

Multinationals and the Creation of Chinese Trade Linkages

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Abstract:

A large and growing literature studies how multinational firms affect the economic performance of local firms on a number of dimensions, with an emphasis on productivity and export performance. This paper studies city-level data on Chinese trade to examine a new dimension of economic performance: how proximity to multinational firms affects the formation of new export connections, or the expanded diversity of product exports, by private Chinese firms. The results show that location near multinational firms, where firm activity is measured by *presence*, does indeed increase the formation of trade linkages by local Chinese firms. And this effect is especially strong when the multinationals operate in the same industry. However, multinational firms also appear to create congestion effects. The formation of new export transactions is curtailed when the *value* of multinational firm exports increases, which suggests that the scale of multinational operations has negative consequences for local factor prices.

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Introduction

The general expectation that host economies will reap benefits from the presence of multinational firms has caused many countries to actively promote foreign investment within their borders.¹ One particular benefit that economists have studied is how proximity with multinational firms affects local firms' export capabilities. For example, Aitken, Hanson and Harrison's (1997) work on Mexican firms suggests that proximity to multinational firms increased Mexican firms' export probabilities. However, while work on UK firms by Greenaway, Sousa and Wakelin (2004) and Chinese provinces by Ma (2004) also find a positive association between multinational presence and exporting probabilities and volumes, work by others suggest that the effects have not been experienced uniformly in all contexts.

The fact that multinational presence is not always associated with elevated export performance may not be surprising. As Aitken and Harrison (1999) point out, multinationals may cause adverse outcomes for local firms if the effects of intensified product market competition outweigh the spillover benefits of improved firm productivity among the local firms. Multinational firm activity might also harm local firms if the multinationals' demands for workers and other factors drive up operating costs for local firms.

Most treatments of export spillovers from multinational firms, study whether the export probabilities or export volumes of local firms are enhanced by proximity to multinational firms. In contrast, this paper examines another potential export spillover: whether proximity to multinational firms results in an expansion of export relationships

¹Blomstrom and Kokko (1998), and Navaretti and Venables (2004), and Gorg and Greenaway (2004) provide comprehensive surveys of host country benefits and harms from multinational activity.

from the host location. This dimension of trade relationships is important, since it addresses whether location near multinational firms enables local firms to increase their trade networks either through the introduction of new products, or expansion in the number of export destinations.

To address this question, this paper examines data on Chinese trade between 1997 and 2003. The analysis focuses on the introduction of new trade in HS8 products at the city level, as it studies how the presence of multinational firms at the level of Chinese cities influenced the count of new export relationships.

The examination of Chinese trade between 1997 to 2003 provides an unusual opportunity for examining how the activities of multinational firms influenced local firm's ability to expand their export connections. First, since the sample period includes China's entrance to the WTO, the increased certainty about the international treatment of China's exports may have resulted in a more rapid formation of trading relationships than is typical for countries that are already members of the WTO. As a result, the data set is likely to provide more variation in new trade transactions that allows one to identify the effects of multinational operations. Second, since China has managed to attract an unusually large volume of foreign investment in the 1990's and early 2000's, there is likely to be sizable variation in the evolution of multinational variables at the city-hs2 industry level, that again facilitates identification of spillover effects to exporting.

The results indicate that private Chinese firms and entrepreneurs were indeed more likely to form new trading relationships, or to expand the number of traded products, when the number of proximate multinationals increased. Contact with all types

of multinationals conveyed these benefits, though the presence of same-industry multinationals generated the strongest exporting spillovers.

In contrast, if one also includes the value of products exported by multinational firms, the results show that an increase in the value of multinational export operations reduced the number of new trade relationships formed by local firms and entrepreneurs. This effect suggests that multinationals also created negative congestion spillovers through their effects on local input markets. In particular, it appears that multinational firms' demand for labor and other factors raised the prices of inputs, hence inhibiting the formation of new Chinese trade relationships. Nonetheless, if one considers the simultaneous effects of multinational presence and multinational scale, it appears that the expansion of multinational operations was associated with increases in the creation of new export transactions from Chinese cities.

The identification of these spillover effects, is in part a function of the data disaggregation. If one looks at the data at the provincial-level, rather than the city-level, the results are generally weaker. In this sense, this paper takes the approach of many other authors who are trying to better identify spillovers from foreign investment, by specifying the types of multinational linkages, or working to use more sensible disaggregation of the data.²

This paper makes two contributions to the literature on international trade. First, while there is a well-established literature on the contributions of multinational firms to host economies, this paper is the first to examine how the presence of multinational firms contributed to the expansion of product and destination diversity of private exporters who

² See for example, Javorcik (2004), Kneller and Pisu (2005), Ruane and Sutherland (2004) or Keller and Yeaple (2003).

were located in close proximity to the multinational firms. Such diversity is of interest, since there is a growing appreciation that increased product diversity may contribute to a country's economic growth.³ In addition, this paper examines whether the presence of multinational firms has affected the creation of trade relationships, as one would predict based on search models of trade. Here, the results, while mixed support that idea that multinationals, by acting as a conduit of information, are indeed helping to facilitate international economic integration.

³ Feenstra, Madani, Yang and Liang, for example, show how expanded export product variety (calculated according to methods of Feenstra (1994) and Feenstra and Markusen (1994) was related to the growth of Taiwan and South Korea.

In addition, to the extent that new product introductions represent an expansion in the diversity of products sold, a country may expand its exports without depressing its terms of trade. (Kichun Kang, Joseph Tracy).

2. *A Model of Export Behavior*

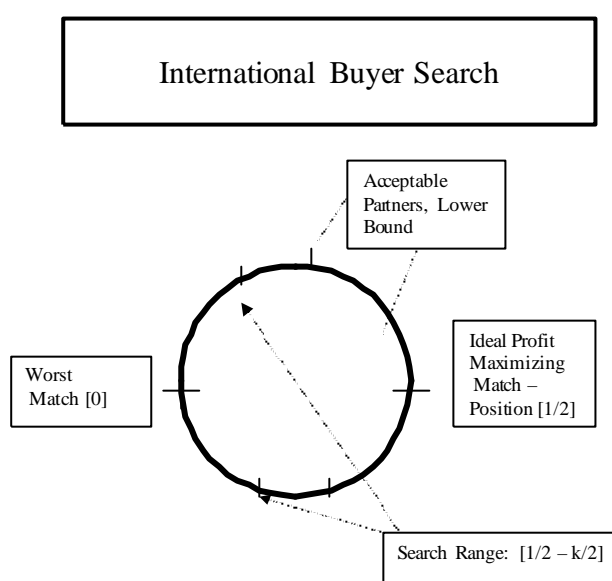
To motivate the empirical analysis, I turn to Rauch and Trindade's (2003) model which examines the effects of information on the globalization of labor and product markets. Although their model is motivated by an example in which a Northern firm searches for partners in the lower wage South, it can easily be reinterpreted to describe the formation of new export relationships, in this case, by local Chinese firms and entrepreneurs.

To begin, suppose a Chinese firm is interested in initiating product exports, or in expanding the locations to which it exports. In either case, the formation of a new export relationship requires that the Chinese manager identify a foreign buyer. The foreign market can be represented by a unit circle, which is populated by foreign buyers, as is illustrated in figure 1. The position of these buyers on the unit circle helps to characterize the profit the Chinese firm will realize if it starts exporting to the foreign market. The ideal buyer, who is located opposite the seller, is associated with the highest profits, while buyers who occupy the same location as the Chinese firm represent the lowest profit transactions.

To begin, assume that if the Chinese firm searches for purchasers in the foreign market, it will be introduced to a single foreign buyer. While the Chinese firm may possess enough information to avoid introductions with the lowest profit partners, the search yields a single partner drawn from the search range of the Chinese firm, which is parameterized by the degree of search uncertainty, k ($0 = k = 1$). If $k = 1$, the search involves a draw from the entire unit circle, while if $k = 0$, there is no uncertainty, and the search is guaranteed to identify the ideal partner. The profitability of the potential buyer

it meets through this search process may or may not exceed the Chinese firm's reservation value, which is defined by the outside opportunities the firm has in the Chinese market. In particular, some searches for a foreign buyer will end in failure, if the inability to perfectly target the search causes the realized introduction to lie beyond the range of acceptable introductions.

Figure 1

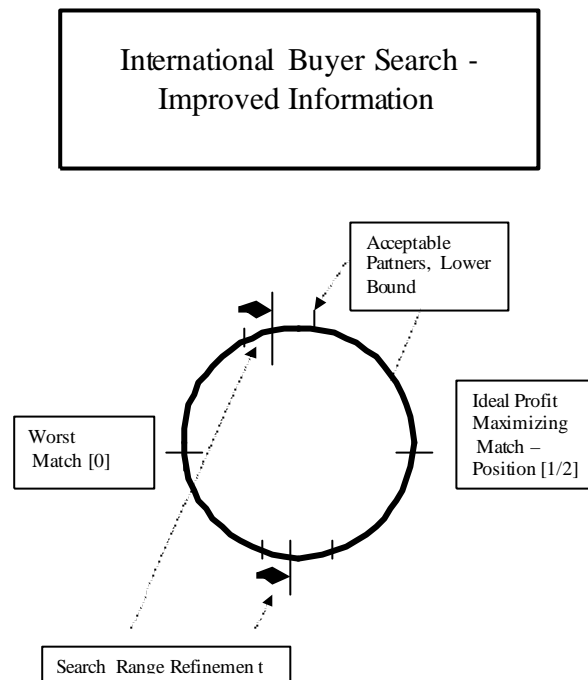


Such search uncertainty is a key feature Rauch and Trindade's framework, as it helps to explain why North-South wage differentials may remain even if labor is identical across countries. In this context, search uncertainty shows why some profit-generating export transactions fail to commence. In some cases the Chinese firm will

shun a foreign selling opportunity, even if it would produce positive profits, if the Chinese firm has better sales opportunities in the Chinese market. In other cases, an ideal buyer may exist, but the failure of the search to reveal the potential partner, leaves the profitable but undiscovered transactions unrealized.

Information-driven globalization can be represented as a reduction in search uncertainty, which enables firms to narrow their search, as they exclude a greater percentage of the least desirable matches. In the case of private Chinese firms or entrepreneurs, the expanding presence of multinational firms in China may have played this informational role. In particular, as the number of multinational firms increased, it is possible that local Chinese firms benefited from information spillovers. Such spillovers would have occurred as Chinese firms observed the product mix and product destinations of multinational exporters, thus gaining insights about the types of products, and location of markets where they could sell their products for the highest profit. Information spillovers may have also occurred if employees left the multinational firms for local Chinese firms, again, taking more precise information about foreign market opportunities with them.

Figure 2



The effect of multinational firms on search is represented by the refinement of search illustrated in figure 2. While partner introductions would still be a random draw, the random draw would come from a narrower interval, and the expected probability of finding an acceptable match would increase. As a result, one would predict that an increase in the presence of multinational firms should have resulted in an accelerated creation of new trade relationships by private Chinese firms. If a greater number of searches bear fruit, we expect to observe the export of products from a city that were not

previously exported, or expansion in the number of export destinations served by Chinese firms.

While information spillovers arising from the presence of multinational firms may increase the formation of export relationships by Chinese firms, the increase in activity by multinational firms may have other consequences that discourage exporting by local Chinese firms. In particular, if exporting by multinationals elevates labor demand in the Chinese cities where they operate, multinational firms may cause an increase in local wages which raises production costs for local Chinese firms, thus depressing their ability to export profitably.

While the two effects of multinational firms are at odds with each other, it is possible that they may still be distinguished. The information spillover effect is likely to be most closely tied to the market presence of multinationals, and hence the number of multinational firms operating in the local market. In contrast, labor market wage effects are likely to be related to the size of multinational firm demand in the local labor market. This is better approximated by a measure which describes the size of multinational operations, such as the value of multinational firm exports, rather than firm counts as an indicator of presence and potential contacts.

3. Estimation and Data

To estimate how proximity with multinational firms affects export outcomes for Chinese exporters, I use the following specification to describe the creation of new trading relationships by private Chinese firms:

$$(1) C_New_{hct} = \alpha + \beta_1 * RelInd_MNC_{hct,t-1} + \beta_2 * RelOther_MNC_{hct,t-1} + e_{hct}$$

The dependent variable, C_New_{hct} , is the count of new trade transactions at the HS8 product level, where h represents the HS2 industry, c the Chinese city or origin, and t the year. Since the dependent variable is a count measure, the regressions are estimated using negative binomial methods.

The key regressors of interest, $*RelInd_MNC_{hct,t-1}$ and $\beta_2 * RelOther_MNC_{hct,t-1}$, represent the level of multinational activity in the city, by multinationals in the same HS2 industry, as well as the effect of multinationals in other HS2 industries, respectively. In both cases, the dependent variables reflect the size of the multinational variable for the city *relative* to the magnitude of the variable for all of China.

The error term is assumed to have two components. The first, γ_{hc} is a city, HS2 industry fixed effect, while the second η_{hct} is an iid error term.

$$(2) e_{hct} = \gamma_{hc} + \eta_{hct}$$

The inclusion of HS2 Industry-City fixed effects is especially important for this analysis, since it is easy to imagine that there are a number of unobserved, and potentially unobservable factors that make some cities well-suited for some industries and not for others. The city-industry fixed effects allow one to control for the general attractiveness

of a city location for export and FDI, thus enabling one to identify the effects of multinational firm activity from the time series variation in multinational activity in Chinese-cities.

3.2 Data

The primary data for this project are based on HS 8 Chinese exports, as reported in the Customs General Administration of the People's Republic of China for 1997-2003.⁴ In addition to information on the Chinese city-district of origin and country destination of these exports, these data include information on the ownership type of the transactions, which enables one to distinguish transactions that are controlled by foreign versus Chinese-owned entities. Finally, while a 4-digit code distinguishes the city origin of Chinese exports, there is a fifth digit in the geographic codes, which enables one to more finely distinguish the location of export within a city.

As Feenstra and Hanson (2005) note, by the time the data are broken down to the HS8 product- city- zone – ownership- processing regime level of disaggregation, this data set begins to provide information that is close in nature to that available in firm-level data sets, even though the operational identifier is HS8 products.

The dependent variable C_New_{hct} is the count of new trade transactions for HS8 products within an HS2 industry h , from city c in year t . Since the Chinese data are first available at the HS8 level in 1997, it is possible generate count measures for the introduction of new trade transactions for 1998 and onward.

Two factors drove the appearance of new transactions. First, one could observe when a city expanded the number of countries it served. For example, if a city exported a

⁴ These data were used under license to the CID at University of California, Davis.

particular HS8 product to Germany in 1999, and then was observed exporting the product to the U.S. in 2000 for the first time, this expansion in destinations was included in the count.⁵ The second factor that increased the count, arose when a city exported an HS8 product that it had not exported anywhere in the previous year. Since new product introduction may respond differently than expansion of locations, an alternative dependent variable, $C_New_Prod_{het}$, the count of new product exports, was also calculated.⁶

Because I am interested in studying the effects of multinational firms on the expansion in local export transactions, I created a set of variables representing the presence of multinational firms, and the level of economic activities conducted under their auspices.

To measure multinational *presence*, I created a multinational variable that is a synthetic count of “firms” as defined by each unique combination of the geographic, regime-type, and firm-type identifiers in the data set. For example, $mnc2$, was the count of “firms” providing HS8 products within an HS2 industry from city c . However, I do not use $mnc2$ directly in the estimation, but the counts for the city relative to China overall.

$$\text{Relative HS2 MNC Presence} = \frac{mnc2}{\sum_c mnc2}$$

Since it is possible that multinational contacts create spillovers that extend across industry lines, as may be the case if they convey country-specific information about

⁵ Since the count variable is created with reference to the previous year, it is not adjusted to account for trade transactions that ceased in the current year.

⁶ From year to year, one may observe the introduction of new HS8 product categories. As a result, some offerings of “new” HS8 products may represent an expanded set of categories, for products that already existed. However, the creation of new HS8 categories will not represent any problems if the new HS8 categories are created to follow newly produced goods.

buyers that is helpful to Chinese sellers of all products, I also created counts of multinational firms by city. Here, *mnc*, represents the number of “firms” within a city of all industries. To study the effect of multinational presence more generally, I also created a relative measure that compares the multinational firm intensity of a city, compared with total multinational firm presence in China, and defined as:

$$\text{Relative MNC Presence} = \frac{mnc}{\sum_c mnc}$$

To see whether the *size* of multinational operations affected Chinese firms, I also generated variables based on the value of exports emanating from multinationals within Chinese cities. Here, the variable *vmnc2* was the value of all exports of multinational firms from a Chinese city within an HS2 industry classification. Further, to examine the size of all multinational exports, *vmnc* was defined as the value of all exports of multinational firms from a Chinese city across all industries.

To include the value of multinational exports in the estimating equation, it was important to create additional variables that summarized the relative value of multinational operations within the city compared to China overall. The variables *Relative HS2 MNC export value*, and *Relative MNC export value*, were created to be the value analogues of the two measures of multinational firm presence.

One last measure of multinational activity was created to get an idea whether there was a diversity of transactions within a city, or whether the city specialized in handful of transactions. To measure transaction diversity, I created a count variable which measures the number of unique export transactions conducted by multinational firms. {Ex: boy’s pajamas to the U.S., tennis shoes to Australia, etc.} The variable *Relative MNC transaction density in City* was then created by dividing transaction

density for the city by the sum of all unique city-product-destination multinational exports of China.⁷

3.3 Results

The basic estimation results for new trade connections are presented in Table 2. As the first two columns of the table demonstrate, multinational firm activity in a city was positively related to private exports from the city. This result is clear, whether one measures the influence of multinationals using counts of multinational firms, or the value of multinational exports from the city. There is a distinction between the effect of own industry multinational and general multinational activity. In particular, the strongest association is noted for multinational activities that are in the same HS2 industry as the private product exports are.

It easy to imagine that some multinationals engage in a greater diversity of transactions than others, where diversity in destination-HS8 product pairs is driven by the range of destinations or span of projects exported by multinationals in the city. To see whether exposure to a greater diversity of transactions elevated the introduction of private export transactions, the regression was augmented in columns three and four by a measure of relative diversity, which was measured as the diversity of city transactions in an HS2, relative to diversity of those transactions across all of China within the HS2 industry. When this variable is introduced, it is not found to affect the estimated effects arising from the *presence* of multinational firms. However, as column 4 shows, once one

⁷I assume that products are differentiated across cities, which means that exports of a product from one city, are different than exports of that same HS8 product from another city.

controls for the density of multinational linkages, the effect of higher export *value* by multinational firms is found to inhibit the creation of new trading relationships.

In the final two columns of Table 2, I investigate what happens when all types of multinational contact are included in the same regression. The results show that it is the *presence* of multinational firms that appears to elevate product introduction, while expanded export operations by multinational firms has a negative effect on the formation of new trade relationships. The one coefficient that differs between the two specifications is the coefficient on the relative value of multinational exports in the same HS2 industry as the private Chinese exporter. It changes from negative to positive when separate province time trends are added to the regression. This final regression shows that the value of multinational exports in one's HS2 industry is still detrimental, though the harm is slightly smaller than the effects associated with the value of multinational activities in other industries.

Overall, the coefficients in Table 2 suggest that the export benefits generated by the presence of multinational firms arose through information spillovers to private Chinese firms. In particular, it appears that local Chinese exporters may have benefited from observing the type of products exported and the destinations served, since observation provided information on the types of international sales relationships they might profitably form.

Another potential benefit of multinational firms that is often mentioned is the creation of supply or purchasing networks. An increase of these networks is expected to benefit local firms, if the local firms are able to engage with the multinational networks, thus achieving economies of scale that assist them in undertaking new projects, including

exporting abroad. Further, if an increase in multinational activity helps to prod local governments into providing infrastructure, or deregulation that is beneficial to all firms, one would expect that an expansion in the scale of foreign export operations would be associated with an improved operating environment for local firms as well. The fact that expanded multinational export operations were negatively correlated with new export transactions by private Chinese firms suggests that this kind of benefit did not materialize in the Chinese context,, or that these effects were more than offset by the congestion effects that were associated with expanded of activities by multinational firms.

The results presented in Table 2 do not distinguish whether transaction density increased due to an expansion in the range of products, or destinations served by local Chinese firms. To see how the results look when the effect of multinationals on trade is defined by any expansion in the range of HS8 products exported by local Chinese firms, Table 3 estimates equation (1), replacing the dependent variable with the count of new HS8 products exported by a city, that were contained within an HS2 industry. What is interesting is that the general results are almost identical to those presented in Table 2. The one exception is the effect of multinational transaction density on the introduction of new product exports. When province time trends are included in the column (6) of the table, the results show that there is no association between transaction density and the number of new products introduced. This seems to suggest that it is proximity to a diversity of product operations that facilitates an expansion in the range of traded products, rather than proximity to exporters serving a multiplicity of export destinations.

While the first set of regressions suggests that the presence of small multinational exporters is particularly associated with the introduction of newly exported products, or

newly created trading relationships, the estimates provide no estimate of the value of these transactions. To examine the effect of multinational firm activities on the value of new private trade transactions I use panel estimation techniques to see how the log of new trade value was related to the multinational firm presence and operation size. These results are presented in Table 4. While the new results describe the effects of multinational firm activity on the value of new private Chinese exports, the general results remain similar to those presented when new transactions or product introductions were examined. The *presence* of multinational firms was associated with higher values of new product introductions, and more highly valued new transactions, while the scale of multinational firm operations was associated with smaller values. In addition, while the presence of same-industry multinationals exerted an even stronger effect on the value of new product exports by private Chinese enterprises, proximity to same industry multinational values imposed no different effect on these outcomes, than the value of multinational activity in other industries.

3.4 Robustness Checks

One might be concerned that new trade relationships were correlated with increases in multinational presence, since multinational presence was determined by the presence of opportunities. For example, one might note that the number of multinational firms increased in Jiangsu in 2002, and that in 2003, the number of new trade connections in Jiangsu increased as well. This relationship might have no spillover component if the multinationals came to Jiangsu in 2002 to produce and export digital cameras, and the private entrepreneurs started exporting digital cameras in 2003 too. It might instead say that Jiangsu had become the location for both multinational and private Chinese to

produce and export consumer electronics products. The correlation would arise since there were city-year shocks that simultaneously elevated multinational activity, and private export connections. To address whether there were city-year shocks that were beneficial to Chinese and foreign exporters, I add a control to the basic equation, which is the count of new trade relationships formed by multinational firms. If unmeasured shocks at the city-year level make cities more attractive for all entities, then measure of new trade transactions should remove the effect of multinational firm presence.

As table 6 shows, this is not the case. When a variable for new transactions by multinational s is added to the original regression, the results show that the creation of new private trade relationships is indeed related to new trade transactions created by multinational firms. However, the original coefficients on multinational *presence* and multinational export *values* retain their relative magnitudes and significance when this new regressor is added to the estimating equation..

As a second check on the robustness of the results, the original regressions were run using provincial rather than city data.⁸ The regressions for the provincial-level regressions are reported in columns (3), (4) and (5) in Table 6. At the provincial level, the general *presence* of multinational firms was positively correlated with new transactions, product introductions, and the overall value of private exports from Chinese firms, which is consistent with the earlier regressions. However, in contrast with the city-level regressions, the presence of multinational s in a particular industry in a province was not found to confer advantage to private Chinese exports from the same industry. The

⁸ Since the new dependent variables represent the sum of city values within a province, they are not perfectly analogous to the variables in the city-level regressions, unless one views exports of an HS8 product from one city as differentiated from export of that HS8 product from another city. Such an assumption is reasonable if the plants in different cities produce somewhat different outputs.

fact that industry distinctions no longer matter, may suggest that industry-specific information spillovers are typically confined to smaller geographic areas, such as cities.

The provincial data are also used to examine the effect of multinational scale on the export expansion by local Chinese firms. Here the results are similar to those in the city-level regressions. In particular, when multinational firm scale is measured by exports of multinational firms in the province, the size of multinational operations is found to depress private Chinese introduction of new products, initiation of new trading relationship, or expansion of trading volume. This general result is not modified for the volume of export transactions in the same industry.

The fact that there was no differential effect for same industry multinational scale has two possible interpretations. First, it may simply mean that all multinational firms generated congestion externalities that were equal in magnitude. Alternatively, it might be the case that same industry multinational activity generated even larger congestion externalities, since same-industry producers competed for the same set of specialized inputs, which are limited in supply. However, this same-industry congestion effect might have been masked if it was exactly offset by positive externalities that arose from the growth of specialized supplier networks in the area, from labor market pooling, or industry-specific knowledge spillovers that were proportionate to the scale of the multinational activity.

To examine congestion at a simple level, I checked the Provincial data to see whether there was evidence that provincial wages rose with multinational firm activity.⁹ To see whether the data exhibited any relationship, I ran a panel regression for Chinese

⁹ While it would be especially interesting to examine city-level wage data, provinces were chosen as the unit of observation due to data availability.

wages that included province fixed effects, and dummies for the years in the sample. In this regression there was no statistical relationship between changes in the number of multinational firms in the province and the average wage for provincial workers in the private sector. This suggests that if multinational firms exerted any effects on Chinese labor markets, the effects were manifested at the city-level, rather than the province-level.

Another implication of search theories of trade is that the benefits of information spillovers from multinational firms may be the most valuable in cases where information is the most important. To think about this issue, Table 5 reports what happens when the data are split into subgroups that may arguably differ in their responsiveness to information. The first split distinguishes manufacturing investments from non-manufacturing investments with the idea that manufacturing outputs may be more highly differentiated than non-manufacturing outputs.¹⁰ If this is the case, the greater differentiation of manufactured products will cause them to benefit to a greater extent from multinational firm activities. However, when I split the data on this basis, it appears that it is the non-manufacturing industries that were especially sensitive to variation in multinational firm presence. Of course, it is possible that the association is manifested in the non-differentiated manufacturing industries, if the evolution of multinational activity reflected evolving patterns of comparative advantage at the city-level. In this case, multinational activity, and associated exports would move in tandem, since they would both reflect changing incentives related to comparative advantage.

The second distinction I make is between the activities of private Chinese firms in the interior of China, versus those in the coast. Due to the superior economic

¹⁰ Textiles were excluded from differentiated manufacturing since the Multifibre Agreement may have influenced their ability to expand trade.

performance of the coast, it is possible that information was less important for cities in the coastal provinces than it was for cities in the interior. The results that come from estimating the relationships for the coast and interior separately, show that the interior has a more marked response to multinational activities on all dimensions, both *presence*, and *scale* of foreign multinational export. This suggests that while multinational presence may have been especially helpful in providing information, that large-scale multinational operations more quickly overwhelmed the capabilities of city-infrastructure in the interior locations, and exerted a larger effect on local factor markets.

4. Discussion

Development economists are especially interested in learning whether the activities of multinational firms enhance economic outcomes for local firms and economies. While China's remarkable growth means that China's growth prospects are of much less concern than the growth outcomes in poorer nations, the results from this analysis provide information that is relevant to economic interests of poorer and smaller countries.

From a policy perspective, it is important to ask whether multinational firm activities were associated with export benefits given that presence comes with size. Since the results suggest that multinational firms presence conferred benefits while multinational export size was correlated with adverse export performance, it is important to calculate the net effect of the typical exposure. If one applies the coefficients from the 6th column of Table 2 to average values of multinational presence and size, the net effect of all multinationals on the creation of new trading relationship was positive. The

calculation suggests that average multinational presence boosted new trade relationships by 3.9% compared to the sample average of 6.55. When the same exercise is applied to new product introduction using the coefficients from the sixth column of Table 3, the results suggest that multinational firms were again associated with net benefits. Compared to the average of 1.36 new HS8 product introductions per year for each city-HS2 industry, the average multinational contact boosted new product export by 18.7%.

In evaluating the potential congestion effects arising from the operation of multinational firms in Chinese cities, it is important to remember that this analysis focuses on a single outcome – the creation of new export relationships. If expanded activity by multinational firms raises wage costs, the additional payments to Chinese workers should be regarded as contributing to the welfare of the Chinese economy, even if the rise in wages depresses the expansion of trade connections by private Chinese firms.¹¹

Valuing diversity,

One could also ask whether multinational presence was related to improvements in the “quality” of trade relationships. If multinationals enable firms to match with foreign buyers that are better suited than they would find without multinational contact, we might expect to find a positive correlation between multinational presence and the unit values of their products. A simple regression of unit export values on the presence of multinational firms in one’s industry reveals that unit values were 3.7% higher, when there was a one percentage point increase in the density of local multinationals.

¹¹As Fosfuri, Motta and Ronde’s (2001) theoretical analysis of technological spillovers from multinationals shows, multinational firms may also pay their local employees more to ensure that they don’t leave the multinational to work for a competitor firm.

However, such a regression does not control for export quality. If the regression is augmented with proxies for quality, in the form of country destination dummies, and province origin dummies, the association between multinational firms and product values is reduced to 2.9%. Finally, such controls may be too coarse yet. If one allows for province-destination-HS2 fixed effects, multinational firm presence was only correlated with a 0.1% increase in export unit values.

It is also interesting to ask whether exposure to multinational firms helps Chinese firms to move more quickly in the product cycle. If so, this may also facilitate more rapid growth in China, than would be the case if multinational firm activity were more limited.¹²

¹² Feenstra and Rose (2000) use a semi-parametric procedure to rank countries based on their sequence of U.S. trade relationships as indicated by the time when they first export different products to the U.S. In suggestive regressions, Feenstra and Rose show that countries that were more highly ranked, as being at the forefront of product cycle introductions, grew more rapidly than less favorably ranked countries.

5.0 Conclusion

This paper studies how the presence of multinational firms contributed to the formation of private Chinese export transactions between 1997 and 2003. The evidence, which is based on the *presence* of multinational firms in Chinese cities, shows that an expanded presence of multinational firms was associated with an elevated creation of trading relationships, and that the effect of multinational presence was especially high when the multinationals were in the same industry. At the same time, the evidence shows that the formation of new trade relationships at the city level appears to have been hampered by the *volume* of multinational export activity, as would occur if growing multinational activities increased factor costs in local Chinese markets. While the results show that the effects of multinational presence and the effects of multinational activity volumes worked in opposite directions, the implied effects for the average multinational contact were positive.

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Table 1: Summary Statistics						
	Full Sample		Coastal Provinces		Interior Provinces	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Count of All New Trade Connections – City/HS2/Yr	6.55	43.9	9.60	55.6	1.93	11.1
Count of All New Trade in Products – City/HS2/Yr	1.36	4.95	1.80	5.84	.699	.302
Relative HS2 MNC presence in City	.0044	.0122	.0065	.0148	.0015	.0052
Relative MNC presence in City	.0039	.0070	.0060	.0083	.0007	.0009
Relative HS2 MNC export value in City	.0041	.0159	.0066	.0200	.0003	.0005
Relative MNC export value in City	.0045	.0243	.0066	.0299	.0014	.0108

	(1)	(2)	(3)	(4)	(5)	(6)
Relative HS2 MNC presence in City	3.934 ^a (.606)		6.445 ^a (.954)		1.085 (.999)	2.983 ^a (.989)
Relative MNC presence in City	15.890 ^a (1.117)		16.625 ^a (1.136)		56.411 ^a (1.687)	76.626 ^a (2.000)
Relative HS2 MNC export value in City		1.503 ^a (.211)		-1.183 ^a (.282)	-.039 (.285)	.507 ^c (.291)
Relative MNC export value in City		-.207 (.338)		-2.567 ^a (.368)	-16.347 ^a (.561)	-18.394 ^a (.673)
Relative MNC transaction density in City			-2.357 ^a (.701)	9.089 ^a (.512)	4.139 ^a (.804)	1.588 ^b (.764)
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province Trends	No	No	No	No	No	Yes
City-HS2 RE	Yes	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-191,359	-191,625	-191,353	-191,477	-191,878	-172,120
Observations	129,994	129,994	129,994	129,994	129,994	129,994

Notes: Standard Errors in (). The superscripts ^a, ^b, and ^c denote statistical significance at the 1%, 5% and 10% levels. Dependent variable is the number of new trade transactions, involving the export of an entirely new HS8 product for the city, or by expansion of the number of destinations to which existing HS8 exports are shipped. Each independent variable labeled "Relative" denotes the share of the activity in the city, relative to China overall.

Table 3: The Effect of Multinationals on the Count of All New Trade in Products

	(1)	(2)	(3)	(4)	(5)	(6)
Relative HS2 MNC presence in City	4.195 ^a (.695)		7.368 ^a (1.068)		3.055 ^a (.999)	3.759 ^a (1.157)
Relative MNC presence in City	34.535 ^a (1.379)		35.326 ^a (1.399)		72.324 ^a (1.967)	76.620 ^a (2.297)
Relative HS2 MNC export value in City		1.678 ^a (.264)		-1.095 ^a (.333)	.188 (.329)	.478 (.354)
Relative MNC export value in City		3.405 ^a (.421)		1.149 ^a (.448)	-17.339 ^a (.681)	-17.774 ^a (.806)
Relative MNC transaction density in City			-3.036 (.788)	9.000 ^a (.584)	1.970 ^b (.868)	-1.006 (.904)
Province Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province Trends	No	No	No	No	No	Yes
City-HS2 RE	Yes	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-144,319	-144,847	-144,311	-144,731	-143,971	-132,056
Observations	129,994	129,994	129,994	129,994	129,994	129,994

Notes: Standard Errors in (. The superscripts ^a, ^b, and ^c denote statistical significance at the 1%, 5% and 10% levels. Dependent variable is the number of new trade transactions involving the export of an entirely new HS8 product from the city. Each independent variable labeled "Relative" denotes the share of the activity in the city, relative to China overall.

Table 4: The Effect of Multinationals on the Value of All New Trade Connections				
	(1)	(2)	(3)	(4)
Relative HS2 MNC presence in City	3.855 ^b (1.866)		4.417 ^b (1.976)	4.545 ^b (1.965)
Relative MNC presence in City	142.83 ^a (15.535)		171.19 ^a (15.967)	84.675 ^a (17.317)
Relative HS2 MNC export value in City		.459 (.839)	-.432 (.888)	-.665 (.883)
Relative MNC export value in City		-39.720 ^a (7.570)	-59.917 ^a (7.781)	-58.778 ^a (8.078)
Year Dummies	Yes	Yes	Yes	Yes
Province Trends	No	No	No	Yes
City-HS2 FE	Yes	Yes	Yes	Yes
R ²	.157	.058	.143	.025
Observations	129,994	129,994	129,994	129,994

Notes: Standard Errors in (). The superscripts ^a, ^b, and ^c denote statistical significance at the 1%, 5% and 10% levels. Dependent variable is the log of the value of new trade transactions, involving the export of an entirely new HS8 product for the city, or the expansion of the number of destinations to which existing HS8 exports are shipped. Each independent variable labeled "Relative" denotes the share of the activity in the city, relative to China overall.

	Industry		Region	
	Differentiated Manufacturing	Other, Industries	Interior Provinces	Coastal Provinces
Relative HS2 MNC presence in City	2.797 ^a (1.013)	9.526 ^a (.536)	6.669 ^a (1.995)	3.271 ^b (.773)
Relative MNC presence in City	103.50 ^a (1.979)	88.760 ^a (1.085)	615.50 ^a (24.359)	46.868 ^a (1.881)
Relative HS2 MNC export value in City	-.0366 (.404)	.405 ^b (.179)	2.896 ^a (.997)	1.079 ^a (.281)
Relative MNC export value in City	-15.718 ^a (.709)	-14.037 ^a (.315)	-160.66 ^a (40.030)	-12.402 ^a (.672)
Year Dummies	Yes	Yes	Yes	Yes
City-HS2 RE	Yes	Yes	Yes	Yes
Log likelihood	Yes	Yes	Yes	Yes
Observations	24,274	95,946	51,716	78,278

Notes: Standard Errors in (). The superscripts ^a, ^b, and ^c denote statistical significance at the 1%, 5% and 10% levels. Dependent variable is the number of new trade transactions, involving the export of an entirely new HS8 product for the city, or by expansion of the number of destinations to which existing HS8 exports are shipped. Each independent variable labeled “Relative” denotes the share of the activity in the city, relative to China overall. Differentiated Manufacturing includes HS2 codes from 80-99. Other, non-textile, is all HS2 industries between 1-79, excluding 61-65.

	(1)	(2)	(3)	(4)	(5)
	Count New Export Trans in City	Count New Product Exports in City	Count New Export Trans in Province	Count New Product Exports in Province	Value New Export Trans in Province
Relative HS2 MNC presence in City	4.241 ^a (.701)	3.449 ^d (.761)			
Relative MNC presence in City	49.171 ^a (1.420)	60.983 ^a (1.676)			
Relative HS2 MNC export value in City	.223 (.273)	-.260 (.305)			
Relative MNC export value in City	-15.684 ^a (.540)	-14.978 ^a (.618)			
Relative HS2 MNC presence in Province			.327 (.301)	-.227 (.349)	-5.608 (4.093)
Relative MNC presence in Province			11.961 ^a (.956)	11.374 ^a (1.068)	51.497 ^a (18.726)
Relative HS2 MNC export value, Province			.021 (.150)	.076 (.175)	3.050 (1.947)
Relative MNC export value, Province			-7.700 ^a (.798)	-2.428 ^a (.783)	-9.806 ^a (12.447)
Increase in MNC trade transactions - Count	.002 ^a (.000)				
Increase in MNC products Traded- Count		.035 ^a (.001)			
Province Dummies	Yes	Yes	Yes	Yes	
Year Effects	No	No	Yes	Yes	Yes
City-HS2 RE	Yes	Yes	-	-	
Province-HS2 RE	-	-	Yes	Yes	
Province-HS2 FE					Yes
Log Likelihood	-192,559	-145,470	-41,264	-32,899	
R ²					.209
Observations	129,994	129,994	16,006	16,006	16,006

Notes: Standard Errors in (). The superscripts ^a, ^b, and ^c denote statistical significance at the 1%, 5% and 10% levels. Dependent variable is the number of new trade transactions, involving the export of an entirely new HS8 product for the city, or by expansion of the number of destinations to which existing HS8 exports are shipped. Each independent variable labeled “Relative” denotes the share of the activity in the city, relative to China overall.