)^{\frac{1}{1-\sigma}}$ is the aggregate price index on market m, and $\widetilde{p}_{m(i)} = \frac{p_{m(i)}}{\lambda_{(i)}^{\gamma_m}}$ is the quality adjusted price. Consumers' expenditure on variety i, which is also the revenue of the firm producing variety i from market m, is

$$R_{m(i)} = (\frac{\widetilde{p}_{m(i)}}{P_m})^{1-\sigma} E_m \tag{3}$$

2.2 Cost Specification

The cost side specification is similar to Hallak and Sivadasan (2007). The firm corresponding to variety i is endowed with two abilities: calibre ξ_i and productivity φ_i. Calibre ξ_i measures

firm i's efficiency in improving quality and productivity φ_i measures its production efficiency as in Melitz (2003). For simplicity, assume there are only two quality levels: λ and 1, where $\lambda > 1$ represents higher quality. To be able to produce a variety of quality λ, firm i needs to incur an investment of $\frac{I}{\xi_i}$. This means firms with higher calibre can update the quality of their varieties at lower costs. If firm i chooses not to incur the investment, it can only produce a variety of quality 1. For the second dimension of ability, the marginal cost for firm i to produce a λ version of its variety is $\frac{c\lambda^\beta}{\varphi_i}$ and the marginal cost of producing the low quality version is $\frac{c}{\varphi_i}$. This means more productive firms have lower marginal costs in producing its variety of either quality. A third cost element is the fixed costs of entering a market, denoted by F_m for market m. Entry costs vary across markets but are the same to all firms for any specific market.

2.3 Firm's Optimization Problem

Given the above demand and cost structures, firm i's optimization problem involves choosing a quality level, markets to enter and the profits-maximizing price on each chosen market. Assume quality is homogeneous within a firm, that is, a firm can choose only one quality level and ship its variety of the same quality to all the markets it chooses[3], the optimization problem can be resolved through backward induction as following:

1. Calculate firm i's operating profits-quality schedule for each market.

2. Find the set of markets where firm i's operating profits from selling the high quality version of variety i exceed the entry costs. Then sum up the profits net of entry costs across all these markets. Do the same assuming firm i is producing the low quality version of variety i.

3. Compare the difference in net profits obtained in (2) against firm i's quality upgrade costs $\frac{I}{\xi_i}$. If the premium profits from offering high quality variety are larger than the quality upgrade costs, firm i would incur the investment to upgrade quality and export to markets

[3] As shown later, this can be achieved by assuming the cost elasticity of quality never exceeds the intensity of preference for quality.

we find in (2) for high quality version of its variety; otherwise, firm i will not invest to upgrade quality, just produce the low quality version of its variety and ship it to markets we find in (2) for the low quality version of its variety.

Starting with the operating profits-quality schedule in the first step, with quality λ, the profit maximizing price of variety i is

$$p_m(\varphi_i, \lambda) = (\frac{\sigma}{\sigma - 1})\frac{c\lambda^{\beta}}{\varphi_i} \tag{4}$$

The resulting operating profits are

$$\pi_m(\varphi_i, \lambda) = P_m^{\sigma-1} E_m (\frac{\sigma}{\sigma - 1})^{-\sigma} \frac{1}{\sigma - 1} (\frac{c}{\varphi_i})^{1-\sigma} \lambda^{(\sigma-1)(\gamma_m - \beta)} \tag{5}$$

With quality 1, the price and operating profits will be

$$p_m(\varphi_i, 1) = (\frac{\sigma}{\sigma - 1})\frac{c}{\varphi_i} \tag{6}$$

$$\pi_m(\varphi_i, 1) = P_m^{\sigma-1} E_m (\frac{\sigma}{\sigma - 1})^{-\sigma} \frac{1}{\sigma - 1} (\frac{c}{\varphi_i})^{1-\sigma} \tag{7}$$

Comparing (**??**) with (**??**), we have

$$\pi_m(\varphi_i, \lambda) = \pi_m(\varphi_i, 1)\lambda^{(\sigma-1)(\gamma_m - \beta)} \tag{8}$$

The two operating profits are equal only when $\gamma_m = \beta$. Moreover, $\pi_m(\varphi_i, 1)$ does not depend on γ_m, while $\pi_m(\varphi_i, \lambda)$ increases with γ_m. The implication is that when consumers intensity of preference for quality γ_m dominates the cost elasticity of quality β, a firm can make more operating profits from the high quality version of its variety and the premium increases with the

intensity of consumers' preference for quality. We are going to assume $\gamma_m \geq \beta$ for any m to rule out quality downgrading on some markets by firms that have invested in quality improvement and so quality heterogeneity within firm.

Before moving on to the second step, we make some simplification assumptions on market characteristics. Firstly, we assume markets are heterogeneous only along two dimensions: entry costs F_m and intensity of preference for quality γ_m. Other market characteristics such as total expenditure E_m and price index P_m are assumed to be the same across markets and we are going to ignore their subscript m. As a result, the preference for quality is the only market side factor that differentiates operating profits across markets, so we can use γ instead of m as subscript of operating profits functions. Secondly, we assume market entry costs to be independent of quality preference. Suppose the joint distribution of entry costs and quality preference is $f(F,\gamma)$ and denote the marginal distributions by $f_F(F)$ and $f_\gamma(\gamma)$ respectively, we then have $f(F,\gamma) = f_F(F)f_\gamma(\gamma)$.

Given the distribution of market characteristics and firm i's potential operating profits from each market, we can derive its overall profits net of entry costs from exporting a high quality version of its variety, using hats to denote profits net of entry costs.

$$\begin{aligned}\widehat{\Pi}(\varphi_i,\lambda) &= \int_{F,\gamma}[\pi_\gamma(\varphi_i,\lambda)-F]1_{\{\pi_\gamma(\varphi_i,\lambda)\geq F\}}f(F,\gamma)dFd\gamma \\ &= \int_\gamma\int_0^{F_{\varphi_i,\gamma}}[\pi_\gamma(\varphi_i,\lambda)-F]f_F(F)dF f_\gamma(\gamma)d\gamma \qquad (9)\end{aligned}$$

$1_{\{\pi_\gamma(\varphi_i,\lambda)\geq F\}}$ in the first line is an indicator function which equals 1 if operating profits $\pi_\gamma(\varphi_i,\lambda)$ exceed entry costs F and 0 otherwise. $F_{\varphi_i,\gamma}$, the upper limit of the integral over F in the second line, gives the entry costs of the marginal market firm i enters in the subset of markets with quality preference γ, which is determined by

$$F_{\varphi_i,\gamma} = P^{\sigma-1}E(\frac{\sigma}{\sigma-1})^{-\sigma}\frac{1}{\sigma-1}(\frac{c}{\varphi_i})^{1-\sigma}\lambda^{(\sigma-1)(\gamma-\beta)} \qquad (10)$$

Similarly, conditional on 1, firm i's total profits from exporting will be

$$\begin{aligned}\widehat{\Pi}(\varphi_i,1) &= \int_{F,\gamma}[\pi_\gamma(\varphi_i,1)-F]1_{\{\pi_\gamma(\varphi_i,\lambda)\geq F)\}}f_F(F)d_F f_\gamma(\gamma)d_\gamma \\ &= \int_0^{F_{\varphi_i,1}}[\pi(\varphi_i,1)-F]f_F(F)d_F \end{aligned} \tag{11}$$

and the upper limit of the integral $F_{\varphi_i,1}$ is determined by

$$F_{\varphi_i,1} = P_m^{\sigma-1}E_m(\frac{\sigma}{\sigma-1})^{-\sigma}\frac{1}{\sigma-1}(\frac{c}{\varphi_i})^{1-\sigma} \tag{12}$$

The premium profits from exporting a high quality variety is

$$\begin{aligned}\Delta\widehat{\Pi}(\varphi_i) &= \widehat{\Pi}(\varphi_i,\lambda)-\widehat{\Pi}(\varphi_i,1) \\ &= \int_\gamma\int_0^{F_{\varphi_i,1}}[\lambda^{(\sigma-1)(\gamma-\beta)}-1]\pi(\varphi_i,1)f_F(F)d_F f_\gamma(\gamma)d_\gamma \\ &\quad +\int_\gamma\int_{F_{\varphi_i,1}}^{F_{\varphi_i,\gamma}}[\pi_\gamma(\varphi_i,\lambda)-F]f_F(F)d_F f_\gamma(\gamma)d_\gamma \\ &= Prob(F<F_{\varphi_i,1})\int_\gamma[\lambda^{(\sigma-1)(\gamma-\beta)}-1]\pi(\varphi_i,1)f_\gamma(\gamma)d_\gamma \\ &\quad +\int_\gamma\int_{F_{\varphi_i,1}}^{F_{\varphi_i,\gamma}}[\pi_\gamma(\varphi_i,\lambda)-F]f_F(F)d_F f_\gamma(\gamma)d_\gamma \end{aligned} \tag{13}$$

The first term can be interpreted as the intensive margin of the premium in the sense that it represents the difference in exporting profits from the common markets of the two quality versions; the second term is corresponding to the extensive margin in the sense that firm i will only ship to these markets if it is producing the high quality version of its variety.

For the investment decision in the third step, firm i will incur the quality upgrading investment if and only if the premium profits of a high quality variety can cover the costs of the investment, that is,

$$\Delta\widehat{\Pi}(\varphi_i) \geq \frac{I}{\xi_i} \tag{14}$$

2.4 Propositions 1 on Sorting

Sorting of high calibre firms into markets with stronger quality preference and low calibre but more productive firms into less quality responsive markets.

Consider two firms k and j characterized by (φ_k, ξ_k) and (φ_j, ξ_j). Suppose

- $\varphi_k > \varphi_j$;
- $\xi_k < \xi_j$;
- $\Delta\widehat{\Pi}(\varphi_k) < \frac{I}{\xi_k}$, so firm k does not invest in quality upgrade and variety k is of quality 1;
- $\Delta\widehat{\Pi}(\varphi_j) > \frac{I}{\xi_j}$, so firm j invests in quality upgrade and variety j is of quality λ;
- There is one market m_0 with entry costs F_0 and preference for quality γ_0 where both firms break even, that is, where $F_0 = \pi(\varphi_k, 1) = \pi_{\gamma_0}(\varphi_j, \lambda)$.

Then on a market with $\gamma < \gamma_0$ and $F = F_0$ we should be able to observe firm k but not firm j.[4] On the other hand, on a market with $\gamma > \gamma_0$ and $F_0 < F < \pi_\gamma(\varphi_j, \lambda)$, we should observe firm j but not firm k.[5] The sorting is illustrated in Figure 1.

[4] Since firm k's operating profits do not depend on γ, firm k breaks even on this market as well; firm j's operating profits decreases when consumers' quality preference is weaker, thus firm j's operating profits on this market will not cover its entry costs so firm j will not enter this market.

[5] This is obviously from comparison of each firm's operating profits against the entry costs

Figure 1: Sorting in Export Market Selection

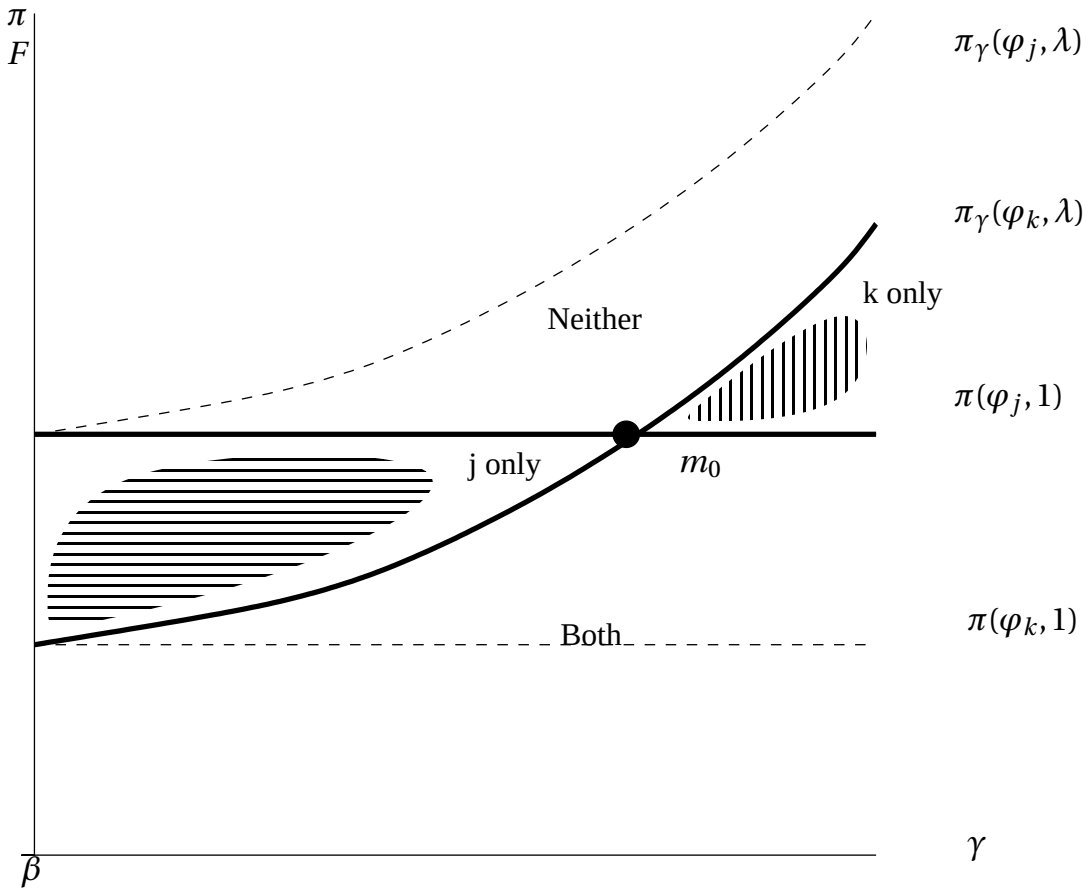

Figure 1: Sorting in Exporting Market Selection: firm j is more productive than firm k thus $\pi_\gamma(\varphi_j,\lambda)$ is positioned higher than $\pi_\gamma(\varphi_k,\lambda)$ and $\pi(\varphi_j,1)$ higher than $\pi(\varphi_k,1)$. However, firm k has such a high calibre ξ_k that the profits premium of the high quality variety represented by the area between $\pi_\gamma(\varphi_k,\lambda)$ and $\pi(\varphi_k,1)$ exceeds $\frac{I}{\xi_k}$. As a result, firm k enters all markets where the entry costs fall below $\pi_\gamma(\varphi_k,\lambda)$ for a given preference for quality γ; on the contrary, firm j's calibre is low so that the premium represented by the area between $\pi_\gamma(\varphi_j,\lambda)$ and $\pi(\varphi_j,1)$ can not cover $\frac{I}{\xi_j}$ and firm j enters the markets where entry costs fall below $\pi(\varphi_j,1)$. The intersection of $\pi_\gamma(\varphi_k,\lambda)$ and $\pi(\varphi_j,1)$ tells the entry costs and preference for quality of market m_0 where both firms break even. Sorting means firm j but not firm k may enter some markets to the south-west of m_0 while firm k but not firm j may enter some markets to the north-east of m_0.

2.5 Proposition 2 on Trade Liberalization and Quality Upgrade Investment

Trade liberalization provides incentive to invest in quality upgrade, no matter it takes the form of lowering variable iceberg trading costs or lowering fixed market entry costs.

As shown above, the incentive to invest in quality upgrading technology comes from the profits premium of exporting the high quality version of a variety. The premium is summarized in (**??**). This part shows that both the lowering of variable iceberg trading costs and fixed market entry costs will drive up the premium thus provide more incentive for quality upgrading investment. We are going to use superscript 0 for variables before trade liberalization and superscript 1 for those after.

2.5.1 Lower Iceberg Trading Costs

The lowering of iceberg trading costs is equivalent to an improvement in production efficiency in the sense that they increase operating profits in the same way. The increase of operating profits will change the profits premium in (**??**) in several ways as shown below. For simplicity, suppose trade liberalization does not affect fixed market entry costs but lowers the iceberg trading costs everywhere.

Focusing on the subset of all markets with preference for quality γ

- Firstly, since $(\lambda^{(\gamma-\beta)(\sigma-1)}-1)\pi^1(\varphi_i,1) > (\lambda^{(\gamma-\beta)(\sigma-1)}-1)\pi^0(\varphi_i,1)$ for any given market, profits premium on common markets will increase.

- Secondly, $F_{\varphi_i,1}$ also increases with $\pi(\varphi_i,1)$ thus $F^1_{\varphi_i,1} > F^0_{\varphi_i,1}$. The fact that the two quality versions of the variety have more common markets also means that firm i can make positive profits from exporting the low quality version of its variety to some markets where before liberalization only high quality version can bring in positive profits, which in turn means a transformation of extensive margin to intensive margin. Since $(\lambda^{(\gamma-\beta)(\sigma-1)}-1)\pi^1(\varphi_i,1) > (\lambda^{(\gamma-\beta)(\sigma-1)}-1)\pi^0(\varphi_i,1) > \pi^0_\gamma(\varphi_i,\lambda)-F$, the increase in the intensive margin must dominate the decrease in the extensive margin and the profits premium must increase for these markets.

- Thirdly, the profits premium also increase on markets where firm i would enter only with the high quality variety both before and after trade liberalization.
- Lastly, firm i may enter more markets with its high quality variety after liberalization.

In summary, we have

$$
\begin{aligned}
& \Delta\widehat{\Pi}^1(\varphi_i) - \Delta\widehat{\Pi}^0(\varphi_i) \\
= & \int_\gamma Prob(F \le F^0_{\varphi_i,1})[\lambda^{(\gamma-\beta)(\sigma-1)} - 1][\pi^1(\varphi_i,1) - \pi^0(\varphi_i,1)] f_\gamma(\gamma) d_\gamma \\
+ & \int_\gamma \int_{F^0_{\varphi_i,1}}^{F^1_{\varphi_i,1}} \{[\lambda^{(\gamma-\beta)(\sigma-1)} - 1]\pi^1(\varphi_i,1) - [\pi^0(\varphi_i,\lambda) - F]\} f_F(F) d_F f_\gamma(\gamma) d_\gamma \\
+ & + \int_\gamma Prob(F^1_{\varphi_i,1} < F \le F^0_{\varphi_i,\gamma})[\pi^1_\gamma(\varphi_i,\lambda) - \pi^0_\gamma(\varphi_i,\lambda)] f_\gamma(\gamma) d_\gamma \\
+ & + \int_\gamma \int_{F^0_{\varphi_i,\gamma}}^{F^1_{\varphi_i,\gamma}} [\pi^1_\gamma(\varphi_i,\lambda) - F] f_F(F) d_F f_\gamma(\gamma) d_\gamma \qquad (15)
\end{aligned}
$$

Figure 2: Lowering Iceberg Trading Costs and High Quality Profits Premium

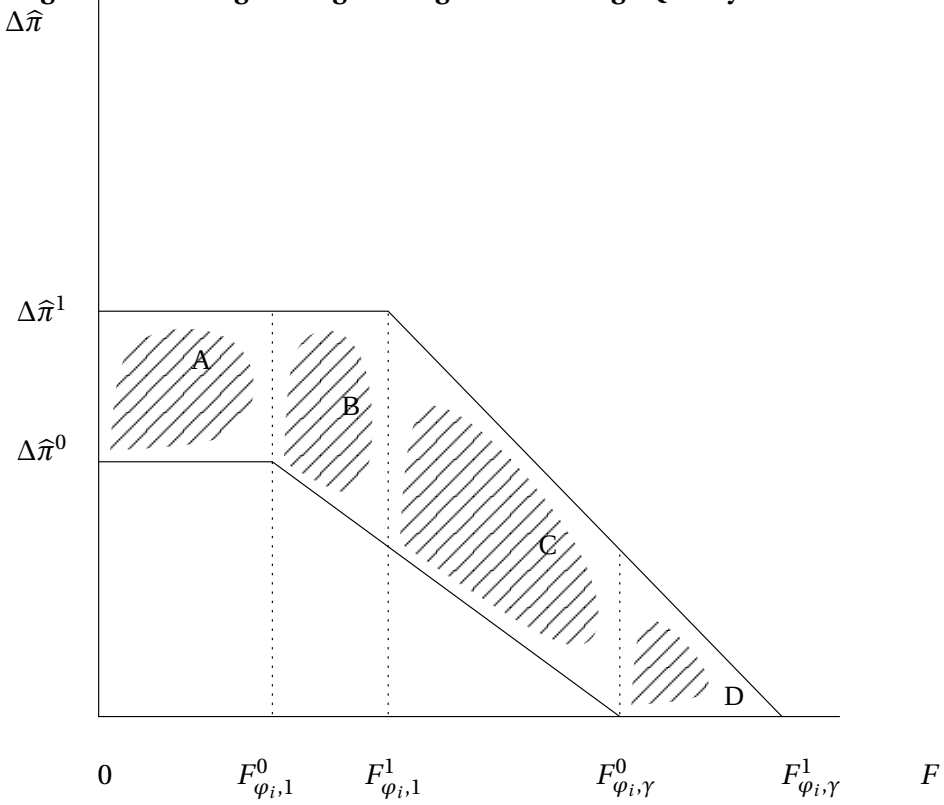

Figure 2: Lowering Iceberg Trading Costs and High Quality Profits Premium: γ is fixed to draw this diagram. Region A represents the increase of premium from the common markets of the two quality versions both before and after trade liberalization; region B represents the increase of premium from markets where extensive margin premium becomes intensive after liberalization; region C represents the increase of premium from markets where only high quality variety is shipped to both before and after liberalization; region D represents the increase of premium from markets where it is only worthwhile to enter with high quality variety after liberalization.

2.5.2 Lower Fixed Market Entry Costs

Trade liberalization may take the form of lowering fixed market entry costs. For simplicity, assume trade liberalization only brings down entry costs and has no affect on variable iceberg trading costs. With lower entry costs, firm i can bring in positive from more markets no matter it is producing a low quality or a high quality variety which also means an increase along the intensive margin of quality premium. The new common markets used to contribute to quality premium along the extensive margin but after trade liberalization their contribution is along the intensive margin. Since $\pi(\varphi_i,1) < F^0$ and $\pi_\gamma(\varphi_i,\lambda) - \pi(\varphi_i,1) > \pi_\gamma(\varphi_i,\lambda) - F^0$, the contribution along the intensive margin after trade liberalization must be larger than the contribution along the extensive margin before trade liberalization. The premium on markets where firm i would export its high quality variety to both before and after liberalization increase by the same magnitude as the entry costs decrease. The third source of increase in premium comes from exporting the high quality variety to markets where it was not profitable before trade liberalization.

In summary, quality premium will increase with lower fixed market entry costs.

$$
\begin{aligned}
& \Delta\widehat{\Pi}^1(\varphi_i) - \Delta\widehat{\Pi}^0(\varphi_i) \\
= & \int_\gamma \int_{m\in M_\lambda^0 \bigcap M_c^1} \{[\lambda^{(\gamma-\beta)(\sigma-1)} - 1]\pi^1(\varphi_i,1) - [\pi^0(\varphi_i,\lambda) - F]\} d_m f_\gamma(\gamma) d_\gamma \\
+ & \int_\gamma \int_{m\in M_\lambda^0 \bigcap M_\lambda^1} (F_m^0 - F_m^1) d_m f_\gamma(\gamma) d_\gamma \\
+ & + \int_\gamma \int_{m\in M_n^0 \bigcap M_\lambda^1} [\pi_\gamma^1(\varphi_i,\lambda) - F] d_m f_\gamma(\gamma) d_\gamma
\end{aligned} \tag{16}
$$

where M_c^0 denotes the set of common markets where both quality versions of variety i may earn positive profits net of entry costs; M_λ^0 denotes the set of markets where only the high quality version can achieve that; M_n^0 denotes the set of markets where operating profits of neither quality version of i can cover entry costs; M_λ^1 denotes the set of markets where only the high quality version can be profitable after liberalization.

Given that the lowering of either type of trading costs drives quality premium in the same

direction, we come to the conclusion that trade liberalization provides firms more incentive to invest in quality upgrading technology.

3 Empirical Evidence for Sorting

The empirical part is going to test the following predictions from the model in the previous section.

Firstly, firms sort into different oversea markets, more specifically, firms that are more efficient in quality improving will invest more and export to more quality sensitive markets. The empirical counterpart of the sorting theory is the contribution of the interactions of firms' characteristics and market characteristics to the probability that we observe the firm-market pair in the data. Based on the belief that robots and machines are better in quality producing and control than manual labour, a firm's capital capital stock will be used as a proxy for quality production. Kraay, Soloaga and Tybout (2002) also finds positive correlation between firms' capital stocks and their quality measure in the study on chemicals manufacturers in Mexico, Columbia and Morocco. The market quality preference will be estimated from the China's customs transaction data. With these firm and market characteristics available, I can check the effect of the interactions of these two on the probablity of the firm's presence on the market. This argument regarding the extensive margin of trade can also be extended to the intensive margin, that is, we should see larger trade volume between firms using more capital and markets where consumers are willing to pay more for quality.

Secondly, in order to make the exporting to more quality sensitive markets profitable, firms may need to investment quality upgrading first. Investment may lower firms' production costs or improve products quality, but it is more likely to be the latter for firms in a less developed country with cheaper labour as China. Thus beyond the positive relationship between investment and entry into a new market, we should also observe a positive contribution of the interaction of quality preference and investment. Since trade liberalization lowers trading costs and makes entering new markets more profitable, we should also observe a stronger correlation between

investment and market entry after the entry of WTO.

This section is organized as following: 3.1 describes the data used for this study; 3.2 carries out the demand estimation to get market specific quality preference adjusted price elasticity; 3.3 shows the evidence for sorting: firms using larger capital stock are more likely to be present on markets with lower quality preference adjusted price elasticities; 3.4 shows the evidence of correlation between investment and new market entry.

3.1 Data Description

The data are from two sources. Trading data (2000 2005) are from Customs of China. These are transaction level records and include the following information: the identification of the trade partner in China, 8-digit HS product code, the unit of measurement, the direction of trade (import or export), the forms of trade (the main categories are ordinary trade versus processing trade), the quantity transacted, the money layout of the transaction, whether to be transferred in a third country, and the means of transportation.

There are two facts regarding the composition of Chinese exports that need special attention. Firstly, it is known that a lot of Chinese firms do not carry out international transactions directly by themselves, but through specialized trading companies, as documented in Manova and Zhang (2008). Since the purpose of this study is to show the correlation between producer and market side characteristics, these transactions can not be included because of lack of producers' identification. The share of trade through specialized trading companies has declined from about one third to one fifth during the period of 2000 and 2005, but given that total trade volume has been tripled from around 250 billion USD to more than 760 billion USD and the majority part of the exports through specialized trading companies is in the form of ordinary trade, we should keep in mind that not all Chinese firms that are producing for international markets are covered in this study.

The second fact is that within direct exports by manufacturing firms, ordinary trade accounts for only 31 % of total export volume and its share increased to 36 % in 2005. The majority part of exports is through processing trade. In this case, unit values do not reflect much information

on consumers' preference as these transactions are very likely to happen only within a multinational. These transactions will be excluded as well for the current study.

In the end, we are looking at exports through ordinary trade by manufacturing firms. As shown in Table 1, this part has experienced the fastest growth in total volume: more manufacturers are exporting and the average size becomes larger with the number effect stronger.

For the current draft, I also narrow down the scope of products by focusing on products that fall into Broad Economic Categories 51 and 522. They are are passenger motor cars and transport equipment for non-industrial use other than passenger motor cars. These two categories cover 62 8-digit HS product lines. The trading summaries of these products are provided in Table 2. The growth pattern is quite similar to the whole picture of Chinese exports. I also narrow down the number of markets to investigate. From 2000 to 2005, Chinese manufacturers of these products ship to more than 200 countries. I will focus on the top 45 markets which account for more than 80% of the total exports through ordinary trade by manufacturers in this period. Table 3 gives a list of these countries. They are quite diversified in terms of market size and degree of development.

The second source of data comes from the annual surveys on state-owned and above-scale (5 million RMB) manufacturing firms by China's National Bureau of Statistics from 1998 to 2005. This data set provides information on a wide range of firms' economic activities. This data set and additional variables constructed are documented in detail in Brandt, Van Biesebroeck and Zhang (2009). The key variable taken from there and used in the current studies are firms' employment and real capital stock.

All the records available for the selected products and markets in the Customs dataset will be used to estimate the demand structure. But for the analysis of sorting, we need a matched sample containing both firm and market characteristics. The two data sets are matched by available information on firms' identification. As shown in Table 4, we get better match results for later years than for earlier years. In summary, we get 566 matched firms exporting to the largest 45 markets and these transactions account for three fifth of the total exports through ordinary trade by manufacturers on the top 45 markets.

3.2 Demand Estimate

Discrete choice model is widely used in the Industrial Organization literature to estimate the demand system of differentiated goods. Anderson, de Palma and Thisse (1992) shows the equivalence between the demand system derived from the discrete choice model and the one derived from the CES utility specification common in the International Trade literature. Kraay, Soloaga and Tybout (2002), Khandelwal (2009) are two examples of using this framework for producer specific quality estimation. Instead of trying to infer firms' qualities from their market shares on a specific market, I will use across markets variation to identify market heterogeneities in price relative to quality sensitivities.

u_{imft} is the indirect utility that consumer i on market m receives from consuming the variety of firm f at time t. Price of variety f, p_{imft}, is allowed to differ across markets, but quality of f λ_f is held constant. Consumers on different markets have different sensitivities to price and quality change, denote by α_m^λ and α_m^p respectively. Randomness is introduced by allowing heterogeneous perceived quality by each individual consumer, that is, consumer i's perceived quality of variety f is $\lambda_f + \lambda_{imft}$, where λ_{imft} is drawn independently from a Type I extreme value distribution which is common across varieties, markets and years. Thus we have

$$u_{imft} = \alpha_m^\lambda * (\lambda_f + \lambda_{imft}) - \alpha_m^p * p_{imft} \tag{17}$$

Consumer i on market m chooses to purchase variety f and not other varieties or the outside option available on market m if and only if $u_{imft} > u_{imf't}$ and $u_{imft} > u_{m0t}$. Since utility is ordinal, dividing the indirect utility by a positive number will not affect market shares implied by the original u_{imft}. We divide the indirect utility of every consumer on market m by α_m^λ and get

$$\widehat{u}_{imft} = \lambda_f - \frac{\alpha_m^p}{\alpha_m^\lambda} * p_{imft} + \lambda_{imft} \tag{18}$$

This looks the same as the standard indirect utility specification in discrete choice models, but we have a slightly different interpretation of the price coefficient as the quality preference adjusted price elasticity. Let $\beta_m = \frac{\alpha_m^p}{\alpha_m^\lambda}$. If we have $\beta_m < \beta'_m$, we know consumers on market m are more quality concerned than consumers on market m'.

Integrate over consumers on market m, we can derive the market share of variety f

$$s_{mft} = \frac{exp^{\lambda_f - \beta_m * p_{imft}}}{exp^{\widehat{u}_{m0t}} + \sum_{f' \in V_{mt}} exp^{\lambda_{f'} - \beta_m * p_{imf't}}} \tag{19}$$

which implies

$$ln(s_{mft}) = \lambda_f - \beta_m * p_{imft} + D_{mt} \tag{20}$$

where $D_{mt} = exp^{\widehat{u}_{m0t}} + \sum_{f' \in V_{mt}} exp^{\lambda_{f'} - \beta_m * p_{imf't}}$ captures the market factors, such as market size and outside option, that have the same impact on all the active firms.

Market share in [**??**] plus a random factor gives the econometric specification of the demand estimate. I make a simplification assumption that the randomness of the aggregated demand system comes only from measurement errors. In other words, the quality of a variety is assumed to be the same no matter to which market the firm is shipping its products thus it can be fully captured by firm fixed effects. This resolves the problem related to the general unobservability of quality. Suppose firms do change their varieties to cater to different tastes across markets[6], then we would have a λ_{fm} term in **??** which is not observable as the market-firm specific part of the quality of a variety, it is correlated with the observed price. Then we have the endogeneity bais in estimating the price coefficient and an instrument for price is necessary for consistent estimate of the price coefficient. This is one of the caveats of the work done by now[7].

[6] We still assume firms do not differentiate consumers on one specific market. Otherwise, even λ_{imft} will not be pure random and the integration from individual choice towards market shares will be much more complicated and we may need random utility models.

[7] I have tried using local wage, a cost shifter, as a price instrument. But unfortunately, after controlling firms' fixed effects, there is not much variation left as firms in general do not produce in many locations and even if they

The estimation is carried out by pooling observations from all markets together, allowing market specific price coefficients and controlling firm fixed effects, market by year fixed effects and product fixed effects at 8-digit HS level. Table 5 shows the results. The first column gives the estimate of adjusted price elasticity which is restricted to be same across markets. The second and third columns show the market specific estimates and the difference is whether the firm fixed effects are controlled. The fourth and fifth columns show the F-statistics testing whether the market specific estimates differ from the restricted one and whether the inclusion of the firm fixed effects have significantly changed the market specific estimates.

We get significantly negative estimates for price coefficients on all markets.When checking the ranking of countries according to our estimates, one should keep in mind that β is a the ratio of price sensitivity over quality sensitivity. That means we can only derive the ranking of quality sensitivity by taking the reverse ranking of β directly when the price sensitivity is constant across countries. This does not seem to be the case here. We have obtained high estimates of β for developed countries like Japan, Korea the United States, and lower ones for poor countries like Togo and Nigeria, which is in contrast to the general sense that consumers in richer countries are more quality concern. One possible explanation is that consumers in Japan, Korea and the United States are also relatively more price sensitive in these selected products. Price sensitivity is about how consumers react to price change for a given product and the more efficient the market, the larger the response, holding other factors constant. Another possible explanation is that the consumers of the imported products in poor countries are not representative of the country's population. For current practice, the scope of products is restricted to transport equipment and motor cars which could be perceived as luxury goods in poor countries and only consumed by the richer people, thus only their preference is reflected in the estimates. We can check this later by expanding the scope of products to ordinary, everyday consumption goods.

The F-test suggests that the βs do differ across markets as 19 of the market specific estimates are significantly different from the restricted estimate. The inclusion of firm fixed effects have significantly changed 28 market specific estimates suggesting that controlling quality is impor-

do, the multi-location firms are very likely to be in a zone where many firms cluster and the residual from within firm demeaning does not display much variation either.

tant in estimating the demand system.

3.3 Test for Sorting

The model suggests firms more capable of producing quality self-select into more quality sensitive markets, while more marginal cost efficient firms self-select into more price sensitive markets. If this sorting pattern actually exists, we should be able to observe a possible correlation between the probability that a firm and market pair is active and the interaction of the firm's quality producing ability and the market's preference for quality. The ratio of price sensitivity over quality sensitivity β_m provides a measure of a market's preference for quality. The smaller the magnitude of β_m the larger the consumers' reaction to quality change relative to price change. If we do believe the usage of capital does help to improve quality, then capital stock, conditional on firms employment size, does provide a measure for firms' ability of producing quality.

Using all the firms that can be matched between the Customs and Annual Survey data and the 45 markets, we construct a balanced panel for each year and then pool all years together. We use dummy variable D to represent whether a firm-market pair is active. Value 1 is assigned to active pairs. Table 6 summaries the number of total firm-market pairs and active ones in the constructed sample. Then we run a logit model of D on the interaction of the estimate of $-\beta_m$ from 4.2 and other controls. The results are shown in Table 6. As expected, the estimates of the coefficient of the interaction term are significantly positive in all the specifications[8]. I also check the relationship between the export volumes and the interaction term conditional on the pair is active and find that even though the sign is positive, the correlation is only significant at 10 % level in some specifications.

[8] It is a bit surprising to see these regression results suggest that conditional on employment scale, capital stock is negatively correlated with the possibility of being an active pair. We have some concern regarding our construction of real capital. The capital depreciation rate might have been overestimated for earlier years which may lead to an underestimate of the capital stock of firms staying longer in the annual survey sample and these firms are more likely to be long term exporters and compose more active pairs.

3.4 Investment and Entry

The second prediction of the model is related to firms' simultaneous decisions on investment and entering new markets when trade liberalization lowers trading costs. Table 9 summarizes the firms' entry and investment behaviour by year. We can see the incidence of positive net investment, the number of new exporters and the number of new active firm-market pairs have all increased in this period. The next question is whether the investment decision and entry decision are associated as the model suggests, in other words, whether the firms incur more investment in this period are also those who explore more markets, especially, more quality sensitive markets.

Several new variables are constructed. The first one is a dummy EN indicating whether a potential exporter actually enters a market. In the pooled panel we constructed above, EN takes value 1 when a firm shows up in a market for the first time in any year other than the initial year 2000 and takes value 0 if the firm is active in exporting but never exports to the market. Exporting experience also matters for exploring new markets. I construct three variables related to past exporting experience for each potential entry,say firm f's decision on whether to enter market m. The first one $exp1$ captures the difference between β_m and the βs of the markets where firm f has exporting experience. I take the difference between β_m and the volume weighted average of the past βs. The second one $exp2$ is a count of market year cells corresponding to which firm f has been active in exporting. The third one $exp3$ is firm f's accumulated export volume in our sample[9]

Investment here is measured as the log of the difference between real capital stocks in two consecutive years. I include the interaction of investment and the first experience measure since our sorting story suggests that if a firm has only been exporting to markets where consumers are more price sensitive, it may need to improve its ability of producing quality to appeal to the

[9]So by including the experience variables, we are actually only looking at the existing exporters' new markets entry decision. However existing exporters entering new markets is not the main source of China's export growth during this period. New exporters have a much more important role in explaining export growth. As our key interest here is to identify the sorting pattern rather than the source of growth, it is fine to work with this sample. To study the entry decision of new exporters, a non-exporter comparison group need to be constructed which is left for future work.

more quality sensitive consumers on the market it decides to enter. I also include the interaction of the WTO dummy, which takes value 1 since year 2002, and the investment measure, since as the model predicts a stronger association between investment and market entry when trade liberalization lowers trading costs. The WTO effect may also interact with the sorting effect, so I also tried the specification including the interaction of the three terms, the WTO dummy, investment measure and our first experience measure and run regressions separately for subsamples before and after the entry into WTO. The results are shown in Table 10.

When investment is included by itself or with its interaction with $exp1$, we get significantly positive coefficients, but the significance disappears once the interactions with WTO are included. When we run regression for the before and after WTO subsamples separately, we get significantly positive estimates for the after WTO sample and insigfinicant or negative estimates for the before sample. This is supportive to the model. The experience variables are significant in all specifications. I also drop the experience variables to include new exporters in the sample and run the regression for before and after WTO sample separately and it turns out after the entry into WTO, there is a significantly positive association between investment and new markets entry.

4 Conclusion

This paper sets up a sorting model with the implication that the set of markets to which a firm chooses to ship its products could be a reflection of its quality level. I find positive correlation between the possibility that a firm is active in exporting to a market and the interaction of the market side variable representing its relative preference for quality and the firm side variable correlated with its ability in producing high quality products. Firms' entry into a potential market is also positively correlated its investment and the interaction of the investment with the difference in the attributes of the potential market and the firms' existing markets.

The next step is to carry out the demand estimation to all products to be able to provide a big picture of where Chinese firms have been shipping their products to and how that distribution

has been changing over time, more specifically, how the markets coverage by the experienced exporters' has changed and where the new ones are located. On the other hand, no causality relationship has been identified so far. The entry into WTO provides a good experiment to study the effect of trade liberalization on firms' decisions on investment, market entry which may provide some insights on the relationship between exporting and productivity growth.

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Table 1: China's Total Export Decompostion, 2000-2005

Export Value: Billions US Dollar								
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**Growth**
MFG	**Ordinary_Trade**	**51.93**	**59.69**	**78.45**	**111.27**	**161.90**	**221.51**	327%
	PT_Pure_Assembly	24.57	25.85	30.06	35.67	48.55	64.82	164%
	PT_Import_Assembly	90.56	99.21	126.99	181.61	252.73	323.89	258%
STC	Ordinary_Trade	59.66	59.58	67.21	85.26	103.49	123.62	107%
	PT_Pure_Assembly	16.56	15.93	17.40	18.55	20.06	19.07	15%
	PT_Import_Assembly	5.96	5.54	5.52	5.93	6.92	8.71	46%
	Share of MFG	67%	70%	72%	75%	78%	80%	13%
	Share of OT by MFG	21%	22%	24%	25%	27%	29%	8%
	Share of OT in MFG	31%	32%	33%	34%	35%	36%	5%

Number of Firms								
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**Growth**
MFG	**Ordinary_Trade**	**41075**	**45427**	**54693**	**67887**	**87854**	**111875**	172%
	PT_Pure_Assembly	7606	8402	9309	10015	11353	12662	66%
	PT_Import_Assembly	25150	25345	26505	28625	31636	34198	36%
STC	Ordinary_Trade	7748	8500	9559	12565	16651	19703	154%
	PT_Pure_Assembly	1431	1479	1502	1593	1653	1783	25%
	PT_Import_Assembly	2059	2037	2024	2008	1996	2181	6%
	Total of MFG	73831	79174	90507	106527	130843	158735	115%
	Share of OT in MFG	56%	57%	60%	64%	67%	70%	15%

Average Volumn per Firm: Millions US Dollar								
		2000	**2001**	**2002**	**2003**	**2004**	**2005**	**Growth**
MFG	**Ordinary_Trade**	**1.26**	**1.31**	**1.43**	**1.64**	**1.84**	**1.98**	57%
	PT_Pure_Assembly	3.23	3.08	3.23	3.56	4.28	5.12	59%
	PT_Import_Assembly	3.60	3.91	4.79	6.34	7.99	9.47	163%
STC	Ordinary_Trade	7.70	7.01	7.03	6.79	6.22	6.27	-19%
	PT_Pure_Assembly	11.57	10.77	11.59	11.65	12.14	10.70	-8%
	PT_Import_Assembly	2.90	2.72	2.73	2.96	3.47	3.99	38%
	Average of All MFG	2.26	2.33	2.60	3.08	3.54	3.84	70%
	Ave. OT&MFG/Ave.OT	56%	56%	55%	53%	52%	52%	-4%

Table 2: China Exports of BEC51 and BEC522 Decompostion, 2000 - 2005

Export Value: Millions US Dollar								
		2000	2001	2002	2003	2004	2005	Growth
MFG	Ordinary_Trade	**471.54**	**480.50**	**508.31**	**1035.81**	**1590.38**	**2252.26**	**378%**
	PT_Pure_Assembly	7.26	6.55	8.73	24.30	24.17	35.13	384%
	PT_Import_Assembly	545.87	506.82	733.57	825.28	1072.11	1421.25	160%
STC	Ordinary_Trade	560.71	646.32	686.56	1168.52	1380.63	1509.50	169%
	PT_Pure_Assembly	222.31	152.53	92.04	45.12	34.82	44.50	-80%
	PT_Import_Assembly	61.35	53.16	51.23	75.34	38.56	56.47	-8%
	Share of MFG	55%	54%	60%	59%	65%	70%	15%
	Share of OT by MFG	25%	26%	24%	33%	38%	42%	17%
	Share of OT in MFG	46%	48%	41%	55%	59%	61%	15%

Number of Firms								
		2000	2001	2002	2003	2004	2005	Growth
MFG	Ordinary_Trade	**451**	**516**	**644**	**816**	**1062**	**1514**	**236%**
	PT_Pure_Assembly	12	16	16	22	20	27	125%
	PT_Import_Assembly	79	94	103	119	142	171	116%
STC	Ordinary_Trade	679	734	876	1120	1159	1302	92%
	PT_Pure_Assembly	4	7	9	6	4	6	50%
	PT_Import_Assembly	25	24	31	24	24	28	12%
	Total of MFG	542	626	763	957	1224	1712	216%
	Share of OT in MFG	83%	82%	84%	85%	87%	88%	5%

Average Volumn per Firm: Millions US Dollar								
		2000	2001	2002	2003	2004	2005	Growth
MFG	Ordinary_Trade	**1.05**	**0.93**	**0.79**	**1.27**	**1.50**	**1.49**	**42%**
	PT_Pure_Assembly	0.61	0.41	0.55	1.10	1.21	1.30	115%
	PT_Import_Assembly	6.91	5.39	7.12	6.94	7.55	8.31	20%
STC	Ordinary_Trade	0.83	0.88	0.78	1.04	1.19	1.16	40%
	PT_Pure_Assembly	55.58	21.79	10.23	7.52	8.71	7.42	-87%
	PT_Import_Assembly	2.45	2.21	1.65	3.14	1.61	2.02	-18%
	Average of All MFG	1.89	1.59	1.64	1.97	2.19	2.17	15%
	Ave. OT&MFG/Ave.OT	55%	59%	48%	64%	68%	69%	13%

Table 3: Country List

Country	Volume of Exports through Ordinary Trade (Million USD)
United States	1198.09
Japan	703.15
Vietnam	413.78
Indonesia	297.76
Nigeria	255.35
United Arab Emirates	141.77
Korea Rep.	141.09
United Kingdom	136.65
Germany	130.80
Myanmar	127.01
Mexico	126.51
Hong Kong	117.65
Turkey	110.80
Togo	110.71
Iran	99.22
Philippines	96.43
Spain	88.76
Russia	86.31
Saudi Arabia	81.79
Australia	77.92
Mali	62.59
Italy	60.04
Malaysia	59.12
Colombia	51.39
Brazil	49.39
Argentina	48.85
South Africa	47.55
France	46.69
Syria	44.70
Canada	44.30
Ukraine	43.13
Ecuador	42.26
Netherlands	41.50
Pakistan	41.03
Guatemala	39.20
Panama	37.08
Bangladesh	36.42
Greece	33.51
Chile	32.31
Belgium	31.85
Lebanon	31.57
Venezuela	31.15
Peru	30.98
Algeria	29.82
Egypt	29.18

Table 4: Export Volume by Matched and Unmatched Exporters

		2000	2001	2002	2003	2004	2005
Volume (Millions USD)	Unmatched Exporter	127	192	207	346	480	685
	Matched Exporters	112	150	200	500	840	1124

Table 5: Demand Estimation

Dep. lnq	Regression			Test	
	Same - β Across Markets	Market Specific - β, Without Firm FE	Market Specific - β, With Firm FE	F test (p value)	F test (p value)
All	-1.045***				
	(0.0296)				
Algeria		-0.732***	-0.759***	0.0028	0.6858
		(0.0937)	(0.0957)		
Argentina		-0.684***	-0.677***	0.0138	0.4207
		(0.151)	(0.150)		
Australia		-0.966***	-1.042***	0.9463	0.0000
		(0.0455)	(0.0500)		
Bangladesh		-0.847***	-0.914***	0.1763	0.2315
		(0.0910)	(0.0971)		
Belgium		-1.231***	-1.235***	0.0251	0.0000
		(0.0847)	(0.0848)		
Brazil		-1.004***	-1.094***	0.7203	0.0301
		(0.141)	(0.137)		
Canada		-1.021***	-1.126***	0.2419	0.0000
		(0.0650)	(0.0689)		
Chile		-1.137***	-1.191***	0.0243	0.0000
		(0.0619)	(0.0647)		
Colombia		-0.885***	-0.875***	0.1109	0.4648
		(0.106)	(0.106)		
Ecuador		-0.817***	-0.822***	0.0011	0.7158
		(0.0664)	(0.0682)		
Egypt		-0.832***	-0.838***	0.0122	0.6207
		(0.0768)	(0.0825)		
France		-0.951***	-1.004***	0.5445	0.0026
		(0.0651)	(0.0684)		
Germany		-0.901***	-0.984***	0.1895	0.0001
		(0.0421)	(0.0470)		
Greece		-0.905***	-0.899***	0.0424	0.1598
		(0.0719)	(0.0721)		
Guatemala		-0.673***	-0.732***	0.0000	0.3946
		(0.0762)	(0.0766)		
Hong Kong		-0.805***	-0.944***	0.0246	0.0012
		(0.0332)	(0.0452)		
Indonesia		-1.043***	-1.019***	0.7156	0.0024
		(0.0661)	(0.0728)		
Iran		-1.215***	-1.226***	0.0153	0.0000
		(0.0717)	(0.0745)		
Italy		-1.003***	-0.988***	0.3232	0.0010
		(0.0543)	(0.0577)		
Japan		-1.126***	-1.290***	0.0000	0.0000
		(0.0371)	(0.0473)		
Korea Rep.		-1.185***	-1.346***	0.0000	0.0000
		(0.0485)	(0.0552)		
Lebanon		-0.911***	-0.910***	0.0978	0.1713
		(0.0833)	(0.0819)		

Malaysia		-1.016***	-1.022***	0.7251	0.0006
		(0.0617)	(0.0653)		
Mali		-0.563***	-0.595***	0.0036	0.1894
		(0.156)	(0.155)		
Mexico		-0.931***	-0.914***	0.1010	0.1426
		(0.0803)	(0.0797)		
Myanmar		-0.973***	-1.345***	0.0830	0.0016
		(0.102)	(0.173)		
Netherlands		-0.934***	-0.962***	0.1690	0.0068
		(0.0579)	(0.0607)		
Nigeria		-0.611***	-0.649***	0.0000	0.0719
		(0.0813)	(0.0823)		
Pakistan		-0.916***	-0.900***	0.0622	0.1875
		(0.0752)	(0.0778)		
Panama		-1.035***	-1.111***	0.3542	0.0000
		(0.0697)	(0.0713)		
Peru		-0.853***	-0.874***	0.0468	0.3758
		(0.0847)	(0.0862)		
Philippines		-0.825***	-0.843***	0.0017	0.4777
		(0.0606)	(0.0643)		
Russia		-1.118***	-1.140***	0.1440	0.0000
		(0.0588)	(0.0650)		
Saudi Arabia		-1.032***	-1.078***	0.6041	0.0000
		(0.0586)	(0.0625)		
South Africa		-0.887***	-0.949***	0.0881	0.0070
		(0.0535)	(0.0563)		
Spain		-1.120***	-1.093***	0.4727	0.0000
		(0.0657)	(0.0671)		
Syria		-0.749***	-0.765***	0.0115	0.7698
		(0.106)	(0.111)		
Togo		-0.323*	-0.423**	0.0008	0.0446
		(0.194)	(0.186)		
Turkey		-0.859***	-0.869***	0.0552	0.4363
		(0.0908)	(0.0919)		
Ukraine		-1.023***	-1.032***	0.8456	0.0024
		(0.0745)	(0.0771)		
United Arab Emirates		-1.095***	-1.130***	0.0995	0.0000
		(0.0468)	(0.0515)		
United Kingdom		-0.959***	-0.967***	0.1451	0.0015
		(0.0505)	(0.0535)		
United States		-1.081***	-1.183***	0.0007	0.0000
		(0.0338)	(0.0405)		
Venezuela		-1.087***	-1.067***	0.7653	0.0002
		(0.0705)	(0.0721)		
Vietnam		-0.798***	-1.106***	0.6767	0.0315
		(0.116)	(0.144)		
Other controls	Market*Year fixed effects, 8-d HS product fixed effects			N (p<0.05)	N (p<0.05)
Observations	26328	26328	26328	19	28
R-squared	0.544	0.418	0.550		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Constructed Firm-Market Panel

	2000	2001	2002	2003
# of Distinct Firms	76	114	142	213
Total pairs (# of distinct firms by 45)	3420	5130	6390	9585
Active pairs	272	451	707	1186

Table 7: Logit Regression of Firm's Presence on Firm and Market Characteristics

Dep. D 1 if active; 0 if not	(1)	(2)	(3)	(4)
- β * log(real capital)	**0.178*** **	**0.157*** **	**0.173*** **	**0.117*** **
	(0.0128)	**(0.0393)**	**(0.0126)**	**(0.0409)**
- β * log(employment)			0.000117***	0.000118***
			(1.37e-05)	(1.37e-05)
log(employment)	0.339***	0.348***	0.439***	0.446***
	(0.0195)	(0.0190)	(0.0223)	(0.0217)
Constant	-2.032***	-2.038***	-2.577***	-2.629***
	(0.128)	(0.130)	(0.141)	(0.145)
Other controls	K/L	log(real cap.)	K/L	log(real cap.)
	Market and Year Fixed Effects			
Observations	52605	52605	52605	52605

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Export Volume and Firm and Market Characteristics, Conditional on Being Acti

Dep. log(export volume)	(1)	(2)	(3)	(4)
- β * log(real capital)	**0.144**	**0.0446***	**0.143**	**0.0443***
	(0.0966)	**(0.0268)**	**(0.0968)**	**(0.0269)**
log(real capital)	0.111		0.111	
	(0.103)		(0.104)	
log(employment)	0.261***	0.271***	0.262***	0.274***
	(0.0404)	(0.0415)	(0.0447)	(0.0462)
Constant	8.733***	8.668***	8.722***	8.650***
	(0.293)	(0.287)	(0.318)	(0.312)
Other controls		K/L	- β * log(emp)	C/L & - β * log(emp)
	Market and Year Fixed Effects			
Observations	6961	6961	6961	6961
R-squared	0.089	0.088	0.089	0.088

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Summaries of Exporters Investment and Entry Behaviour

Year	# of Exporters with Positive Net Inv.	Net Investment Summaries (10 thousand RMB)				# of Exporters	# of New Exporters	# of Active Pairs	# of New Active Pairs
		Mean	Median	p25	p75				
2000	31	186506	4888	1251	30057	76		272	
2001	34	30254	3425	1045	13715	114	67	451	332
2002	50	38525	4994	675	13499	142	63	707	483
2003	97	39419	3488	923	8837	213	110	1186	788
2004	112	35015	3680	1094	14106	299	157	1973	1328
2005	158	44878	3127	594	10649	326	93	2390	1141

Table 10: Logit Regression of Market Entry on Firm Investment and Firm - Market Characteristics

Dep. EN 1 pair becomes active 0 pair stays inactive	(1)	(2)	(3)	(4)	(5)
log(net Inv)	**0.00252*** **	**0.00163*** **	-0.00107	-0.00181	-0.000943
	(0.000565)	**(0.000607)**	(0.00237)	(0.00238)	(0.00247)
exp1*log(net Inv.)		0.00803***		**0.00798*** **	-0.00142
		(0.00205)		**(0.00206)**	(0.00617)
WTO*log(net inv.)			0.00382	0.00366	0.00273
			(0.00245)	(0.00245)	(0.00254)
exp1*WTO*log(net inv.)					0.0102
					(0.00639)
exp2	0.0257***	0.0249***	0.0258***	0.0249***	0.0250***
	(0.00245)	(0.00247)	(0.00246)	(0.00247)	(0.00247)
exp3	0.0740***	0.0773***	0.0733***	0.0766***	0.0766***
	(0.0119)	(0.0120)	(0.0119)	(0.0120)	(0.0120)
Constant	-2.424***	-2.482***	-2.395***	-2.455***	-2.641***
	(0.239)	(0.239)	(0.240)	(0.240)	(0.269)
Other controls	Market and Year Fixed Effects				
Observations	22125	22125	22125	22125	22125

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dep. EN 1 pair becomes active 0 pair stays inactive	(6)	(7)	(8)	(9)
log(net Inv)	0.00249	**0.00146** **	0.00230	**0.00288*** **
	(0.00280)	**(0.000631)**	(0.00150)	**(0.000454)**
exp1*log(net Inv.)	-0.0216**	**0.00942*** **		
	(0.00959)	**(0.00215)**		
WTO*log(net inv.)				
exp1*WTO*log(net inv.)				
exp2	0.146***	0.0236***		
	(0.0313)	(0.00251)		
exp3	0.0288	0.0742***		
	(0.0479)	(0.0125)		
Constant	-1.673*	-2.597***	-2.611***	-1.957***
	(0.919)	(0.248)	(0.563)	(0.153)
Other controls	Market and Year Fixed Effects			
Observations	1311	20461	3604	32431

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1