Multinational Firms and New Chinese Export Transactions

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Abstract:

We study Chinese trade between 1997-2003 to see how the presence of multinational firms affected the quality, frequency and survival of new export transactions by private Chinese traders. By exploiting the richness of the data that come from fine geographic and product detail, we show how own-industry multinational firm presence helped to stimulate new trade, and to elevate the quality of those trades. In contrast, while we find that greater concentrations of other-industry multinational activity was associated with greater export introduction, and longer survival, other-industry exposure was also correlated with lower-valued export introductions.

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Introduction

There is an increasing understanding that international trade, even at the finest levels of product disaggregation, is characterized by a high degree of quality differentiation. Such quality distinctions are not generally random, as higher quality exports generally originate from more developed countries.[1] In addition, a growing body of research finds that favorable national outcomes, such as higher growth rates and larger per capita incomes, are positively related to the variety of a country's exports. In light of these associations, which are based on aspects of finely disaggregated trade data, one can ask whether there are economic factors that enhance a country's ability to export higher quality products or to increase the number of its trade linkages.

To examine this question, we study the trade of Chinese firms to learn how proximity to multinational firms influenced the quality or nature of new Chinese trade. One reason for testing for such effects is the fact that an already extensive literature documents how proximity to multinational firms confers other economic benefits on local firms. For example, in many cases proximity to multinational firms is found to elevate local firms' probability of entering export markets.[2] In addition, the remarkable expansion of multinational activity in Chinese cities provides a fruitful environment for examining the evidence on multinational spillovers.

Nonetheless, while much of the literature on multinational firms highlights positive spillovers manifested by enhanced local firm productivity, greater local firm export propensities, or higher worker wages paid to local workers employed by

[1] For evidence based on product unit values see Schott (2004) or Hummels and Klenow (2005). In addition, quality differences also appear to affect demand as shown by Hallak (2006).
[2] See Aitken, Hanson, and Harrison (1997), Greenaway, Sousa and Wakelin's (2004), Sjoholm (2003), or Ma (2004) for evidence on Mexican firms , UK firms, Indonesian firms and Chinese provincial trade, respectively.

multinational firms, not all multinational spillovers are positive.[3] First, as Aitken and Harrison (1999) show, any productivity benefits gained by local firms may be more than fully offset by adverse effects that arise from the intensified competition that accompanies an increased multinational presence. Second, as Javorcik (2004) finds in her study of Lithuanian firm productivity, some multinational contacts appear to benefit local firm productivity more than others. In her sample, backward-linkages to multinational firms generated spillover benefits to Lithuanian firms, while other forms of multinational contact had no discernable effect on local firm productivity.

To learn whether multinational firm presence generated spillovers to private Chinese exporter quality and characteristics, we turn to fine product-level data on Chinese trade for 1997-2003. The data on Chinese trade are especially attractive for two reasons. First, Chinese trade during this period grew at an extremely rapid pace, and included an exceptionally rapid increase in new trade transactions. As Figure 1 shows new private trade transactions, which were defined as any new private-Chinese HS8 product export between a particular Chinese city-country destination pair, represented more than two-thirds of all private trade transactions between 1998 and 2003.[4] In addition, while Figure 2 indicates that new trade transactions were smaller in value than the value of ongoing private transactions, trade in new products during this period represented 28 percent or more of total private Chinese trade value in each of these years. The second benefit of using Chinese trade data is the fine geographic level at which the data are reported. Since product exports are distinguished by their city-district of origin,

[3] Blomstrom and Kokko (1998), Navaretti and Venables (2004), and Gorg and Greenaway (2004) provide extensive surveys of host country benefits and harms from multinational activity.
[4] Private Chinese trade represented roughly one percent of Chinese exports in 1997, and roughly ten percent of Chinese exports in 2003.

the data observations are close to the firm or enterprise level, which is the basis of recent economic theories of international trade.

To guide our analysis, we use insights from Melitz's (2003) model of firm heterogeneity to think about the effects of multinational presence on export quality. In particular, if one introduces multinational firm effects through spillovers to local firm capabilities, as well as to local factor market prices, the simple model has implications for the local effects of multinational firms in the same versus different industries. In sum, the main effects are related to the benefits of informational or productivity spillovers, versus harms brought about by local factor market congestion. Further, to the extent that multinational firm presence affects the population of local firms, the quality of exports from surviving local firms is predicted to rise with an increase in multinational firm presence.

To test these ideas, we with an examination of the unit values for new private Chinese export transactions. We learn that unit values were in fact higher for private Chinese exporters surrounded by same industry multinationals, while unit values were lower for entrepreneurs surrounded by multinationals in different industries. We then exploit cross-product differences in dispersion to search for the source of multinational effects, and find that the increase in unit values due to own-industry multinational firm proximity were greater in less dispersed, lower productivity industries than they were in high dispersion industries. We also explore the effects of multinationals presence on new Chinese trades. Controlling for city-industry effects, we find that Chinese firms located in cities that experienced more rapid multinational growth were more successful at

generating new trade links, and that the effects were stronger in industries characterized by a greater degree of homogeneity.

This paper makes three contributions to the literature. First, this paper shows that Chinese enterprises located near larger concentrations of own-industry multinationals benefited from a new dimension of export spillovers - the extensive margin at the product level. This effect was further enhanced by multinational spillovers which enhanced the value of new trades, as multinational proximity appears to have enabled Private Chinese traders to enter into new export relationships that had higher unit values than did Chinese enterprises that were not similarly situated near large concentrations of own-industry multinationals. These finding emerge whether one measures multinational presence by the count of multinational firms, or the volume of multinational exports. The results suggest that proximity to multinational firms appeared to alleviate own-industry informational barriers to trade.

Second, the paper shows that the effects of multinational presence on newly-created Chinese export relationships were not uniform across industries, and that industry sales dispersion, which is an indicator of industry productivity differences, played an especially important role in mediating the effects of multinational presence. If higher productivity industries are characterized by greatest sales dispersion, this result implies that the benefits of multinational presence were smaller for more productive Chinese industries. In addition, although competition arising from own-industry multinational presence appears to have reduced the survival probabilities for newly-created Chinese trade transactions, the effect of own-industry multinational firm presence on survival probabilities was smaller for newly-created transactions in industries that were

characterized by a greater level of dispersion. This further supports the notion that multinationals reduced informational barriers to trade in industries where informational barriers to trade were the greatest.

Finally, the paper shows that contact with other-industry multinationals had a mixed effect on new Chinese export transactions. On the positive side, private Chinese entrepreneurs succeeded in creating more new trade relationships when they were surrounded by an increased density of other-industry multinational firms. Such transactions were also more likely to survive than were new private trade transactions created in cities with less multinational activity. However, for transactions that were created, an increase in other industry multinational activity was negatively correlated with new export transaction unit values.

The remainder of the paper is organized as follows. To develop predictions about the effects of multinational firm presence on the nature of trade transactions, section two provides a model of product quality in a heterogeneous firm setting. The model's predictions about the quality, frequency and survival of new trading relationships are then tested in section three. Section four concludes.

2. Model

To develop predictions about the micro characteristics of new Chinese trade transactions, we draw some insights from Melitz's (2003) model of heterogeneous firms and trade. In this framework the representative consumer has CES preferences over different varieties, and his utility increases with both the quantity and quality of the products consumed. Each variety is produced by a single firm. Further, each firm's productivity is based on its productivity draw, φ. Each product variety is indexed by, ω. In our model consumer utility is given by,

$$U = [\int_{\omega \subset \Omega} (d_\omega)^\rho d\omega]^{1/\rho},$$

where $d_\omega \equiv gq_\omega$. Product quality is given by g, while q_ω is the quantity demanded. The elasticity of substitution between two varieties is $1/(1-\rho)$.

Labor is the only input, and the wage rate is *w*. Following Feenstra (2004), we denote the cost associated with producing one unit of each variety with quality g as $g\omega/\varphi$.

We can now examine firm export behavior. The creation of a new export relationship entails fixed cost f, which represents the relationship specific investment between the supplier and the international buyer. In each period δ percent of the previous period's export transactions survive. As a result,

$$\Pi_{\omega t} = \frac{1}{1-\delta}[p_\omega - \frac{gw}{\varphi}]q_\omega - fw,$$

represents the sum of expected profits created by an export relationship, where p and q denote price and quantity sold. The pricing rule, $p_\varphi(\varphi) = gw/\rho\varphi$, indicates that product prices are determined by a fixed markup over marginal cost. The zero profit condition

defines the minimum productivity draw, or φ*, which will cause firms to export. The threshold productivity level for exporting is given by,

$$\varphi^* = \frac{gw}{\rho}\left[\frac{Pfw(1-\delta)}{R(1-\rho)}\right]^{\frac{1-\rho}{\rho}},$$

and is affected by aggregate expenditure R and the aggregate price level P, which is given by:

$$P = \left[\int_{\omega\subset\Omega} p_\omega^{\frac{\rho}{\rho-1}} d\omega\right]^{\frac{\rho-1}{\rho}}$$

To pin down our predictions regarding the effects of multinational firm proximity, we make a number of assumptions about the direction and magnitudes of the spillover effects in our model.

We assume that proximity to multinational firms benefits private Chinese suppliers by reducing fixed investment costs associated with the creation of new trade relationships. The scope for such spillovers is present, since foreign firms trade more products than do domestic firms. Thus, local Chinese firms may learn about product-market opportunities by observing the activities of local multinational firms. In addition, if the presence of multinational firms increases the local density of traders, brokers and other middlemen, an increasing concentration of multinational firms should reduce the fixed costs associated with the creation of new trades.

Assumption 1a: $\frac{\partial f}{\partial \Gamma_{MNC}} < 0$, $\frac{\partial f}{\partial \Gamma_{MNCO}} < 0$, and $\frac{\partial f}{\partial \Gamma_{disp}} > 0$.

Γ_{MNC} and Γ_{MNCO} refer to the activities by multinational firms in the same product group as the exporter and activities by multinational firms outside the exporter's product group,

respectively. Γ_{disp} measures the productivity dispersion, based on export sales, for suppliers in a product market. This term is included since we assume that the fixed costs of relationship creation are higher for producers in dispersed industries, since assymetric information implies that it is more difficult for suppliers in these industries to distinguish themselves from competing Chinese suppliers.

We also assume that multinational firms may have a positive effect on local firm product quality.

Assumption 1b: $\frac{\partial g}{\partial \Gamma_{MNC}} > 0$, and $\frac{\partial g}{\partial \Gamma_{MNCO}} > 0$.

Assumption 1b states that when multinational firms are located in the same city as Chinese suppliers, Chinese suppliers benefit from positive spillovers in the form of improved product quality.

Assumption 1c: $\frac{\partial \delta}{\partial \Gamma_{MNC}} > 0$, $\frac{\partial \delta}{\partial \Gamma_{MNCO}} > 0$, and $\frac{\partial \delta}{\partial \Gamma_{disp}} < 0$.

Location in a city with active multinationals may assist local suppliers who need to gain knowledge of the international market in a fashion which increases their survival probabilities. This argument is consistent with Rauch and Watson's (2003) argument, which finds empirical support in Besedes and Prusa (2004,) that better information when an export relationship is being formed causes new export relationships to last longer. If we assume that firm productivity follows the Pareto distribution, as Grossman and Helpman (2004) do, average productivity will be higher in industries that are characterized by a higher level of dispersion. This is because the expected productivity of the outside options is higher in more highly dispersed industries. As a result, existing

relationships are less likely to survive in a more highly dispersed industry, than are new relationships in less dispersed industries.

Assumption 1d: $\frac{\partial w}{\partial \Gamma_{MNC}} > 0$, and $\frac{\partial w}{\partial \Gamma_{MNCO}} > 0$.

Increased labor demand due to growth in multinational activities raises local production worker wages.

Taken together, these assumptions imply that multinational firms bring positive spillovers to local firms in the form of increased product quality, and reduced international search costs, while they also create negative spillovers due to their influence on local production wages.

Since the spillover effects of multinational firms act through a number of channels, and are not all in a single direction, the overall effect of exposure to multinational firms is indeterminate. To provide more concrete predictions, the relative magnitude of the spillover effects must be specified.

Assumption 2: $\left|\frac{\partial \delta}{\partial \Gamma_{MNC}}\right| > \left|\frac{\partial f}{\partial \Gamma_{MNC}}\right| > \left|\frac{\partial g}{\partial \Gamma_{MNC}}\right| > \left|\frac{\partial w}{\partial \Gamma_{MNC}}\right|$

and $\left|\frac{\partial w}{\partial \Gamma_{MNCO}}\right| > \left|\frac{\partial \delta}{\partial \Gamma_{MNCO}}\right| > \left|\frac{\partial f}{\partial \Gamma_{MNCO}}\right| > \left|\frac{\partial g}{\partial \Gamma_{MNCO}}\right|$.

Assumption two ranks spillover magnitudes, specifying that the information spillovers from multinationals in a firm's own product group are greater in magnitude than quality spillovers, which are bigger in magnitude than the spillovers to local wages. If this ordering is satisfied, it implies that local Chinese firms benefit on net from own-industry

multinational presence, since the benefits of forward or backward linkages to own-industry multinationals outweigh the adverse effects created by own-industry multinationals' upward pressure on labor costs. In contrast, this ordering implies that the negative spillover effects from other-industry multinationals, due to their role in raising production wages, exceed the magnitude of their positive spillovers.

Proposition 1: $\frac{\partial \varphi^*}{\partial \Gamma_{MNC}} < 0, \frac{\partial \varphi^*}{\partial \Gamma_{MNCO}} > 0, and \frac{\partial \varphi^*}{\partial \Gamma_{disp}} > 0$

New exports increase with the own-industry's multinational activities, but decrease multinational activities in other industries grow. New exports are also less common in industries characterized by a greater degree of productivity dispersion among local producers. From the productivity threshold equation and assumption 2, we know that the threshold productivity, which represents the minimum productivity draw that brings about export effort, is influenced by the fixed cost, wage, and survival rate. The net effect of own-industry multinationals is to lower this threshold, thus spawning an expansion of export activities. Since fixed marketing cost are increasing for suppliers whose productivity levels are more dispersed, more dispersed industries are characterized by a higher productivity threshold for entry.

Proposition 2: $\frac{\partial p_\varphi}{\partial \Gamma_{MNC}} > 0 and \frac{\partial p_\varphi}{\partial \Gamma_{MNCO}} < 0.$

From the pricing equation, the prices for each variety are increasing in product quality and marginal costs. Positive spillovers from own-industry multinationals, which are manifested in spillovers to product quality and efficiency gains which enable firms to

reduce their fixed costs of operation, reinforce the increase in price - given the assumption that the effects of upward pressure on wages is smaller than the positive spillovers. The net effect implies that unit prices will increase as own-industry multinational activities grow. The remaining inequalities in assumption 2 imply that growth in other-industry multinational firm activity will be associated with reduced unit values for newly exported products.

3. Estimation and Data

To estimate how multinational firm proximity affected the quality of new export outcomes for Chinese exporters, our main analysis estimates the following specification:

(1) $\ln P_{hcdt} = \alpha + \beta_1 * [\text{Own-Ind MNC}]_{hc,t-1} + \beta_2 * [\text{Other-Ind MNC}]_{hc,t-1} + \Gamma * X_{hcd,t-1} + \varepsilon_{hcdt}$

The subscripts h, c, d and t represent the HS8 product market, Chinese city of export origin, country destination of the exports, and year. The specification identifies the *net effect* of multinational firm proximity on the characteristics of new product trade. The error term has two components: the first, Ψ_{hc}, is a province, HS4 industry fixed effect, while the second η_{hcdt} is an iid error term.

(2) $\varepsilon_{hcdt} = \Psi_{hp} + \eta_{hcdt}$

Province-industry fixed effects are included to account for differences in local characteristics that affect the quality of newly introduced products. These differences may include differences in resources and endowments or differences in infrastructure, which were fixed over time, and enabled firms in some provinces to produce higher quality products than those produced elsewhere in China. We choose province as our geographic unit since we expect environmental conditions to be fairly similar at the

provincial level.[5] Since we control for province-industry effects, we use changes over time in the density of multinational activity in Chinese cities to learn how multinational firm activity affected the quality of Chinese trade transactions. The ultimate panel of data is not balanced, since it is based on those transactions that were introduced. While our primary dependent variable is the unit value for newly introduced products, we also apply specification (1) to later year unit values and transaction survival probabilities as a means of interpreting our results.

We also explore the effects of multinational firm presence on the count of new trade introductions, using:

(3) $[\#NewT_{hct}] = \alpha + \beta_1 * [\text{Own-Ind MNC}]_{hc,t-1}\ \beta_1 * [\text{Other-Ind MNC}]_{hc,t-1} + \Gamma * X_{hc,t-1} + \delta_{hct}$.

In this setting the dependent variable is the count of all new HS8 trades introduced in a city in a year, or $[\#NewT_{hct}]$.[6] The data in this analysis constitute a balanced panel, whose dimensions are HS2, city and year. Since new transaction counts are the dependent variable, we use random effects negative binomial methods to estimate specification (3), Including random effects, Φ_{hc}, which are assumed to operate at the city-HS2 industry level, and an iid error term, the error term is given by:

(4) $\delta_{hct} = \Phi_{hc} + \pi_{hct}$.

City-industry random effects encompass differences in infrastructure or resources that enable a greater number of export transactions to be initiated in some cities than in others. As a result, we use differences in the evolution of city-industry multinational activity to

[5] In the U.S. context, Rosenthal and Strange (2001) note that the effects of factor market endowments on industry agglomeration appear to operate at the level of the state, while knowledge spillovers appear to be manifested at the finer zip-code level of geographic disaggregation.

[6] City-HS2 industries were excluded from the panel if the city-industry pair never recorded any export transactions during the sample period.

identify the effects of multinational presence on new trade introductions. This approach is valid as long as comparative advantage does not evolve over time at the city-industry level, in a fashion which attracts multinationals to choose particular locations that are gaining advantage, while simultaneously generating new private trades.

Data

We use Chinese data on ordinary exports between 1997 and 2003 to examine the effects of multinationals on the quality of new trade connections. The trade data, which were reported in the Customs General Administration of the People's Republic of China for 1997-2003 record all export transactions at the HS 8 level of dissagregation.[7]

While the data are recorded by product category rather than firm, the fine level of geographic detail in the data enable one to draw inferences about the number of agents and frequency of new trading relationships underpinning Chinese trade. As the data summary in Table 1 shows, China recorded exports from 504 different cities. However, Chinese records provided yet further information on the sources of Chinese exports, since the data also include the city-district of origin.[8] The data also record the identity type of the exporter. In this context, we defined new private trade transactions as any private HS8 product export between a Chinese city-district location and a foreign destination that did not exist in the previous year. New export transactions arose when private Chinese firms in a city-district were observed exporting an HS8 product that they had not exported to any country in the previous year, or when private Chinese firms in a city-district expanded the number of destinations they exported an existing export commodity

[7] These data were used under license to the CID at the University of California, Davis.
[8] The district types included: special economic zones, economy and technique development area, high-tech development area, bonded area, and other.

to. While it is possible, that the HS8 product had been exported between the (city-district)-destination pair at an earlier time, such transactions are likely to have involved a different buyer-seller combination. Since the creation of each new buyer-seller combination is likely to involve search costs and relationship specific investments, we treat transactions separated in time as distinct. [9]

To measure multinational firm activity at the city level, we exploited the ownership information included in the trade records. First, to measure the volume of own-industry multinational firm activity, we measured the volume of all exports by foreign-owned enterprises or joint ventures that were engaged in the HS2 industry that encompassed the HS8 industry under study. Further, as Feenstra and Hanson (2005) note, by the time the data are disaggregated to the HS8 product- city- zone – ownership-processing regime level of disaggregation, this data set provides information that is very close in nature to that of firm-level data sets, even though the operational identifier is HS8 product. Thus these data can be used to construct count measures of MNC exporters. In particular, we measure the presence of own-industry MNC exporters by the count of unique [HS8]-[city/district]-[multinational exporter type] export combinations recorded for each HS2 industry city pair.[10]

[9] In related work, Roberts and Tybout (1997) find that Colombian firms were more likely to export if they exported in the previous year, but were not more likely to export if they had exported in earlier years, which suggests that investments in export connections, and information about buyers, depreciate rapidly.

[10] We classified trade transactions as belonging to multinational firm activity, if the exporter listed themselves as foreign-owned enterprises or as Sino-foreign contractual or equity joint ventures. To prevent undefined values, the multinational exporter presence variable was ln(# of Multinationals +.001). If firms produced multiple products, this measure will overestimate the number of firms. On the other hand, our measure will underestimate the number of multinational firms if there was more than one firm in a city involved in exporting a particular HS8 product under a particular contractual form. Nonetheless, the measure provides a reasonable approximation for firm presence as long as there are no systematic differences across multinational firms by city or products.

We use data on HS8 trade transaction values to measure the degree of dispersion in an HS8 product market. To create the measure, we used the standard deviation of log export sales in 2003. We chose 2003 since it was the year with the greatest number of trade transactions. However, if we re-estimate the paper's regressions using alternative measures based on earlier years' data or coarser definitions of industry - HS4 or HS6 - the general results remain the same.

We use importer per-capita GDP as a control in the unit value regressions to capture the well-documented fact that, even at the fine HS8 product level, richer countries import more expensive product varieties than do less wealthy countries.[11] The remaining controls are firm type, an OECD destination dummy, year dummies and the log of the unit value of other new export transactions in the HS8 industry. One reason for adding the average unit value of other transactions in the HS8 product market is to control for large differences in unit values that are product-specific. For example, cars will always command a greater unit value than do bicycles. We chose to include the unit value for new transactions, rather than the overall average, in case new transactions represented more sophisticated offerings than the transactions that existed in the previous year.[12] Year dummies are important if there were changes in the macroeconomic environment that affected the price of Chinese exports. While we don't report the coefficients for the year variables, they are always very significant determinants of year to year price variation.

[11] See Schott (2004), Hummels and Klenow (2005), Hallak (2006).

[12] For example, we could imagine that unit values for cell phone handsets rose over time as handsets incorporated better display screens, photographic capabilities, and other enhanced features.

Results

As Table 2 shows, the results of multinational presence generally match our predicted effects. Columns (1) and (2) show that new export unit values were positively correlated with own-industry multinational presence, at the city level. This effect is apparent whether multinational activity is measured by the size of multinational operations, or the breadth of multinational contacts. In contrast, multinational activity in other industries was negatively related to the new export transaction values for private Chinese firms. The latter effect suggests that the primary effect of other-industry multinational firm presence was related to increases in input demand and infrastructure usage which drove up input costs and created congestion, thus inhibiting the opportunities for local entrepreneurs. Since the multinational firm coefficients in the regressions represent net spillover effects, it is not possible to measure each individual spillover which enters into the net effect. This approach means that other mechanisms may generate the observed responses. For example, the effects of other-industry multinational firms may be more pronounced in their effects as suppliers or purchasers of inputs. For example, an increase in other-industry multinationals might provide a low cost source of inputs that Chinese firms could incorporate into their production. If so, the negative coefficient on the term measuring other-industry multinational activity would represent the cost reductions achieved when multinational firms provided a cheaper source of inputs.

The other result that emerges here is that firm heterogeneity, which is captured by the dispersion of sales values in an HS8 product category, was negatively related to unit

values. This confirms our prediction that exporters in industries characterized by dispersion would have lower unit values than exporters in less dispersed industries.

To interpret why dispersion matters for unit values of newly introduced trades, we followed product unit values in the three years following the creation of a new trade relationship. The coefficients in Table 3 demonstrate that own-industry linkages were associated with higher unit values in later years, while other-industry multinational activity was associated with lower unit values. However, while the effects of the multinational firm presence did not change over time, the correlation with industry dispersion did change for unit values later years. In particular, as time passes, industry dispersion ceases to have a negative correlation with unit trade values, switching to a positive and significant correlation by years two and three following anew trade link's creation. This result shows the effects of selection on trade values, since the trade data are characterized by a high level of attrition. It indicates that surviving transactions in dispersed industries had higher unit values than surviving transactions in less dispersed industries. This result is consistent with Rauch and Watson's (2003) model of learning about exporter quality over time, since it appears that lower quality transactions are weeded out over time in dispersed industries.

Another way to assess the effects of multinational firm presence is to examine whether multinational firm proximity helped elevate the number of new trade transactions introduced by private Chinese exporters. As the column (1) of Table 4 shows, there was a positive effect of all multinational activity on the count of new trade introductions at the city-industry level: private Chinese exporters located in Chinese cities that experienced an increase in multinational activity managed to introduce a

greater number of new export trades. In this case increases in own-industry multinational presence boosted the count of new export transactions by a smaller amount than did other-industry multinational presence. While multinational presence of all types was likely to offer informational benefits to local Chinese entrepreneurs, it is possible that competition at the industry level may have offset some of those benefits.

New transactions may arise for two reasons. Chinese firms could start exporting products that they had not exported before, or they could expand the number of destinations they exported their products to. To see whether the responses for new product exports were the same as the response for new introductions of all types, column (4) of Table 4 looks at the effects of multinational firms on the count of new product trades. The results here are very similar to those of all new transactions. Again, the number of new product trades was boosted by increased own- or other-industry multinational firm contacts. The fact that the positive effect of multinational firm presence on new product trade counts is not dominated by industry-specific knowledge spillovers suggests that multinational spillovers operate at a very general level. For example, multinational activities may increase awareness of market potential in export destinations, or may increase the number of traders whose knowledge is of benefit to Chinese traders.

It is possible that some multinational connections are more valuable than other. To examine whether contacts with multinationals exporting to the U.S. and Japanese generated benefits that were different than those exporting to other markets, we examined whether the value of proximity to U.S. or Japanese contacts had a greater or smaller effect on the number of new contacts. Since the U.S. and Japanese markets are

economically large, and populated by high income consumers, one might expect information about these markets to be more valuable than are contacts in other locations. However, as the results in column (3) of Table 4 show, there is only a small difference in effects.

Finally we test whether own-industry multinational presence appeared to provide information spillovers that facilitated the creation of new trades. In columns (2) and (5) of Table 4 we add interactions between dispersion and own-industry multinational firm counts. While the interaction term has no correlation with all trade transactions, it is found to be negatively correlated new product trades. The latter effect suggests that multinational proximity was most helpful in increasing new product introductions by private Chinese producers in more homogenous product segments.

The last set of regressions in Table 5 examines survival probabilities for newly introduced Chinese exports. As the first two columns of table 5 show, the presence of all multinationals, whether measured by counts or multinational export value, boosted the survival probability of new Chinese trades. In addition, the beneficial effect of multinational presence was greater in the case of other-industry effects than it was for own-industry presence. This dichotomy may arise since each coefficient gives the reduced form effect of sometimes offsetting multinational effects. If the positive informational benefits from own-industry presence are partially offset by a negative effect due to competition in product markets, or increased factor costs for critical industry inputs, then the overall benefits from own-industry proximity may be smaller than the overall benefits arising from growth in other-industry multinational activity.

To see whether the effects of information appear to influence industry responses, columns (3) and (4) in Table 5 add interactions between dispersion and multinational activity. Whether multinational activity is measured by export value, or exporter counts, the positive coefficients on the interaction terms indicate that benefits from own-industry multinational activity on survival probabilities are larger in more dispersed industries. Such a difference suggests that multinational firm information spillovers that are more pronounced in more heterogeneous industries.

4. Conclusion

This paper examines private Chinese trade transactions for the years 1997 to 2003 to see whether the presence of multinational firms influenced the quality, frequency or survival of new trade transactions. By exploiting the geographic and product detail in the data, we are able to trace how differences in the density and time patterns of multinational activities across Chinese cities affected new Chinese trade transactions. Our results show that own-industry multinational contact was associated with a greater frequency of trade creation and with higher trade quality as represented by unit values. Other-industry multinationals also fostered higher levels of trade creation, although other-industry contacts appear to have had a negative effect on the quality of these newly introduced trades. This suggests that multinationals had an adverse effect on local factor markets, due to congestion or their effect on factor prices.[13]

The effect of multinational firm presence on trade values may have particularly important implications for country welfare and growth. Multinational proximity appears

[13] *Business Week*, in its November 14, 2005 article "Go West, Westerners" (pp60-61), notes how wages are rising in China, particularly in areas such as Guangdong, Beijing and Shanghai that have received large multinational investments.

to have enabled Private Chinese traders to enter into new export relationships that had higher unit values than did Chinese enterprises that were not similarly situated near large concentrations of own-industry multinationals. This finding on unit values provides support for Rodrik's conjecture that a growing concentration of multinational firms has helped to boost the value-segments in which China exports.[14] More importantly, the growth in values appears to spill over to domestic firms, rather than reflecting an increase in the unit values of multinational firm exporters. The importance of such increases in product value are made apparent by Hausman, Hwang and Rodrik's (2005) discovery that movement into higher value products is strongly correlated with subsequent country growth.

[14] Schott (2006) also notes Chinese activity in increasingly sophisticated sectors. However, Schott finds that the unit values or Chinese exports, when compared at a product level, were uniformly lower than those of the OECD.

Figure 1

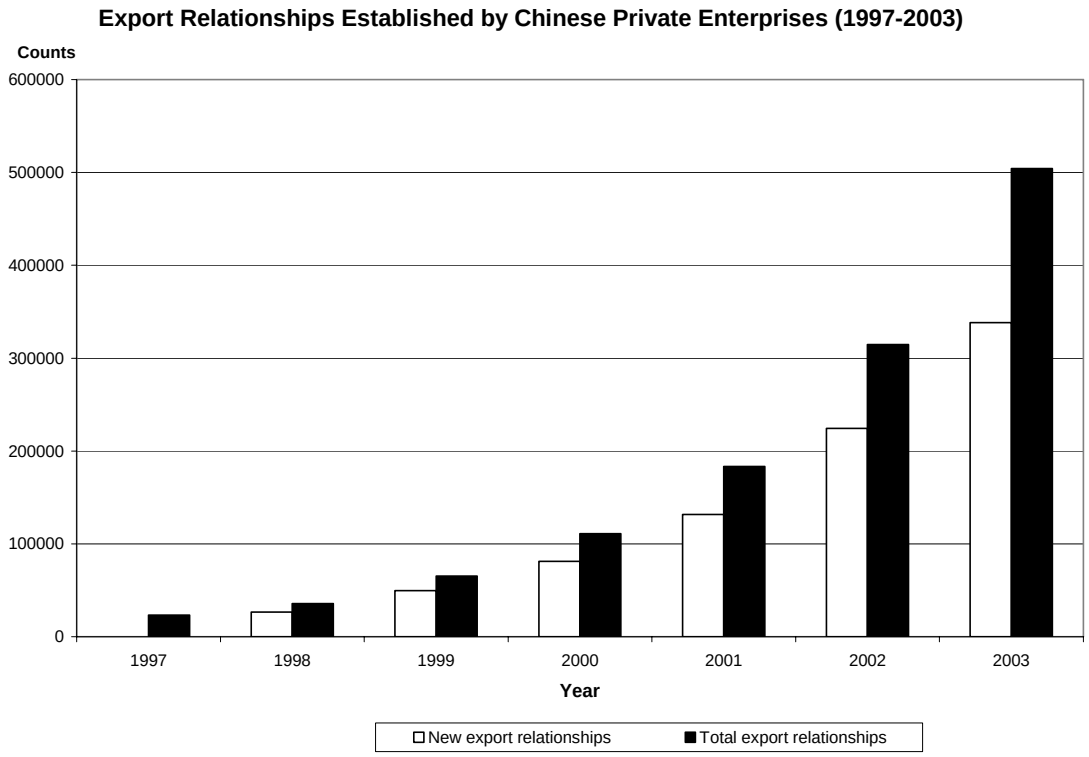
Export Relationships Established by Chinese Private Enterprises (1997-2003)
Counts
600000
500000
400000
300000
200000
100000
0
1997
1998
1999
2000
2001
2002
2003
Year
New export relationships
Total export relationships

Figure 2

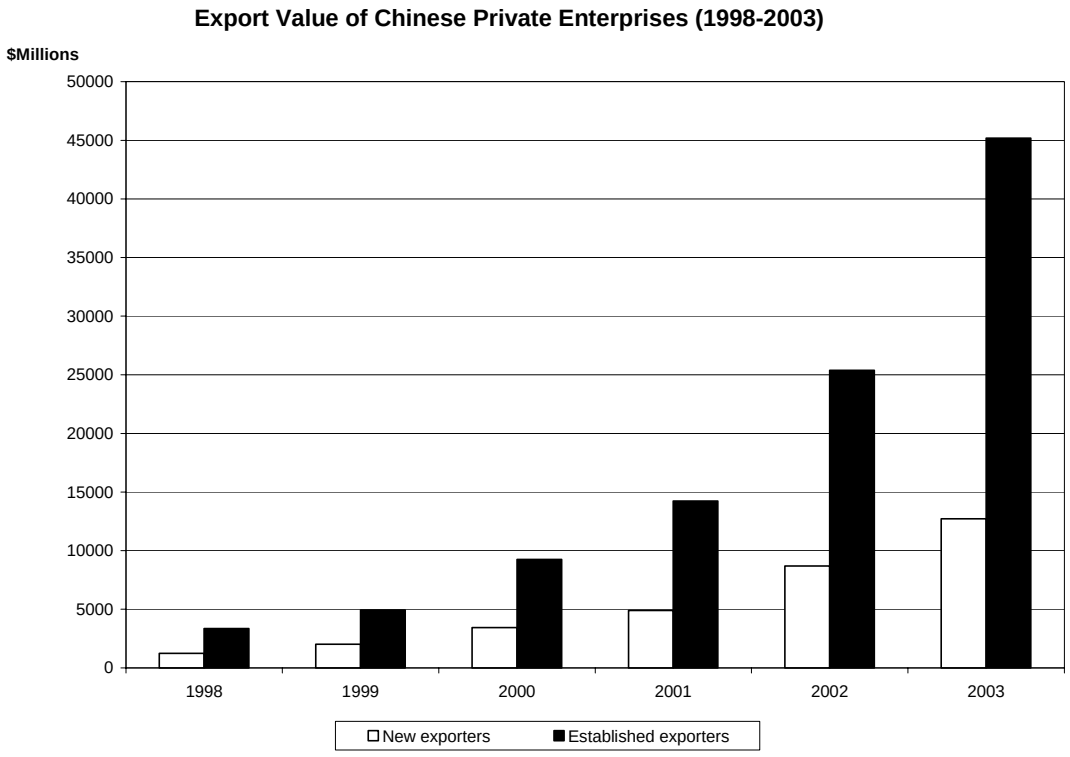
Export Value of Chinese Private Enterprises (1998-2003)
$Millions
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
1998
1999
2000
2001
2002
2003
New exporters
Established exporters

Table 1: New Export Transactions by Private Chinese Enterprises

Province Name	Number of Cities in Province	Average # of MNC-Product Firms by City, 1997	Average # of New Export Transactions per City, 1998	Average # of New Export Transactions per City, 2000	Average # of New Export Transactions per City, 2003
Zhejiang	23	469	303	1148	4089
Guangdong	23	2076	290	1000	3352
Hainan	3	128	622	1235	1678
Fujian	11	846	104	476	1481
Jiangsu	26	685	135	259	1346
Shanghai	20	1051	46	85	1342
Shandong	29	382	68	190	750
Hebei	12	201	43	149	555
Liaoning	20	316	19	47	315
Anhui	17	76	14	32	294
Heilongjiang	20	39	4	8	280
Qinghai	4	7	2	8	275
Tianjin	18	409	38	37	260
Shaanxi	10	58	2	16	245
Sichuan	21	46	9	41	231
Hubei	18	85	19	60	201
Guangxi	16	82	9	23	194
Hunan	18	32	12	30	152
Beijing	19	284	11	30	142
Chongqing*	33	13	34	69	113
Henan	23	45	4	13	109
Jiangxi	12	53	4	14	95
Inner Mongolia	14	21	2	11	89
Shanxi	12	28	6	24	71
Xinjiang	14	7	4	2	64
Yunnan	20	17	2	6	58
Ningxia	4	15	0	1	53
Jilin	17	68	4	10	49
Guizhou	8	25	1	6	45
Gansu	14	10	0	3	40
Tibet	5	2	1	0	2

Table 2: The Effect of Multinationals on New Export Transaction Unit Values

	(1)	(2)	(3)	(4)
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0076 [0.0004]***		0.0212 [0.0016]***	
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	-0.0094 [0.0008]***		-0.0095 [0.0008]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$		0.0155 [0.0009]***		0.0503 [0.0036]***
Ln(Number of MNC Exporters in other HS2's)$_{ch,t-1}$		-0.0109 [0.0014]***		-0.0109 [0.0014]***
Dispersion	-0.0305 [0.0067]***	-0.0301 [0.0067]***	0.0732 [0.0139]***	0.0219 [0.0084]**
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* Dispersion			-0.0069 [0.0008]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* Dispersion				-0.0176 [0.0017]***
OECD	0.2087 [0.0075]***	0.1849 [0.0046]***	0.2064 [0.0075]***	0.1839 [0.0046]***
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* OECD	-0.0018 [0.0004]***		-0.0017 [0.0004]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* OECD		-0.0013 [0.0009]		-0.0009 [0.0009]
Ln (UnitValue of other new exports in HS8)	0.8437 [0.0017]***	0.8438 [0.0017]***	0.8423 [0.0017]***	0.8423 [0.0017]***
Ln (UnitValue of other new exports in HS8)*OECD	-0.0565 [0.0018]***	-0.0571 [0.0018]***	-0.0566 [0.0018]***	-0.0572 [0.0018]***
Ln (GDP per capita)	0.0577 [0.0018]***	0.0581 [0.0018]***	0.0577 [0.0018]***	0.0581 [0.0018]***
Firm Type	-0.0341 [0.0030]***	-0.0351 [0.0030]***	-0.0341 [0.0030]***	-0.0352 [0.0030]***
Year Dummies	Yes	Yes	Yes	Yes
Constant	-0.0265 [0.0302]***	-0.0765 [0.0280]***	-0.2293 [0.0384]***	-0.1775 [0.0298]***
Observations	755,123	755,123	755,123	755,123
# of Province-HS4 Groups	16,971	16,971	16,971	16,971
R-squared	0.28	0.28	0.28	0.28

Notes: Standard errors contained in [ ]. *** represents statistical significance at the 1% level.

Table 3: The Effect of Multinationals on New Export Transaction Unit Values, Years t+1 to t+3.						
	(1)	(2)	(3)	(4)	(5)	(6)
Year→	[t+1]	[t+1]	[t+2]	[t+2]	[t+3]	[t+3]
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0078 [.0008]***		0.0078 [.0012]***		0.0085 [.0018]***	
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	-0.0548 [.0018]***		-0.0692 [.0027]***		-0.0554 [.0037]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$		0.0183 [.0019]***		0.0163 [.0029]***		0.0195 [.0040]***
Ln(# of MNC Exporters in other HS2's)$_{ch,t-1}$		-0.0689 [.0030]***		-0.0836 [.0043]***		-0.0695 [.0058]***
Dispersion	0.0104 [.0131]	0.0123 [.0131]	0.0317 [.0202]*	0.0351 [.0202]*	0.0851 [.0301]***	0.0871 [.0301]***
OECD	0.1438 [.0148]***	0.1475 [.0086]***	0.1395 [.0227]***	0.1455 [.0128]***	0.1776 [.0316]***	0.1645 [.0177]***
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* OECD	0.0019 [0.0009]**		0.002 [.0013]		-0.0005 [.0019]	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* OECD		0.0071 [.0018]**		0.0067 [.0027]**		-0.0013 [.0038]
Ln (UnitValue of other new exports in HS8)	0.8709 [.0032]***	0.8712 [.0032]***	0.8723 [.0046]***	0.8724 [.0046]***	0.8686 [.0068]***	0.8687 [.0069]***
Ln (UnitValue of other new exports inHS8) *OECD	-0.0568 [.0032]***	-0.0576 [.0032]***	-0.0529 [.0047]***	-0.0535 [.0047]***	-0.0432 [.0066]***	-0.0438 [.0066]***
Ln (GDP per capita)	0.056 [.0032]***	0.0582 [.0032]***	0.0554 [.0046]***	0.0585 [.0046]***	0.0769 [.0067]***	0.0779 [.0067]***
Firm Type	-0.0411 [.0051]***	-0.0503 [.0051]***	-0.0873 [.0075]***	-0.1027 [.0074]***	-0.0596 [.0106]***	-0.0659 [.0106]***
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.6985 [.0574]***	0.1649 [.0512]***	1.0953 [.0847]***	0.4032 [.0753]***	0.3683 [.1229]***	-0.1707 [.1091]***
Observations	197,093	197,093	92,017	92,017	45,464	45,464
# of Province-HS4 Groups	8,882	8,882	4,950	4,950	3,312	3,312
R-squared	0.32	0.32	0.33	0.33	0.32	0.32

Notes: Standard errors contained in [ ]. *** represents statistical significance at the 1% level.

Table 4: New Chinese Trade Transactions and Multinational Activity

	All New Transactions			New Product Trades	
	(1)	(2)	(3)	(4)	(5)
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	.0255 [.0009]***	.039 [.0083]***		.0198 [.0011]***	.0367 [.0100]***
Ln(Value of HS2 MNC Exports – US or Japan)$_{ch,t-1}$			0.0143 [0.0010]***		
Ln(Value of HS2 MNC Exports – Other Dest'n)$_{ch,t-1}$			0.0193 [0.0011]***		
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	.0702 [.0023]***	.0701 [.0023]***		.0633 [.0025]***	.0631 [.0025]***
Ln(Val MNC Exports in other HS2's – US or Japan)$_{ch,t-1}$			0.032 [0.0037]***		
Ln(Val MNC Exports in other HS2's – Other Dest'n)$_{ch,t-1}$			0.0483 [.0039]***		
Dispersion$_h$	.3382 [.0557]***	.3975 [.0667]***	.3649 [0.0555]***	.5642 [.0787]***	.6525 [.0946]***
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$ *Dispersion$_h$		-0.0062 [0.0038]			-0.0078 .[0045]*
Year	.5314 [.0028]***	0.5315 [0.0028]***	0.5266 [0.0028]***	.4115 [.0029]***	.4115 [.0029]***
HS2-City Effects	Yes	Yes	Yes	Yes	Yes
Constant	-4.4093 [.1263]***	-4.5359 [0.1487]***	-4.6074 [0.1262]***	-4.0567 [.1737]***	-4.2449 [0.2064]***
Observations	89,646	89,646	89,646	89,508	89,508
Groups	14,941	14,941	14,941	14,918	14,918
Log-Likelihood	-102,123	-102,122	-101,907	-75,899	-75,897

Notes: Estimated using negative binomial techniques. Dependent Variable is the count of all new private Chinese trade transactions by [city-HS2] or the count of all new product trades by [city-HS2]. *** indicates statistical significance at the 1% level.

Table 5: First Year Survival Probabilities for New Chinese Trade Transactions

	(1)	(2)	(3)	(4)
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0074 [0.0005]***		-0.0043 [0.0021]**	
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	0.0243 [0.0013]***		0.0244 [0.0013]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$		0.0146 [0.0011]***		-0.0123 [0.0047]***
Ln(# of MNC Exporters in other HS2's)$_{ch,t-1}$		0.0372 [0.0021]***		0.0371 [0.0021]***
Dispersion	0.0849 [0.0087]***	0.085 [0.0089]***	0.0039 [0.0168]	0.0555 [0.0102]***
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* Dispersion			0.0059 [0.0011]***	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* Dispersion				0.0137 [0.0023]***
OECD	0.177 [0.0044]***	0.1762 [0.0044]***	0.1771 [0.0044]***	0.1764 [0.0044]***
Firm Type	0.3438 [0.0047]***	0.3451 [0.0047]***	0.3437 [0.0047]***	0.3447 [0.0047]***
Constant	-3.0743 [0.0374]***	-2.7825 [0.0331]***	-2.9136 [0.0469]***	-2.7208 [0.0346]***
Observations	496,218	496,218	496,218	496,218
Groups	13,917	13,917	13,917	13,917
Log-Likelihood	-299,704	-299,698	-299,688	-299,681

Notes: Standard errors contained in [ ]. *** represents statistical significance at the 1% level.

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