Multinational Exposure and the Quality of New Chinese Exports

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Abstract:

We exploit rich information on the geographic, product and trader characteristics of Chinese exports between 1997-2003 to examine how evolution in the city-industry presence of multinational firms influenced the quality, frequency and survival of new export transactions by private Chinese firms. Our analysis finds that increased contact with own-industry multinational firms was associated with more frequent, higher-valued, and longer-lasting new trade transactions. For example, a one standard deviation change in multinational presence was associated with a 3.6 percent increase in unit values and a 2 percent increase in the number of trade transactions introduced by private Chinese firms. Thus, the increasing presence of multinational firms appears to influence the pace and orientation of China's integration with the world economy.

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1. Introduction

A growing body of research notes that favorable national outcomes, such as higher growth rates and larger per capita incomes are positively related to the variety and sophistication of a country's exports.[1] In addition, there is an increasing understanding that international trade, even at the finest levels of product disaggregation, is characterized by a high degree of price dispersion. Such cross country price differences are not random, as higher priced exports generally originate from more developed countries, which suggests that export price differences reflect international differences in product quality.[2] In light of these associations, which are based on the observation 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 density of its trade linkages. In this paper we focus on a particular conduit - proximity to multinational firms.

Multinational presence has numerous channels of potential influence on local private firms. On the positive side, local firms may learn about new ideas, technologies, or opportunities when multinational firms locate in their area. In addition, if multinational firms provide better inputs, or a greater variety of inputs, their presence may enhance local firm productivity. Conversely, multinational exposure may harm local firms if growth in multinational firm activity intensifies product market competition or raise the local costs of production inputs. Due to the contrasting pressures brought by multinational firms, the overall influence of multinational firm exposure on private firm

[1] Hummels and Klenow (2005), Feenstra and Kee (2005), Feenstra and Rose (2000), Hausman, Hwang and Rodrik (2007) and Jarreau & Poncet (2010).

[2] Schott (2004) or Hummels and Klenow (2005) provide evidence based on product unit values. Hallak (2006) demonstrates the effect of quality differences on import demand.

activity may be positive or negative. For this reason, we use geographic and trader disaggregated data on Chinese product-level exports to assess the effect of multinational firm presence on new private firm exports.

By studying the quality and survival characteristics of new product trade, rather than firm export probabilities or other local outcomes, our work identifies new dimensions of multinational firm spillover. First, our data reveal that new export transaction prices, as measured by unit values, were higher for private Chinese exporters surrounded by own-industry multinationals.[3] The positive effect of multinational proximity on new transaction prices is enduring, as it remains in the years following the introduction of the new transaction. Second, we also examine how multinational presence affects the survival probabilities of newly introduced trades. Notably, while many new trade transactions fail to survive, both own-industry and other multinational proximity are associated with higher new transaction survival rates.

Two contrasting explanations may account for our transaction price and survival rate results. The first possibility is that multinational presence conferred benefits that enabled local firms to initiate new export connections that were of higher quality than those that would have formed in the absence of multinational contact. An alternative possibility is that multinational exposure introduced competitive pressures that caused weaker Chinese firms to avoid export markets altogether. Under the second explanation, the increase in observed private transaction values for new transactions could be explained by selection, as transaction values would only be observed for upper-tail productivity or quality firms that were capable of competing against multinationals.

[3] This finding is consistent with Harding and Javorcik's (2007) discovery based on 116 countries' exports that country export unit values rose in 4-digit SITC sectors which promoted inward foreign investment.

To learn which explanation is supported by our data, we turn to counts of new private trade introductions at the city-industry level to evaluate whether positive spillovers or selection effects drove the changes in product prices and survival. Notably, the selection hypothesis implies that growth in local multinational activities will suppress new export activity by private firms. In particular, if the primary effects of multinational proximity exert pressure on input costs, or through direct competition with local firms, Melitz (2003) selection effects in a world of heterogeneous firms suggests that a smaller number of higher quality/productivity firms would remain while inferior firms were prevented from entering export markets. However, in contrast with the selection hypothesis we find that Chinese firms generated a greater number of new trade links when they were located in cities that experienced particularly rapid multinational growth. For this reason, since multinational presence is positively associated with new trade introduction, it appears that the predominant effect of multinational contact is through positive spillovers to local firms.

A second contribution of our paper is its demonstration that the association between multinational presence and the characteristics of newly-created Chinese export relationships is conditioned by underlying industry characteristics. In particular, industry productivity differences, and industry differences in product type play an especially important role in mediating the effects of multinational presence. For example, we learn that price or survival benefits associated with multinational exposure, are more pronounced for new private trades introduced in differentiated product sectors. Thus, the data further support the hypothesis that multinational firms reduced informational barriers to trade in industries where informational barriers to trade were the greatest. Our

regressions also show that industry heterogeneity at the HS8 product level has a direct association with transaction characteristics, and that industry heterogeneity can amplify or dampen the spillovers from multinational contact to prices or survival.

Recent work in the new literature in international trade has introduced a number of intriguing facts and puzzles contained Chinese trade micro-data. One key insight is that while China has increasingly entered more sophisticated export sectors, Chinese exports are generally shipped at lower prices than are similar products exported from other locations.[4] Thus, a third contribution of our paper is that we show how multinationals affect export formation by private firms in China.[5] In particular, our results suggest that multinational firm spillovers will have an impact on the nature of China's integration in world markets, as other recent work on Chinese exports documents the role of firm heterogeneity and sorting in China's engagement in the world economy.[6]

The remainder of the paper is organized as follows. Section two provides a brief review of multinational firm spillovers. Section three outlines the estimation framework and section four discusses the data. Section five tests the model's predictions regarding the quality, frequency and survival of new private trade relationships and discusses the economic implications of the findings.

[4] Hausman, Hwang and Rodrik (2007) document growth in the sophistication of China's exports. However, Schott (2007) finds that product-level unit values of Chinese exports to the U.S. were uniformly lower than those of the OECD, a finding that is echoed when Kiyota (forthcoming) uses Japanese data to study Chinese export quality and variety. Blonigen and Ma (2010) document that multinational firms exporting from China have higher export prices than do domestic Chinese exporters.

[5] In related work, Sun (2009) shows how multinational FDI has influenced Chinese exports in the case of the cultural, educational and sporting manufacture industry, and Head, Jing and Swenson (2010) show how the growing presence of multinational retailers influenced Chinese city and provincial capabilities in the case of Chinese retail goods exports.

[6] Kneller and Yu (2008) and Manova and Zhang (2009)'s analyses of Chinese export data provide evidence in support of models of heterogeneous firms and trade.

2. Background

The extensive literature on multinational firm spillovers demonstrates that multinational contact may influence local firm ability, local firm opportunities, and market fundamentals in host countries.[7] For this reason, we expect that multinational exposure introduces a combination of positive and negative spillovers to local firms in China. Thus, we discuss the potential repercussions of multinational exposure for the characteristics of local private firm export transactions.

Multinational firm proximity may potentially provide a number of spillover benefits to private Chinese firms. First, since Brambilla (2006) shows that firms in China with 50% or more foreign ownership introduced twice as many new product varieties as did private firms, the scope for learning about product-market opportunities appears to be present.[8] Second, if an increasing concentration of multinational firms increases the local density of traders, brokers and middlemen, local firms may benefit from information spillovers, and increased opportunities to interact and match with new international customers. They may also learn about the quality standards they need to meet in international markets, and in cases where local firms work directly with multinational firms, product quality may be improved as the firm learns from the multinational, or is pressured to meet particular quality standards.[9] Further, in cases where private Chinese

[7] Blomstrom and Kokko (1998), Navaretti and Venables (2004), and Gorg and Greenaway (2004) provide comprehensive surveys of host country benefits and harms from multinational activity. In the case of host country exports, Aitken, Hanson, and Harrison (1997), Greenaway, Sousa and Wakelin (2004), Sjoholm (2003), and Kneller and Pisu (2007) document that multinational proximity is associated with higher firm export probabilities. Similarly, Ma (2004) observes higher export probabilities for Chinese provinces, while Swenson (2008) observes spillovers to Chinese city-industry export volumes.

[8] When Brambilla, Hale and Long (2009) study the products produced by Chinese firms, they argue that evidence of increased imitation of vertically differentiated foreign investors, results in another spillover from foreign investment.

[9] Javorcik and Spatareanu (2009), document the prevalence of such channels in the case of direct contact of multinationals with local partners in the Czech Republic.

firms supply inputs to local multinational affiliates, they may gain additional customers as they develop a reputation for being able to meet international standards.[10] In each of these cases, a growing presence of multinational firms may improve the quality and diversity of products offered by local firms. In addition, the operation of these channels may reduce the fixed cost of developing new trade connections.

Learning effects introduced by an increasing concentration of multinational firms may also help increase the survival probabilities of local exporters, since information on international markets and customers will allow local firms to make better judgments about the likely quality of potential new trade relationships. This argument is consistent with Rauch and Watson's (2003) export model, which finds empirical support in Besedes and Prusa (2006), that better information facilitates the creation of longer lasting trades

On the negative side, competition from multinationals may have diminished export opportunities for local firms.[11] Further, increased labor demand due to growth in multinational activities raised local production worker wages in China.[12] Finally, an increasing presence of multinational firms may have also raised the price of specific factors required for production, and increased costs for all local firms as multinational activity lead to congestion in local markets.

[10] For example, "Chinese Auto Parts Enter the Global Market," New York Times, June 7, 2007, the claim of a president of Asian and Pacific operations for General Motors, that after a Chinese firm works with a multinational, "They get put on the global list and then can quote for anything worldwide", supports a reputation and quality explanation.

[11] In Columbia, Aitken and Harrison (1999) find that productivity benefits accruing to local firms were often more than fully offset by the negative effects of intensified product market competition that accompanied increases in multinational presence.

[12] When Hale and Long (2006) examine data from a 2001 World Bank Survey of managers in five Chinese cities, they find that the presence of foreign firms in Chinese cities increased the wages paid to managers and engineers. More broadly, anecdotal evidence (for example: "How Rising Wages are Change the Game in China" - Business Week, March 27, 2006) observes the effects of wage changes and skills shortages on firm location decisions.

Taken together, these assumptions imply that multinational firms may convey positive spillovers to local firms in the form of increased product quality, better survival rates and reduced international search costs. At the same time they generate negative spillovers due to their influence on local production costs and product market competition. Since multinational firms spillovers act through a number of channels, the overall effect of multinational contact on new Private firm trade can only be assessed through empirical analysis.

3. Estimation Framework

To examine the relationship between multinational firm exposure and the characteristics of new private exports, our analysis focuses on the prices, survival rates, and frequency of new export transactions by private Chinese firms. Our first estimating equation examines how the characteristics of new private trade transactions were related to the evolving presence of multinational firms.

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

In our first set of regressions, Y represents the product price for the new trade transaction. For each new trade transaction the subscripts h, c, d and t represent the HS8 product market, Chinese city of production, export country destination and year.

Specification (1) identifies the *net effect* of multinational exposure on local firm trade characteristics. However, while some multinational spillover effects are positive and others negative, they may operate on different dimensions. For example, negative competition effects due to horizontal FDI, will be manifested at the own-industry level, as entry of multinational firms affects the opportunities for similar-industry local firms. In contrast, adverse effects due to congestion in labor markets or on infrastructure will

have a negative impact on all local firms, regardless of the multinational firms' choices of industry. For this reason, the regression analysis provides separate variables for own and other industry multinational proximity.[13] The variables *Own-Ind MNC* and *Other-Ind MNC* capture multinational contact within the Chinese firm's HS2 industry, and in other HS2 industries, respectively.

To mitigate the potential for simultaneity between multinational activity and local firm export opportunities, all of our estimating equations use lagged values of our multinational contact variables. In addition, while our timing convention is used to deal with potential simultaneity problems, its use is also motivated by the expectation that some time elapses between the time when private firms learn from multinational firms their later implementation or emulation the ideas they discover.

Our specification includes a number of controls to capture additional economic factors (X) that influence the characteristics of new trade transactions. First, since previous work on the characteristics of international transactions documents systematic effects related to destination market characteristics, the regression specification includes import country GDP and the distance to the importing country.[14] We also include importer per-capita GDP to capture the well-documented fact that, even at the fine HS8

[13] Use of input-output tables, as developed by Javorcik (2004), provides insight into MNC contact distinguished by its horizontal, backward and forward linkages. Unfortunately, the absence of detailed product level input-output tables for China precludes the use of these distinctions in this project.

[14] Kneller and Yu (2008) show that destination market characteristics are important determinants of average 1997-2002 Chinese export prices. In contrast with our paper, which focuses on the quality of Chinese exports shipped from different locations in China, their unit of analysis is average price of each HS8 product shipped for each destination country. For the majority of HS2 industries, their analysis suggests that destination price differences can be explained by Melitz and Ottaviano's (2008) model of quality sorting and heterogeneous firms, which shows note how destination country market size influences prices, through competition, and therefore mark-ups. Manova and Zhang (2009) study of Chinese 2005 firm exports also notes the explanatory power of importing country characteristics.

product level, richer countries import more expensive product varieties than do less wealthy countries.[15]

The second set of regression controls measure local Chinese economic factors that may influence trade prices. To this end, each regression includes provincial measures of GDP, GDP per capita, governmental expenditure, educational attainment, and transportation infrastructure. The regressions also include controls for exporting firm type. Finally, since national changes in China's economic environment may have exerted common and systematic effects on the characteristics of private Chinese exports transactions, all regression specifications include year dummies.[16]

In line with the literature on firm heterogeneity and firm sorting, we also include a measure of export sales dispersion at the HS8 product level to capture industry productivity differences.[17] Further, if asymmetric information makes it difficult for suppliers in dispersed industries to distinguish themselves from competing Chinese suppliers, producers in dispersed industries may be pressured to introduce their products at lower introductory price before their customers become aware of their true quality.

Finally, since it is impossible to measure or include all factors that might potentially influence new export characteristics, our regressions include fixed effects to reflect unmeasured factors that vary systematically across locations and/or industries. When we examine export transactions data, most of our regressions are run with province-industry fixed effects which are meant to account for unmeasured differences in

[15] See Schott (2004), Hummels and Klenow (2005), Hallak (2006), and Manova and Zhang (2009).
[16] While we don't report the coefficients for the time dummies, they are always statistically significant.
[17] We use the dispersion of export sales as our metric for gauging dispersion, and hence productivity, by product market. As is common in the literature (see Helpman, Melitz and Yeaple (2004), for example) we assume firm productivity follows the Pareto distribution. Thus, industries characterized by a higher level of dispersion have higher average productivity. This is because the expected productivity of the outside options is higher in more highly dispersed industries.

local characteristics that affect the tradability and quality of newly introduced product trades.[18] These differences may include differences in resources and endowments or differences in institutional quality at the provincial level which were fixed over time and enabled firms in some provinces to produce higher quality products than were produced elsewhere in China. We choose province as our geographic unit since the use of city-level data would limit our analysis to the largest Chinese cities that provide information on local economic factors. Nonetheless, we expect the policy and economic environment to be fairly uniform at the provincial level. Further, province-level controls are particularly appropriate if Chinese markets were integrated at the provincial level, while interprovincial barriers segmented markets across Chinese provinces - a form of market segmentation which is suggested by Amiti and Javorcik's (2008) discovery that foreign investment decisions in China were influenced by market and supplier access at the province level.[19] Since our regressions include location-industry fixed effects, we identify how the growth of multinational firm activity affected the quality of new Chinese trade transactions by exploiting differences in the evolution of industry-specific multinational activity across Chinese cities and time.

While our primary dependent variable of interest is unit values for newly introduced private exports, we also use specification (1) to examine additional elements of trade quality. First, the regression framework is applied to later year prices to see whether multinational presence was associated with temporary or enduring price changes. In addition, we also use this estimation framework to examine whether multinational

[18] To avoid high densities of zeros in the province-industry fixed effects, our primary industry effect is implemented by defining industry at the HS4 level of disaggregation. Notably, the results remain very similar if we define industry with coarser controls at the HS2 level of disaggregation.

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

exposure influenced the survival probabilities for newly introduced transactions. This is done by running a panel probit on equation (1), replacing the dependent variable Y, with ones and zeros to indicate the transactions that survived past the year of introduction, versus those that did not.

When we study how multinational firm presence affected the frequency of new private trade introduction we turn to a second regression specification:

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

In this setting the dependent variable $[\#NewT_{ict}]$, is the count of all new HS8 trades within an HS2 industry i introduced in city c in year t. $[\#NewT_{ict}]$ is formed by aggregating original transactions data to city-HS2 industry level counts. In this analysis, the data form a balanced panel whose dimensions are HS2 industry, city and year.[20] Since the dependent variable is now a count variable which is not distributed Poisson, we turn to negative binomial methods to estimate specification (2). The new error term, $\delta_{ict} = \Phi_{ic} + \pi_{ict}$, includes a set of random effects, Φ_{ic}, which are assumed to operate at the city-HS2 industry level, as well as an iid error term, π_{ict}. City-industry random effects help to control for differences in infrastructure or resource endowments that enable a greater number of export transactions to emerge in particular cities in particular industries. For example, these random effects are helpful in assisting estimation if some cities provided access to raw materials that were useful for production in some, but not all industries.

As in our estimation of regression (1), our inclusion of city-industry fixed effects implies that we use differences in the evolution of city-industry multinational activity to identify the effects of multinational presence on the frequency of new trade introduction.

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

While the efficacy of this identification strategy is weakened if pattern of comparative advantage changed dramatically at the city-industry level in a fashion that simultaneously attracted multinationals and new private firm exporters, we expect that city-industry changes in comparative advantage would have been reasonably small over the six year estimation window covered by our dataset.

4. Data

We use Chinese data on ordinary exports between 1997 and 2003 to examine the effects of multinational proximity on the quality and frequency of new trade connections. The trade data collected by the Customs General Administration of the People's Republic of China, record all export transactions at the HS8 level of dissagregation.[21] The full sample includes new transactions in 6,929 distinct HS8 product categories. However, the original data are more disaggregate yet, as the Chinese transactions data provide further transaction information on city-district of origin and exporting firm type.[22]

Since Chinese trade grew at a remarkable pace during this period and included an exceptionally rapid increase in new trade transactions, the Chinese data is particularly well suited for addressing our questions. For example, as Figure 1 illustrates, the count of new private trade transactions - 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.[23] These new transactions indicate either that private firms in a Chinese city started to export a new

[21] These data were used under license to the CID at the University of California, Davis.

[22] The city-district designation means that trade transactions are separately reported for special economic zones, economy and technique development areas, high-tech development areas, bonded areas, and other areas within a city. The data are also separately reported by firm type, including foreign-owned enterprises, collective enterprises, private enterprises, state-owned enterprises, equity joint ventures and Sino-foreign joint ventures.

[23] Private Chinese trade accounted for roughly one percent of Chinese exports in 1997, and roughly ten percent of Chinese exports in 2003.

product, or that private firms expanded their range of export destinations when compared with the previous years. As in other contexts, new private trade transactions were generally smaller in value than ongoing private trade transactions. Nonetheless, as Figure 2 shows, the value of new private transactions was non-negligible, since trade in new products represented 28 percent or more of total private Chinese exports for each of the years in our sample.

While it might be desirable to see whether there were differences between entirely new trade connections, and trade connections that were re-established after two, three or four years of inactivity, the short length of the data panel precludes such an examination. Nonetheless, even in cases where we observe the reestablishment of a private HS8 product export for a particular [city-district]-[country destination] pair, time separation makes it more likely that different buyer-seller pairs were involved in the time-separated transactions in our data sample. And, since the creation of a new buyer-seller combination is likely to involve search costs and relationship-specific investments, we expect many time-separated transactions to be subject to similar impediments as those combinations that are introduced for the very first time. [24]

To measure multinational firm activity at the city-industry level, we exploit the firm ownership information included in the trade records. As Feenstra and Hanson (2005) note, since the data are reported at the highly disaggregated HS8 product- city-zone – ownership- processing regime level, the finely disaggregated export transactions data provides information that is very close in nature to that of firm-level data sets, even though the operational identifier is HS8 product, distinguished by the city-district to

[24] 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. This suggests that investments in export connections and information about buyers depreciate rapidly.

foreign country pair. Thus we measure own-industry multinational activity as the export activity of foreign-owned enterprises or joint ventures that were engaged in the HS2 industry that encompassed the HS8 industry of the dependent variable. Along these lines, our first measure is a count measure of MNC exporter contacts which measures 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.[25] To provide a second measure of multinational contacts, we also use the value of multinational trade at the HS2 industry-city level as an alternative measure.

The breadth of private firm and multinational firm export-related activities is illustrated in Table 1 which shows that Chinese recorded HS8 exports from 504 different cities. When the data are arranged by province, Table 1 also shows that the provinces that hosted the most active multinational exporters also hosted the most active new Private export activities.

Following convention in international trade literature, prices are measured by unit values, which are created by dividing the value of each transaction by the quantity of the product sold in the transaction.

To capture heterogeneity at the product level, we use data on HS8 export transaction values to measure dispersion in HS8 product markets. Our primary measure of product market dispersion is the standard deviation of log export sales in 2003. We use 2003 since it was the year with the greatest number of trade transactions. However, if we

[25] We classified trade transactions as belonging to multinational firm activity if the exporter listed itself as foreign-owned enterprises or as Sino-foreign contractual or equity joint ventures. To avoid undefined values, the multinational exporter presence variable is 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.

re-estimate the regressions using alternative measures based on earlier years' data or on coarser industry definitions - HS4 or HS6 - the general results remain the same. While previous work, such as Helpman, Melitz and Yeaple (2004), use firm sales data to measure dispersion, we do not have measures of foreign multinational sales to use in creating our measure of dispersion. However, the use of information on the dispersion of sales in each export product market may be particularly appropriate, as this measure describes a fundamental export market characteristic for local firms that wish to enter export markets.

The last variable created from the Chinese trade data is firm type. This reflects the fact that there are two types of private firm: private enterprises, and town collectives. To account for differences in products across the different organizational forms, firm type is set to one for private enterprise transactions.

The remaining regression variables were assembled from traditional sources. Data on Chinese economic activity by region were collected from multiple years of the *China Statistical Yearbook*, international trade distances from the data web site of CEPII, and importing country characteristics from the Penn World Tables.

5. Estimation Results

Econometric analysis of private Chinese export transactions reveals that the growing presence of multinational firms at the city-industry level was associated with higher quality and longer surviving new private Chinese exports. The growth in multinational presence is also found to coincide with more frequent export introduction by private Chinese firms.

A. New Transaction Prices

Regressions based on specification (1) reveal a positive connection between the local concentration of multinational firms and the level of new private trade prices. To begin, as Table 2 shows in columns (1) and (2), 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 value of multinational exports, or by the number of distinct multinational contacts at the fine city-industry level. The positive coefficients for own-industry multinational contact imply that the benefits from growth of own-industry multinational proximity outweighed any negative effects on export transaction prices.

In contrast, we uncover a negative relationship between multinational activity in other HS2 industries and the transaction values for new exports by private Chinese firms. One possible interpretation is that other-industry multinational firm presence may lower production costs for local firms by providing lower cost inputs or improved inputs that were not previously available. If so, the negative coefficient on the other-industry multinational variable may reflect cost reductions which are facilitated when the entry by multinational firms provides new access to cheaper or better-suited intermediate inputs.

The sets of control variables for origin characteristics, destination characteristics, and time each have a strong association with variation in unit prices. However, in contrast with Manova and Zhang's (2009) study from a cross-section of Chinese export prices, and Kneller and Yu's (2008) study of a panel of Chinese average export prices by product and destination, we do not find a positive and significant association for both importer GDP and distance to the importing country. While our importer GDP

coefficients are positive and significant throughout, the coefficient on distance is negative. However, the difference in results may reflect differences in the pricing of new export transactions as compared with the pricing of established exports.

The province-HS4 fixed effect component of the error term captures almost three-fourths of the variation in transaction prices. Nonetheless, the key coefficients that estimate the effects of multinational exposure are not influenced by the choice of fixed effects. In particular, when we experimented with alternative fixed effects, the coefficients for own-MNC contact remained similar or larger in magnitude as compared with the results displayed in Table 2.[26]

The results in Table 2 also show that firm heterogeneity, which is captured by the dispersion of export sales values in an HS8 product category, was negatively related to unit values. If dispersion is due to firm heterogeneity in productivity or quality, Chinese firms may find it difficult to convey their true quality to international customers, or they may have a more difficult time locating customers who are the best match for their particular variety of a differentiated good. In this case, the information or market connections fostered by multinational firms may alleviate these problems. Thus, we test whether own-industry multinational presence had a differential effect on prices for firms selling HS8 products in industries that have more dispersed sales. This test is implemented by adding an interaction between the own-industry multinational contact

[26] We report the own-industry multinational firm coefficients under five alternatives were, which were each run twice: once with the MNC Value measure, and then again with the MNC Number measure. 1) With **City-HS2 FE** [~41% of variation], the MNC-Own Effect is .0083 {Value}; .0187 {Number}. 2) Under **Destination Country-HS2 FE** [~82% of variation], the MNC Own Effect is .0198 {Value}; .0444 {Number}. 3) Using **Destination Country-HS2 FE plus Province FE** gives MNC Own Effect .0189 {Value}; .0422 {Number}. 4) Alternatively, **Destination Country-HS2 FE plus Province FE and Province-Year FE** yields MNC Own Effect .0184 {Value}; .0412 {Number}. 5) Lastly, using **HS4 FE plus Province FE and Destination FE** leads to .0222 {Value}; .0510 {Number}.

variable, and HS8 industry dispersion. In support of this conjecture, the results in columns (3) and (4) of Table 2 show that private Chinese firms in more dispersed product markets who were exposed to greater own-industry multinational contact managed to attain higher prices in international markets.

Because we were concerned about unmeasured factors that contribute to changes in product prices, we ran additional regressions that augmented the basic regression of Table 2 with the log of the unit value of other-firm 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.[27] When the log of new unit values is included, its coefficient is 0.84 and highly significant. Nonetheless, the MNC coefficients are not very different from those in the original table. The estimate for the MNC Own Effect is .0184 when MNC contact is measured with the variable based on Value, while the effect is .0412 when MNC contact is measured with the variable based on the number of unique contacts. The only original coefficients that change are those on distance (which loses any significance) and on dispersion (whose coefficient shrinks in magnitude). Therefore, since the average price variable has high explanatory power, while it has no influence on

[27] For example, we could imagine that unit values for cell phone handsets might rise over time as handsets incorporated larger and clearer display screens, improved photographic or video capabilities, and other enhanced features. As a result, changes in the average unit value will capture changes in product quality, for products that are upgraded over time, despite the constancy of the HS8 product classification.

Our results do not change if we replace our measure of average unit value for all other *new* transactions with the average unit value for all transactions in the HS8 product.

the estimated effects of multinational contact, it is included in the regression analyses from this point on.

While the initial results suggest that multinational exposure enables private firms to introduce new products at higher prices, the positive effects of multinational exposure diminish or change in later years. For this reason, in Table 3 we examine product unit values in the three years following the creation of a new trade relationship. Our estimates demonstrate that own-industry multinational proximity prior to the initiation of a new trade transaction had a positive and sustained association with later year unit values.[28] Similarly, as was true for the prices of newly introduced exports, proximity to other-industry multinational activity continues to be associated with lower unit values in the years following the establishment of a new trade relationship.

In contrast with the original results, the correlation between unit values and industry dispersion changes in the years following the formation of a new trade transaction. As time passes, industry dispersion ceases to have a negative correlation with unit trade and becomes insignificant in the years following a new trade link's creation. As we conjectured earlier, one possibility is that price dispersion within an industry indicated a wide range of product or customer match quality within an industry. If so our initial result that new Chinese traders offer lower introductory prices, may arise if private Chinese firms discount their products until their customers become better acquainted with the true quality or value of their items. Those products that prove their quality are able to discontinue any initial discounting, and also manage to survive. Our

[28] The trade data are characterized by a high level of attrition. However, while the decline in the number of observations for year [t+2] and [t+3] unit values reflects attrition, it is also influenced by the use of panel data. For example, since our data includes export data through 2003, we can only observe [t+2] unit values for all surviving trades that were introduced between 1998 and 2001.

result supports Rauch and Watson's (2003) model of learning about exporter quality, since it appears that lower quality transactions indeed are weeded out over time in more dispersed industries.

B. New Transaction Survival Probabilities

Our next set of regressions tests how the presence of multinational firms affected survival probabilities for newly introduced Chinese export transactions. As the first two columns of Table 4 show, all multinational contact, whether measured by counts or multinational export value, was associated with higher survival probabilities for new Chinese trades. However, the net positive association with multinational presence was more pronounced for the case of other-industry contact than it was for own-industry presence. Thus it appears that even if own-industry contact brought more informational benefits to local private firms, such benefits were partially offset by intensified product market competition, or increased factor costs for critical industry inputs.

Further, to learn whether the survival benefits associated with multinational contact are consistent with explanations based on information, we tested whether the effects of multinational presence were particularly strong in sectors where informational needs are greater. In this regard, industries characterized by dispersion are a good candidate, a hypothesis we test by adding variables interacting dispersion in HS8 product markets and and own-industry multinational firm contact.[29] The results reported in columns (3) and (4) of Table 4 support the idea of information spillovers, as they

[29] Following Javorcik and Harding (2007) we test for informational dependence effects by examining the coefficient ψ in our modified specification, where Dispersion_h is a measure of export sales dispersion.

$$(1') \ \ln Y_{hcdt} = \alpha + \beta_1 * [\text{Own-Ind MNC}]_{hc,t-1} + \beta_2 * [\text{Other-Ind MNC}]_{hc,t-1} + \psi \ \text{Dispersion}_h * [\text{Own-Ind MNC}]_{hc,t-1} + \Gamma * X_{hcd,t-1} + \varepsilon_{hcdt}.$$

demonstrate that increased survival probabilities related to own-industry multinational contact were particularly strong in cases where private Chinese firms introduced products into more highly dispersed, and therefore more heterogeneous, industries.

C. The Creation of New Trade Relationships

The initial results indicate that contact with multinational firms is associated with the introduction of higher quality trade in terms of higher product prices and longer transaction survival duration. However, the initial regressions are based on the analysis of the full set of newly introduced product trades. For this reason, two competing factors could explain the positive association between multinational presence and new export quality. First, less productive private firms may decide to avoid trade if a growing presence of multinational firms intensifies competition or raises local costs. In this case, the apparent quality of private trade would rise as competition from multinational firms discouraged export by poorer quality Chinese firms. If selection pressure precludes export by neighboring private firms, the presence of multinational firms will depress the number of new trade introductions in a city in those industries where multinationals increase their activities.

In contrast, if exposure to multinational firms enhances local private firm quality and productivity, an increase in multinational firm exposure will raise the frequency of export market entry by local Chinese firms. In this case, the increased multinational firm exposure will increase the number of new private export transactions.[30]

[30] In related work suggesting positive spillovers, Greenstone, Hornbeck and Moretti (2008) compare U.S. incumbent plants in locales that managed to attract a large investor, versus incumbants in the competitng locales that failed. They report that " Five years after the opening, TFP of incumbent plants in winning counties is 12% higher than TFP of incumbent plants in losing counties."

To shed light on the selection versus the quality story of multinational exposure, our final estimating equations examine the relationship between the number of new private Chinese export transactions and growth in local proximity to multinational firms. Column (1) of Table 5 reveals a positive relationship between multinational activity and 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. Notably, increases in other-industry multinational presence were more strongly related to new export transactions than was a similar increase in own-industry multinational presence. While multinational presence of all types may have generated informational benefits, the fact that the net effect of other-industry contacts was stronger suggests that own-industry competition due to increases in multinational presence may have offset some of the informational benefits generated by own-industry multinational proximity.

The count data include two forms of new export. We count transactions as new exports when Chinese firms start exporting products they had not previously exported, or when they expand the number of destinations to which they exported their products. To determine whether new product exports responded in the same fashion as new exports in general, column (4) of Table 5 analyzes the effect of multinational firms on the count of new product trades. Notably, the results here are very similar to those for all new transactions. Again, an increase in own- or other-industry multinational firm contacts was associated with an increased number of new product trades. The fact that the positive relationship between multinational firm presence and new product trade counts is not dominated by own-industry proximity 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.[31]

Finally, in columns (2) and (5) of Table 5 we add interaction terms between own-industry multinational firm counts and industry heterogeneity as measured by export sales dispersion to test whether industry heterogeneity influences the strength of multinational presence on the introduction of new trades. While the coefficient on interaction term is negative in the regression for all new trade transactions and in the regression for new product trades, it is only significant in the second case. This suggests that multinational proximity may have been particularly helpful in increasing new product introductions by private Chinese producers in less heterogeneous product segments.

D. Robustness Checks

Since many of the results suggest that multinational firms provide positive spillovers to local private firms, we first examined whether the influence of multinational firms was greatest in industries where information is likely to be most important. Thus, we divided the data into two categories, differentiated goods versus other, using Rauch's (1999) goods classification.[32] We then tested whether the effects of multinational firm exposure had differential effects across goods by type, on firm export prices or on transaction survival.

[31] Alvarez, Faruq and Lopez's (2008) work with Chilean firm export data on the product level suggests that firms learn from the export activities of other firms, as they note that firm export of a particular product goes up when other firms start to export that product.

[32] Rauch provides conservative and liberal classifications for differentiated goods. While our paper uses Rauch's conservative definition, our results are the same if we use the liberal definition instead.

Consistent with the hypothesis of information spillovers, the results in Tables 6 and 7 demonstrate that multinational firm contact had a stronger effect on private firm transaction quality outcomes for differentiated products. First, while own-industry multinational contact elevated transaction prices for all goods, and helped increase the first year survival rate, the magnitude of the effect was much larger in differentiated good sectors. Second, to the extent that other-industry multinational contact was associated with better survival rates, this effect was especially strong for differentiated goods.

As a second check we tested whether some multinational connections are more valuable than others. For example, since the U.S. and Japanese markets are economically large, and populated by high income consumers, contacts with multinational firms exporting to the U.S. or Japan might have provided especially good information about high-value opportunities. Thus, we examined whether proximity to multinationals conducting trade with the U.S. or Japan was associated with a larger effect on the number of new trades. However, such differences were negligible.

Finally, all of the original regressions assume that the effects multinational contact, as well as the control variables, is the same for all export markets. To check whether there were dramatic differences in export characteristics for products shipped to developed or developing country destinations, the sample was split between transactions destined for OECD countries, versus those shipped elsewhere. The results for the key regressors in the unit value regression are displayed in Table 8, while the results for survival regression are displayed in Table 9. In general, the beneficial effects of own-industry multinational exposure appear to be a small bit larger for export transactions shipped to OECD locations. If Chinese firms need to learn more to match with partners

or provide adequate quality to consumers, the greater benefit of multinational contact on OECD exports implies that learning was more important in the case where informational requirements were the greatest.

Another interesting result in Table 8 is the finding that the effect of other industry multinational contact on unit values is especially large for shipments to non-OECD countries. If prices are an especially important element of export success in lower-income locations, this suggests that connections to suppliers, or to more diverse inputs is helpful for Chinese exporters attempting to generate new exports to developing country locations. A final piece of evidence suggests that low-income importers are more price sensitive. In particular, results in Table 8 show that the negative coefficient on price dispersion is especially large for exports destined to non-OECD locations.

E. Economic Significance and Discussion

The economic effects associated with multinational presence are non-trivial. For example, the coefficients in Table 6 suggest that a one standard deviation change in multinational presence, measured by the value of own-industry multinational exports, was associated with a 3.6 percent increase in transaction unit values.[33] The empirical connection between multinational firm growth and new private exports supports Rodrik's (2006) conjecture that the growing concentration of multinational firms in China has helped to boost the value-segments in which China exports.[34] In addition, these results show that the increased value of Chinese trade is not solely limited to the activities of

[33] If multinational activity is measured by the number of multinational exporters instead, a one-standard deviation change in multinational activity is associated with a 3.9% increase in unit values.

[34] In related work, Harding and Javorcik (2007) show that following country policies targeting FDI in particular sectors, unit export values of the targeted sectors rise. Similarly, while Blonigen and Ma (2010) note that the gap between the higher export unit values of foreign firms and lower unit value of private firms has grown, they find weak evidence that the gap has narrowed for Chinese products exported to G3 destinations, in sectors where China encouraged FDI.

multinational firms, but are manifested by increased product value and product survival for domestic exporters. Since Hausman, Hwang and Rodrik (2007) discover that movement into higher value products is strongly correlated with subsequent country growth this result suggests multinational firm presence may benefit country welfare and growth through the influence of multinational firms on the quality of the newly introduced export transactions of domestic traders.[35]

The same one-standard deviation change in the value of multinational activity was associated with a 2 percent increase in the number of trade transactions, and a 6.8 percent increase in the number of products exported by private Chinese firms.[36] Such increases in the international engagement of local firms may provide improve national welfare, as cross-country evidence from Feenstra and Kee (2005) and Funke and Ruhwedel (2001) show that export variety is associated with improved country productivity and per capita incomes, respectively. In addition, while growth in a country's exports is thought to have the unfortunate effect of depressing a country's terms of trade, Kang (2004) demonstrates that this effect may be ameliorated when export growth is driven by an increase in exports at the extensive margin, rather than by volume expansions for continuously exported products. It is important to note that new private trade transactions were a small component of overall trade flows, since new trade transactions were only 2.8 percent as large as established trade transactions. Nonetheless, if new export transactions play the same dynamic role in the evolution of firm and industry dynamics in China as newly introduced products do in firm dynamics as observed by Bernard, Redding, and Schott

[35] Hausman, Hwang and Rodrik's (2007) result is based on an index which reflects the income level of countries that export similar category goods. Jarraeu and Poncet (2010) confirm this relationship using regional variation in export sophistication by Chinese regions, and learn further that the export sophistication of domestic firms is most strongly associated with future provincial growth.
[36] Calculation based on coefficients in columns (1) and (4) in Table 4.

(2010), this micro element of trade formation may provide the basis for future growth. In fact, given Alvarez, Faruq and Lopez's (2008) observation that firms learn from others, as well as from their own experience, the exposure to exporting activities may have enduring effects on the structure of Chinese trade. More generally, Fontagne, Gaulier and Zignago (2008) note that North and South export products are distinct. If multinational spillovers facilitate the bridging of quality gaps, they may accelerate the rate at which southern country products enter into competition with countries in the North.[37] Thus, to the extent that the growing presence of multinational firms affects the quality and frequency of new private trade transactions, the rapidly growing presence of multinational firms may accelerate the rate of international economic integration by Chinese firms.

Lastly, it is important to ask whether our results from China translate directly to other countries. In this regard, there are a number of reasons to believe that the strength of these effects may be stronger in China than they would be in other locations. First, because multinationals in China are heavily engaged in export, contact with multinationals in China may have provided stronger export spillover benefits than are available in countries where the key interest of multinationals is in serving the local market. Second, since the period of observation includes the years surrounding China's accession to the WTO, there may have been more opportunities for trade creation, than there are more generally in times of stable trade policy. Finally, since China is economically "large" compared to most developing countries, the presence of scale or agglomeration economies in China may have generated factor or production market conditions that assisted private Chinese firms that sought to expand their trade.

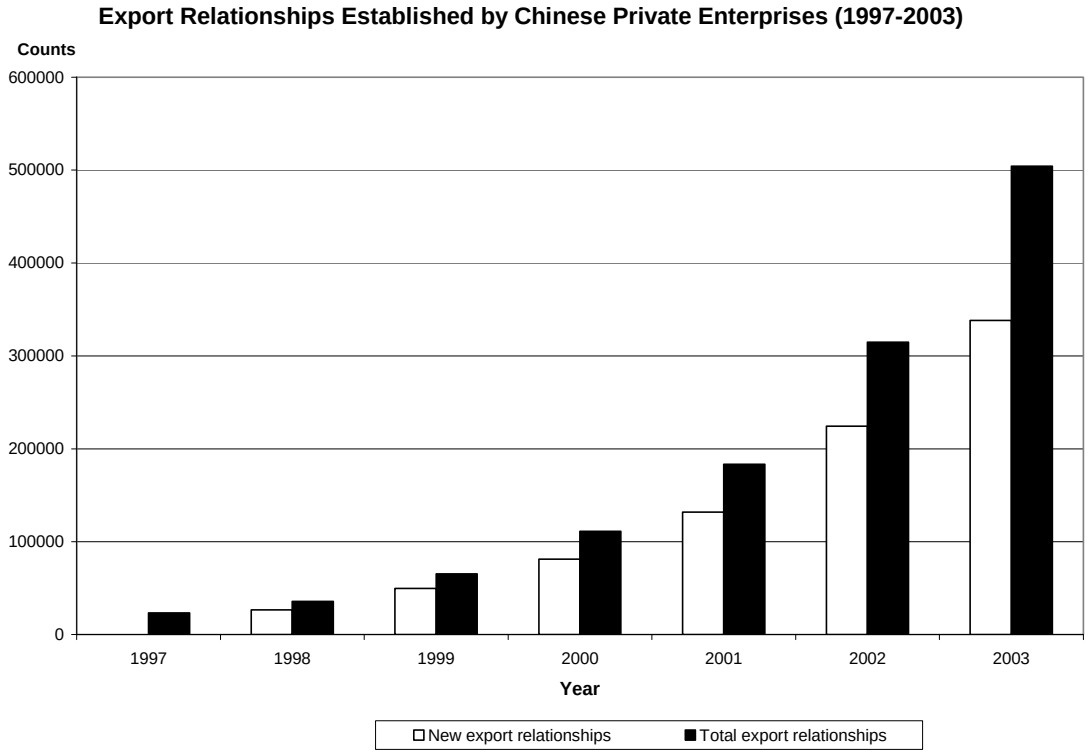
[37] Khandelwal's (2010) work on quality ladders provides a formal demonstration of this idea.

6. Conclusion

This paper examines new private Chinese trade transactions to see how the quality, frequency or survival of new trade transactions was related to the presence of multinational firms. By exploiting the geographic and producer details recorded in Chinese export transactions, we are able to trace how differences in the evolution of the industry-density of multinational activities across Chinese cities was related to the development of new Chinese trade transactions. Our results based on data from 1997 to 2003 suggest that the net effect of multinational exposure was positive, as we find that own-industry multinational contact was associated with a greater frequency of trade creation and with higher trade quality as represented by transaction prices and survival rates.

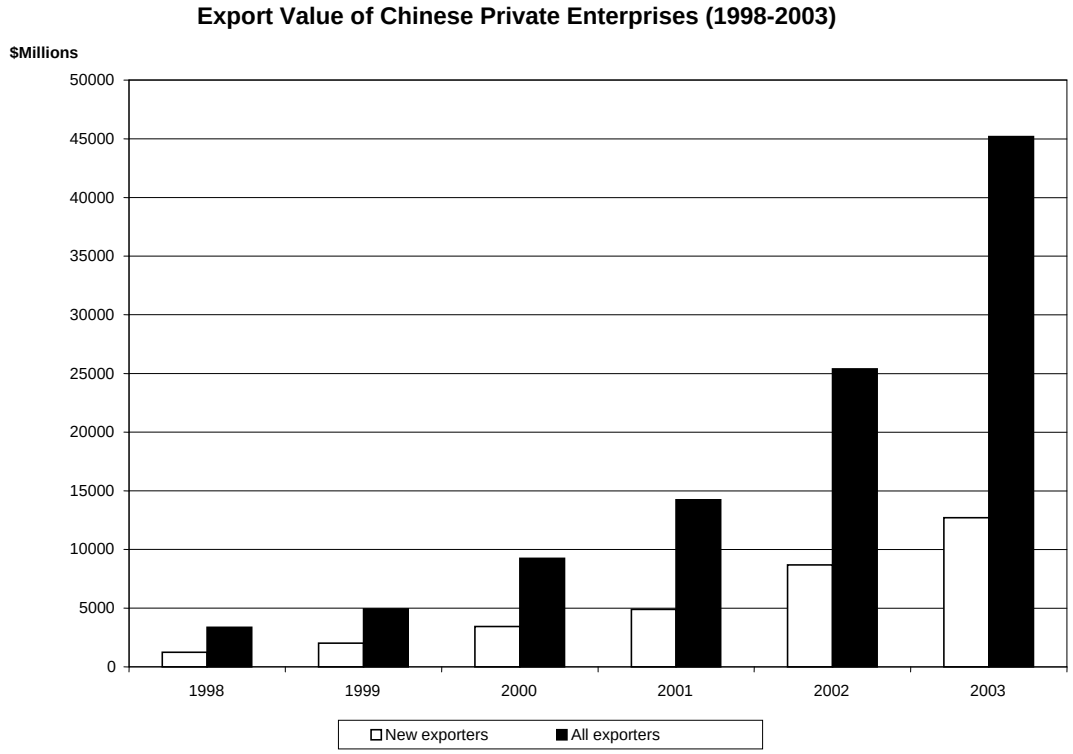
The fact that private Chinese traders entered into more and higher-valued new export relationships when they were located near larger concentrations of own-industry multinationals suggests that proximity to multinational firms provides two previously unrecognized spillovers to the *characteristics* of new product trades. Since the presence of multinationals is also positively related to the frequency of new trade introduction, the evidence suggests that a key conduit of multinational spillovers is through beneficial information spillovers that improve export product quality, or the ability of firms to match with buyers in international markets. Thus, the increasing presence of multinational firms appears to influence the pace and orientation of China's integration with the world economy.

Figure 1



Notes: "Total export relationships" is the count of distinct export transactions at the HS8-city level by private Chinese firms. "New Export relationships" is the count of all new export transactions by private firms at the HS8-city level, as compared with the previous year.

Figure 2



Notes: The "all exporter" columns represent the total value of export transactions by private Chinese firms. The "New Exporters" represent the total value of new exports by private Chinese firms, where the activities of new exporters represent trade transactions at the city-HS8 industry level that were not observed in the previous year.

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)$_{ch,t-1}$	0.0079 [0.0011]^{a}		0.0515 [0.0075]^{a}	
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	-0.0065 [0.0032]^{b}		-0.0067 [0.0033]^{b}	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$		0.0177 [0.0025]^{a}		0.1304 [0.0185]^{a}
Ln(Number of MNC Exporters in other HS2's)$_{ch,t-1}$		-0.0064 [0.0058]		-0.0064 [0.0058]
Dispersion	-0.2192 [0.0593]^{a}	-0.2189 [0.0593]^{a}	-0.1126 [0.0494]^{b}	-0.0488 [0.0472]^{a}
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* Dispersion			-0.0220 [0.0037]^{a}	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* Dispersion				-0.0569 [0.0091]^{a}
Firm Type	-0.0509 [0.0121]^{a}	-0.0519 [0.0121]^{a}	-0.0511 [0.0121]^{a}	-0.0522 [0.0120]^{a}
Ln(Distance)	-0.0200 [0.0044]^{a}	-0.0205 [0.0045]^{a}	-0.0200 [0.0045]^{a}	-0.0204 [0.0045]^{a}
Ln(Importing Country GDP)	0.0326 [0.0022]^{a}	0.0327 [0.0022]^{a}	0.0326 [0.0021]^{a}	0.0327 [0.0021]^{a}
Ln(Importing Country GDP per capita)	-0.1082 [.0151]^{a}	-0.1071 [0.0150]^{a}	-0.1079 [.0151]^{a}	-0.1066 [0.0150]^{a}
Ln (GDP in Province)	-0.1538 [0.1380]	-0.1517 [0.1381]	-0.1509 [0.1381]	-0.1469 [0.1381]
Ln (GDP per capita)	0.1821 [0.0164]^{a}	0.1811 [0.0164]^{a}	0.1817 [0.0164]^{a}	0.1804 [0.0164]^{a}
Ln (Railways)	-0.0978 [0.0278]^{a}	-0.1007 [0.0278]^{a}	-0.0985 [0.0280]^{a}	-0.1017 [0.0279]^{a}
Ln (Highways)	0.0263 [0.0363]	0.0239 [0.0364]	0.0266 [0.0363]	0.0242 [0.0364]
Ln(Waterways)	-0.0271 [0.0122]^{b}	-0.0282 [0.0122]^{b}	-0.0273 [0.0122]^{b}	-0.0283 [0.0122]^{b}
% College	1.1957 [.6784]^{a}	1.2057 [.6798]^{a}	1.2151 [.6805]^{c}	1.2223 [.6821]^{a}
% High School	-2.3339 [0.5642]^{a}	-2.4036 [0.5658]^{a}	-2.3587 [0.5651]^{a}	-2.4311 [0.5665]^{a}
Ln(Government Expenditures in Province)	-0.0616 [0.0304]^{b}	-0.0622 [0.0303]^{b}	-0.0628 [0.0305]^{b}	-0.0632 [0.0304]^{b}
Year Dummies	Yes	Yes	Yes	Yes
Observations	712,540	712,540	712,540	712,540
# of Province-HS4 Groups	15,875	15,875	15,875	15,875
R-squared	0.011	0.011	0.012	0.012

Notes: Standard errors contained in [ ]. ***, **, * represent statistical significance at the 1, 5 and 10% level. FE estimation with clustered standard errors.

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 → MNC Measures →	[t+1] Value	[t+1] Number	[t+2] Value	[t+2] Number	[t+3] Value	[t+3] Number
Ln(HS2 MNC Exports)$_{ch,t-1}$	0.0048 [.0016]^{a}	0.0115 [.0041]^{a}	0.0053 [.0020]^{a}	0.0096 [.0050]^{a}	0.0056 [.0029]^{b}	0.0136 [.0073]^{c}
Ln(HS2 MNC Exports)$_{ch,t-1}$ * OECD	0.0080 [0.0006]^{a}	0.0209 [.0022]^{a}	0.0073 [0.0008]^{a}	0.0199 [.0028]^{a}	0.0048 [0.0011]^{a}	0.0122 [.0036]^{a}
Ln(MNC Exports in other HS2's)$_{ch,t-1}$	-0.0541 [.0066]^{a}	-0.0677 [.0107]^{a}	-0.0693 [.0092]^{a}	-0.0824 [.0144]^{a}	-0.0564 [.0106]^{a}	-0.0697 [.0162]^{a}
Dispersion	0.0007 [.0339]	0.0028 [.0340]	0.0248 [.0505]	0.0286 [.0506]	0.0662 [.0656]	0.0684 [.0657]
Ln (UnitValue of other new exports in HS8)	0.8697 [.0176]^{a}	0.8684 [.0176]^{a}	0.8711 [.0232]^{a}	0.8699 [.0231]^{a}	0.8696 [.0286]^{a}	0.8686 [.0286]^{a}
Ln (UnitValue of other new exports inHS8)*OECD	-0.0523 [.0070]^{a}	-0.0487 [.0068]^{a}	-0.0505 [.0093]^{a}	-0.0476 [.0090]^{a}	-0.0442 [.0106]^{a}	-0.0422 [.0104]^{a}
Firm Type	-0.0424 [0.0136]^{a}	-0.0512 [0.0136]^{a}	-0.0881 [0.0169]^{a}	-0.1032 [0.0172]^{a}	-0.0638 [0.0189]^{a}	-0.0699 [0.0191]^{a}
Ln(Distance)	-0.0088 [0.0055]	-0.0017 [0.0054]	-0.0075 [0.0068]	0.0004 [0.0065]	0.0082 [0.0092]	0.0144 [0.0088]
Ln(Importing Country GDP)	0.0174 [0.0027]^{a}	0.0217 [0.0027]^{a}	0.0170 [0.0037]^{a}	0.0203 [0.0036]^{a}	0.0244 [0.0046]^{a}	0.0265 [0.0044]^{a}
Ln(Importing Country GDP per capita)	-0.0629 [.0217]^{a}	-0.1201 [0.0218]^{a}	-0.1155 [.0324]^{a}	-0.1668 [0.0315]^{a}	-0.1988 [.0486]^{a}	-0.2424 [.0465]^{a}
Ln (GDP in Province)	-0.2857 [0.1823]	-0.3556 [0.1825]^{c}	0.0922 [0.2458]	0.0874 [0.2448]^{c}	2.0163 [0.9668]^{b}	2.1033 [0.9780]^{b}
Ln (GDP per capita)	0.1163 [0.0221]^{a}	0.1854 [0.0220]^{a}	0.1674 [0.0331]^{a}	0.2298 [0.0319]^{a}	0.2751 [0.0482]^{a}	0.3259 [0.0456]^{a}
Ln (Railways)	0.0209 [0.0277]	0.203 [0.0281]	-0.0159 [0.0355]	-0.0238 [0.0360]	0.3327 [0.2456]	0.2630 [0.2442]
Ln (Highways)	-0.0162 [0.0396]	-0.0246 [0.0396]	-0.0310 [0.0490]	-0.0399 [0.0491]	0.7279 [0.3560]^{b}	0.7166 [0.3538]^{b}
Ln(Waterways)	-0.0058 [0.0210]	-0.0065 [0.0212]	-0.0926 [0.0656]	-0.0706 [0.0657]	-0.2196 [0.1185]^{b}	-0.1989 [0.1179]^{c}
% College	2.9160 [.7093]^{a}	2.8409 [.7122]^{a}	-1.9328 [1.3212]	-1.3719 [1.3123]	-5.2637 [2.2628]^{b}	-4.3776 [2.2474]^{c}
% High School	-2.1617 [0.6126]^{a}	-2.1304 [0.6131]^{a}	1.7989 [0.9936]^{c}	1.4851 [0.9891]	0.6327 [1.5836]	0.5781 [1.5836]
Ln(Government Expenditures in Province)	-0.0328 [0.0359]	-0.0322 [0.0360]	-0.0516 [0.0499]	-0.0406 [0.0497]	-0.1200 [0.0988]	-0.1063 [0.0986]
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	187,908	197,093	92,017	92,017	45,464	45,464
# Province-HS4 Groups	8,486	8,486	4,769	4,769	3,198	3,198
R-squared	0.32	0.32	0.33	0.33	0.32	0.32

Notes: Standard errors contained in [ ]. ***,**,* represent statistical significance at the 1, 5 and 10% level.
FE estimation with clustered standard errors.

Table 4: First Year Survival Probabilities for New Chinese Trade Transactions

	(1)	(2)	(3)	(4)
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0088 [0.0005]^{a}		-0.0053 [0.0023]^{a}	
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	0.0415 [0.0014]^{a}		0.0415 [0.0014]^{a}	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$		0.0175 [0.0012]^{a}		-0.0149 [0.0050]^{a}
Ln(Number of MNC Exporters in other HS2's)$_{ch,t-1}$		0.0631 [0.0023]^{a}		0.0630 [0.0023]^{a}
Dispersion	0.0887 [0.0092]^{a}	0.0890 [0.0093]^{a}	-0.0126 [0.0187]	0.0482 [0.0112]^{a}
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$* Dispersion			0.0072 [0.0011]^{a}	
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$* Dispersion				0.0164 [0.0025]^{a}
Firm Type	0. 3408 [0.0045]^{a}	0.3437 [0.0045]^{a}	0.3408 [0.0045]^{a}	0.3438 [0.0045]^{a}
Ln(Distance)	-0.1028 [0.0029]^{a}	-0.1027 [0.0029]^{a}	-0.1028 [0.0029]^{a}	-0.1027 [0.0029]^{a}
Ln(Importing Country GDP)	0.0664 [0.0014]^{a}	0.0665 [0.0014]^{a}	0.0664 [0.0014]^{a}	0.0667 [0.0014]^{a}
Ln(Importing Country GDP per capita)	0.0905 [.0146]^{a}	0.0915 [.0146]^{a}	0.0905 [.0146]^{a}	0.0914 [.0146]^{a}
Ln (GDP in Province)	-0.0076 [0.0124]	-0.0145 [0.0124]	-0.0067 [0.0124]	-0.0133 [0.0124]
Ln (GDP per capita)	0.0062 [0.0164]	0.0046 [0.0142]	0.0064 [0.0142]	0.0048 [0.0142]
Ln (Railways)	0.0272 [0.0087]^{a}	0.0232 [0.0087]^{a}	0.0274 [0.0087]^{a}	0.0234 [0.0087]^{a}
Ln (Highways)	-0.0104 [0.0133]	-0.0002 [0.0133]	-0.0110 [0.0133]	-0.0007 [0.0133]
Ln(Waterways)	0.0101 [0.0049]^{b}	0.0052 [0.0049]	0.0101 [0.0049]^{b}	0.0052 [0.0049]
% College	1.9473 [.3522]^{a}	2.0664 [.3524]^{a}	1.9450 [.3521]^{a}	2.0630 [.3522]^{a}
% High School	-1.6535 [0.2641]^{a}	-1.6568 [0.2640]^{a}	-1.6443 [0.2639]^{a}	-1.6457 [0.2637]^{a}
Ln(Government Expenditures in Province)	-0.0094 [0.0106]	-0.0115 [0.0106]	-0.0102 [0.0106]	-0.0124 [0.0106]
Year Dummies	Yes	Yes	Yes	Yes
Observations	431,833	431,833	431,833	431,833
Groups	12,518	12,518	12,518	12,518
Log-Likelihood	-280,681	-280,680	-280,663	-280,608

Notes: Standard errors contained in [ ]. ***, **, * represent statistical significance at the 1, 5 and 10% level. Panel probit with clustered standard errors.

TABLE 5: 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 MNC Exports in other HS2's)$_{ch,t-1}$	.0702 [.0023]***	.0701 [.0023]***		.0633 [.0025]***	.0631 [.0025]***
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(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]. Standard errors contained in [ ]. ***,**,* represent statistical significance at the 1, 5 and 10% level.

Table 6: The Effect of Multinationals on New Export Transaction Unit Values

	(1) Differentiated Goods	(2) Other Goods	(3) Differentiated Goods	(4) Other Goods
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0107 [0.0005]***	0.0032 [0.0006]***		
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	-0.0091 [0.0010]***	-0.0058 [0.0017]***		
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$			0.0247 [0.0012]***	0.0053 [0.0016]***
Ln(Number of MNC Exporters in other HS2's)$_{ch,t-1}$			-0.0133 [0.0019]***	0.0016 [0.0030]
Dispersion	-0.4186 [0.0095]***	0.1251 [0.0106]***	-0.4183 [0.0095]***	0.1257 [0.0106]***
Ln(Distance)	-0.0319 [0.0025]***	0.04694 [0.0041]***	-0.0323 [0.0024]***	0.0466 [0.0041]***
Ln(Importer GDP per capita)	0.0930 [0.0019]***	0.1279 [0.0034]***	0.0931 [0.0019]***	0.1279 [0.0034]***
Ln(Importer Population)	0.0370 [0.0011]***	0.0499 [0.0021]***	0.0370 [0.0011]***	0.0498 [0.0021]***
Firm Type	-0.0647 [0.0039]***	0.0229 [0.0071]***	-0.0653 [0.0039]***	0.0210 [0.0071]***
Ln (GDP in Province)	0.3332 [0.0474]***	0.2589 [0.0606]***	0.3365 [0.0474]***	0.2351 [0.0606]***
Ln(Population in Province)	-.1502 [0.0540]***	-0.1340 [.0742]*	-0.1394 [0.0540]***	-0.1165 [.0742]
Ln (Average Province Wage)	-0.2811 [0.0722]***	-0.3420 [0.1052]***	-0.2650 [0.0722]***	-0.3435 [0.1052]***
Ln (Railways)	-0.1075 [0.0121]***	0.0060 [0.0058]	-0.1086 [0.0121]***	-0.0890 [0.0200]
Ln (Highways)	0.0366 [0.0200]**	-0.1570 [0.0306]***	0.0347 [0.0200]*	-0.1605 [0.0306]***
Ln(Waterways)	-0.0359 [0.0066]***	0.02111 [0.0092]**	-0.0364 [0.0066]***	0.02117 [0.0092]**
% College	2.0038 [.4063]***	-3.0873 [.6590]***	2.0095 [.4063]***	-3.0620 [.6590]***
% High School	-2.1816 [0.3058]***	-0.5438 [0.4978]	-2.2474 [0.3059]***	-0.6066 [0.4978]
Ln(Government Expenditures in Province)	-0.0637 [0.0175]***	-0.0412 [0.0259]	-0.0639 [0.0175]***	-0.0395 [0.0259]
Year Dummies	Yes	Yes	Yes	Yes
Observations	649,932	128,907	649,932	128,907
# of Province-HS4 Groups	10,679	5,732	10,679	5,732
R-squared	0.01	0.06	0.01	0.06

Notes: Standard errors contained in [ ]. ***, **, *[c] represent statistical significance at the 1, 5 and 10% level. FE estimation with clustered standard errors.

Table 7: The Effect of Multinationals on New Export Transaction Survival

	(1) Differentiated Goods	(2) Other Goods	(3) Differentiated Goods	(4) Other Goods
Ln(Value of HS2 MNC Exports)$_{ch,t-1}$	0.0089 [0.0006]***	0.0058 [0.0009]***		
Ln(Value MNC Exports in other HS2's)$_{ch,t-1}$	0.0575 [0.0016]***	0.0095 [0.0026]***		
Ln(Number of HS2 MNC Exporters)$_{ch,t-1}$			0.0167 [0.0014]***	0.0135 [0.0022]***
Ln(Number of MNC Exporters-other HS2's)$_{ch,t-1}$			0.0834 [0.0026]***	0.0105 [0.0046]**
Dispersion	0.1290 [0.0111]***	0.0039 [0.0146]	0.1297 [0.0111]***	0.0031 [0.0146]
Ln(Distance)	-0.0928 [0.0030]***	-0.1259 [0.0064]***	-0.0928 [0.0030]***	-0.1259 [0.0064]***
Ln(Importer GDP per capita)	0.1695 [0.0024]***	0.1093 [0.0054]***	0.1684 [0.0024]***	0.1094 [0.0054]***
Ln(Importer Population)	0.0679 [0.0014]***	0.0537 [0.0033]***	0.0679 [0.0014]***	0.0536 [0.0033]***
Firm Type	0.3473 [.0047]***	0.3310 [.0112]***	0.3529 [.0047]***	0.3318 [.0112]***
Ln (GDP in Province)	-0.0602 [0.0278]**	-0.0707 [0.0448]	-0.0661 [0.0279]**	-0.0634 [0.0451]
Ln(Population in Province)	0.1523 [0.0421]***	0.0869 [0.0669]	0.1489 [0.0421]***	0.0812 [0.0670]
Ln (Average Province Wage)	-0.0143 [0.0563]	-0.4162 [0.0926]***	-0.0131 [0.0563]	-0.4102 [0.0927]***
Ln (Railways)	0.0124 [0.0101]***	0.0146 [0.0192]	0.0074 [0.0101]	0.0128 [0.0192]
Ln (Highways)	-0.0562 [.0171]***	-0.0720 [.0300]**	-0.0423 [.0171]**	-0.0647 [.0299]**
Ln(Waterways)	-0.00004 [0.0059]	0.0082 [0.0092]	-0.0063 [0.0059]	0.0063 [0.0092]
% College	2.0991 [0.3792]***	0.3241 [0.7844]	2.2026 [0.3792]***	0.3868 [0.7847]
% High School	-1.2489 [0.3013]	0.2622 [0.5663]	-1.2333 [0.3013]	0.2818 [0.5661]
Ln(Government Expenditures in Province)	-0.0178 [0.0147]	0.0839 [0.0259]***	-0.0178 [0.0147]	0.0790 [0.0260]***
Year Dummies	Yes	Yes	Yes	Yes
Observations	394,507	74,644	394,507	74,644
# of Province-HS4 Groups	8,502	4,470	8,502	4,470
Log likelihood	-255,055.32	-49,108.91	-255,039.65	-49,114.42

Notes: Standard errors contained in [ ]. $^{***, **, *}$ represent statistical significance at the 1, 5 and 10% level. Panel probit with clustered standard errors.

Table 8: The Effect of Multinationals on New Export Transaction Unit Values -- Effects by Export Destination

	Ln(HS2 MNC Exports)$_{ch,t-1}$	Ln(MNC Exports in other HS2's)$_{ch,t-1}$	Dispersion
Full Sample			
MNC Measure	Value	Value	
	.00755 [.00039]***	-.00680 [.00089]***	-.24073 [.00746]***
Exports to OECD countries			
MNC Measure	Value	Value	
	.00695 [.00059]***	-.00361 [.00143]***	-.06065 [.01145]***
Exports to non-OECD countries			
MNC Measure	Value	Value	
	.00774 [.00052]***	-.01092 [.00113]***	-.35441 [.00971]***
Full Sample			
MNC Measure	Number	Number	
	.01687 [.00097]***	-.00657 [.00163]***	-.24040 [.00746]***
Exports to OECD countries			
MNC Measure	Number	Number	
	.01594 [.00146]***	-.00327 [.00252]***	-.06018 [.01144]***
Exports to non-OECD countries			
MNC Measure	Number	Number	
	.01721 [.00129]***	-.01288 [.00211]***	-.35419 [.00971]***

Notes: Regressions also include firm type, (Province variables for GDP, population, wages, railways, highways, college education, high school completion, government expenditure), (Importing country distance, GDP per capita, population), year dummies, and HS2 Industry dummies. Panel estimation with clustered standard errors. ***, **, *[c] represent statistical significance at the 1, 5 and 10% level.

Table 9: The Effect of Multinationals on New Export Survival
Effects by Export Destination

	Ln(HS2 MNC Exports)$_{ch,t-1}$	Ln(MNC Exports in other HS2's)$_{ch,t-1}$	Dispersion
Full Sample			
MNC Measure	Value	Value	
	.00842 [.00047]***	.04443 [.00139]***	.08343 [.00889]***
Exports to OECD countries			
MNC Measure	Value	Value	
	.00947 [.00073]***	.04794 [.00224]***	.09793 [.01381]***
Exports to non-OECD countries			
MNC Measure	Value	Value	
	.00780 [.00061]***	.03868 [.00174]***	.06254 [.01115]***
Full Sample			
MNC Measure	Number	Number	
	.01632 [.00115]***	.06727 [.00226]***	.08367 [.00889]***
Exports to OECD countries			
MNC Measure	Number	Number	
	.01976 [.00174]***	.06831 [.00352]***	.09827 [.01381]***
Exports to non-OECD countries			
MNC Measure	Number	Number	
	.01410 [.00146]***	.06097 [.00287]***	.06262 [.01115]***

Notes: Regressions also include firm type, (Province variables for GDP, population, wages, railways, highways, college education, high school completion, government expenditure), (Importing country distance, GDP per capita, population), year dummies. Panel probit with clustered standard errors. ***, **, *[c] represent statistical significance at the 1, 5 and 10% level.

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