From Beijing to Bentonville: Do Multinational Retailers Link Markets? *

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Abstract

The world's largest retailers—Walmart, Carrefour, Tesco, and Metro—all entered China after 1995. They established hundreds of stores as well as centers for procuring goods to be sold worldwide. Multinational retailers may affect Chinese exports through two channels. First, they could inform outlets in other countries where they operate about the products offered by local Chinese suppliers, thereby enhancing bilateral exports. Second, they can augment the general capabilities of local suppliers. Chinese city-level exports to all destinations grow following the increase of multinational retailers' activities in and near the city, as predicted by the capability hypothesis.

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1 Introduction

In 2006 negotiations with the Indian government, Walmart argued that allowing it to expand its retail presence in India would lead to a subsequent increase in India's exports. The story as reported by *The Economist* (April 15, 2006) was that Walmart's outlets would procure goods within India, familiarizing local suppliers with the requirements for products to be sold in other markets. To support their case, Walmart pointed to its previous experience in China. Walmart is said to account for about 10% of all Chinese exports to the United States.[1] They might also have quoted the *People's Daily Online* (April 22, 2002), an official newspaper in China, which commented that "the direct supply of 'made in China' products to foreign chain groups had become a key channel for their entry into the global market." This paper subjects the claim of Walmart and the *People's Daily* to stringent econometric tests.

All the largest multinational retailers have established operations in China. France-based Carrefour (the second largest retailer worldwide and the largest in Europe) entered China entered first, in 1995. It was followed by US-based Walmart (the largest retailer in the world) and German-based Metro AG (fourth-ranked) in 1996. UK-based Tesco (fifth-ranked) was the last of the giant generalist retailers to enter in 1998.[2] These retailers operate stores selling products to Chinese consumers and also use China as an important global purchasing base.

We investigate whether the presence of multinational retailers increases China's exports; and if so, what mechanisms tie retailer presence to the promotion of China's exports. Two potential mechanisms are proposed and tested. First, multinational retailers could increase

[1] Fishman (2006, p. 103) reported that Walmart and its suppliers exported $18 billion to the US in 2004.

[2] Deloitte 2006 Global Retailing Powers Study provides the ranking. The fourth largest retailer Home Depot, is classified as a specialist retailer and is not included in this study.

the *bilateral* exports of a Chinese city to specific foreign countries in which the retailers operate stores. We call this mechanism the multinational retailers' "linkage effect." In addition, the presence of retailers could stimulate *multilateral* exports of a city, perhaps by raising the productivity of local suppliers. We call this mechanism the "capability effect." It predicts that Chinese cities in which multinational retailers are located increase exports to *all* destination countries, regardless of whether the destination countries host retail outlets.

This paper tests these hypotheses using export data from 35 Chinese major cities to 50 countries over the period 1997–2005. We confine the analysis to exports of retail goods because we expect the pro-trade effect of multinational retailers to be limited to the types of goods that are sold in stores such as Walmart. In addition to retail stores in China, each of the multinational retailers, i.e. Walmart, Carrefour, Metro and Tesco, has set up global procurement centers (GPC) in China. We form city-level linkage variables reflecting the number of stores and proximity to the nearest GPC.

Using standard gravity models and models with origin-destination dyadic fixed effects we test whether Chinese exports are positively related to the presence of multinational retailers. We find that the presence of multinational retailers is associated with bilateral trade above the level predicted by gravity models. Furthermore, this effect remains even after we control for dyadic fixed effects, which means that the identification of retailers' pro-trade effects comes solely from the variation of key variables within dyads over years. With regard to the multinational retailers' linkage effects, we use the stringent specification for bilateral trade suggested by Baldwin and Taglioni (2006) which includes dyadic, origin-year, and destination-year fixed effects. The positive and significant association between retailer presence and city exports disappears when we control for city-year fixed effects.

To understand why origin-year fixed effects absorb the apparent linkage effects of multinational retailers, we investigate whether retailer presence enhances a city's multilateral export capabilities. We test whether the estimated origin-year fixed effects are positively related to the origin city's proximity to global procurement centers and to the number of

retailer outlets. Controlling for the current development of a city, with origin and year fixed effects, we find that as a city's distance to global procurement centers decreases by 10%, the city's general export capability increases by 2.4%. Similarly, as the number of outlets in the city increases by 10%, the origin city's export capability increases by 2.36%.

Research on multinational retailers' impacts on international trade is growing fast. Basker and Van (2008b) derive a theoretical model and show that large retailers have stronger incentives than small retailers to import from distant, low-cost countries because large retailers enjoy economies of scale in both retailing and importing. Basker and Van (2008a) find that large US retailers have a higher marginal propensity to import relative to small US retailers for every one dollar's increase in sales. In summary, these two papers provide a theory and evidence regarding the impact of multinational retailers on the imports of retailers' home countries. In contrast with these work, our paper takes the perspective of countries hosting multinational retailers and focuses on the retailers' impact on the exports from retailers' host countries.[3]

On the retailers' impact on host countries, Javorcik and Li (2008) examine the impact of Walmart's entry on host country firm *productivity*. Their work provides direct evidence for the positive effect of Walmart on the productivity of Romanian supplying firms. The mechanisms for such productivity improvements are explained in the Javorcik, Keller, and Tybout (2008) case study about the effects of Walmart's entry on the soap, detergent and surfactant industry in Mexico. Iacovone, Javorcik, Keller, and Tybout (2009) specify those mechanisms in a dynamic industry model. One prediction of their model is that the presence of Walmart increases the productivity of the supplying industry as a whole. Our work focuses

[3]Ahn, Khandelwal, and Wei (2009) show that intermediaries, such as trading houses, reduce the fixed and variable costs faced by firms and then allow less efficient firms to be able to export through intermediaries. Their empirical analysis confirms the prediction that in tough markets, a higher proportion of exports are transacted through intermediaries. Multinational retailers, especially their GPCs, have similar functions as intermediaries in promoting Chinese products overseas.

on the impact of multinational retailers on host country *exports*, and it provides insight to *host country* policy makers about the connection between multinational retailers and local exports.

The remainder of the paper is structured as follows. The next section describes the procedures followed by Metro and Walmart when they export Chinese products to their outlets outside China and the deregulation history in China's retail market. Section 3 discusses the hypotheses based on two potential mechanisms. Specifications and key variables are explained in section 4, while data are described in section 5. Sections 6 and 7 show and discuss the econometric results. We conclude in section 8.

2 China's Retail Market

In this section, we provide some background information about China's retail market. We first present an overview of the purchasing procedures followed by Metro and Walmart in China and then describe the important elements of China's deregulation of its retail market. The deregulation history shows why the four multinational retailers chose distinct locations within China as the base of their operations, and the point from which they spread. This is one source of variation that we exploit in identifying how multinational retailer linkages affect international export development.[4]

2.1 Procurement Procedures

The export procedures of Metro and Walmart are discussed below. While there is little public information on the other two retailers, there is no strong reason to believe that their procurement practices should differ dramatically from those of Metro and Walmart.

Metro uses the Chinese domestic market as a testing ground for Chinese products to be

[4]The other source of variation is based on the fact that the four retailers have stores in different countries.

exported. "Metro AG emphasizes the quality of products. The products which have entered Metro's procurement system will be sold in Chinese regional markets first. If they sell well, the products will be sold in all stores within China. At last they will be sold globally" (Wu, 2004, p. 74). This statement suggests that the more stores Metro has in China, the more Chinese products are likely to be exported through Metro's procurement system.

Walmart Global Procurement (WMGP), established in Shenzhen in 2001, facilitates the purchase of Chinese goods by Walmart's outlets in the world. WMGP regularly looks for new products and inquires about prices.[5] After making some simple classifications, WMGP sends the information by email to the buyers of all Walmart outlets. The outlet buyers then decide what kind of products their stores may need and which should be explored in their "buying trips." This procedure is time consuming. Outlet buyers routinely meet two to three times each year in China. Before the buyers arrive in China, WMGP prepares the required samples. The staff at WMGP mark the product's price and features on the sample but cover the manufacturer's name. In other words, the outlet buyers do not know the manufacturer of samples when they make their initial purchasing decision. During the meeting, the buyers decide which products to buy. The staff at WMGP do not give the buyers much input before the buyers make decisions. Next, the buyers and the WMGP staff discuss privately the price and other details of orders. Afterwards, WMGP contacts manufacturers and starts negotiations. The outlets' buyers have little or no direct contact with manufacturers. Once the order is made, WMGP handles the logistics of the order. They check the factory to make sure there are no child workers, no excessive overtime, etc. They check product quality at least twice—once during production and once after production. In addition, WMGP contacts shipping companies such as the Maersk Line, and prepares export documents, for instance, letters of credit.

The anecdotal details from these procurement procedures suggest that Chinese local

[5]The following procedures are summarized from an article on www.jamoo.net.

suppliers could benefit from the presence of global procurement centers of multinational retailers. Local Chinese suppliers could try out their products for multiple foreign markets without paying market-specific fixed costs in advance. In addition through the interaction with global procurement centers, Chinese suppliers would learn some international standards on quality or safety issues and the general preferences of foreign consumers. All these benefits suggests that the presence of global procurement centers in China may have a positive impact on China's exports.

2.2 Deregulation of Retailing in China

The following part of this section summarizes the deregulation history in China's retail market, focusing on the regulations that caused different retailers to enter in different Chinese regions. Carrefour made the first entry of the retailers with a hypermarket[6] located in Beijing at the end of 1995. In 1996, Walmart established its first super-center in Shenzhen, while Metro opened its first cash and carry in Shanghai. Finally, Tesco entered the Chinese retail market when it set up its first store in Shanghai in 1998. It is important to understand why the retailers chose distinct entry locations in China, since location variation is a key component applied to identify the importance of retailer linkages.

Wang and Zhang (2006, p. 295) list important policy changes in the Chinese retail market, which we summarize in Table 1. Two points in the table are worth emphasizing. First, during the period 1992–1995, foreign retailers were allowed to operate in only 11 designated areas, and each area was permitted to host only one or two foreign retailers (including the retailers with headquarters in Hong Kong, Taiwan, and Macau, which were treated as foreign by the government). This restriction helps explain why Walmart, Tesco, and Carrefour chose different entry locations when they first entered China. The second important point

[6] A hypermarket or superstore is a retail self-service establishment offering a broad range of food and non-food products. (source: `http://stats.oecd.org/glossary/detail.asp?ID=6250`)

highlighted by Table 1 is the fact that majority foreign-owned joint ventures of retailer chains were only conditionally permitted from 1999 to 2004. The condition was that large quantities of domestically-made goods be exported through the retailer's distribution channels. This requirement meant that multinational retailers had another direct incentive to export Chinese products through their procurement systems—in order to obtain more freedom for their operations in the Chinese *retail* market. All these restrictions were lifted after 2005.

Table 1: Deregulation of Foreign Retailers in China's Retail Market

Restrictions	1992–1995	1995–1999	1999–2004	After 2005[3]
Geographic	6 cities and [1] 5 Special [2] Economic Zones	–	provincial capitals	lifted
Operational				
retail/wholesale	retail only	wholesale allowed	–	lifted
single/chain	single only	chain only allowed in Beijing	chain	lifted
Percentages of Goods purchased within China	$\geq 70\%$	–	–	lifted
Equity	joint venture minority stake	–	joint venture chains with majority stake as conditionally allowed	lifted
Permission	entry must be approved by both state and local governments	–	–	only local gov't permit is needed

"–" implies no regulation is changed. 1.Beijing, Shanghai, Tianjin, Guangzhou, Dalian, and Qingdao. 2. Shenzhen, Zhuhai, Shantou, Xiamen, and Hainan. 3. Since December 11, 2004.

3 Two Mechanisms

Two potential mechanisms may cause the presence of multinational retailers to increase China's exports. First, multinational retailers could increase China's exports by creating linkage connections with distant markets. The managers in multinational retailers' purchasing centers or retail stores learn about nearby Chinese suppliers and convey the information to their stores outside China when they discover attractive products. Because informa-

tion related to suppliers or products is systematically shared only with other affiliates in the retailer's global operations, this mechanism suggests that the presence of multinational retailers will increase the exports *only* for city-country dyads which are populated by same-retailer affiliates at each end. In other words, if firm-specific network linkages are important, we predict that multinational retailers will facilitate exports from Chinese cities where these retailers have stores or nearby global procurement centers, and these increased exports will only go to the countries where these retailers have established stores. Each multinational retailer creates a "strategic network" when it provides its branches or subsidiaries with access to information, and resources (Gulati and Zaheer, 2000). We call this mechanism multinational retailers' "linkage effect." According to this effect, it predicts that the presence of multinational retailers in a Chinese city increases the city's exports to the countries where the multinational retailers have stores.

A second potential mechanism by which multinational retailers increase China's exports will operate if multinational retailers stimulate the productivity growth of local Chinese suppliers thus improving the general export capabilities of the Chinese suppliers. There are several avenues by which multinational retailers could stimulate the productivity of local suppliers. As Javorcik et al. (2008) and Javorcik and Li (2008) emphasize, the entry of multinational retailers is likely to increase the competitive pressures facing suppliers in host countries. This is generally true, since multinational retailers often have more bargaining power relative to other retailers in host countries. When multinational retailers require suppliers to lower prices or/and improve products, high-cost suppliers are driven out of the market, while suppliers that remain in operation improve their productivity by labor-shedding and innovation. As suggested by Javorcik and Li (2008) the entry of multinational retailers may further increase the productivity of suppliers, if the entry of multinational retailers introduces advanced retail technologies and international management practices. Local firm productivity is enhanced by this mechanism if suppliers reallocate their savings in distribution costs to production. The third channel for local supplier productivity increases comes

into play if the activities associated with the multinational retailer allows local suppliers to achieve economies of scale. Each of these points support the argument that the presence of multinational retailers increases the productivity of local Chinese suppliers.

Iacovone et al. (2009) formalize the previous ideas and present a dynamic industry model. One of its mechanism is that suppliers with high productivity choose to sell their products through Walmart, and the low productivity ones keep selling products through traditional retailers. This difference is driven by the fact that only suppliers with relatively high productivity find it attractive to sell through Walmart because the large market share and potential efficiency gain from dealing with Walmart can outweigh the profit lose squeezed by Walmart. Once Walmart starts selling the product in local market, Walmart changes the price menu faced by *all* existing suppliers. The retail prices of the product drop in the local market. In the end, low productivity suppliers have to exit, and the overall productivity of the industry increases.

Several economic mechanisms suggest that the presence of multinational retailers could have a pro-productivity effect. When the productivity of suppliers is improved, we anticipate that a city will increase its exports to all destination countries, independent of the number of stores of the multinational retailer that the destination country hosts. Hence, we propose the capability effect, which is that the presence of multinational retailers in a Chinese city increases the city's exports to *all* countries.

There is another channel through which the presence of multinational retailers could increase the exports of a city to *all* destination countries. As the large multinational retailers purchase goods from China, firms in other foreign countries become aware that Chinese suppliers could produce high quality goods at reasonable prices and also start importing them from China. The awareness of Chinese firms' productivities is improved. For convenience, we regard this mechanism as a part of the "capability effect" in this paper.

4 Estimation Strategies

In this section, we discuss the empirical methods we use to test the linkage and capability effects. For each of these effects, we discuss the regression specification and key variables formed by multinational retailers.

4.1 Method for Testing Linkage Effects

We use the gravity equation for bilateral trade as the empirical framework for testing for linkage effects. Baldwin and Taglioni (2006) summarize the theory underlying the gravity model and show that the log of exports from origin o to destination d is given by

$$\ln V_{od,t} = \ln Y_{o,t} - \ln \Omega_{o,t} + \ln E_{d,t} + (\sigma - 1) \ln P_{d,t} - (\sigma - 1) \ln \tau_{od,t}, \tag{1}$$

where V is the value of exports, τ refers to trade costs, and σ is the elasticity of substitution among varieties in the CES utility function. Y_o is the exporting country's production output of traded goods. E_d is the importing country's expenditure on traded goods. P_d is country d's CES price index. The term $\Omega_o = \Sigma \left(\tau_{od}^{1-\sigma} \frac{E_d}{P_d^{1-\sigma}} \right)$ is thought of by Baldwin and Taglioni as an index of the exporter's openness.

Equation 1 decomposes log bilateral exports into three components. The first component, $\ln Y_{o,t} - \ln \Omega_{o,t}$, is origin-year specific. The second component, $\ln E_{d,t} + (\sigma - 1) \ln P_{d,t}$, is destination-year specific. The last component, $(\sigma - 1) \ln \tau_{od,t}$, is a time-varying dyadic term. Standard gravity equations model the origin and destination effects with the GDPs and per capita incomes of the origin and destination countries. Thus, they omit the Ω and P terms. These terms, often referred to as "remoteness" before Anderson and van Wincoop (2003) labelled them "multilateral resistance", depend on the Y and E of *all other countries*, discounted by trade costs. The omission of these terms can lead to inconsistency in the estimates of the included right-hand side variables because it is likely that the multilateral resistance terms are correlated with GDP and trade cost measures.

The final term in equation 1 encompasses two distinct factors. The first is the time-invariant trade costs between the origin and destination. The other is the time-varying costs. In this paper, part of the *time-varying* cost is related to the linkage effect. The other time-varying cost will be absorbed by the error term. In the standard gravity equation, distance is always used as a proxy for trade costs. Most studies add other proxies such as dummies for common languages and a prior colonial relationship. Since the list of potential proxies is a long one and few are well-measured, a more appealing approach is to allow for dyadic fixed effect. We embed our linkage hypothesis within the specification in terms of origin-year, destination-year, and dyadic fixed effects, as advocated by Baldwin and Taglioni (2006).

$$\ln X_{odt} = \alpha_{ot} + \beta_{dt} + \delta_{od} + \lambda L_{odt} + \varepsilon_{odt} \tag{2}$$

o : origin $\qquad$ d : destination $\qquad$ t : year

X_{odt} is the total exports value from origin o to destination d in year t. α_{ot} and β_{dt} represent origin-year and destination-year fixed effects, respectively. δ_{od} controls for dyadic fixed effects. L_{odt} is the linkage variable formed by multinational retailers. Its construction method is explained later in this subsection. The technical problems associated with this specification are discussed in our online supplementary materials. The unit of analysis is at the origin-destination-year level. The coefficient we are interested in is λ, i.e. the effect of multinational retailers on the total export value of retail goods. We expect λ to be significantly positive if multinational retailers increase Chinese retail goods exports via their linkage effects.

Two linkage variables are constructed to proxy for the linkages generated by the four multinational retailers. One linkage variable is primarily based on locations of the four retailers' global procurement centers in China; the other is based on retailers' store counts.

As mentioned in section 2, we speculate that retailers' procuring and retailing systems may both have positive effects on Chinese regional exports.

The functional forms of these two linkage variables depends on the way in which global procurement centers and stores connect distant markets. GPCs scour cities in their regions for product ideas. Search and communication costs impede the transfer of lists from city o to its nearest global procurement center. With s_o items available for each city, the proportion of the list that is successfully transmitted to its nearest global procurement centers decreases in the distance D_o from city o to the GPC with the standard functional form for distance costs found in gravity equations,[7] which is $\frac{s_o}{D_o}$. Suppose the probability for each item being chosen is $\pi \in [0,\ 1]$ and the number of stores of retailer r in country d is n_{dr}, then the total number of items produced in city o and expected to be picked up in country d equals $s_o\pi \sum_r \frac{n_{dr}}{D_{or}}$.

Stores also bring product lists to their stores overseas. As before, the probability for each item being chosen by a store is assumed to be π, and n_{dr} stores of retailer r are assumed to be located in country d. Then $s_o\pi n_{dr}$ items proposed by a single store are expected to be picked up in country d. If there are n_{or} stores in city o and the product lists are non-overlapping, the total expected number of items produced in city o that are picked up by retailer r' stores in country d is $s_o\pi n_{dr}n_{or}$. Summing over the retailers, we could have $s_o\pi \sum_r n_{dr}n_{or}$.

In order to apply these measures to the data, three issues need considering. First, the assumption of non-overlapping lists is unrealistic, and some products would be chosen in the absence of any stores. We incorporate these ideas by adding 1 and raising the sum to a power that is presumably less than one to reflect diminishing returns that would arise from redundant lists. Then the numbers of products linked by global procurement centers and stores are $(1 + s_o\pi \sum_r \frac{n_{dr}}{D_{or}})^{\zeta}$ and $(1 + s_o\pi \sum_r n_{dr}n_{or})^{\eta}$ respectively. Second, when we apply these two measures to panel data, s_o enters time-invariant city fixed effects and π is co-linear with the constant term. Then these two expressions become $\ln(1 + \sum_r \frac{n_{dr}}{D_{or}})$ and

[7]Refer to Disdier and Head (2008)

$\ln(1+\sum_r n_{dr}n_{or})$. Third, it takes time for procurement centers and stores to show their full strength in the customs records, and lagged measures are appropriate. Take Walmart's procurement centers as an example. Before signing contracts, Walmart's procurement centers need to accumulate manufacturers' information, send the product list to the buyers in overseas stores, get their feedback, and arrange business trips. A spokeswoman with Carrefour China revealed that "it usually takes us half a year, even a year, to clinch a deal."[8] After the contracts have been signed, manufacturers also need time to manufacture the products. There is a time gap between the date the global procurement center or store is set up and the time when the first shipment of goods arrives at customs. In empirical tests, we apply lagged one period measures of retailers' presence in China to generate the linkages formed by the four retailers.[9]

We construct the linkage variable based on global procurement centers as

$$\text{GPC}_{odt} = \ln\left(1+\sum_{r=1}^{4}\frac{n_{drt}}{D_{or,t-1}}\right).$$

The letter r denotes a retailer. Then n_{drt} refers to the number of stores that retailer r has in country d in year t. $D_{or,t-1}$ is the geographic distance from the city o to its nearest global procurement center of retailer r in the previous year.[10] GPC_{odt} increases when the store count of a retailer in the destination country increases, or the distance from the city to the nearest global procurement center of any one of the four retailers decreases.[11]

[8] www.chinadaily.com.cn, October 14, 2006.

[9] We also test the lagged two or three period key variables since it may take procurement centers or stores longer to affect the data at customs. Related results are shown in the online supplementary materials.

[10] When a city has a global procurement center in town, the total area of the city is applied to calculate the inner distance following the formula of $D = 0.376*(\text{Area in sqm})^{\frac{1}{2}}$.

[11] In the construction of GPC_{odt}, we neglect all the other global procurement centers that a city could

The the linkage variable constructed according to the number of retail stores is

$$\mathrm{RS}_{odt} = \ln\left(1 + \sum_{r=1}^{4} n_{drt} n_{or,t-1}\right).$$

The letter $n_{or,t-1}$ represent the number of stores of retailer r in origin city o in the previous year, and n_{drt} is the number of stores of retailer r in destination country d in year t.

In the two linkage variables above, only the denominators take lagged values. The motive for such a construction is the trade-off between limitations of data and sample size. The worldwide store distribution of the four multinational retailers provides data only back to 1996. As we take the lagged measure of key variables, our sample size shrinks. It not only reduces the efficiency of the estimates but also makes the estimates not comparable over time. Meanwhile, it seems to be common sense that stores need to purchase products before they start operation, so the number of stores set to open could also affect the link formed by multinational retailers. It is worth mentioning that when the origin and destination parts both take lagged values, the estimation results are similar.

4.2 Method for Testing Capability Effects

In the second half of this paper, we investigate the alternative mechanism through which multinational retailers increase China's exports. The specific mechanism tested is whether multinational retailers increase China's exports by increasing Chinese cities' *general* export capabilities.

We take the following procedures to test this effect. We first run specification (2). We extract the estimated coefficients for each city-year dummy, i.e. $\hat{\alpha}_{ot}$, and then take them as a measure of cities' time-varying export capabilities. Each city-year coefficient thus becomes a

reach except the nearest one. Another measure, i.e. $SGPC_{odt}$ is constructed, which increases when a new procurement center is set up. Its construction formula and estimation results are shown in our online supplementary materials.

unit of observation.[12] In the regressions, we control for city, year fixed effects, and other time-varying city-level variables, i.e. gross value of industrial output per capita and population.

The general export capability could be influenced by a city's access to global procurement centers and the number of retail stores in the city. A city's access to GPCs is defined as:

$$\text{cityGPC}_{ot} = \ln\left(\sum_{r=1}^{4} \frac{1}{D_{ort}}\right),$$

where D_{ort} refers to the distance from city o to the nearest GPC of retailer r. The number of multinational retailers' stores available in a city is the sum of stores of the four retailers in the city. It is defined as

$$\text{cityRS}_{ot} = \ln\left(1 + \sum_{r=1}^{4} n_{ort}\right),$$

in which n_{ort} is the number of stores of retailer r in city o in year t. These two key variables are different from the ones used in the previous linkage effect test. Retailers' stores outside China are absent.

In order to test the capability effect, the following specification is applied:

$$\begin{aligned}\hat{\alpha}_{ot} =& \theta + \gamma \text{cityGPC}_{o,t-1} + \eta \text{cityRS}_{o,t-1} + \zeta \ln \text{pop}_{ot} \\ &+ \iota \ln \text{gviopa}_{ot} + \phi_o + \phi_t + \epsilon_{ot}\end{aligned} \tag{3}$$

The dependent variable $\hat{\alpha}_{ot}$ is the estimated coefficients of city-year dummies from the linkage effect estimation. To be consistent with the previous estimation, cityGPC and cityRS are

[12] In a robustness test following the suggestions of Saxonhouse (1976), we extract estimated standard errors of the coefficients as well and take their inverses as the weights in the regressions. The observations with higher variance are then given lower weights. The estimation results are shown in our online supplementary materials.

lagged by one period. The population and gross value of industrial output per capita of cities are represented by pop_{ot} and gviopa_{ot}, respectively. The origin fixed effect is captured by ϕ_o, and ϕ_t controls for the year fixed effect. The idiosyncratic error term is represented by ϵ_{ot}.

5 Data

In order to generate the key variables formed by the four multinational retailers, three data sets are combined: the four retailers' store distribution in China, stores' distribution over the world, and the distribution of global procurement centers in China.

The worldwide store distributions of the four multinational retailers are summarized from these retailers' annual financial reports. Each retailer usually has multiple formats of stores in operation. In addition to the main format, stores that carry the widest range of goods, the four retailers also have specialist stores, such as electronics stores, apparel stores, etc. This paper focuses on the stores of the main format. The reasons are that the goods sold in the specialist stores differ from those sold in the typical stores, and the sales areas in the main format stores are usually much larger than those of the other formats.[13] The main formats for the retailers are as follows: Carrefour—hypermarket; Metro—cash and carries; and Walmart—super-center and Sam's club. Tesco does not have a clear classification of the formats of stores. In their financial reports, only the total number of stores is consistently reported.

Four retailers' store distribution in China are collected from a Chinese web site—linkshop.[14]

[13]This is especially true for a large number of convenience stores via which those retailers reach the consumers in catchment areas.

[14]http://www.linkshop.com.cn/index.htm

It lists the opening date and location of each store of these four retailers.[15] Carrefour, Metro, and Walmart usually only operate their main formats of stores in China.[16] We also collected the information on the four retailers' global procurement centers in China. This data set is based on a comprehensive summary of reports in the media, whether in Chinese or English. The sources of this data is available in our online supplementary materials. We classify the GPCs established July or later as occurring in the subsequent year.

The exports data are based on Chinese exports of products at HS4 level, reported in the Customs General Adminstration of the People's Republic of China over the period 1997–2005. This data set was used under the license to the Center for International Data at the University of California, Davis. The information on the origin cities and destination countries are included. We determine the set of retail goods by classifying each HS4 (harmonized classification of goods by 4-digit codes) based on whether it corresponds to a good typically available at a Walmart store. We then sum the export values of all the HS4 designated as retail goods. The data sources of control variables are shown in the data appendix.

Over the period 1995–2006, average city exports of retail goods keep increasing. In the meantime, multinational retailers increasingly expanded their operation in mainland China. The two panels in figure 1 illustrates the operation of the four retailers in 1996 and 2005, respectively. In 1996, the four retailers concentrate in the three large cities in China—Beijing, Shanghai, and Shenzhen. In 2005, these retailers have opened their stores in second-tier

[15]This data contains measurement errors because some stores must have been closed; however, we do not know which specific stores have been closed. The difference between the store numbers in China reported in retailers' financial reports and the sum of all opened stores increases over time. The number of stores recorded in retailers' financial reports does not provide enough information given our identification strategy. We need to know the specific city in which a store is set up.

[16]There is an exception. Walmart has opened a few neighborhood stores in Guangdong province in very recent years.

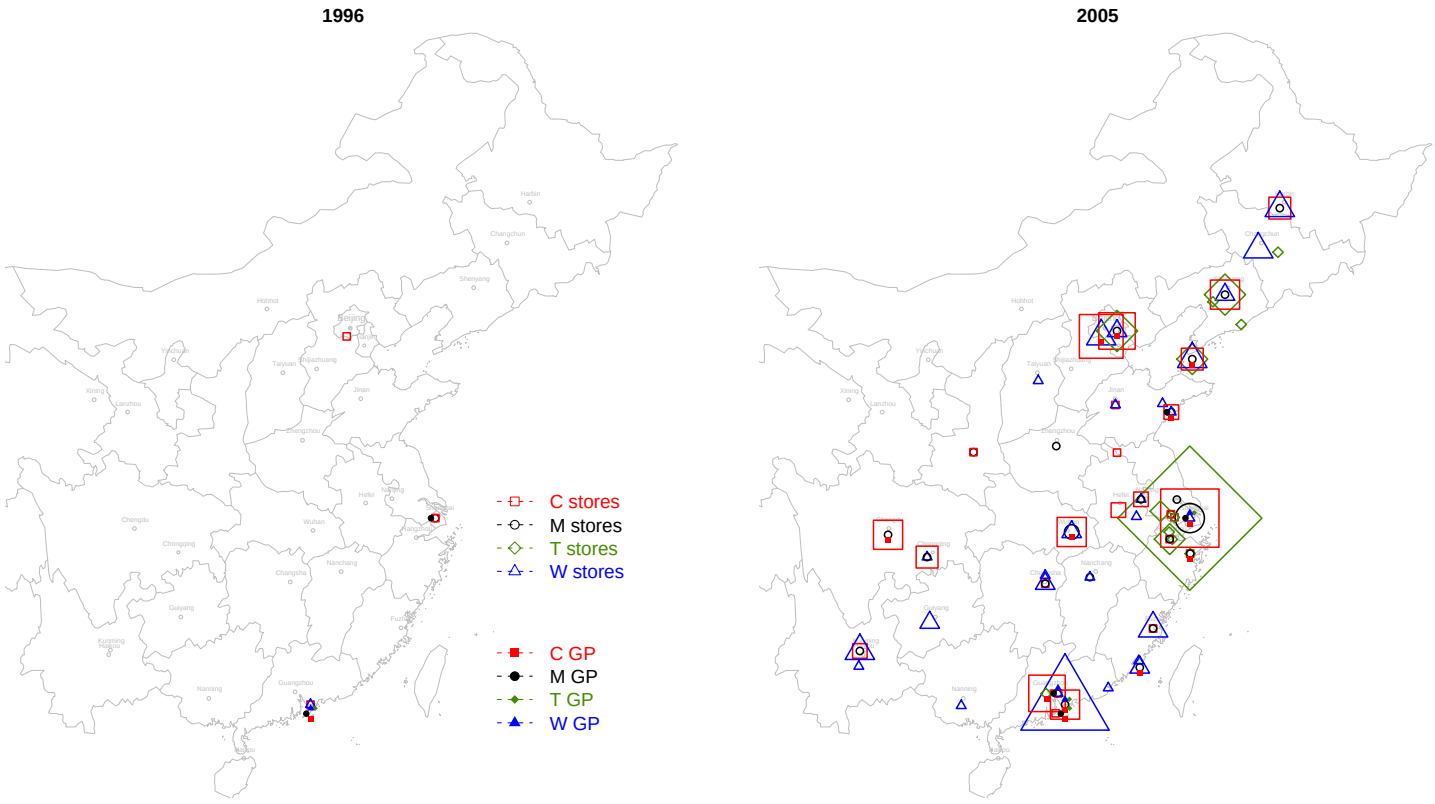

Figure 1: Operations of The Four Multinational Retailers in China

cities, and their procurement centers are present in more inner land cities. These expansions greatly reduce the distances from major Chinese cities to the global procurement centers of the four retailers.

In figure 2, we show how Chinese cities' proximity to global procurement centers,[17] the number of retailer stores,[18] and average city exports of retail goods have grown over time. Each series is expressed as an index relative to its 1997 value (set equal to 100). It shows that over the nine years, Chinese cities' exports are positively associated with the presence of multinational retailers in China.

[17]It is measured by $\sum_{r=1}^{4} \frac{1}{D_{ort}}$.

[18]It is measured by $\sum_{r=1}^{4} n_{ort}$.

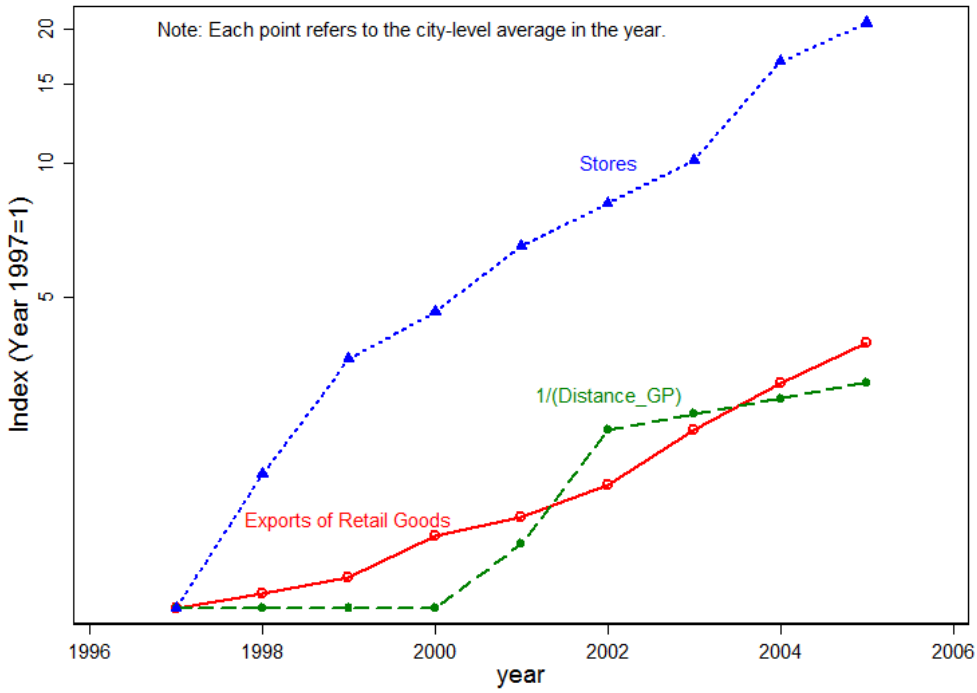

Figure 2: City Trend

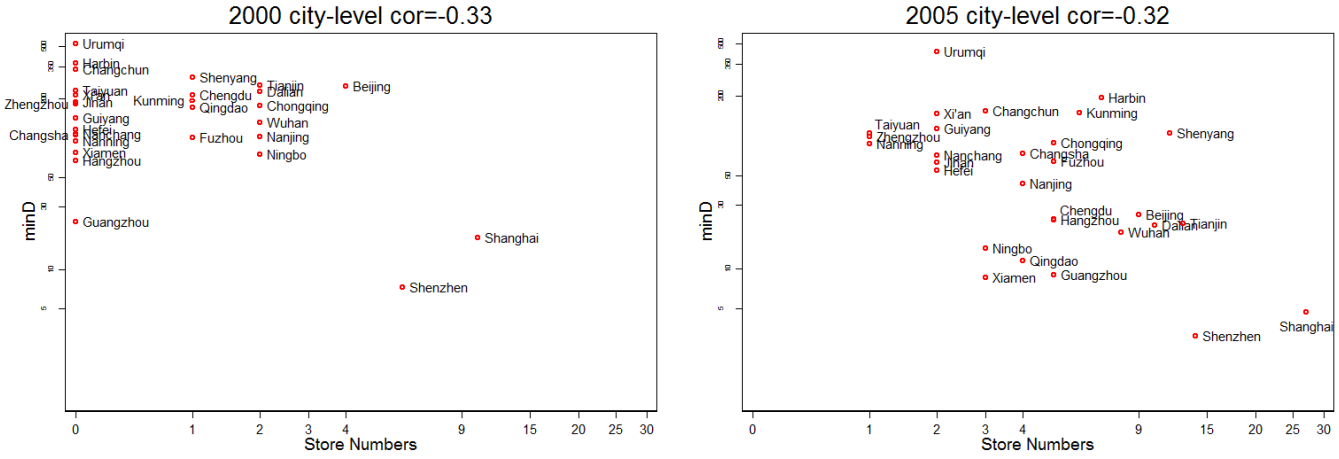

Figure 3: Correlations between Global Procurement Centers and Retail Stores in China

Before turning to the empirical results, we also check the correlation between our two key variables. Our two linkage variables share a common part, which is the number of stores outside China. The simple correlation between GPC_{odt} and RS_{odt} over all years is 0.208. The correlations between cityGP_{ot} and cityRS_{ot} is 0.639. Figure 3 shows the correlations between cityRS_{ot} and the inverse of cityGP_{ot} denoted by minD. Each point in the figure refers to a city in China with the city's name beside the point. In the figure, the left one refers to the data in 2000, and the right one describes the situation in 2005. Both of them show that these two key variables are not highly correlated, which alleviates the concern about collinearity. Figure 3 also shows that as time elapses, the plots shift to the right and downwards, which implies that cites have more stores in town and become closer to procurement centers.

6 Linkage Effect Test

In this section, we investigate whether multinational retailers increase China's exports of retail goods by creating global linkages connecting distant markets. We test this effect on Chinese city-level exports and find that multinational retailers do *not* increase cities' exports to the countries where the retailers have outlets *in particular*.

Table 2 reports the results for GPC_{odt} and RS_{odt}.[19] We start with the basic gravity model and then gradually relax the assumptions on the unobserved heterogeneities of origins, destinations, and dyads. Our preferred specification (2) is shown in the last column of Table 2.

Table 2 begins with the simple gravity model. All variables of standard gravity models

[19]We have also run the regressions using the lagged two ($\text{GPC}_{od,t-1}$ and $\text{RS}_{od,t-1}$) or three period ($\text{GPC}_{od,t-2}$ and $\text{RS}_{od,t-2}$) measures of key variables since it might take global procurement centers or retail stores some time to affect the data at customs. The estimates of key variables become larger in magnitude than the corresponding coefficients in Table 2, before we control for city-year fixed effects. However, the results exhibit exactly the same pattern as Table 2.

Table 2: Linkage Effects Test, City-level

	(1)	(2)	(3)	(4)	(5)
Fixed effects controlled	t	t country city	t dyadic	dyadic country-t	dyadic country-t city-t
GPC_{odt}	0.250^a	0.229^a	0.139^a	0.400^a	-0.0705
	(0.0615)	(0.0489)	(0.0392)	(0.0526)	(0.0643)
RS_{odt}	0.00115	0.0260^b	0.0277^a	0.0495^a	0.0121
	(0.0156)	(0.0113)	(0.00978)	(0.0100)	(0.0122)
$\ln(\text{gviopa}_{ot})$	1.380^a	0.225^a	0.224^a	0.181^a	
	(0.0442)	(0.0408)	(0.0394)	(0.0391)	
$\ln(\text{pop}_{ot})$	0.901^a	-0.384^a	-0.398^a	-0.321^a	
	(0.0425)	(0.125)	(0.125)	(0.117)	
$\ln(\text{gdppa}_{dt})$	0.936^a	1.026^a	1.064^a		
	(0.0252)	(0.0881)	(0.0848)		
$\ln(\text{pop}_{dt})$	0.918^a	2.479^a	2.977^a		
	(0.0293)	(0.734)	(0.731)		
$\ln(\text{extD}_{od})$	-0.802^a	-0.916^a			
	(0.0463)	(0.119)			
$\ln(\text{intD}_{od})$	-0.386^a				
	(0.0254)				
Constant	-31.00^a	1.158	-9.541^a	10.29^a	14.60^a
	(1.478)	(3.408)	(2.841)	(1.272)	(0.121)
N	14022	14022	14022	14141	14141
R^2	0.661	0.820	0.156	0.244	0.305
groups			1714	1716	1716
S.E of u_i			3.537	2.941	3.592
S.E.of e_{it}			0.915	0.880	0.854
RMSE	1.609	1.174	0.857	0.823	0.798

Note: Robust standard errors in parentheses are clustered at the dyadic level with ^{a}, ^{b}, and ^{c} respectively denoting significance at the 1%, 5% and 10% levels.

enter with the expected signs and magnitudes. In this regression, two variables differ from a traditional gravity model—intD$_{ot}$ and gviopa$_{ot}$, and need some explanation. The Chinese "open door policy" mainly takes effect in coastal cities, so the distance to the nearest port is an important factor for a city's exports, and it should be included in the specification. Instead of using GDP per capita, we use the gross value of industrial output per capita i.e. gviopa$_{ot}$ because of data availability. The gross value of industrial output, by definition, includes the value of intermediate goods. Since almost half of Chinese exports are processing trade, the variable gvio$_{ot}$ captures the effect of the origin city's economic mass on exports more accurately.[20] Column 1 in Table 2 shows that GPC$_{odt}$ is positively associated with a city's exports of retail goods. The coefficient of GPC equals 0.250. This shows that exports of retail goods increase by 2.5% as GPC linkage increases by 10%. In this specification, stores do not appear to have a significant and positive effect on the exports of retail goods.

In column 2 of Table 2, we add city and country fixed effects. These two sets of fixed effects control for the time-invariant unobserved features at the city and country levels, respectively. They also incorporate the permanent component of multilateral resistance terms. Results in column 2 shows that the coefficient of GPC$_{odt}$ falls very slightly to 0.229 and remains significant at the 1% level. Disdier and Head (2008) report the mean effect of distance on trade is -0.9. In this regression, the coefficient of extD$_{od}$ equals -0.916, which is consistent with the previous study. In column 3 of Table 2, we apply dyadic fixed effects. This set of fixed effects controls for not only the features captured in column 2 but also the unobserved permanent dyadic features, such as geographic distance, common border, etc. Our global procurement center linkage variable, must be correlated with these dyadic features. Without controlling for these features, the estimated coefficients will be

[20] Andreas Freytag states that "[...]the share of processing trade in China's export appears to have grown over the last decades from 47 percent in 1992 to 55 percent in 2005." (http://www.voxeu.org/index.php?q=node/1150, accessed in September 2008.)

inconsistent. After we control for the dyadic fixed effects, we identify the effects of GPC_{odt} based only on its variation within the dyad over time. We find that a 10% increase in GPC leads to a 1.39% increase in the exports of retail goods. The first three columns of Table 2 show that global procurement centers are positively associated with bilateral trade above the level predicted by both the standard gravity and dyadic fixed effects models.

In columns 4 and 5 of Table 2, we include the city-year and country-year fixed effects, which capture the time-varying components of the multilateral resistance terms and relax the assumption that cities have the same unobserved features over time. Column 4 gives the estimation result when only the country-year fixed effects are included. The coefficient of GPC_{odt} is significant, and its magnitude becomes even larger. The estimation result of our preferred specification (2) is shown in column 5, which controls for both city-year and country-year fixed effects. Once we add city-year fixed effects, the coefficient of GPC_{odt} is largely reduced in magnitude and becomes statistically insignificant.[21] RS_{odt} exhibits the same pattern. It is significantly positive in columns 2 to 4 in Table 2, and it becomes insignificant in the last column. In summary, the results in Table 2 indicate that linkage effects are not the working mechanism through which multinational retailers increase China's exports.[22]

The large decrease of the two key variables' coefficients in magnitude and the striking

[21] In order to make sure our insignificant results are not driven by the construction method of GPC_{odt}, we construct another measure, i.e. SGPC_{odt}, which captures a city's exposure to *all* procurement centers in China. Results using SGPC_{odt} are shown in the online supplementary materials. As expected, the signs and significant levels are same to the ones with GPC_{odt}. Once we control for city-year fixed effects, the significant and positive coefficient associated with SGPC_{odt} disappears.

[22] We re-estimate the regressions on the province-level data which includes the exports from *all* provinces in China. Compared with the city-level data which comprises only 35 major Chinese cities, province-level export data is more comprehensive. Estimation results shown in the online supplementary material exhibit the same pattern as the one at the city level. Once the province-year fixed effects are controlled for, the significant and positive coefficients of GPC_{odt} and RS_{odt} disappear.

change of signs in the last column give a clear implication that city-level time-varying unobserved features create the significantly positive associations shown in the first four columns of Table 2. These city-level unobserved features could be explained as cities' recent development in their export capabilities on retail goods. This unobserved feature increases a city's exports to *all* countries rather than *only* to the countries where the multinational retailers have retail stores.

7 Capability Effect Test

In the previous section, we demonstrate that linkage effects do *not* appear to be the main working mechanism. All sets of regressions studied[23] show that once we control for the origin-year fixed effects, the significant and positive coefficients of GPC_{odt} and RS_{odt} disappear. This recurring evolution of the coefficients gives us a strong hint, which is that the origin time-varying unobserved features play a key role in the positive associations shown above. In this section, we directly test whether the presence of multinational retailers in China increases Chinese cities' time-varying unobserved features. In other words, we test whether the presence of multinational retailers in a Chinese city improves the city's general export capabilities.

As discussed in section 2, specification (3) is applied to test whether being close to multinational retailers' global procurement centers or having a large number of retail stores in the city, increases the city's general export capabilities. The general export capability is estimated with the city-year dummies from specification (2). The closeness of a city to retailers' global procurement centers is measured by $\text{cityGPC}_{o,t-1}$ and the concentration of

[23]Besides the regressions in Table 2, we have also tested the linkage effect with an alternative measure for GPC, or on province-level data set.

retail stores is denoted by cityRS$_{o,t-1}$.[24]

In testing the capability effects, GDP per capita, population, city fixed effects, and year fixed effects are controlled for in order to alleviate the endogeneity concern associated with location choice decisions. When retailers choose cities to set up stores, they usually look for places with high disposable income and large population of middle class. GDP per capita and population also have strong impacts on cities' exports. In the absence of GDP per capita and population, even if we find a significantly positive coefficient for cityRS$_{ot}$, it cannot be taken as evidence for multinational retailers' capability effect. When multinational retailers search locations for their global procurement centers, they look for places with strong export capabilities. City fixed effects capture the time-invariant city-level unobserved heterogeneities. They may involve local transportation and logistic systems, government preferential policies towards foreign direct investments and exports, consumption habits of local consumers, etc. The policy changes affecting all Chinese cities are absorbed by year effects.

Because the dependent variable in this section takes the estimated parameters of city-year dummies from the linkage effect test, the data set used here has a unique structure. In specification (2), the total number of city-year dummies that can be estimated is $N_o \cdot (t-1)$ rather than $N_o \cdot t$. This difference is resulted from a perfect collinearity problem between city-year and dyadic fixed effects. Our online supplementary materials demonstrate this issue with a simple example.[25] For each city, after demeaning city-year dummies for each dyad, the sum of those demeaned city-year dummies *for each city over all years* are zero vectors. This explains why STATA usually drops *some* city-year dummies automatically

[24]In a robustness test, we run the same regressions on the province-level data. These two variables are constructed correspondingly.

[25]There are another two sets of perfect collinearity problems embedded in specification (2).

when we follow the standard method and set only the first city-year dummy as default. In order to replicate the results obtained by letting STATA decide which dummies to drop, and fully control the city-year dummies estimated, we must drop one city-*year* dummy for each *city*. In the following regressions, we set the earliest city-year dummy of each city as default. Therefore, in total, 280 (35*(9-1)=280) city-year dummies are estimated in specification (2). In the following analysis, zeros are plugged in as the estimated parameters of the 35 *first year* of city-year dummies since they are taken as default groups.[26]

Table 3 contains the estimation results of capability effects at the city level. The first three columns show the impacts of lagged one, two, and three period measures respectively on the general export capabilities. In order to alleviate the concern about autocorrelation, column 4 shows the estimates after controlling for the contemporaneous measures of cityGPC and cityRS. In the last column, future cityGPC and cityRS are plugged in to test whether the significant and positive coefficients shown in the first four columns are driven by multinational retailers locating their stores or procurement centers in the cities with high export *potentials*. Over the five columns, we focus on the coefficients of lagged cityGPC and cityRS because lagged measures are pre-determined with regard to general export capabilities, which largely simplifies the explanation of results. It is hard to imagine that current export capabilities could attract retailers' entries two or three years ago unless the entry decision is based on the predictions of each city's export potentials.

The estimation results in the first three columns of Table 3 show that proximity to global procurement centers has a significantly positive effect on the general export capabilities of cities, and this effect becomes stronger as time goes by. The same arguments also apply to the presence of retail stores. In column 1, $\text{cityGPC}_{o,t-1}$ is significantly positive, which provides direct evidence for the statement that city time-varying effects absorb the positive

[26]In a robustness test with estimated standard errors as weights, only the 280 coefficients estimated are utilized.

Table 3: Capability Effect Robustness Tests, City, Unweighted

	(1)	(2)	(3)	(4)	(5)
Lagged t	t=1	t=2	t=3	All	With F.1
$\text{cityGPC}_{o,t-1}$	0.253[a]			-0.026	-0.032
	(0.083)			(0.058)	(0.061)
$\text{cityRS}_{o,t-1}$	0.102			-0.113[b]	-0.154[c]
	(0.074)			(0.056)	(0.079)
$\text{cityGPC}_{o,t-2}$		0.268[a]		0.085	0.147[b]
		(0.091)		(0.064)	(0.062)
$\text{cityRS}_{o,t-2}$		0.203[b]		0.048	0.119
		(0.081)		(0.071)	(0.072)
$\text{cityGPC}_{o,t-3}$			0.270[a]	0.179[a]	0.294[b]
			(0.081)	(0.060)	(0.130)
$\text{cityRS}_{o,t-3}$			0.255[a]	0.184[b]	0.090
			(0.081)	(0.069)	(0.064)
cityGPC_{ot}				0.173[a]	0.097
				(0.057)	(0.075)
cityRS_{ot}				0.118	0.051
				(0.070)	(0.070)
$\text{cityGPC}_{o,t+1}$					0.085
					(0.060)
$\text{cityRS}_{o,t+1}$					0.030
					(0.068)
$\ln(\text{pop}_{ot})$	-0.292	-0.271	-0.309[c]	-0.130	-0.135
	(0.218)	(0.204)	(0.178)	(0.205)	(0.202)
$\ln(\text{gviopa}_{ot})$	0.154[b]	0.136[c]	0.073	0.058	0.057
	(0.072)	(0.074)	(0.099)	(0.080)	(0.073)
Constant	0.593	0.818	2.125	1.943	2.912[b]
	(1.224)	(1.175)	(1.495)	(1.430)	(1.406)
N	315	315	315	315	280
$Within R^2$	0.870	0.876	0.880	0.890	0.875
RMSE	0.241	0.236	0.231	0.224	0.207

Note: Robust standard errors in parentheses are clustered at the city level with [a], [b], and [c] respectively denoting significance at the 1%, 5% and 10% levels. City and year fixed effects are both controlled.

impacts of multinational retailers on exports. The results in column 3 show that after global procurement centers have been operating for three years, as cityGPC increases by 10%, the general export capability increases by 2.7%; as cityRS increases by 10%, the general export capability increases by 2.55%.

In the fourth column of Table 3, contemporaneous cityGPC$_{ot}$ and cityRS$_{ot}$ are included. It helps to confirm previous results are not driven by reverse causation and time-series correlations. Cities with high general export capabilities could attract multinational retailers to set up global procurement centers and retail stores there. Meanwhile, the lagged measures of key variables are highly correlated with their contemporaneous measures. Without controlling for contemporaneous variables, the significant results shown in the first three columns could just pick up the strong correlation between the contemporaneous measures and the dependant variable, which can be driven by reverse causation. The results in column 4 show that this argument is not a big concern. The lagged three period cityGPC and cityRS are significant even though contemporaneous cityGPC are significant as well. Since the changes of retailers' presence occurring prior to the changes in cities' export capabilities, this result gives us some reason to believe the effect could be causal.

Before claiming multinational retailers have a directly causal effect on cities' general export capabilities, it is important to show that the previous results are not driven by retailers locating their stores or procurement centers according to cities' export *potentials*.[27] Large multinational retailers are sophisticated and experienced. They are able to predict which Chinese cities will probably have big jumps in their export capabilities in the next a few years. When they choose cities, their decisions are based on not only a city's present features, such as GDP per capita, but also a city's export potential. In other words, since the

[27]This forward-looking story should not be a serious concern in our analysis. One conceptual reason is that if it plays an important role, multinational retailers are expected to locate their procurement centers or stores in same cities. However in fact, the stores and procurement centers are widely distributed in China.

variations of cityGPC and cityRS heavily depend on retailers' locations, the key variables could be positively correlated with error terms in future periods. Under this circumstance, fixed effect estimates are inconsistent.

In the last column of Table 3, we implement a "strict exogeneity test", which is discussed in Wooldridge (2002, p. 285). To do it, we add in future measures of cityGPC and cityRS. If cityGPC and cityRS are strictly exogenous to export capabilities, $\text{cityGPC}_{o,t+1}$ and $\text{cityRS}_{o,t+1}$ should be *insignificant*. In column 5 of Table 3, neither the coefficient of $\text{cityGPC}_{o,t+1}$ or $\text{cityRS}_{o,t+1}$ is statistically significant, and the p-value of the F-test for these two variables is 0.339. These results suggest that the forward-looking story is not supported by the data. The total average treatment effect equals the sum of cityGPC and cityRS's coefficients in all periods other than the future measures. Its magnitude is 4.265, and the p-value of its F-test is 0.001.[28]

In summary, this section provides good evidence for multinational retailers' capability effects. It supports the hypothesis that the presence of multinational retailers increase China's exports via improving the general export capabilities of Chinese cities.[29]

[28]In order to make sure our results is not driven by the inefficiency associated with the estimated coefficients as dependent variable, following Saxonhouse (1976), we take $1/s.e.(\widehat{\alpha_{ot}})^2$ as the weight and re-run the regressions. Results are shown in the online supplementary materials, and they confirm our previous findings. The magnitudes of the coefficients are close to the estimates in Table 3, and lagged cityGPC and cityRS are significant at the 5% level.

[29]We also conduct the same analysis of Table 3 on province-level data since province-level export data is more comprehensive. The dependent variable takes the coefficients of province-year dummies estimated from specification 2. The results corroborate the findings at the city level. After global procurement centers have been operating for three years, as $\text{provGPC}_{o,t-3}$ increases by 10%, the general export capability increases by 1.41%. After the stores have been operating for three years, a 10% increase in $\text{provRS}_{o,t-3}$ induces a 1.91% increase in general export capabilities. The p-value of the F-test for future key variables, i.e. $\text{provGPC}_{o,t+1}$ and $\text{provRS}_{o,t+1}$, is 0.47. The p-value of the F-test for current and lagged measures of provGPC and provRS is smaller than 0.002.

The underlying mechanism of capability effects is, however, not directly tested. One mechanism is that information, such as quality requirements, international business practice, is transmitted from multinational retailers to local Chinese firms. If this is the main driving force of capability effects, we expect that capability effects be stronger for domestic firms who presumably have less information about quality requirements, technology, etc, than foreign invested firms. However, in the estimates available upon request, we find that the effects between domestic and foreign firms are quite similar in terms of sign, magnitude and statistical significance.[30]

8 Conclusion

We motivated this paper with the argument Walmart offered to the government of India: "Were it to have outlets in India, its procurement would naturally increase. Suppliers would become familiar with its requirements, and exports would also climb."[31] What do our results imply with regard to Walmart's claim? First, estimates from the standard gravity model show that cities near purchasing centers export significantly more to countries with retail stores than do other cities of similar size and distance. Second, this positive effect does not seem to arise directly from procurement by the retailer in the Chinese city to serve its overseas stores. Rather, retailer presence (proximity to purchasing centers and the placement of stores in a city) is correlated with the city's export fixed effect. The evidence that changes in retailer presence occur prior to changes in city export capability gives some reason to believe the effect could be causal. Therefore, a city with Walmart presence is indeed likely to increase its exports, but those exports will not be biased in the direction of countries with

[30]We thank Beata Javorcik for encouraging us to explore this issue.

[31]Economist (2006), April 15.

large Walmart presences.

Two lessons could be learned from this econometric exercise. First, it is important to have a good econometric identification strategy to test linkage effects. In this exercise, the estimates of naïve gravity and dyadic fixed effects specifications all suggest that linkages have a significant effect on bilateral exports. However, the estimated linkage effects disappear once we control for the general export capabilities of origins. In other words, without taking into account endogeneity of linkages, we would have ended up with a misleading result. Second, by applying the second stage estimation, we find that the presence of multinational retailers improves the general export capabilities of origins, which is in line with Javorcik and Li (2008)'s findings of the retailer-induced productivity improvement for Romanian food suppliers. The next step in this research agenda would be to devise methods to discriminate between different economic mechanisms through which proximity to procurement centers enhances export capabilities of cities.

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Data Appendix

Table 4: Data Sources for Control Variables

Variable	Source
Countries' GDP and populations	World Bank Development Indicators
Chinese provinces' GDP and populations	China Data Online
The longitudes and latitudes of country capitals	CEPII
The longitudes and latitudes of province capitals	Map of World website
Chinese city land areas	China Data Online
Chinese ports	Lloyd's ports of the world (1995)