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**Simultaneous Impact of the Presence of Foreign MNEs on Indigenous Firms' Exports
and Domestic Sales**

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Simultaneous Impact of the Presence of Foreign MNEs on Indigenous Firms' Exports and Domestic Sales

Abstract

Incorporating the global production network approach and competitor analysis, this paper establishes an analytical framework with two hypotheses for the role of foreign multinational enterprises (FMNEs) in indigenous firms' exports and domestic sales. First, the presence of FMNEs as a whole is likely to have a negative impact on indigenous firms' domestic sales but a simultaneous positive impact on their exports in an emerging economy like China. Second, the presence of MNEs from Hong Kong, Macau and Taiwan (HMT MNEs) is more likely to generate this pattern of impact than MNEs from other countries (Other FMNEs). The FDI-led export strategy contributed to the dominance of the scenario described by the first hypothesis in China, while a higher degree of market commonality and resource similarity of HMT MNEs with that of indigenous Chinese firms than Other FMNEs leads to the second hypothesis. These novel hypotheses are tested and supported by a very large and recent firm-level panel dataset from Chinese manufacturing.

Key words: Global production network approach; competitor analysis; the presence of foreign MNEs; domestic sales; exports; indigenous Chinese firms.

I. Introduction

This paper examines whether and how foreign direct investment (FDI) by foreign multinational enterprises (FMNEs) simultaneously affects indigenous firms' exports and domestic sales. The existing vast literature on FDI spillovers has largely concentrated on the final effects of FMNE presence on the productivity of indigenous firms (for surveys, see Crespo and Fontoura 2007; Görg and Greenaway 2004; Görg and Strobl 2001; Iršová and Havránek 2013; Meyer and Sinani 2009; Smeets 2008; Wooster and Diebel 2010). There is some research on the impact of FMNEs' activities on indigenous firms' exports (Aitken et al. 1997; Anwar and Nguyen 2011; Buck et al. 2007; Faruq 2012; Greenaway et al. 2004; Karpaty and Kneller 2011; Nguyen and Sun 2012; Sun 2010), but no study has been conducted on how the presence of FMNEs affects indigenous firms' domestic sales and exports simultaneously.

It has only recently been emphasized that exports and domestic sales need to be simultaneously examined as a firm maximizes the sum of profits from both export and domestic markets and exports and domestic sales are interdependent (Salomon and Shaver 2005). If exports and domestic sales are based on economies of scale and scope in intangible assets such as Research and Development (R&D) and marketing that can be transferred across markets with little or no modification, exports and domestic sales may grow simultaneously. On the other hand, a negative relationship between exports and domestic sales is likely to be observed if firms need to make a trade-off strategic decision when constrained by resources. However, exporting could mitigate investment liquidity constraints as it "signals more stable expected cash flows and quality, which can increase external capital providers' willingness to fund investments" (Shaver 2011), which may in turn stimulate domestic sales. Given the interdependency between exports and domestic sales, the impact of FMNE presence on indigenous firms' exports and domestic sales could be subject to four possible scenarios: simultaneous positive impacts on exports and domestic sales, a positive impact on exports but a simultaneous negative impact on domestic sales, a negative impact on exports but a simultaneous positive impact on domestic sales, and simultaneous negative impacts on exports and domestic sales. Integrating the global production network (GPN) approach and competitor analysis, we establish a general analytical framework for the simultaneous impact of FMNE presence on indigenous firms' domestic and foreign sales. While this framework can be adapted to any business environment with FMNE presence, we choose China as our case study to test novel hypotheses derived from the framework.

China provides an opportunity for a nuanced analysis. China's impressive economic growth over the past 30 years or so is often attributed to its investment- and export-led growth strategy (Lemoine 2013; Razmi 2010). Based on this strategy, China's average annual export growth rate was as high as 25% during 2000-2008 before the global financial crisis (PRC National Bureau of Statistics various years). China became the world's largest exporter accounting for 10% of the global exports in 2009 (People's Daily, March 25, 2011). There is a general consensus that FDI has contributed significantly to export growth in China (Sun 2012; Wei and Wang 2009). FMNEs not only account for more than half of China's total exports (PRC National Bureau of Statistics various years), but also promote indigenous firms' exports via knowledge spillovers (Buck et al. 2007; Ma 2006; Sun 2010; Swenson 2008). While existing research sheds some light on export externalities generated by FMNEs to indigenous firms in China, these studies fail to take into account the endogeneity of exports and domestic sales, which may result in a potential bias in estimation. Furthermore, an investigation of the impact of FMNE presence on indigenous firms' domestic sales is important as "the shift in focus on domestic-demand-led growth is necessary both in developed and emerging-market economies" (UNCTAD 2010, p. I).

China, as the largest host of inward FDI in the developing world, attracts two main groups of foreign investors: ethnic Chinese from Hong Kong, Macau and Taiwan (HMT MNEs) and other foreign investors, mainly from OECD countries (Other FMNEs). Their average shares in China's total inward FDI flows during 2000-2008 were 40% and 60% respectively (PRC National Bureau of Statistics various years)¹. In addition, the Chinese domestic sector encompasses firms with different types of ownership, including state-owned enterprises (SOEs), collectively-owned enterprises (COEs), and privately-owned enterprises (POEs). SOEs have been subject to extensive institutional transformation since China's opening up in 1978. They still receive government subsidies and special support and face soft budget constraints, but they are generally inefficient and the most costly to operate. COEs, which are mainly owned by local governments and include numerous township-and-village enterprises (TVEs), receive some local government assistance and are more market-driven than SOEs. However, overall, COEs, given their ownership structure and governance system, are similar to SOEs and suffer from the agency problem. POEs on the other hand do not enjoy any privileges of government support and have to rely on the market for resources, but have the advantage of being flexible in decision-making and are very much profit- and market-driven. Therefore, it is reasonable to expect different effects of FMNE presence on indigenous Chinese firms with different ownership.

Although there are already numerous studies on FDI productivity spillovers in China, how FMNE presence (HMT and Other FMNE presence) simultaneously influences indigenous firms' domestic sales and exports as a whole or as separate groups (i.e. SOEs, COEs and POEs) remains under-explored. Based on our general analytical framework, we develop explicit hypotheses in the context of an emerging economy like China where GPNs are organized predominantly by FMNEs (Koopman et al. 2012). The hypotheses are tested using a very large firm-level panel dataset covering over 357,000 manufacturing firms over the period 2001-2002 and 2005-2007 in China. This study, to the best of our knowledge, is the very first investigation of whether and how FMNE presence simultaneously affects indigenous firms' exports and domestic sales, given the possible endogenous relationship between these two activities. This enables a better understanding of FDI externalities on indigenous firms' sales behavior. We also hope this study will prompt rethinking of the analytical approaches adopted in existing studies of the effect of FMNE presence on firm performance.

The paper proceeds in the following way. The next section draws on the literature on the GPN approach and competitor analysis to develop our analytical framework. Section III explains data and methodology. Section IV discusses empirical results. Finally, section V offers our conclusions.

II. Theory and Hypotheses

II.1 Global production networks (GPN)

A global or international production network is a concept used to capture the phenomenon that leading MNEs have progressively shifted their internationalization strategies towards systemic globalization, defined as the international dispersal and integration potentially of all elements of the value-added chain (Ernst 1997; Ernst and Guerrieri 1998; Ernst and Kim 2002; Ernst and Ravenhill 1999; Hanson 2012; Kam 2013; Kim 2012; Wang et al. 2007). This is also termed the 'global factory system' by Buckley (2011). The international dispersion, coordination and integration often draw on the organizational capacity and geographic reach of MNEs and make necessary substantial FDI and international trade (Buckley 2011; Levy 2008). In the process, the focus of MNEs has transformed from "stand-alone" overseas investment projects as described in Dunning (1981) to "global

network flagships” which incorporate their dispersed supply, knowledge and customer bases into regional or global production networks (Ernst and Kim 2002).

In recent years, knowledge transfer (both directly and indirectly)ⁱⁱ has been emphasized in GPN research (Ernst and Kim 2002; Kim 2011; Rugman and D’Cruz 2000). Ernst and Kim (2002) suggest that GPNs contain a parallel process of integration of hierarchical layers of network participants, creating new opportunities for international knowledge transfer that lower-tier network suppliers may be able to exploit. Kim (2011) argues that the nature of GPN linkage is characterized by intense knowledge- and technology-based interactions aimed at developing new products and processes. MNEs as flagships are the central figures in knowledge transfer within GPNs because they hold the key knowledge and extensive experience about the production and services given their ownership advantages (Buckley 2011; Görg and Greenaway 2004). They may improve the information flow that helps facilitate indigenous firms to better understand economic opportunities available at home and international markets, preferences of domestic and foreign consumers and costs of serving different markets and market segments. They may force indigenous firms to adopt new technology and improve their efficiency.

II.2 Competitor analysis

Competitors are normally defined as “firms operating in the same industry, offering similar products, and targeting similar customers” (Chen 1996). Competitor analysis is an essential part of strategic analysis and planning (Lim 2013). It aims to understand and predict the interactive market behavior or rivalry between firms when they are pursuing a competitive position in an industry (Caves 1984; Chen 1996; Porter 1980; Scherer and Ross 1990; Upson et al. 2012). Chen (1996) develops an analytical framework of competitor analysis and firm-rivalry by introducing two firm-specific and theory-based constructs: market commonality and resource similarity.

Market commonality refers to “the degree of presence that a competitor manifests in the markets it overlaps with the focal firm” and resource similarity is “the extent to which a given competitor possesses strategic endowments comparable, in terms of both type and amount, to those of the focal firm” (Chen, 1996). A pair-wise comparison of a focal firm with a competitor in terms of market commonality and resource similarity can

predict the degree of competitive tension between the two and how they react to each other. Specifically, when market commonality is high, a firm is potentially highly motivated not only to refrain from aggression toward a competitor, but also to retaliate against any attacks directed its way by that competitor (Upson et al. 2012).

Chang and Xu (2008) extend the framework by using the concepts of market commonality and resource similarity to study spillovers and competition effects between foreign entrants and indigenous firms, among foreign entrants, and among indigenous firms. They conclude that competition effects are more likely to outweigh other positive spillover effects in regional markets than they are in national markets, and that competition effects are more likely to outweigh other positive spillover effects among firms of similar resource types than they are among firms of distinct resource profiles.

II.3 FMNE presence and indigenous firms' exports and domestic sales

To date there has not been any theoretical discussion of how FMNEs affect indigenous firms' domestic sales and exports simultaneously, although there are some investigations of the FDI spillover effects on exports. According to the GPN approach, indigenous firms, whether as part of a GPN or independently, can benefit from knowledge transfer or spillovers from FMNEs acting as flagships. This may affect their domestic sales and exports simultaneously. Applying competitor analysis, FMNEs and indigenous firms can be direct competitors between and among them if they operate in the same industries. We argue that, by combining the GPN approach and competitor analysis into an integrated framework, we are able to assess the possible simultaneous impact of the very presence of FMNEs on indigenous firms' exports and domestic sales. There can be the following four scenarios, depending on the relative competitive positions (market commonality and resource similarity) of MNEs and indigenous firms in a particular industry.

Scenario 1 – Simultaneous positive impact on indigenous firms' exports and domestic sales

MNEs often have strong competitive advantages when entering the international market, including knowledge and experience in international management and international marketing and well-established international distribution networks (Görg and Greenaway 2004; Liu et al. 2009). Such networks are integrated parts of GPNs which involve both intra- and inter-firm transactions and coordination, and link together the flagship's own

subsidiaries and joint ventures with its subcontractors, suppliers, service providers, as well as partners in strategic alliances (Ernst and Kim 2002). A GPN facilitates both knowledge transfer and spillovers among the participants via horizontal and vertical linkages (Kim 2011). Knowledge also spills over from a GPN to independent indigenous firms. In this scenario, flagship FMNEs can have a simultaneous effect on indigenous firms' domestic sales and exports for the following reasons.

(a) Export spillovers may occur when an indigenous firm directly enters into an FMNE's supply chains abroad using the FMNE's brand name, distribution networks and reputation (Buck et al. 2007). This is the so-called supply chain effect. (b) An FMNE's subsidiaries may have information about export markets (e.g. consumers' tastes, market structure, competitors and regulations), which may spill over to indigenous firms (Greenaway and Kneller 2005) and help them reduce the sunk costs associated with commencing exporting. (c) Spillovers of new technological and managerial knowledge from flagships lead to efficiency gains that in turn improve the competitiveness of indigenous firms (Buck et al. 2007). This may well increase indigenous firms' domestic sales in addition to exports. (d) The local competition from FMNEs forces indigenous firms to enhance their capabilities, enabling them not only to expand export activities (Greenaway et al. 2004) but also increase their domestic sales. (e) The human capital effect (De Clercq et al. 2008; Inkpen and Tsang 2005) can lead to higher productivity which may lead to higher exports and domestic sales in indigenous firms.

Scenario 2 – A positive impact on indigenous firms' exports but a simultaneous negative impact on their domestic sales

In scenario 1, positive knowledge spillover prevails and the competition is not severe enough to generate a negative effect. However, when competition is intensified, GPNs may produce a positive impact on indigenous firms' exports but a simultaneous negative impact on their domestic sales. This can happen when flagships sell their products in the host country market (a case of high degree of market commonality) in addition to the international market. In this case, FMNEs and indigenous firms are likely to be direct competitors. While there can still be knowledge spillovers (for instance, via demonstration and competition effects), knowledge diffusion is much less likely because FMNEs "have an incentive to prevent technology leakage and spillover from taking place" (Javorcik 2004). FMNEs often have unique knowledge resources. When they combine such resources with cheap inputs supplied in the host economy, they further enhance their competitive advantages and are in a

better position to compete with indigenous firms operating in the same industry (Buckley 2011). This may negatively affect the domestic sales of indigenous firms. Because of this, indigenous firms may be induced to more actively explore export opportunities.

On the other hand, if FMNEs target international markets, treating the host country as an export-platform (a case of mild market commonality), the competition between FMNEs and indigenous firms in international markets may not be as fierce as in the host country market due to a lower degree of market commonality. In an export-oriented GPN, FMNEs may export output back to their home country (home-country orientation), a different foreign country (third-country orientation) or both home and other foreign countries (global orientation) (Ekholm et al. 2007; Smeets and Wei 2010). In any case, such a GPN enables indigenous firms to obtain “access to new and large foreign markets” (Zhang 2007). Because of these new foreign markets, there are more business opportunities but less severe and direct competition for indigenous firms.

Scenario 3 – A negative impact on indigenous firms’ exports but a simultaneous positive impact on their domestic sales

FMNEs may inhibit the expansion of indigenous firms to become exporters and may not help to develop the host country’s dynamic comparative advantages by focusing solely on local cheap labor and raw materials (a case of resource similarity) (Zhang 2006; Zhang 2007). In such cases, indigenous firms may find it relatively more profitable to concentrate on the local market. Similarly, when regulations are tightened on the international market, which negatively affects exports, and when indigenous firms find it more appropriate to switch their outputs from the foreign to local market, FMNE presence could lead to reduced exports but increased domestic sales. Furthermore, whether FMNE presence has a positive or negative impact on indigenous firms productivity depends on the selling prices on the domestic and foreign markets, and the output switching costs.

Scenario 4 – A simultaneous negative impact on indigenous firms’ domestic sales and exports

FMNE presence may generate a simultaneous negative effect on indigenous firms’ exports and domestic sales. The monopoly status of FMNEs in the host country (De Clercq et al. 2008) as well as in GPNs and the competition from FMNEs with lower marginal costs may force indigenous firms up their cost curves

(Greenaway and Kneller 2007; Swenson 2008). This will draw demand from indigenous firms in both domestic and foreign markets, causing them to cut production. In these cases, FMNEs may well have a simultaneous negative effect on indigenous firms' domestic sales as well as exports.

II.4 Hypotheses about FMNE presence and indigenous firms' exports and domestic sales in China

Based on the GPN approach and competitor analysis, our general analytical framework identifies four possible scenarios of the simultaneous effect of FMNE presence on indigenous firms' exports and domestic sales in section II.3. Which scenario dominates depends largely on the relative competitive positions of MNEs and indigenous firms within and outside GPNs. Applying this framework to China, given its investment- and export-led growth strategy, FDI-led export (especially FDI-led processing and assembly trade) is encouraged where imported materials and intermediate goods are processed, assembled and then re-exported. This strategy is to some extent consistent with China's comparative advantage of labor abundance (Liang 2008). Because of this strategy, more than half of China's total imports and exports, and more than 70% of China's total processing trade, are contributed by MNEs in their GPNs in China, given their strong technical strengths and international marketing knowledge, experience and networks (Liang 2008; Wei and Liu 2001; Xing 2012; Zhang 2007).

The overall trend of FDI-led trade described above should make scenario 2 the dominant pattern of simultaneous positive impact from FMNEs on indigenous firms' exports but negative impact on their domestic sales in China. Labor-intensive processing or assembling is organized by flagships in GPNs within vertically integrated international industries. Although exports arising from such activities may involve intra-firm trade, much of it is arm's length transactions between FMNEs and indigenous firms (Zhang 2007). As explained before, knowledge spillovers are more likely to take place via integration in GPNs. The supply chain effect will have a positive impact on indigenous firms participating in GPNs led by FMNEs. In addition, the knowledge spillover effects from GPNs to independent indigenous firms will also positively affect their export performance. On the other hand, while most of the output from an export-platform GPN is sold abroad (Zhang 2007), sales of the remaining output in the Chinese market constitute fierce competition with indigenous firms when FMNEs combine their superior technologies with Chinese cheap labor. In addition, rapid economic growth in China has attracted much domestic-market-oriented FDI. While they can produce positive horizontal spillovers via demonstration and labor turnover effects, these FMNEs may compete directly with indigenous firms. Given

technology gaps, indigenous firms may be hurt by the competition, or even be driven out of the market. Facing fierce competition in the local market, these indigenous firms may shift their sales from domestic to foreign markets. Based on our framework in general and the analysis of the Chinese case in particular, we develop the following hypothesis.

Hypothesis 1: FMNE presence as a whole is likely to have a positive impact on indigenous firms' exports, but a simultaneous negative one on their domestic sales in an emerging economy like China.

As mentioned earlier, there are two main types of foreign investors in China: HMT MNEs and Other FMNEs. Because of their relative competitive positions with indigenous firms within and outside GPNs, the impacts of these two types of FMNEs on indigenous firms' exports and domestic sales are expected to be different. As a result, there is a need to disaggregate FDI into HMT and other FDI, and examine how these two types of FMNE presence simultaneously affect indigenous firms' exports and domestic sales.

There is no lack of disaggregated investigations of FDI spillovers to indigenous firms in China. Buckley et al. (2002; 2007) compare the different impacts of investors from HMT and the rest of the world using industry level data, and Lin et al. (2009), Liu et al. (2009), Tian (2007; 2010), and Wei and Liu (2006) do so at the firm level. While these studies provide insights into productivity spillovers, there is a need to examine the impact of FMNE presence on indigenous firms' exports and domestic sales simultaneously.

Building on our framework, we now turn to how HMT MNEs and Other FMNEs may simultaneously affect indigenous firms' sales behavior. In comparing the different sources of FDI in China, Zhang (2005) notes that FMNEs from the Triad countries usually possess valuable intangible assets such as cutting-edge technology, brand names, and efficient marketing networks. They invest heavily in sectors with advanced and complex technology and high capital intensity such as electronics, machinery, aircraft, and automobiles, and they are normally oriented towards the Chinese market. In other words, the Triad or "Other" (as defined in this paper) MNEs act as flagships in domestic-market-oriented GPNs in China. On the other hand, HMT MNEs are not on the global cutting-edge frontiers of technology and organizational sophistication. However, they are good at adapting mature technologies to more labor-intensive context and to raw materials (Vernon 1979), and delivering timely, uniform quality products to markets of the Triad countries (Wells Jr. 1993). While Other FMNEs are particularly interested in serving China's domestic market, HMT MNEs are small or medium-sized,

and involved in labor-intensive and export-oriented manufacturing industries such as textiles, garments, footwear, toys, sport facilities, plastic/rubber products and home electronics. For example, Yang (1997) finds that although the total volume is large, FDI from Taiwan is widely distributed across industries, and the average investment size is fairly small. *Chiu (1995)* suggests that the Taiwanese investment is mainly in the low-skill, labor-intensive traditional industries in the *mainland*. HMT MNEs act as flagships in export-processing GPNs in China.

As an emerging economy, China has a natural comparative advantage in producing labor-intensive products (Claro 2009). While *having* gained revealed comparative advantage in selected medium-tech sectors (e.g. office machines and electric machinery) and the high-tech telecommunications and automatic data processing equipment sectors, China maintains its competitiveness in low-tech labor-intensive products (Koopman et al. 2012; Vaidya et al. 2007). HMT MNEs are involved in labor-intensive and export-oriented industries and Other FMNEs in high-tech and capital-intensive sectors in the mainland. There is a higher degree of market commonality between HMT MNEs and indigenous Chinese firms than that between Other FMNEs and indigenous firms. In addition, as HMT MNEs possess relatively lower technologies than Other FMNEs and the general technological level of indigenous firms is also relatively low, HMT MNEs have a higher degree of resource similarity to indigenous firms than Other FMNEs. As a result, HMT MNEs are expected to engage in closer contact and more direct competition with indigenous Chinese firms than Other FMNEs.

On the other hand, as discussed earlier, FMNE presence is more likely to have a positive impact on indigenous firms' exports, but a simultaneous negative one on their domestic sales. Since HMT MNEs engage in more direct interaction with indigenous Chinese firms due to their higher degree of market commonality and resource similarity than Other FMNEs, HMT MNE presence is likely to produce greater competition effects on indigenous Chinese firms. However, since negative competition externalities are more likely to occur to indigenous firms' domestic sales than to their exports, we are able to develop the following hypothesis:

Hypothesis 2: The presence of HMT MNEs is more likely than that of Other FMNEs to generate a negative impact on indigenous firms' domestic sales, but a simultaneous positive impact on their exports in an emerging economy like China.

III. Methodology and Data

In order to test the hypotheses, we examine the following non-recursive system of equations:

$$Exports_{ijt} = \beta_{11}DomesticSales_{ijt} + \beta_{12}Spillovers_{ijt} + \Gamma_1'W_{ijt} + \eta_{ijt}$$

$$DomesticSales_{ijt} = \beta_{21}Exports_{ijt} + \beta_{22}Spillovers_{ijt} + \Gamma_2'X_{ijt} + \varepsilon_{ijt}$$

where $Exports_{ijt}$ and $DomesticSales_{ijt}$ refer to firm i in industry j 's sales in the foreign and domestic markets at time t respectively. "Spillovers" denote the FDI spillover or MNE presence variables. W and X are vectors of variables that affect a firm's exports and domestic sales respectively. η and ε are error terms. For the equation system to be identified, we must have explanatory variables that are unique to either exports or domestic sales equations only. We use capital intensity to exports and advertising to predict domestic sales. Other control variables in $Exports$ and $DomesticSales$ equations are Size, R&D and industry competition. The correlation between FMNE presence and a firm's exports and domestic sales may also be affected by other factors such as industry-, region-, and time-specific factors including industry differences in capital and infrastructure, regional differences in institutional environment, geographical distance from export markets, and time effects associated with exogenous technological changes and macroeconomic fluctuations. To control for these fixed effects, we include 2-digit industry, region and year dummies.

Another econometric issue is the possibility of endogeneity for spillover variables: FMNEs may be attracted to sectors with higher sales in domestic or foreign markets. The use of industry, region and year dummies can help mitigate this potential issue. However, to keep it to a minimum and take into account the lagged impact of spillovers on exports and domestic sales, we introduce spillover variables with a lag of one year into the estimation. Following Salomon and Shaver (2005), instead of estimating this system of equations simultaneously, we deal with each equation separately using the generalized method of moments (GMM).

The dataset for this study is from the *Annual Industrial Survey Database* of the Chinese National Bureau of Statistics (NBS). It covers all firms whether indigenous or foreign in China with annual sales of at least 5 million RMB in the year prior to the survey. The accuracy and reliability of official statistics in developing and transitional countries in general, and in China in particular, have been subject to some debate in recent literature. Rawski (2001), for example, claims that data reporting in China is likely to be influenced by political factors. However, we have reasons to believe in the quality of micro data collected under strict government mandates to be subject to less manipulation. First, Article 3 of the *Statistics Law of the People's Republic of China* (adopted

in 1983 and revised in 1996) requires that any organization under statistical investigation shall “provide truthful statistical data. They may not make false entries or conceal statistical data, and they may not refuse to submit statistical reports or report statistical data belatedly”. Second, unlike macroeconomic data such as GDP and unemployment rates, micro data could hardly serve as indicators in the performance evaluation of local officials who therefore would have little incentive to falsify data (Fan and Wei 2006). In addition, based on his personal experience in examining and using Chinese official data, Chow (2006) points out that the Chinese statistics reported by the NBS are mostly reliable, accurate and internally consistent for the purposes of empirical analysis. Finally, data from the same source have been used in several relatively recent studies published in leading journals (e.g. Chang and Xu 2008; Du and Girma 2007; Gao et al. 2010; Girma et al. 2009; Lin et al. 2009; Liu et al. 2009; Tian 2007; Wei and Liu 2006; Wei et al. 2008), although the dataset used in this study tends to be more recent.

The dataset includes ownership, number of employees, capital, fixed assets, advertising, exports, sales, R&D, profits, and other financial information. Though the dataset covers the sectors of mining and production and distribution of electricity, gas and water, we focus on manufacturing only since the other two sectors export very little. The final dataset covers 2001–2002 and 2005–2007 because information on R&D and advertising expenditure was not available before 2001 and for 2003 and 2004. However, data for 2000–2007 are used to construct FDI spillovers variables. For deflators, the consumer price index is obtained from *China Statistical Yearbook 2009*. We checked the dataset extensively. Firms with obviously inaccurate numbers, e.g. negative sales and negative total assets are deleted from the sample. The final useable sample includes an unbalanced panel of 357,641 firms with 995,857 firm-year observations. Based on China’s official definition, a foreign firm is defined as the one with at least 25% share of the registered capital.

In the existing literature, various measures of FMNE presence are adopted, including employment, capital, fixed assets and sales. Wei and Liu (2006) argue that each of these indicators may capture a different aspect of spillover effects, although they might be correlated. In this study, we have compared the results from different measures. The overall results are quite consistent, although different measures tend to have varying degrees of impact at the disaggregate levels. In this paper our main discussion of the results is based on the most commonly used measure of FMNE presence, i.e. the share of foreign firms’ employment in a 4-digit industry’s

total employment. We then conduct our robustness check, and compare the key results using alternative measures. The details of variables and their measures are reported in the Appendix.

IV. Empirical Results and Discussion

Table 1 presents summary statistics for firms of different ownership. Indigenous firms in China are broadly classified as SOEs, COEs, POEs and others, while FIEs are known by their country-of-origin for two groups – HMT MNEs and Other FMNEs. There are clearly different firm characteristics between groups. Foreign firms overall are considerably more export-oriented, pay higher average wages and spend more on advertising than indigenous firms. Between HMT MNEs and Other FMNEs, the former have a clearly higher export share in sales than the latter, but the latter pay higher average wages and spend noticeably more in R&D and advertising. These differences in firm characteristics indicate that foreign firms of different country-of-origin may have differentiated impacts on indigenous firms. In the domestic sector, SOEs are generally larger than all other firms in terms of both employment and sales, pay higher average wages and spend more on R&D and advertising. However, only 2.7% of SOEs' sales are targeted towards foreign markets. In contrast, POEs tend to be smaller in size, are more export-oriented and spend less on R&D and advertising than SOEs and COEs. COEs' statistics lie between SOEs and POEs except for average wages and capital intensity which are the lowest among the three. Given the differences in the ownership structure, indigenous firms may be affected differently by FMNE presence. In summary, it is important to differentiate the FMNE presence of different country-of-origin and different ownership structure of the domestic sector.

<Tables 1 and 2 about here>

Descriptive statistics and correlations of the key variables are provided in Table 2. As can be seen, the correlation coefficients for all variables are very low except those between HMT MNE presence with overall FMNE presence (including both HMT and other FMNE presence) and Other FMNE Presence with overall FMNE Presence. Since neither HMT nor Other FMNE Presence will be used together with FMNE Presence, multicollinearity is not an issue of concern.

IV.1 Results for exports-domestic sales relations

Table 3 presents the main results for the overall sample including all firms and the subsamples according to ownership. A dummy variable *Foreign* is included in columns (1) and (2) to capture different degrees of exports and domestic sales due to the foreign/Chinese ownership, holding other things constant. It is clear that, for firms with the same characteristics, MNEs are likely to sell more to foreign markets than domestic firms given the positive and statistically significant coefficient on *Foreign* in the export equation. The negative and statistically significant coefficient on *Foreign* in the domestic sales equation indicates that indigenous firms are likely to sell more in the domestic market than MNEs. This gives us a reason to relax the assumption of the same coefficients on all independent variables for indigenous firms and MNEs and split the sample according to ownership. Columns (3) and (4) present the results for the overall domestic sector. Columns (5) and (6) are for SOEs. Columns (7) and (8) are for COEs. Finally, columns (9) and (10) are for POEs.

<Table 3 about here>

We first analyze the results for the relationship between exports and domestic sales. Given the highly significant and negative coefficient on *DomesticSales* in column (1), it is clear that domestic sales have a significantly negative impact on exports in Chinese manufacturing. The coefficient on *Exports* is also highly significant but positive in column (2). Therefore, we can conclude that exports have a significantly positive impact on domestic sales in Chinese manufacturing. As a result, there is a two-way relationship between domestic sales and exports in all firms in Chinese manufacturing, whether foreign or indigenous.

We now examine the results for the domestic sector and the subsamples of firms of different ownership. The coefficient on *DomesticSales* in column (3) is now positive and statistically significant. This shows that more sales in the domestic market by indigenous firms will have a positive impact on their performance in the export market. However, looking more closely into indigenous firms, the level of significance and sign of the coefficient on *DomesticSales* vary across different types of ownership. The results for the domestic sector extend to SOEs (column 5) and POEs (column 9), but not COEs (column 7). In contrast, the coefficient on *Exports* is consistently positive and highly significant in the domestic sales equations (columns 4, 6, 8 and 10), a result in line with that for the overall sample, i.e. exports have a positive impact on domestic sales of indigenous firms.

The above findings from Chinese manufacturing show that there can be a simultaneous relationship between domestic sales and exports. However, how they are related varies across different sectors. While exports always positively affect domestic sales in any sector, domestic sales show different patterns of impact in different sectors. Our results enrich those provided in Salomon and Shaver (2005) and Singh (2009).

IV.2 Results for hypothesis 1

We can now look at the results for hypothesis 1. The coefficients on *FP* (FMNE presence) in the *Exports* equations (columns 1, 3, 5, 7 and 9) of table 3 are statistically significant and positive, indicating that the presence of MNEs as a whole has a positive impact on exports. On the other hand, the coefficients on *FP* in the *DomesticSales* equations (columns 2, 4, 6, 8 and 10) are statistically significant and negative, showing that FMNE presence as a whole has a negative impact on domestic sales. In other words, FMNE presence has a positive impact on exports but a simultaneous negative one on domestic sales in Chinese manufacturing. Hypothesis 1 is clearly supported. The results imply that the positive externalities from FMNE presence (such as knowledge, supply chain, competition, and human capital externalities) outweigh the negative competition effects on the exports of indigenous firms. Therefore, the overall effect of FMNE presence on exports is positive. On the other hand, the negative externalities from FMNE presence (such as the “crowding out” effect) outweigh the positive ones (such as demonstration, imitation and staff turnover effects) on the domestic sales. Therefore, the overall effect of FMNE presence on domestic sales is negative. This is the result of the interactions between FMNEs and indigenous firms in China’s domestic market. FMNEs as a whole possess advanced technologies and managerial expertise or skills in international marketing, and adapting mature technologies to more labor intensive contexts, which enable them to “steal” the domestic market from indigenous Chinese firms.

Hypothesis 1 concerns FMNEs as a whole. To shed further insights, we divide FMNEs by market-orientation, i.e. domestic market- and export-oriented FMNEs, and compare how these two types of FMNEs affect exports and domestic sales of indigenous Chinese firms. In our sample there were a total of 30,854 FMNEs in 2001 among which 17,196 (56%) had exports representing less than 50% of their total sales and 12,090 (39%) were 100% local Chinese-market-oriented. Among the remaining 13,658 (44%), 7,100 (23%) were 100% export-oriented. In 2007, there were a total of 67,062 FMNEs, and the share of FMNEs whose exports represented less

than 50% of total sales was 58% (i.e. 388,99 FMNEs). If we classify an FMNE whose exports represented less than 50% of total sales as domestic-market-oriented and one whose exports represented 50% or more of its total sales as export-oriented, we can examine whether domestic-market- (export-) oriented FMNEs are more likely than export- (domestic-market-) oriented FMNEs to exert negative impact on domestic sales (exports) of indigenous Chinese firmsⁱⁱⁱ. The regression results are reported in table 4.

<Table 4 about here>

As can be seen in columns (3) and (4), the coefficient on the presence of domestic-market-oriented FMNEs is negative in the *Exports* equation but is positive in the *DomesticSales* equation and the coefficient on the presence of export-oriented FMNEs is positive in the *Exports* equation but is negative in the *DomesticSales* equation. Columns (5) to (10) also show a similar pattern of the impact except in a few cases where the coefficients are statistically insignificant. The results seem to suggest that the market-orientation of FMNEs has different impacts on indigenous firms' exports and domestic sales.

The net impact of the presence of domestic-market-oriented FMNEs on exports and domestic sales of indigenous Chinese firms corresponds to scenario 3. The positive effects of domestic-market-oriented FMNEs outweigh their respective direct competition or "crowding out" effects on domestic sales, but the opposite is true of exports at the same time, probably due to the output shifting effect. As shown in Long (2005), a few surveys of FMNEs in China indicate that FMNEs filled technological gaps in China and brought with them advanced technologies and improved existing technologies to China. The availability of new knowledge and technologies motivates indigenous firms to concentrate on their home market activities. In addition, the strong demonstration effects of domestic-market-oriented FMNEs may induce indigenous Chinese firms to shift their output from the exporting markets to the domestic market. This leads to increased domestic sales but reduced exports.

The presence of export-oriented FMNEs has a net positive impact on exports but a net negative one on domestic sales of indigenous Chinese firms, corresponding to scenario 2. Export-oriented FMNEs typically enter into the host country with their strength on their international distribution and marketing networks. Their activities in the host country tend to be about the exploitation of local competitive assets. As argued by Kokko et al. (2001), their spillover effects are therefore more likely to lead to export success rather than productivity improvement,

which could also be associated with the output shifting effect, though here, it is the shift from the domestic to export markets.

It is very important to note that from columns 3 and 4, the magnitudes of the presence of export-oriented FMNEs are greater than those of domestic-market-oriented FMNEs. Diagnostic tests indicate the differences in coefficients of the two variables are statistically significant. This suggests that the presence of FMNEs as a whole has a net positive impact on exports but simultaneously a net negative impact on domestic sales of indigenous Chinese firms. Thus, hypothesis 1 holds though there are nuances in details in terms of the market orientation of FMNEs.

In summary, export-oriented FMNEs tend to generate a positive impact on exports but a simultaneous negative impact on domestic sales of indigenous Chinese firms. Domestic-market-oriented FMNEs tend to generate a positive impact on domestic sales but a simultaneous negative impact on exports of indigenous Chinese firms. In both cases, the product/sale shifting effect is at work, and the overall positive demonstration effect is greater than the overall competition effect. Export-oriented FMNEs generate a greater net positive effect than domestic-market-oriented FMNEs partly due to China's encouragement of FDI-led export. As a result, the presence of FMNEs as a whole has a positive effect on exports and a simultaneous negative effect on the domestic sales of indigenous Chinese firms.

IV.3 Results for hypothesis 2

We now turn to the results for our hypothesis 2 (see table 5). HMT MNE and Other FMNE presence appear to affect exports and domestic sales differently. HMT MNE presence (*HMTFP*) has a highly significant and simultaneous negative impact on exports and positive impact on domestic sales of all firms in Chinese manufacturing (columns 1 and 2), while it has a positive impact on exports and a simultaneous negative impact on domestic sales of indigenous Chinese firms (columns 3 and 4). The results imply that the overall negative externalities generated by HMT MNE presence to exports of all firms in Chinese manufacturing can be attributed chiefly to its negative impact on Other FMNEs' exports, and the overall positive externalities generated by HMT MNE presence to domestic sales of all firms in Chinese manufacturing can be attributed chiefly to its positive impact on Other FMNEs' sales on the Chinese market. As discussed in section II, HMT MNEs are mainly involved in relatively low technology and labor intensive industries and help deliver products

to developed country markets. Their business activities are complementary to Other FMNEs' in the Chinese market, but compete with Other FMNEs in the export markets. Therefore, the results from columns (1) to (4) actually suggest that the presence of HMT MNEs has a negative impact on exports and a simultaneous positive impact on domestic sales of Other FMNEs in Chinese manufacturing.

<Table 5 about here>

Columns (1) and (2) also show that Other FMNE presence (*Other_FP*) has a positive impact on exports but a simultaneous negative one on domestic sales of all firms in Chinese manufacturing. These results extend to indigenous Chinese firms, as shown in columns (3) and (4).

Both HMT MNEs and Other FMNEs significantly affect domestic sales and exports of indigenous firms (columns 3 and 4), but the coefficients on HMTFP in absolute terms are significantly higher than those on *Other_FP*. These results lend clear support to our hypothesis 2, i.e. HMT MNE presence is more likely than Other FMNE presence to have a simultaneous negative impact on indigenous firms' domestic sales, but positive impact on their exports.

Comparing the simultaneous impacts of HMT MNEs with Other FMNEs on exports and domestic sales of the domestic sector at a disaggregated level reveals more insights. As shown in columns (5)-(10), HMT MNE presence demonstrates a persistent pattern of a positive impact on exports and a simultaneous negative one on domestic sales of different groups of the domestic sector: SOEs, COEs and POEs. Based on competitor analysis, the relatively high degrees of market commonality and resource similarity between HMT MNEs and indigenous Chinese firms lead to close interactions between them. Therefore there is relatively high competition between the former and the latter on the Chinese market. The GPN analysis indicates that it is more likely for FMNEs to generate positive export spillovers than positive domestic sales externalities to indigenous firms. Although HMT MNEs share high similarity with indigenous firms in terms of markets and resources, they introduce foreign markets to indigenous Chinese firms, and hence their overall impact on indigenous Chinese firms' exports is positive.

Other FMNE presence demonstrates a very different pattern of impact. It does not have a significant impact on exports and domestic sales of SOEs and COEs, but it has a significant positive effect on exports and domestic sales of POEs. Following competitor analysis, although many Other FMNEs are Chinese-market-oriented, they are active in high-tech and capital-intensive industries instead of low-tech and labor-intensive industries where both HMT MNEs and indigenous Chinese firms are dominant. They produce both negative “crowding out” effects and positive “crowding in” effects via demonstration, imitation and staff turnover. To benefit from spillovers, an indigenous firm must possess necessary resources such as absorptive ability to learn new technologies and managerial skills (Zhang et al. 2010). Within the domestic sector, POEs are the most entrepreneurial and can benefit from Other FMNE presence by quickly learning how to export their products, while SOEs and COEs are much less able to do so. In the domestic market, POEs are more likely to compete against Other FMNEs. In terms of resource similarity, POEs may have large differences with Other FMNEs, and therefore are less likely to suffer from the “crowding out” effects. In addition, Chinese firms on average are smaller in size, weaker in technology and less profitable than FMNEs from the developed world (Zeng and Williamson 2003). As a result, many FMNEs do not seem to perceive Chinese firms as their potential competitors, and have missed the rise of the new breed of Chinese companies that have already succeeded in capturing some foreign markets, e.g. Asia, Europe and the US. Such a business environment facilitates the export growth of indigenous Chinese firms, in particular that of POEs.

IV.4 Robustness check

As mentioned in section III, various measures of FMNE presence are used in the literature (Wei and Liu 2006). Although the share of employment of foreign firms is the most widely used measure, other common measures such as capital, fixed assets and sales are adopted and they may capture a different aspect of spillover effects. To conduct a robustness check, we have estimated our equations using these different measures for comparison^{iv}. Using measures by capital, fixed assets and sales for FMNE presence variable has produced qualitatively similar results. This confirms the unique overall pattern of a positive impact of FMNE presence on exports and a simultaneous negative impact on domestic sales of indigenous Chinese firms. At the disaggregated level, HMT MNE presence measured by the share of capital, fixed assets and sales shows a clear pattern of producing a highly significant positive impact on exports but a simultaneous negative impact on domestic sales of indigenous firms. By comparison, Other FMNE presence tends to demonstrate a different pattern of impact. In a

number of cases, Other FMNE presence does not have a significant impact at all. These results are broadly in line with the discussion above when the share of employment is used to measure FMNE presence. As a result, our hypothesis is further confirmed when the alternative measures are used for FMNE presence. As there are missing data for 2003 and 2004 in the sample, we also estimate the regressions using the latest three-year data covering 2005-2007. The results again are broadly in line with those discussed above.

V. Conclusions

Although there are a few studies on FDI's export spillovers, they generally assess this in isolation of indigenous firms' domestic sales, while very recent literature suggests that exports and domestic sales are likely to be simultaneously determined. In addition, so far little research has been conducted on the impact of the FMNE presence on indigenous firms' domestic sales. The current study examines whether and how the FMNE presence simultaneously affects indigenous firms' exports and domestic sales in Chinese manufacturing. It contributes to the literature in the following ways. First, to the best of our knowledge, this is the very first study of possible simultaneous effects of the FMNE presence on indigenous firms' exports and domestic sales.

Second, we have established an analytical framework by drawing on the literature on global production networks (and FDI spillover) and competitor analysis. The global production network points to the possibilities of both positive and negative export externalities, but there is little explicit discussion of which externalities may be dominant. In addition, there is little research on the impact of the FMNE presence on indigenous firms' domestic sales, although there is some implicit or indirect discussion of this issue in the productivity spillover literature. Our framework explicitly argues that in general (and at least in the short run), the FMNE presence is likely to have a negative impact on indigenous firms' domestic sales but a simultaneous positive one on their exports. FMNEs are likely to generate negative effects on indigenous firms' domestic sales as they enter and compete with indigenous firms in the domestic market. At the same time they produce positive effects on indigenous firms' exports as they introduce them to foreign markets. Given the context of the current study, our framework explicitly argues that the HMT MNE presence is more likely than the other FMNE presence to have a negative impact on indigenous firms' domestic sales but a simultaneous positive one on their exports due to market commonality and resource similarity. Our first hypothesis tends to be a generic one and second one is more specific to China. Both hypotheses are supported by the very large dataset from Chinese manufacturing.

Theoretical and Empirical Implications

Our framework is an extension of the general literature on global production networks and competitor analysis. After identifying the basic conditions for the four possible scenarios of simultaneous effect of the FMNE presence on indigenous firms' exports and domestic sales, we argue that which scenario will be dominant depends mainly on the relative competitive positions of FMNEs and indigenous firms within and outside GPNs. The relative competitive position of an indigenous firm will depend on its relative technical and managerial capabilities, the nature of its link with the GPN, and even the big business environment such as the development strategy the host government is pursuing. It must be emphasized here that the framework developed is only an initial attempt. To provide a comprehensive study of the topic, there may be a need to draw on further theoretical models such as resource-based views, industrial economics and institutional theories. Also the impact of the FMNE presence on indigenous firms' export and domestic sales can be dynamic, as the relative positions of firms are changing. Therefore, one fruitful direction for theoretical development may be the introduction of dynamics into an analytical framework. By so doing, we will be able to gain more understanding of this interesting and important topic in international business.

Empirically, it is important to provide direct measurement of relative competitive positions of FMNEs and indigenous firms. This requires us to design measures for a firm's technical and managerial capabilities, its linkage with the GPN, and some environmental variables such as government strategy or policy or other institutions. With a good generic analytical framework and suitable measurement of relevant variables, such an analysis can be generalized to other economies.

Managerial Implications

Two important implications emerge from this study for business managers. First, given that there is a simultaneous relationship between domestic sales and exports, managers need to pay attention to both exports and domestic sales simultaneously in order for the growth of their firms. Particularly, our results show that exports always positively affect domestic sales in any sector. This implies that if managers promote exports,

their domestic sales could be simultaneously facilitated. However, whether domestic sales necessarily aid exports depends on the nature of the sector in which a firm operates.

Second, the performance of a firm's domestic sales and exports is not only affected by traditional factors such as R&D and advertising but also the presence of FMNEs. Specifically, this performance is influenced by the firm's relative competitive position within and/or outside the global production network led by FMNEs. As a result, a manager needs to analyze the firm's market commonality and resource similarity with other firms, especially FMNEs in the sector. By so doing, the firm can better compete with or learn from other firms in order to promote its own exports and/or domestic sales.

Limitations

There are some limitations of this study. As discussed above, it would be ideal to provide a direct measure of a firm's competitive position within or outside a global production network. This study only uses the existing literature to describe the competitive position of an indigenous firm relative to MNEs from Hong Kong, Macao and Taiwan and those from the rest of the world. A direct measure of the firm's linkage with a global production network, including its market commonality and resource similarity with other firms, would more accurately enhance our understanding of the topic.

Secondly, as argued above, a firm's relative competitive position tends to be dynamic. Although we have a very large number of firms in the database, the information on some key control variables such as advertising is only available for recent years only. As a result, the panel dataset covers five years only. A longer time period will allow a more dynamic approach.

Third, offshore assembly is a very important part of FMNE global production networks linked to China (Koopman et al. 2012; Xing 2012). In this operation, an FMNE has a contract with a Chinese firm that produces in China but ships the finished assembled goods overseas. This implies that an indigenous Chinese firm's exports can result from such an offshore assembly arranged by FMNEs or from its own efforts such as R&D, marketing and learning from FMNEs. In the former case, the FMNE activity directly leads to the Chinese firm's exports. In the latter case, knowledge spillover from FMNEs plays an important role in a Chinese firm's exports.

China's processing trade data show that China serve as an assembling center for regional multinational exports targeting the US and Europe (Xing 2012). It would be interesting to compare the two different types of impact associated with FMNE activities on indigenous Chinese firms' simultaneous export and domestic sales behavior. However, our dataset does not provide such detailed information.

Fourth, a breakdown of the shares of FMNE presence by individual manufacturing sectors indicates that shares of foreign firms in the total number of firms range from 4% in the tobacco industry to 52% in the communication equipment, computer and other electronic equipment industry in 2007. It is likely that connections between indigenous Chinese firms and FMNEs are weaker in sectors where the share of FMNEs is low (e.g. tobacco) than in those where the share of FMNEs is high (e.g. communication equipment). While our econometric analysis has revealed an average impact of the presence of FMNEs on indigenous firms' simultaneous export and domestic sales behavior in China, we are unable to identify which particular companies are influenced by the FMNE presence and which are not. This will require a detailed case study approach.

Finally, despite our reasoning that the dataset is suitable for this study, we acknowledge that measurement errors are likely to exist because of the current system, lack of scientific methods and business environment. Therefore, caution needs to be exercised when interpreting the findings.

Appendix: Variable Measurement

Variable	Measurement
DomesticSales	Sale minus exports, adjusted by consumer price index, 2005=100
Exports	Exports, adjusted by consumer price index, 2005=100
Size	Firm size, Log (the number of employees)
R&D	R&D expenditure, adjusted by consumer price index, 2005=100
Competition	Herfindahl index
Advertising	Advertising expenditure, adjusted by consumer price deflator, 2005=100
KI	Fixed assets per employee, adjusted by consumer price deflator, 2005=100
Foreign	Dummy variable, foreign-invested firms = 1, 0 otherwise
HMT	Dummy variable, from Hong Kong, Macao and Taiwan invested firms = 1, 0 otherwise
Other_Foreign	Dummy variable, firms with foreign investments coming from other foreign countries than Hong Kong, Macao and Taiwan = 1, 0 otherwise
FP	FDI spillover variable proxied by the share of foreign-invested firms in a 4-digit industry total or in a 4-digit industry within a region, excluding the focal firm. The variable is lagged by one year.
Domestic-market-oriented_FP	Domestic-market-oriented FDI spillover variable proxied by the share of domestic-market-oriented foreign-invested firms in a 4-digit industry total or in a 4-digit industry within a region, excluding the focal firm. A foreign firm is classified as domestic-market-oriented if its export share in total sales is less than 50%. The variable is lagged by one year.
Export-oriented_FP	Export-oriented FDI spillover variable proxied by the share of export-oriented foreign-invested firms in a 4-digit industry total or in a 4-digit industry within a region, excluding the focal firm. A foreign firm is classified as export-oriented if its export share in total sales is 50% or more. The variable is lagged by one year.
HMTFP	HMT spillover variable proxied by the share of HMT-invested firms in a 4-digit industry total or in a 4-digit industry within a region, excluding the focal firm. The variable is lagged by one year.
Other_FP	Foreign spillover variable proxied by the share of other non HMT foreign-invested firms in a 4-digit industry total or in a 4-digit industry within a region, excluding the focal firm. The variable is lagged by one year.

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Endnotes:

ⁱ Please bear in mind the so-called “round-tripping” investment from Hong Kong, Macau and Taiwan, i.e. Chinese investors move money from China to Hong Kong, Macau and Taiwan and then bring it back to China disguised as foreign investment so as to take advantage of preferential treatments granted exclusively to MNEs. This type of investment was estimated to be around 25-40% of China’s total FDI inflows (Dollar and Kraay 2005; Prasad and Wei 2005; World Bank 2002; Xiao 2004). However, since 2001 when China joined the WTO, China has gradually removed this super-national treatment to MNEs. As a result, the round-tripping FDI is believed to have declined.

ⁱⁱ Indirect knowledge transfer is often termed knowledge spillovers.

ⁱⁱⁱ We also tried different threshold levels such as 25% and 100%, and the qualitative findings are broadly similar. The results are available upon request.

^{iv} Not all robustness test results are presented here due to space constraints but are available upon request.

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Table 1: Mean values of firm characteristics, 2001-2002 & 2005-2007

Ownership	Employment	Domestic Sales	Exports	Export share (% of sales)	Wage	Wage per employee	R&D	Advertising	Capital intensity
SOEs	667.975	1.684	0.100	2.711	125.591	0.137	9.660	2.792	2.004
COEs	205.905	0.429	0.039	6.672	22.734	0.118	1.222	0.749	0.590
POEs	116.951	0.309	0.027	8.862	14.028	0.127	0.267	0.225	0.622
HMT-invested firms	335.737	0.584	0.415	44.446	59.104	0.176	2.793	3.634	1.329
Other foreign invested firms	336.301	1.086	0.790	41.726	77.541	0.230	7.295	7.982	1.924
Other Chinese firms	220.668	0.732	0.079	10.420	34.368	0.145	3.367	1.595	1.134
Total	264.503	0.744	0.174	15.781	44.782	0.151	3.590	2.262	1.184

Note: All variables except employment are adjusted by consumer price index, therefore are shown at 2005 constant price.

Table 2: Descriptive statistics and correlations

	Mean	s.d.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Exports	0.201	3.827											
2. DomesticSales	0.841	8.314	0.148										
3. FP	0.259	0.198	0.060	-0.032									
4. Domestic-market-oriented_FP	0.110	0.076	0.028	0.001	0.552								
5. Export-oriented_FP	0.144	0.170	0.065	-0.037	0.929	0.203							
6. HMTFP	0.132	0.121	0.033	-0.040	0.922	0.412	0.899						
7. Other_FP	0.121	0.099	0.080	-0.017	0.882	0.604	0.767	0.631					
8. Size	4.822	1.136	0.112	0.190	0.061	-0.045	0.096	0.064	0.044				
9. R&D	4.202	156.622	0.248	0.326	0.004	0.012	-0.001	-0.007	0.016	0.078			
10. Competition	0.017	0.030	0.031	0.038	-0.054	-0.008	-0.056	-0.093	0.005	0.023	0.040		
11. Advertising	2.618	99.055	0.048	0.176	0.008	0.038	-0.007	-0.003	0.019	0.058	0.207	0.026	
12. KI	1.203	37.104	0.014	0.026	-0.012	-0.005	-0.013	-0.012	-0.010	-0.013	0.002	0.019	0.011

Sample size = 995,857, the number of firms = 357,641. s.d. = standard deviation. FMNE presence (FP), Domestic market-oriented FMNE presence (Domestic-market-oriented_FP), Export-oriented FMNE presence (Export-oriented_FP), HMT MNE presence (HMTFP) and Other FMNE presence (Other_FP) are measured by employment here and are all lagged by a year.

Table 3: Exports, Domestic sales and FDI Spillovers

	All firms		Domestic Firms		SOEs		COEs		POEs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales
Exports		8.198*** (0.570)		16.439*** (0.679)		11.626*** (2.076)		14.027*** (1.475)		21.815*** (2.050)
DomesticSales	-0.044*** (0.004)		0.025*** (0.001)		0.048*** (0.005)		-0.118*** (0.008)		0.100*** (0.008)	
FP	0.810*** (0.032)	-7.542*** (0.541)	0.112*** (0.009)	-2.101*** (0.165)	0.208*** (0.052)	-2.572*** (0.705)	0.108*** (0.018)	-1.583*** (0.249)	0.067*** (0.006)	-1.259*** (0.152)
Size	0.396*** (0.006)	-1.694*** (0.198)	0.092*** (0.002)	-0.808*** (0.083)	0.090*** (0.008)	-0.434 (0.325)	0.145*** (0.005)	-0.498*** (0.113)	0.014*** (0.003)	-0.726*** (0.101)
R&D	0.007*** (0.000)	-0.038*** (0.003)	0.005*** (0.000)	-0.074*** (0.003)	0.001*** (0.000)	-0.006 (0.006)	0.007*** (0.000)	-0.074*** (0.009)	0.005*** (0.000)	-0.144*** (0.016)
Competition	2.460*** (0.146)	-15.433*** (1.766)	0.097** (0.041)	-0.055 (0.675)	-0.094 (0.155)	2.575 (1.757)	0.112 (0.071)	0.792 (0.728)	0.033 (0.028)	-1.391** (0.599)
Advertising		0.012*** (0.000)		0.012*** (0.000)		0.007*** (0.002)		0.062*** (0.005)		-0.014*** (0.003)
Foreign	0.269*** (0.011)	-2.545*** (0.187)								
KI	0.022*** (0.001)		0.006*** (0.000)		0.002** (0.001)		0.028*** (0.002)		-0.008*** (0.001)	
Endogeneity test	518.960***	5674.368***	259.129***	3776.855***	53.430***	72.891***	661.067***	403.745***	134.519***	2311.272***

Robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models include regional, industry and time dummies. FMNE presence (FP) is measured by employment.

Table 4: Exports, Domestic sales and FDI Spillovers, Domestic-market-oriented MNE Presence vs. Export-oriented MNE Presence

	All firms		Domestic Firms		SOEs		COEs		POEs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales
Exports		7.846*** (0.527)		16.182*** (0.661)		11.586*** (2.069)		13.380*** (1.365)		20.491*** (1.828)
DomesticSales	-0.042*** (0.004)		0.025*** (0.001)		0.048*** (0.005)		-0.118*** (0.008)		0.103*** (0.008)	
Domestic-market-oriented_FP	0.153** (0.065)	1.336*** (0.502)	-0.123*** (0.018)	2.553*** (0.299)	0.082 (0.091)	0.077 (1.092)	0.022 (0.037)	2.285*** (0.376)	-0.126*** (0.011)	2.197*** (0.264)
Export-oriented_FP	1.286*** (0.039)	-12.191*** (0.766)	0.216*** (0.012)	-4.120*** (0.222)	0.291*** (0.072)	-4.321*** (0.890)	0.146*** (0.023)	-3.223*** (0.354)	0.155*** (0.008)	- 2.735*** (0.245)
Size	0.391*** (0.007)	-1.534*** (0.182)	0.091*** (0.002)	-0.764*** (0.081)	0.090*** (0.008)	-0.422 (0.324)	0.144*** (0.005)	-0.439*** (0.104)	0.012*** (0.003)	- 0.652*** (0.090)
R&D	0.007*** (0.000)	-0.036*** (0.003)	0.005*** (0.000)	-0.073*** (0.003)	0.001*** (0.000)	-0.006 (0.006)	0.007*** (0.000)	-0.070*** (0.008)	0.005*** (0.000)	- 0.134*** (0.014)
Competition	2.506*** (0.145)	-15.152*** (1.681)	0.105*** (0.041)	-0.190 (0.665)	-0.094 (0.155)	2.594 (1.751)	0.115 (0.071)	0.638 (0.697)	0.045 (0.028)	- 1.523*** (0.567)
Advertising		0.012*** (0.000)		0.012*** (0.000)		0.007*** (0.002)		0.060*** (0.005)		- 0.013*** (0.003)
Foreign	0.259*** (0.011)	-2.371*** (0.170)								
KI	0.022*** (0.001)		0.006*** (0.000)		0.002** (0.001)		0.028*** (0.002)		-0.008*** (0.001)	
Endogeneity test	518.960***	5674.368***	259.129***	3776.855***	53.430***	72.891***	661.067***	403.745***	134.519***	

Robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models include regional, industry and time dummies. FMNE presence (FP) is measured by employment. Domestic-market-oriented_FP = Domestic-market-oriented FMNE Presence. Export-oriented_FP = Export-oriented FMNE Presence

Table 5: Exports, Domestic sales and FDI Spillovers, HMT MNE Presence vs. Other MNE Presence

	All firms		Domestic Firms		SOEs		COEs		POEs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales	Exports	Domestic Sales
Exports		8.873 ^{***} (0.670)		16.431 ^{***} (0.678)		11.614 ^{***} (2.073)		13.959 ^{***} (1.462)		21.809 ^{***} (2.049)
DomesticSales	-0.047 ^{***} (0.004)		0.025 ^{***} (0.001)		0.048 ^{***} (0.005)		-0.118 ^{***} (0.008)		0.100 ^{***} (0.008)	
HMTFP	-1.110 ^{***} (0.057)	7.809 ^{***} (0.863)	0.149 ^{***} (0.017)	-2.686 ^{***} (0.291)	0.399 ^{**} (0.103)	-5.282 ^{***} (1.346)	0.154 ^{***} (0.032)	-2.355 ^{***} (0.403)	0.071 ^{***} (0.010)	-1.320 ^{***} (0.234)
Other_FP	2.979 ^{***} (0.062)	-26.131 ^{***} (2.060)	0.069 ^{***} (0.019)	-1.429 ^{***} (0.308)	0.016 (0.103)	0.146 (1.169)	0.045 (0.040)	-0.520 (0.416)	0.061 ^{***} (0.012)	-1.187 ^{***} (0.257)
Size	0.399 ^{***} (0.006)	-1.917 ^{***} (0.232)	0.092 ^{***} (0.002)	-0.807 ^{***} (0.083)	0.090 ^{***} (0.008)	-0.436 (0.325)	0.145 ^{***} (0.005)	-0.493 ^{***} (0.112)	0.014 ^{***} (0.003)	-0.726 ^{***} (0.101)
R&D	0.007 ^{***} (0.000)	-0.042 ^{***} (0.004)	0.005 ^{***} (0.000)	-0.074 ^{***} (0.003)	0.001 ^{***} (0.000)	-0.006 (0.006)	0.007 ^{***} (0.000)	-0.074 ^{***} (0.009)	0.005 ^{***} (0.000)	-0.144 ^{***} (0.016)
Competition	1.885 ^{***} (0.146)	-12.136 ^{***} (1.726)	0.105 ^{**} (0.041)	-0.183 (0.678)	-0.068 (0.156)	2.211 (1.764)	0.122 [*] (0.072)	0.614 (0.728)	0.034 (0.028)	-1.406 ^{**} (0.601)
Advertising		0.013 ^{***} (0.000)		0.012 ^{***} (0.000)		0.007 ^{***} (0.002)		0.062 ^{***} (0.005)		-0.014 ^{***} (0.003)
HMT	0.054 ^{***} (0.014)	-1.029 ^{***} (0.134)								
Other_Foreign	0.452 ^{***} (0.014)	-4.196 ^{***} (0.338)								
KI	0.021 ^{***} (0.001)		0.006 ^{***} (0.000)		0.002 ^{**} (0.001)		0.028 ^{***} (0.002)		-0.008 ^{***} (0.001)	
Endogeneity test	547.567 ^{***}	5624.853 ^{***}	258.411 ^{***}	3776.555 ^{***}	53.257 ^{***}	72.791 ^{***}	661.165 ^{***}	402.941 ^{***}	134.534 ^{***}	2310.285 ^{***}

Robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. All models include regional, industry and time dummies. FMNE presence (FP) is measured by employment. HMTFP = HMT MNE Presence. Other_FP = Other FMNE Presence