Asian
Growth Research
Institute

調査報告書 17－02

Foreign Multinationals and Trade in Southeast Asian Manufacturing

平成 30（2018）年 3 月

公益財団法人　アジア成長研究所

東南アジアの製造業における外国籍企業と貿易

Foreign Multinationals and Trade in Southeast Asian Manufacturing

Project Coordinator, Eric D. Ramstetter

Project Summary

This project examines the relationship between foreign ownership and exports of manufacturing firms in Vietnam during 2010-2013 and manufacturing plants in Thailand in 1996. Consistent with patterns observed in commodity export data, MNEs in Vietnam are found to account for the majority of firm exports during this period. Wholly-foreign MNEs (WFs), which accounted for the vast majority of MNE production in Vietnam, accounted for most MNE exports. Both WFs and MNE joint ventures (JV) made larger direct contributions to exports than to production or employment, as observed in several other Asian developing economies. There was a strong tendency for WFs to have the highest export propensities (export-turnover ratios) followed by JVs. Manufacturing firms exported over four-fifths of the total in most years. Tobit estimates that control for the effects of firm size, capital intensity, liquidity, location, and industry affiliation for manufacturers indicate WFs also had the highest conditional export propensities, followed by JVs, private firms, while export propensities tended to be similar in state-owned enterprises (SOEs) and private firms in most industries. Because Vietnam imposes few ownership restrictions on MNEs, these results imply that MNEs generally prefer to export from WFs rather than JVs, and are consistent with previous results for Thailand in 1996 and Indonesia in 1990-2001, for example.

Similarly, in Thailand in 2006, mean export-sales ratio (export propensities) in heavily-foreign MNEs with foreign ownership shares of 90 percent or more exceeded 50 percent and heavily-foreign MNEs accounted for one-third of plant exports. Minority-foreign

(10-49% foreign shares) and majority-foreign (50-89% shares) MNEs accounted for another one-fifth of plant exports but had lower export propensities, about 30 percent and 40 percent, respectively. Mean export propensities for local plants in 20 sample industries was only 15 percent. In large samples of all 20 industries, Tobit estimates controlling for industry affiliation with intercept dummies as well as the effects of the scale, age, factor intensities or labor productivity, and BOI-promotion status of plants also indicated that export propensities were the highest in heavily-foreign MNEs, followed by majority-foreign MNEs, minority-foreign MNEs, and lastly by local plants. Moreover, ownership-related differences in export propensities were highly significant statistically. When estimates were performed at the inter-industry heterogeneity was more fully accounted for by allowing slope coefficients as well as intercepts to differ among the 20 industries, export propensities were the highest in heavily-foreign MNEs and significantly higher than in local plants in 12 industries. However, differences among MNE ownership groups were usually insignificant and MNE-local differentials in export propensities differed substantially among industries, suggesting it is especially important to fully account for inter-industry heterogeneity in the Thai case.

Contents

Chapter 1
Foreign Ownership and Exports of Thai Manufacturing Plants by Industry in 2006

Eric D. Ramstetter (corresponding author; ramstetter@gmail.com)
Asian Growth Research Institute, Kyushu University, and Thammasat University

Juthathip Jongwanich and Archanun Kohpaiboon
Faculty of Economics, Thammasat University

Abstract

This paper investigates how foreign multinational enterprises (MNEs) contributed to exports by Thai manufacturing plants at the industry level in 2006. The mean export-sales ratio (export propensities) in heavily-foreign MNEs with foreign ownership shares of 90 percent or more exceeded 50 percent and heavily-foreign MNEs accounted for one-third of plant exports. Minority-foreign (10-49% foreign shares) and majority-foreign (50-89% shares) MNEs combined to account for another one-fifth of plant exports but had lower export propensities, about 30 percent and 40 percent, respectively. The mean export propensity for local plants in 20 sample industries was only 15 percent. In large samples of all 20 industries combined, econometric estimates controlling for industry affiliation with intercept dummies as well as the effects of the scale, age, factor intensities or labor productivity, and BOI-promotion status of plants also indicated that export propensities were the highest in heavily-foreign MNEs, followed by majority-foreign MNEs, minority-foreign MNEs, and lastly by local plants. Moreover, ownership-related differences in export propensities were highly significant statistically. When inter-industry heterogeneity was more fully accounted for by allowing slope coefficients as well as intercepts to differ among the 20 industries, export propensities were the highest in heavily-foreign MNEs and significantly higher than in local plants in 12 industries. However, differences among MNE ownership groups were usually insignificant and MNE-local differentials in export propensities differed substantially among industries, suggesting it is important account for inter-industry heterogeneity as fully as possible.

JEL Classification Codes: F14, F23, L33, L60, L81, O53
Keywords: ownership, multinational enterprises, exports, Thailand, manufacturing
Acknowledgement: We are grateful to the Asian Growth Research Institute (AGI) for funding the project "Foreign Multinationals and Trade in Southeast Asian Manufacturing" during fiscal 2017. We thank Kien Trung Nguyen for help with methodology and related research on Vietnam, and we also thank Bin Ni for comments on the Vietnam paper. However, the authors are solely responsible for the content of this paper including all errors and opinions expressed.

1. Introduction

This paper asks whether plants controlled by foreign multinational enterprises (MNEs) had higher export propensities than corresponding medium-large (20+ workers), local plants covered by the Thai manufacturing census for 2006. Jongwanich and Kohpaiboon (2008) and Cole et al. (2010) are the two previous studies we know that examine this issue for Thailand in 2006. However, both of these studies analyze heterogeneous samples of plants in a wide range of industries combined, using industry dummies or industry characteristics such as concentration and effective protection to control for industry effects. As a result, both of these studies assume that the relationship between MNE ownership and exporting is the same in all manufacturing industries. Furthermore, these studies assume that the between MNE ownership and exporting does not depend on the extent or share of MNE ownership. In contrast, previous studies of Thailand in 1996 (Umemoto and Ramstetter 2006) and related studies of Indonesia in 1990-2000 (Ramstetter and Takii 2006) and Vietnam in 2000-2001 (Phan and Ramstetter 2009) indicate that ownership effects differ substantially among manufacturing industries and that plants or firms with large foreign ownership shares export larger portions of their output than other MNEs, which in turn export more than local plants, most of which were still non-MNEs in 2006. This paper's major contribution is thus to examine whether the relationship between MNE ownership and exporting is related to foreign ownership shares and varies among industries.

The paper first reviews literature analyzing the effects of MNE ownership on plant or firm exports (Section 2). Second, it describes the database used and compares export propensities in MNEs and in local plants (Section 3). It then analyzes whether MNE-local differentials in export propensities persist after accounting for other factors (size, age, factor intensity or labor productivity) that may affect export propensities (Section 4). Section 5 concludes and discusses topics for future research.

2. Literature Review

Theory and empirical evidence suggest MNEs are likely to possess relatively large amounts of generally knowledge-based, intangible, firm-specific assets related to production technology, marketing, and entrepreneurship that should make these firms more productive than non-MNEs (Buckley and Casson 1992; Casson 1987; Caves 2007; Dunning 1993; Rugman 1980, 1985). This is reflected by larger firm size, higher factor productivity and factor returns, and/or higher capital or technology intensity. However, previous studies of Malaysia (Haji Ahmad 2010; Oguchi et al. 2002) and Thailand (Ramstetter 2006) indicate that MNE-local productivity differentials have generally been small, varied substantially among industries, and were usually insignificant statistically. On the other hand, MNE-local wage differentials were positive and often significant statistically (Ramstetter 2014; Movshuk and Matsuoka-Movshuk 2006). In other Southeast Asian economies, positive MNE-local productivity differentials appear to have been more common in Indonesia and Vietnam, but significant wage differentials were again more common, and variation of productivity and wage

differentials among industries was substantial.[1]

The theoretical literature often focuses on the tendency for MNEs to possess relatively large amounts of technology-related intangible assets such as the results of research and development (R&D) or patents, for example. Possession of these assets in relatively large amounts implies that MNEs tend to have relatively high productivity. Correspondingly, MNEs may tend to export more than non-MNEs because exporting firms first tend to be more productive than non-exporters and MNEs have relatively high productivity. However, it is very difficult to sort out the direction of causality. Does high productivity lead to exporting, or does exporting force firms to become more productive, or does causality run both directions (Bernard and Jensen 2004, Melitz 2003)?

On the other hand, it is clear MNEs also invest substantial resources in international marketing networks. These investments are sunk costs and accumulation of related assets is a key reason that some firms become able to export relatively cheaply (Roberts and Tybout 1997). Moreover, it seems equally clear that MNEs invest more in their international marketing networks than non-MNEs. Thus, even if ownership-related productivity differentials are not pervasive, it is highly possible that MNEs might have higher export propensities than non-MNEs because their investments in international marketing networks lead to lower exporting costs in MNEs. This is an important part of the story told by the previous studies of Indonesia (Ramstetter and Takii 2006; Sjöholm and Takii 2006) and Thailand (Ramstetter and Umemoto 2006), which indicate MNEs are more likely to export, and

[1] For studies of Indonesia, see Takii (2004) on productivity and Lipsey and Sjöholm (2004) and Ramstetter and Narjoko (2013) on wages. For studies of Vietnam see Ramstetter and Phan (2013) on productivity and Nguyen and Ramstetter (2015, 2017) on wages.

more likely to export large portions of their output than local plants.

The other potentially important part the story relates to evidence that export propensities tend to be highest in heavily-foreign MNEs, or MNEs with very large foreign ownership shares of 90 percent or more, and that these ownership-related differences remain statistically significant after accounting for related firm- or plant-level characteristics, as summarized in the introduction. This evidence is also related to an important policy-oriented study by Moran (2001), who argues that MNE affiliates that are well integrated into the parent's network are likely to be better equipped to contribute to host economies than are affiliates which are isolated from the parent-controlled network by ownership restrictions or local content requirements. Moran's argument also suggests that productivity should be higher in MNEs with relatively large foreign ownership shares, but empirical evidence is often inconsistent with this latter hypothesis in Indonesia (Takii 2004), Thailand (Ramstetter 2006), or Vietnam (Ramstetter and Phan 2013), for example.

Although the existing evidence for Southeast Asia suggests that the level of foreign ownership is not strongly related to productivity, other evidence indicates that WFs or MNEs with large foreign ownership shares (e.g., 90 percent or more) have higher export propensities than other MNEs in Indonesia (Ramstetter and Takii 2006), Thailand (Ramstetter and Umemoto 2006), and Vietnam (Phan and Ramstetter 2009). This in turn suggests that parent MNEs often restrict access of affiliates with smaller ownership shares to exporting networks, more than they restrict access to technology-related firm-specific assets. Part of the reason may be that most MNE affiliates in Thailand and other developing economies utilize relatively simple technologies which are useful in

labor-intensive assembly activities. Correspondingly, the risk of leaking sophisticated technologies through minority-owned affiliates in developing economies is likely to be relatively small. On the other hand, the risks of uncontrolled affiliates oversupplying specific markets may be large. This risk is also reflected by the fact that MNEs sometimes force local partners to sign agreements forbidding them from exporting the MNE's products.

After the financial crisis in 1997, Thailand and several developing economies in Southeast Asia (and elsewhere) relaxed ownership restrictions and local content requirements for MNEs exporting large portions of their output. In contrast, MNEs in Thailand faced considerably stricter regulations in 1996 and earlier years. Thus, strong correlations between foreign ownership shares and export propensities may also have resulted from policy biases, in addition to MNE strategies in past years, but such biases were relatively weak by 2006.

3. The Data

This study uses the plant-level data for 2006 underlying the Thai industrial census conducted in 2007. Published compilations report that there were 457,968 plants, 26,293 of which had 16 or more workers (National Statistical Office 2009; Table 1). The plant-level data includes records for all plants with 16 or more workers but only 11 percent of smaller plants reported in published compilations, which are extrapolated from stratified samples. Most MNEs (plants with foreign ownership shares of 10 percent or greater) had 16 or more workers (2,516 of 2,657). Plants with 16 or more workers also accounted for over 99.8 percent of all workers, paid workers, exports, output,

and value added in MNEs. In contrast, plants with 16 or more workers accounted for only one-third of the local plants in the database, but markedly larger shares (91 percent or more) of all workers, paid workers, exports, output, and value added in local (non-MNE) plants.

In other words, plants with 15 or fewer workers are overwhelmingly local and account for relatively small shares of economic activities such as employment, production, and exporting. Correspondingly, comparisons between MNEs and local plants can easily be distorted if small plants are included. Because of this fact and because small plants reported negligible exports in all ownership groups, the analysis below focuses on a subsample of medium-large plants, defined as those with 20 or more workers. We choose the slightly higher cutoff of 20 workers primarily to facilitate comparisons with similar studies of Indonesia (where corresponding surveys only include plants with 20 or more workers) and Vietnam where similar cutoffs of firm size have been used. The higher cutoff also helps remove more extreme observations (likely outliers), which are much more common among small plants.

In addition to containing a large number of small, local plants that cannot be meaningfully compared to the predominately large MNEs, the census data had records for a number of medium-large plants that reported implausibly small values for key variables. For example, of the 22,934 plants with 20 or more workers, 4,169 plants had output per worker of less than 50,000 baht, value added per worker of less than 10,000 baht, or initial fixed assets per worker of less than 10,000 baht per worker (Appendix Table 1). These cutoffs are all less than 3.3% of corresponding averages for all medium and large plants and comparable nation-wide estimates (including small plants) from

either the industrial census or alternative sources. They are also substantially smaller than per capita GDP in the country in 2006 (130,398 baht according to the revised series in National Economic Social and Development Board 2012). Plants with extremely low values of these key variables are also predominantly local (98 percent) and are excluded from the sample to avoid distorting ownership comparisons and reduce the influence of outliers.

Among the remaining 18,765 medium-large plants, the data set included several apparent duplicates. For example, 4,828 observations included exact duplicates for 12 key variables in at least one other record (Appendix Table 1).[2] The vast majority of these records (87 percent) had different locations but identical performance information. This suggests that several plants belonging to multiplant firms in different locations reported the identical firm-level information, as in the 1996 census (Ramstetter 2006).[3] Duplicates were primarily local plants (93 percent) but several duplicates were also MNEs.[4] In order to avoid double counting, maximize sample size, and coverage of large, multiplant firms, which are the focus of an MNE study, the 4,828 duplicates were dropped, leaving one record from each set of duplicates in the data set. Although this is probably the best feasible solution, it results in a database that mixes up firm- and plant-level information, thereby complicating interpretation of results and distorting location information.

---

[2] The variables were: (a) output, (b) sales of goods produced, (c) intermediate consumption, (d) purchase of materials and parts, (e) export values (estimated as the product of the export propensity and output value), (f) initial fixed assets, (g) ending fixed assets, (h) female workers, (i) male workers, (j) female operatives, (k) male operatives, and (l) foreign ownership shares.

[3] Cross checking of duplicates with a data set on large firms compiled from Business On-Line (2008) suggests several cases in which plants recorded firm-level information in large firms.

[4] For example, duplicates accounted for 21 percent of heavily-foreign plants with 20 or more workers and 11 percent of minority-foreign plants.

After dropping plants with extreme values and duplicates, there were 13,947 plants remaining in the dataset (Table 1). Although this amounts to only 19 percent of the plants in the original database, sample plants accounted for much larger shares of employment and paid workers (68-70 percent) and even larger shares of fixed assets, exports, output, and value added (80-82 percent). Thus, sample plants account for the vast majority of economic activity reported by plants in the original database. However, the original database and published estimates (which include estimates for small plants not in the database) of economic activities based on the industrial census are substantially smaller than alternative estimates of manufacturing activity from labor forces surveys (employment), national accounts (output, value added) and related capital stock estimates, as well as manufacturing exports. Coverage of the census database and our sample is relatively high for value added and output (67-69 or 54-57 percent, respectively) but smaller for exports (58 or 47 percent, respectively).

Alternative estimates are less comparable to plant totals for exports than for other variables for two reasons. First, commodity classifications used to calculate alternative estimates of manufacturing exports often exclude resource-intensive products of manufacturing plants such as processed food, raw materials, and fuels. To address this problem, we use a Bank of Thailand (2018) classification that appears to define most processed, resource-intensive products as manufactures and reports that 87 percent of Thailand's exports were manufactures. Second, plants do not report export values, which are estimated as the product of the reported export propensity and gross output. The use of gross output instead of merchandise sales in this calculation results in a relatively large estimate of plant export values, but census and sample coverage of exports is relatively low compared to

production. This probably results from the omission of some large exporters from the census or the underreporting of export propensities. Underreporting might result from substantial exports through trading firms, for example, which are not counted when reporting export propensities.

Reflecting the fact that sample plants account for relatively small shares of exports, they had slightly smaller export propensities (34 percent), compared to all plants or all medium-large plants covered in the census (35 percent each; Table 1). And these ratios were both much lower than estimates calculated from alternative sources (42 percent). This comparison suggests that the biggest discrepancies between sample or census estimates and alternative estimates result from differences between coverage and definitions in the census and in alternative sources, not from restricting samples to medium-large plants or from exclusion of plants with extremely low production (output or value added) or capital (fixed assets) per worker. On the other hand, sample restrictions, affected estimates of average export propensities and output, value added, or fixed assets per worker for local plants more than for all MNE ownership groups.[5]

Plants in the broadly defined electronics-related machinery industry were by far the largest exporters accounting for just over a third (35 percent) of sample plant exports (calculated from Table 2). This share is identical to the corresponding share of manufactured commodity exports calculated from Bank of Thailand (2018). Non-electric machinery and food product plants followed with shares

[5] Export propensities were 4.5 percent higher in sample local plants than all local plants in the database while output, value added, and fixed assets per worker were 24-27 percent higher. Corresponding differentials in export propensities were also relatively large (in absolute value) for some MNEs (e.g., -6.3 percent for heavily-foreign MNEs and -3.7 percent for minority-foreign MNEs), but relatively small for output, value added, or fixed assets per worker (never larger than 7.3 percent in absolute value for any MNE ownership group; calculations from Table 1).

of 12 percent each, but both of these shares were much smaller than corresponding shares reported by the Bank of Thailand (BOT, 7 percent each). Plants in rubber products, chemicals and motor vehicles followed with shares of 5-6 percent each; together these top six industries accounted for three-fourths of the exports by all sample plants. However, the BOT reports a markedly lower share for rubber (2 percent) and larger share for motor vehicles (10 percent). These large discrepancies between shares of firm and merchandise exports suggests that coverage of the plant sample varies among industries and/or indicates differences in definitions or classifications, which can be important when multi-product plants export, as in the Thai case.

MNEs accounted for 54 percent of the exports by sample plants and MNE shares were 69 percent or more in four industries: other transport machinery, paper, electronic-related machinery, and metal products (Table 2). MNE shares were also large (45-62 percent) in another eight industries but 22 percent or less in only six of the 20 sample industries. Heavily-foreign MNEs accounted for most MNE exports or 35 percent of the plant total. Heavily-foreign were also largest (57 percent or more) in paper, metal products, and electronics, but rather small (11 percent or less) in 10 of the 20 industries. Minority-foreign MNEs accounted 13 percent of sample plant exports and their shares 10 percent or less in 11 of the 20 industries; they were one-fourth or more in four industries: beverages, other transportation machinery, non-electric machinery, and basic metals. Majority-foreign MNEs accounted for only 8 percent of the sample total and had relatively small shares (4 percent or less) in half of the industries, but relatively large shares in other transportation machinery (44 percent) and textiles (24 percent).

If plants in the 20 sample industries are combined, mean export propensities were slightly over one half for heavily-foreign MNEs, two-fifths for majority-foreign MNEs, and 30 percent for minority-foreign MNEs (Table 3). Because mean propensities were only 12 percent for sample, local plants, mean, unconditional, MNE-local differentials ranged from 18 percentage points (for minority-foreign MNEs) to 39 percentage points (for heavily-foreign MNEs). These differentials varied greatly among the 20 sample industries, but there was a strong tendency for differentials to be largest for heavily-foreign MNEs and smallest for minority-foreign MNEs. For example, differentials were 40 percentage points or more in eight industries for heavily-foreign MNEs, but only four for majority-foreign MNEs, and none for minority-foreign MNEs. Conversely, differentials were less than 20 percentage points in only two industries for heavily-foreign MNEs, seven industries for majority-foreign MNEs, and 15 industries for minority-foreign affiliates.

Industry-level correlations to mean export propensities in local plants were also strongest for heavily-foreign MNEs (correlation coefficient of 0.81), but were also rather strong for minority-foreign (0.66) and majority-foreign (0.70) MNEs (calculated from Table 3). This suggests that industry effects, which may be related to levels of effective protection and producer concentration (Jongwanich and Kohpaiboon 2008) among other things, are important determinants of export propensities for all ownership groups. On the other hand, industry-level correlations of MNE-local differentials to mean export propensities in local plants were much higher for heavily-foreign MNEs (0.60) than for majority-foreign (0.37) and minority-foreign (0.17) MNEs.

Comparisons with alternative estimates from firm-level data also indicate it is likely that the 2006 census data substantially underestimates production by foreign MNEs compared to that by all or local firms. For example, calculations from Ramstetter and Kohpaiboon (2012, 38), suggest that MNE shares of large manufacturing firm revenues increased from 52 to 69 percent in 1996-2006. This increase is consistent with the large increase of flows and stocks of foreign direct investment (FDI) by foreign MNEs after the 1997 crisis, even though large portions of the increased FDI were used to finance buyouts of local partners in joint ventures, many of whom became insolvent, rather than to finance increases in production capacity.[6] However, during the same 1996-2006 period, the industrial census data indicate that the MNE shares of out fell from 54 percent (slightly larger than the corresponding share of firm revenues) to 43 percent (less than two-thirds of corresponding estimates from large firm data. This suggests that the 2006 data census not only underestimate exports substantially, but also underestimate MNE production relative to production by local or all firms or plants. As explained above, the existence of multiplant firms is an important cause of discrepancies between compilations from firm- and plant-level data, but the large decline in MNE shares suggested by the plant-level data seems implausible and most probably results of omitting several large MNEs from our 2006 samples.

[6] Increases were close to 4-fold for both the U.S. dollar value of FDI stocks (cumulative FDI flows from 1970 forward; $20 to $78 billion) and ratios FDI stocks to GDP (11 to 38 percent; Ramstetter 2012, 34).

4. Plant Characteristics and the Relationship between Foreign Ownership and Exporting

Patterns observed in the unconditional, aggregate and industry-level export propensities described above suggest a fairly strong tendency for them to be highest in heavily-foreign MNEs, followed by majority-foreign MNEs, minority-foreign MNEs, and lastly by local plants. These patterns are consistent with the expectation that MNEs have extensive international marketing networks which makes it relatively cheap for them to export and import and that MNEs often insist on ownership control before allowing their affiliates in developing economies like Thailand access to those networks. On the other hand, MNEs may have relatively high export propensities because they are relatively large and experienced, or because they have relatively high capital- or skilled labor intensity, or alternatively relatively high labor productivity.

In Thailand, the Board of Investment (BOI) has also relaxed restrictions on foreign ownership and imported inputs, for example, to investment projects of plants which are located outside of the greater Bangkok area or export a large portion of their output, or meet other BOI criteria.[7] In principle, projects of all ownership groups were eligible for BOI promotion privileges in a wide range of industries, including most manufacturing categories. However, relaxed foreign ownership restrictions and exemptions of import duties on inputs used for export production have been two of the biggest benefits of BOI promotion, and these benefits were probably important for larger proportions of MNEs than local plants. Thus, BOI promotion status is another potentially import determinant of export propensities in the Thai context.

[7] Note that restrictions on foreign ownership were much stricter before 1998 and the the benefits of BOI promotion were larger.

To account for these influences, we estimate the relationship between export propensities after accounting for plant size, plant age, factor intensity or labor productivity, and BOI promotion status using the following equations.

$$XS_i = f(LOU_i, LOU_i^2, LYR_i, LYR_i^2, LKL_i, LKL_i^2, LPL_i, LPL_i^2, DBOI_i, DF1_i, DF5_i, DF9_i,) + U1 \quad (1)$$

$$XS_i = g(LOU_i, LOU_i^2, LYR_i, LYR_i^2, LVL_i, LVL_i^2, DBOI_i, DF1_i, DF5_i, DF9_i,) + U2 \quad (2)$$

where
$DBOI_i$=dummy variable =1 if plant i is BOI-promoted, =0 otherwise
$DF1_i$=dummy variable =1 if plant i is a minority-foreign MNE, =0 otherwise
$DF5_i$=dummy variable =1 if plant i is a majority-foreign MNE, =0 otherwise
$DF9_i$=dummy variable =1 if plant i is a heavily-foreign MNE, =0 otherwise
LOU_i=plant size, natural log of output in plant i
LKL_i=natural log of initial fixed assets per employee in plant i
LPL_i=natural log of the ratio of production workers to all employees in plant i
LVL_i=natural log of value added per employee in plant i
LYR_i=plant age, natural log of years operated of plant i
U1, U2=error terms
XS_i=export propensity (percent) of plant i

Plant size and labor productivity are both expected to be positively correlated with export propensities, but the influence of these two factors may be smaller for large plants or plants with relatively high labor productivity. Correspondingly, coefficients on LOU_i and LVL_i are expected to be positive and coefficients on their squares negative or insignificant. Because capital intensity is usually positively correlated with labor productivity, while relatively unskilled (production) labor intensity is negatively correlated, if expectations about the influence of labor productivity are correct, coefficients on LKL_i and its square should also be positive and negative or insignificant, respectively, while coefficients on LPL_i and its square should be negative and positive or insignificant, respectively. Problems related to potential simultaneity between export propensities on the one hand,

and labor productivity or factor intensities on the other, are probably less severe in equation (1) because initial (as of 1 January) capital stocks are less influenced by exporting during the year than labor productivity during the year. However, the inability to find adequate instruments to account for potential simultaneity remains a potentially a major shortcoming of this cross section analysis.

The influence of plant age is indeterminate. On the one hand, experience might lead to relatively low transactions costs related to exporting for older plants. On the other hand, many older plants were established when policy emphasis on import substitution was relatively strong and export promotion relatively weak. Correspondingly, many older plants were established with the primary aim of serving the Thai market, while many newer plants emphasized exporting more. Several plants have also gradually shifted from emphasis on the Thai market to greater emphasis on export markets, especially during the 1990s.[8] In this respect, contrary to the assumptions made in many theoretical models of the MNE that emphasize the distinction between exporting plants and non-exporting plants or between plants that are vertically or horizontally integrated with MNE operations worldwide, it is important to recognize that several MNEs (and local plants) produce several products, servicing both local and foreign markets, and embodying both vertical and horizontal integration.

Because exporting a large portion of output is one of the main reasons for granting BOI promotion status, the coefficient on the BOI dummy is expected to be positive, as in previous studies

[8] The shift resulted from changes in MNE strategy (e.g., increased emphasis on integrating Thai affiliates into regional and global value chains), Thai policy (e.g., increased emphasis on export promotion and reduced import protection), and the large depreciation of the baht following the Asian Financial Crisis in 1998, among other factors.

(Ramstetter 2002). Coefficients on the foreign ownership dummies then reflect the sign and significance of conditional differentials in export propensities between the three MNE ownership groups and local plants, after accounting for the influences of plant size, age, labor productivity or factor intensity, and BOI promotion status. However, the values of these coefficients are not directly comparable to the unconditional differentials in Table 3 because a nonlinear Tobit estimator is used to account for the facts that the export propensity is a limited dependent variable (i.e., $0 \leq XS_i \leq 100$) and most plants do not export. Robust standard errors are also used to account for heteroscedasticity.

One of the most important contributions of this paper is to examine the sensitivity of the relationship between MNE ownership and exporting to industry effects in some detail. First, 3- and 4-digit industry dummies are included in all estimates as appropriate. When estimates are performed in large, heterogeneous samples of 20 industries combined, there are 50 3-digit dummies (51 industries) and 109 4-digit dummies (110 industries). Second, the influences of industry effects are further explored by performing separate estimates for each of the 20 sample industries. The industry-level samples yield more accurate estimates because they allow all slope coefficients, including coefficients on ownership dummies to vary among industries, and this variation is often substantial. Samples are large enough (a minimum of 147 observations for equation (1) in leather products, and usually several times larger) that the industry-level estimates should be reasonably reliable. On the other hand, the detailed disaggregation of manufacturing plants into 20 industries precludes meaningful examination of alternative industry-level influences such as the effect of producer concentration or import protection, as studied in Jongwanich and Kohpaiboon (2008).

5. Results

Table 4 presents estimates of all slope coefficients and other key information from estimates of equations (1) and (2) in large, heterogeneous samples of all 20 manufacturing industries combined. As hypothesized above, the coefficient on plant size was positive and highly significant at the 1 percent level in all four estimates (two levels of industry dummy aggregation for each equation), while coefficient on its square was negative and significant. In other words, larger plants had higher export propensities, but the effect of plant size diminished as plant size increased. BOI-promotion status was also positively, significantly, and strongly correlated with export propensities in all estimates. In contrast to the productivity-related expectations explained above, the coefficient on share the of production workers was positive and highly significant when equation (1) was estimated, suggesting that plants using production workers relatively intensively were better able to produce competitive exports than others, even though production worker shares are likely to be negatively correlated with productivity; the coefficient on this variable's square was insignificant. On the other hand, plant age and capital intensity or labor productivity were not significantly correlated with plant exports. Values of Psuedo-R^2 were 0.22 in all estimates, which are typical for large cross sections such as these.

Consistent with the patterns observed in Table 3, coefficients on all foreign ownership dummies were positive, highly significant, and largest for heavily-foreign MNEs, followed by majority-foreign MNEs, and lastly minority-foreign MNEs (Table 4). Wald tests of the null hypothesis that all ownership dummies were equal were also rejected at the 1 percent level. In other words, estimates in

large heterogeneous samples of plants in all 20 industries combined strongly indicate that conditional MNE-local differentials in export propensities were positive and highly significant for all three MNE groups, largest for heavily-foreign MNEs and smallest for minority-foreign MNEs, after controlling for the influences of plant size, age, factor intensity or labor productivity, and BOI promotion status, as well as industry effects on the constant using two alternative levels of aggregation.

However, when estimates were performed in the 20 more homogeneous, industry-level samples, this pattern was never observed at the standard (5 percent or better) level of significance (Table 5). If the weak 10 percent significance level is used for the Wald test of coefficient equality, this pattern was observed in only one industry, metal products. The metal products industry has the second largest number of sample plants among these industries following food products, but accounts for under 9.4 percent of all sample plants so it is unlikely that this industry is driving results for the larger samples of all 20 industries combined. Rather, it is more likely that failing to allow all slope coefficients to vary among industries and more fully account for inter-industry heterogeneity leads to misleading estimates when estimates are conducted in large, heterogeneous samples.

There is relatively strong evidence that heavily-foreign MNEs had the highest export propensities (i.e. coefficients on the heavily-foreign dummy were largest and significant, and tests rejecting coefficient equality significant) in three industries: footwear, basic metals, and miscellaneous manufactures (Table 5). Coefficients on the heavily-foreign MNE dummy were also largest and usually significant at the 5 percent level in four more industries, chemicals, plastics, non-electric machinery, and electronics-related machinery, but tests of MNE dummy coefficient equality usually

could not be rejected. These four include the largest industry of plant exports (electronics-related machinery), the third largest (non-electric machinery), and the sixth largest (chemicals), which combined to account for over half of all exports by sample plants (Table 2). MNEs typically dominate these three industries more than others in many countries, primarily because sunk costs of intangible assets related to development of production technology (e.g., R&D, patents, production processes) and marketing networks (e.g., those facilitating sales and after-care services) are relatively large.[9] There is also weaker evidence that heavily-foreign MNEs had the highest export propensities in leather, wood products, paper products, and other transport machinery, but these results were sensitive to specification (other transport machinery) or the aggregation of industry dummies (the other three industries), and tests of MNE dummy coefficient equality could not be rejected

Results for the second (food), fourth (rubber), and fifth (motor vehicles) largest export industries contrast because they indicate that heavily-foreign MNEs did not have significantly higher export propensities than local plants. Moreover, in motor vehicles, all MNE groups didn't have significantly higher export propensities than local plants. This result might is surprising because MNEs accounted for almost half of plant exports in the industry and six large MNEs are known to have accounted for over two-thirds of the Thailand's automotive exports and had relatively large export propensities in 2001 (Ramstetter and Umemoto 2006, 209, 212-213).

However, as indicated in Section 2, ratios of plant exports to corresponding Bank of Thailand (2018) estimates for 2006 were conspicuously low in motor vehicles (22 percent of the

[9] Firms in these industries can share key these intangible assets among alternative production locations worldwide at relatively low marginal cost more easily than firms in most other industries.

corresponding BOT automotive category). This large discrepancy, combined with the high probability that the six major auto firms continued to account for large portions of automotive exports in 2006, suggests that these samples (and the 2006 Census) probably omitted some large, MNE auto exporters.[10] In addition, many exports classified as automotive by the BOT, are probably produced by plants that the Census could easily classify as belonging to other industries (e.g, electronics, tires, leather, and plastics). For example, tire exports classified as automotive by the BOT but manufactured by rubber products' plants could partially explain why BOT estimates of rubber product exports were much lower than corresponding plant estimates.

Majority-foreign MNEs had the highest export propensities in food products, followed by minority-foreign plants, but differences between heavily-foreign MNEs and local plants were insignificant. This pattern reflects strong synergies resulting from numerous joint ventures in the industry, which are designed to take advantage of combining strong technological and marketing advantages in the numerous Thai conglomerates that dominate the industry and their foreign partners. In rubber, the only consistently significant differential was observed when equation (2) was estimated, suggesting relatively high export propensities in majority-foreign MNEs. In short, the patterns observed in large heteorgenous samples of many industries combined and in the 20 individual industries, which account for inter-industry heterogeneity more fully, often tell very different stories.

[10] The six large auto firms are MMC Sittiphol (Mitsubishi), AutoAlliance (Thailand) (Ford), General Motors (Thailand), Toyota Motor Thailand, Honda Automobile (Thailand), Isuzu Motor Thailand.

6. Conclusions

This paper has investigated how foreign multinational enterprises (MNEs) contributed to exports by Thai manufacturing plants at the industry level in 2006. The mean export-sales ratio (export propensities) in heavily-foreign MNEs exceeded 50 percent and heavily-foreign MNEs accounted for one-third of plant exports. Minority-foreign and majority-foreign MNEs accounted for another one-fifth of plant exports but had lower export propensities, about 30 percent and 40 percent, respectively. The mean export propensity for local plants in 20 sample industries was only 15 percent.

In large samples of all 20 industries combined, econometric estimates controlling for industry affiliation with intercept dummies as well as the effects of the scale, age, factor intensities or labor productivity, and BOI-promotion status of plants also indicated that export propensities were the highest in heavily-foreign MNEs, followed by majority-foreign MNEs, minority-foreign MNEs, and lastly by local plants. Moreover, ownership-related differences in export propensities were highly significant statistically. When inter-industry heterogeneity was more fully accounted for by allowing slope coefficients as well as intercepts to differ among the 20 industries, export propensities were the highest in heavily-foreign MNEs and significantly higher than in local plants in about half of the industries. However, differences among MNE ownership groups were usually insignificant and MNE-local differentials in export propensities differed substantially among industries, suggesting it is important to fully account for inter-industry heterogeneity.

As in most cross sectional studies of this nature, there are several technical problems affecting these estimates that mandate caution when interpreting the results and further examination of the data and the estimates. For example, it seems highly likely that the relationships between export propensities on the one hand, and labor productivity or factor intensities on the other, are affected by simultaneity bias. Unfortunately, panel data are not available and the cross section data contain few if any plausible instruments. Second, the lack of data on export or domestic prices for plant production means that the estimates ignore potentially important price effects, creating the possibility for omitted variable bias as well. To partially address this issue, it might be possible to use data on domestic and export quantities and values to create unit price indices at the industry level, but it is unlikely that such data can be gathered at the plant level. Finally, as mentioned in Sections 3 and 5, comparisons with alternative estimates from data on large firms suggest it is likely that the 2006 Census underestimates shares of MNEs in that year. To clarify the extent of this problem, more careful comparisons of the firm- and plant-level data (which differ for good reasons), and comparisons to newer data for 2011 are warranted. Similar analyses of the 2011 data would also be very helpful in this respect.

References:

Athukorala, Premachandra, Sisira Jayasuriya, and Edward Oczkowski (1995), "Multinational firms and export performance in developing countries: Some analytical issues and new empirical evidence, *Journal of Development Economics*, 46(1), 109-122 .

Athukorala Prema-chandra and Tran Quang Tien (2012), "Foreign direct investment in industrial transition: the experience of Vietnam", *Journal of the Asia Pacific Economy*, 17(3), 446-463.

Bank of Thailand (2018), "Total Value and Quantity of Exports Classified by Product Group", Table EC_XT_008_S2, downloaded 23 February from https://www.bot.or.th/English/ Statistics/EconomicAndFinancial/Pages/StatInternationalTrade.aspx

Bernard, Andrew B. and J. Bradford Jensen (2004), "Why Some Firms Export", *Review of Economics and Statistics*, 86(2), 561-569.

Buckley, Peter J. and Mark Casson (1992), *The Future of the Multinational Enterprise*, 2nd Edition. London: Macmillan.

Business-On-Line (2008) Data on the largest 15 firms in each of 66 manufacturing industries, custom order CD-ROM. Bangkok: Business On-Line.

Casson, Mark (1987), *The Firm and the Market: Studies on the Multinational and the Scope of the Firm*. Cambridge, MA: MIT Press.

Caves, Richard E. (2007), *Multinational enterprise and economic analysis* (3rd ed.). Cambridge, UK: Cambridge University Press.

Cole, Matthew A., Robert J. R. Elliott, and Supreeya Virakul (2010), "Firm Heterogeneity, Origin of Ownership and Export Participation", *The World Economy*, 33(2), 264-291.

Dunning, John H. (1993), *Multinational Enterprises and the Global Economy*. Workingham, U.K.: Addison-Wesley Publishing Co.

Haji Ahmad, Shahrazat Binti. 2010. A Quantitative Study on the Productivity of the Manufacturing Industry in Malaysia. Ph.D. Dissertation, University of Kitakyushu.

Jongwanich, Juthathip and Archanun Kohpaiboon (2008), "Export Performance, Foreign Ownership, and Trade Policy Regime: Evidence from Thai Manufacturing", ADB Economics Working Paper Series No. 140, Manila: Asian Development Bank.

Lipsey, Robert E., and Fredrik Sjöholm (2004), "Foreign Direct Investment, Education, and Wages in Indonesian Manufacturing", *Journal of Development Economics*, 73(1), 415-22.

Movshuk, Oleksandr and Atsuko Matsuoka-Movshuk (2006), "Multinational Corporations and Wages in Thai Manufacturing?" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 54-81.

Melitz, Marc J. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, 71(6), 1695-1725.

Moran, Theodore H. (2001), *Parental Supervision: The New Paradigm for Foreign Direct Investment and Development*. Washington, D.C.: Institute for International Economics.

National Economic and Social Development Board (2012), Gross output and value added data for manufacturing by 4-digit TSIC, 1995-2010, provided by email in December.

National Economic and Social Development Board (2015), *Capital Stock of Thailand 2013 Edition*, link as of 11 May 2018 http://www.nesdb.go.th/nesdb_en/ewt_news.php?nid=4243&filename=index.

National Economic and Social Development Board (2012), *National Income of Thailand, chain volume measures 1990-2010 Edition*, link as of 11 May 2018, http://www.nesdb.go.th/nesdb_en/ewt_news.php?nid=4293&filename=national_account.

National Statistical Office (2009), *The 2007 Industrial Census Whole Kingdom*, tables downloaded from http://service.nso.go.th/nso/nso_center/project/search_center/23project-en.htm (link as of 11 May 2018) and underlying plant-level data.

National Statistical Office (2011), Summary Tables from the *Labor Force Survey*, link as of 11 May 2018, http://web.nso.go.th/en/survey/lfs/lfs2011_tab.htm.

Nguyen, Kien Trung and Eric D. Ramstetter (2015), "Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing", Working Paper 2015-06, Kitakyushu: Asian Growth Research Institute.

Nguyen, Kien Trung and Eric D. Ramstetter (2017), "Wage Differentials among Ownership Groups and Worker Quality in Vietnamese Manufacturing", *Global Economic Review: Perspectives on East Asian Economies and Industries*, 45(3), 232-250.

Oguchi, Noriyoshi, Nor Aini Mohd. Amdzah, Zainon Bakar, Rauzah Zainal Abidin, and Mazlina Shafii. 2002. Productivity of Foreign and Domestic Firms in Malaysian Manufacturing Industry. *Asian Economic Journal*. 16 (3): 215-228.

Phan, Minh Ngoc and Eric D. Ramstetter (2009), "Foreign Ownership and Exports in Vietnamese Manufacturing" *Singapore Economic Review*, 54(4), pp. 569-588.

Ramstetter, Eric D. (2002), "Trade Propensities and Foreign Ownership Shares in Thai Manufacturing, 1996", Working Paper 2013-23, Kitakyushu: International Centre for the Study of Development.

Ramstetter, Eric D. (2006), "Are Productivity Differentials Important in Thai Manufacturing?" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 114-142.

Ramstetter, Eric D. (2012), "Foreign Multinationals in East Asia's Large Developing Economies", Working Paper 2012-06, Kitakyushu: International Centre for the Study of Development.

Ramstetter, Eric D. (2014), Wage Differentials between Multinationals and Local Plants and Worker Quality in Malaysian manufacturing, *Asian Development Review*, 31(2), 55-76.

Ramstetter, Eric D. and Archanun Kohpaiboon (2012), "Foreign Ownership and Energy Efficiency in Thai Manufacturing Plants", Working Paper 2012-12, Kitakyushu: International Centre for the Study of Development.

Ramstetter, Eric D. and Phan Minh Ngoc (2007), "Employee Compensation, Ownership, and Producer Concentration in Vietnam's Manufacturing Industries", Working Paper 2007-07, Kitakyushu: International Centre for the Study of East Asian Development.

Ramstetter, Eric D. and Phan Minh Ngoc (2013), "Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing", *Journal of Asian Economics*, 25, 28-42.

Ramstetter, Eric D. and Dionisius Narjoko (2013), "Wage Differentials between Foreign Multinationals and Local Plants and Worker Education in Indonesian Manufacturing", Working Paper 2013-23, Kitakyushu: International Centre for the Study of Development.

Ramstetter, Eric D. and Kien Trung Nguyen (2016), "Multinational Enterprises and Vietnam's Exports: Comparing Economy-wide and Firm-level Evidence", Working Paper 2016-22, Kitakyushu: Asian Growth Research Institute.

Ramstetter, Eric D. and Sadayuki Takii (2006), "Exporting and Foreign Ownership in Indonesian Manufacturing 1990-2000", *Economics and Finance in Indonesia*, 54(3), 317-345.

Ramstetter, Eric D. and Masaaru Umemoto (2006), "Exports and Foreign Ownership in Thai Manufacturing" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 194-219.

Roberts, Mark J. and James R. Tybout (1997), "The Decision to Export in Colombia: an Empirical Model of Entry with Sunk Costs", *American Economic Review*, 87(4), 545-564.

Rugman, Alan M., (1980) "Internalization as a General Theory of Foreign Direct Investment: A Re-Appraisal of the Literature", *Weltwirtschaftliches Archiv*, 116(2), 365-379.

Rugman, Alan M. (1985) "Internalization is Still a General Theory of Foreign Direct Investment", *Weltwirtschaftliches Archiv*, 121(3), 570-575.

Sjöholm, Fredrik and Sadayuki Takii (2006), "Multinational Companies and Exports in Indonesian Manufacturing Exports" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 173-193.

Takii, Sadayuki (2004), "Productivity differentials between local and foreign plants in Indonesian manufacturing, 1995", *World Development*, vol. 32, no. 11, pp. 1957-69.

Umemoto, Masaru and Eric D. Ramstetter (2006), "Exports and Foreign Ownership in Thai Manufacturing" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 194-219.

Table 1: Key Indicators for Thai Manufacturing

Sample	Number of plants	Thousands		Values in billion baht			
		Workers	Paid workers	Fixed assets (avg.)	Exports	Output	Value added
Published industrial census estimates (National Statistical Office 2009)							
All plants	457,968	4,460.3	3,819.0	3,183.2	-	7,304.5	1,758.8
16+ workers	26,293	3,476.9	3,422.9	2,882.6	-	7,042.2	1,667.7
All plants in database underlying National Statistical Office (2009)							
All plants	73,931	3,726.4	3,591.5	2,972.9	2,475.6	7,146.6	1,716.6
16+ workers	26,293	3,476.9	3,422.9	2,882.6	2,473.4	7,042.2	1,672.5
20+ workers	22,934	3,418.6	3,371.0	2,859.4	2,471.7	7,001.2	1,661.7
Sample plants	13,947	2,519.1	2,509.8	2,403.6	2,012.9	5,855.8	1,378.6
Local plants in database (foreign shares 0-9%)							
All plants	71,274	2,782.5	2,648.9	1,764.9	1,106.3	4,093.3	1,007.1
16+ workers	23,777	2,534.5	2,481.7	1,676.1	1,104.8	3,993.9	963.8
20+ workers	20,503	2,477.7	2,431.3	1,654.5	1,103.9	3,956.4	953.6
Sample plants	11,960	1,727.4	1,719.0	1,356.0	911.5	3,228.6	794.3
Minority-foreign plants in database (foreign shares 10-49%)							
All plants	1,220	304.9	304.6	381.2	298.9	992.4	166.3
16+ workers	1,123	303.9	303.6	380.5	298.3	990.4	165.8
20+ workers	1,063	302.9	302.6	379.6	298.1	988.6	165.6
Sample plants	909	263.1	262.9	353.0	263.4	908.3	149.4
Majority-foreign plants in database (foreign shares 50-89%)							
All plants	440	178.1	178.0	270.4	183.9	495.7	95.7
16+ workers	420	177.9	177.8	270.2	183.8	495.0	95.6
20+ workers	409	177.7	177.6	269.9	183.4	494.0	95.5
Sample plants	355	156.3	156.2	225.6	164.9	451.3	87.6
Heavily-foreign plants in database (foreign shares 90-100%)							
All plants	997	460.8	460.1	556.5	886.6	1,565.2	447.6
16+ workers	973	460.6	459.8	555.8	886.5	1,563.0	447.2
20+ workers	959	460.3	459.6	555.3	886.4	1,562.2	447.1
Sample plants	723	372.2	371.8	469.0	673.1	1,267.6	347.2
Alternative estimates for Thai manufacturing and database ratios to alternative estimates							
Alternatives	-	5,504.1	-	6,114.2	4,280.2	10,285.2	2,548.5
All plants ratio %	-	68%	-	49%	58%	69%	67%
Sample ratio %	-	46%	-	39%	47%	57%	54%

Notes: For plant data, fixed assets are averages of initial and ending stocks abd exports are estimated as the product of export propensities and output from National Statistical Office (2009); for alternative estimates: employment is the average of labor force survey estimates for quarters 1-4 (National Statistical Office 2011); value added and gross output from national accounts data (National Economic and Social Development Board 2012); fixed assets (gross capital stock at replacement value) from capital stock estimates (National Economic and Social Development Board 2015); exports from Bank of Thailand's (2018) commodity classification; samples include one plant from each set of duplicates and exclude plants with unreasonably low output, value added, or fixed assets per worker (see text and Appendix Table 1 for details).

Table 2: Exports by Industry and Owner (total in billion baht, MNE shares in percent)

Industry	Total	MNE shares by ownership group			
		10%+	10-49%	50-89%	90%+
Manufacturing	2,012.88	55	13	8	33
Sample industries	1,949.97	54	11	8	35
Food products	231.74	22	11	4	7
Beverages	6.85	47	45	0	1
Textiles	76.76	36	6	24	6
Apparel	77.11	32	19	1	11
Leather	11.63	15	0	3	11
Footwear	6.58	11	5	1	5
Wood products	16.14	11	9	1	1
Paper products	22.39	79	6	2	71
Chemicals	93.69	45	10	9	26
Rubber products	123.50	49	13	10	26
Plastics	35.02	52	12	9	30
Non-metallic mineral products	23.34	21	10	3	8
Basic metals	43.91	62	25	1	36
Metal products	62.62	69	8	2	59
Non-electric machinery	230.88	59	29	8	22
Electronics-related machinery	689.17	70	3	9	57
Motor vehicles	97.15	48	4	9	36
Other transport machinery	12.69	79	34	44	1
Furniture	16.76	19	7	9	3
Miscellaneous manufactures	72.07	60	18	7	35
Excluded industries	62.91	91	84	6	1
Tobacco	2.16	63	63	0	0
Publishing	1.70	63	59	0	5
Petroleum products	58.67	93	86	7	0
Recycling	0.38	72	0	0	72

Note: Exports are estimated as the product of export propensities and output.

Source: Compilations from data underlying National Statistical Office (2009).

Table 3: Export Propensities (percent) in MNEs by Industry and Foreign Share and MNE-local differentials (percentage points)

	MNE Intensities			MNE-local differentials		
Industry	10-49%	50-89%	90%+	10-49%	50-89%	90%+
Manufacturing (plant mean)	30.28	39.98	50.68	18.66	28.36	39.06
Sample industries (plant mean)	30.57	40.04	51.14	18.42	27.89	38.99
Food products	50.35	54.29	46.81	36.67	40.61	33.13
Beverages	25.13	0.00	10.00	20.97	-4.16	5.84
Textiles	28.57	60.63	54.19	17.85	49.91	43.47
Apparel	55.73	54.00	96.64	34.04	32.31	74.95
Leather	5.62	24.83	74.75	-11.97	7.24	57.16
Footwear	28.00	95.00	92.25	6.37	73.37	70.62
Wood products	44.91	5.00	64.00	29.72	-10.19	48.81
Paper products	13.92	24.29	22.73	7.98	18.35	16.79
Chemicals	18.71	24.43	33.18	11.11	16.83	25.58
Rubber products	36.92	64.67	64.89	8.82	36.57	36.79
Plastics	20.72	31.55	37.87	14.42	25.25	31.57
Non-metallic mineral products	26.21	49.22	53.85	18.77	41.78	46.41
Basic metals	13.80	11.83	44.65	4.99	3.02	35.84
Metal products	15.25	29.00	34.97	12.35	26.10	32.07
Non-electric machinery	26.56	29.35	47.37	17.74	20.53	38.55
Electronics-related machinery	31.56	51.38	54.84	16.43	36.25	39.71
Motor vehicles	19.81	17.05	36.93	11.57	8.81	28.69
Other transport machinery	13.23	32.50	33.33	7.93	27.20	28.03
Furniture	31.75	51.83	80.00	17.73	37.81	65.98
Miscellaneous manufactures	62.82	75.35	89.80	25.66	38.19	52.64

Note: Data refer to export propensities reported by plants.

Source: Compilations from data underlying National Statistical Office (2009).

Table 4: Estimates of Slope Coefficients and Indicators for Equations (1) and (2) in 20 Sample Industries Combined (Tobit estimates; all p-values based on robust standard errors)

Independent variable,	3-digit industry dummies		4-digit industry dummies	
statistic, or indicator	Equation (1)	Equation (2)	Equation (1)	Equation (2)
LOU_i	44.8985 a	45.7469 a	49.2034 a	50.3082 a
LOU_i^2	-1.0766 a	-1.0849 a	-1.1845 a	-1.2011 a
LYR_i	0.5804	1.1007	0.1503	0.4637
LYR_i^2	0.0140	-0.1699	0.1110	-0.0062
LKL_i	2.4828	-	2.3613	-
LKL_i^2	-0.1745	-	-0.1361	-
LPL_i	13.3781 a	-	9.8368 b	-
LPL_i^2	1.5242	-	0.6130	-
LVL_i	-	-7.8888	-	-7.9833
LVL_i^2	-	0.1935	-	0.2275
$DBOI_i$	112.4571 a	112.1096 a	108.8477 a	108.5754 a
$DF1_i$	7.3738 a	6.7564 a	7.4226 a	6.9843 a
$DF5_i$	13.3433 a	12.3469 a	13.1321 a	12.5465 a
$DF9_i$	20.7570 a	19.7657 a	20.6866 a	20.0637 a
Test: $DF1_i=DF5_i=DF9_i$	13.46 a	12.75 a	13.71 a	13.34 a
F-statistic	158.30 a	164.32 a	87.77 a	89.33 a
Observations	13,264	13,306	13,264	13,306
Pseudo-R^2	0.22	0.22	0.22	0.22

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level (all p-values based on robust standard errors); estimated equations also include 3- and 4-digit industry dummies as indicated and relevant (see explanation in the text); for further sample details and precise p-values, see Appendix Table 4.

Table 5: Estimates of MNE Slope Coefficients for Equations (1) and (2) for 20 Individual Sample Industries (Tobit estimates; all p-values based on robust standard errors)

Independent variable	3-digit industry dummies		4-digit industry dummies	
or statistic	Equation (1)	Equation (2)	Equation (1)	Equation (2)
FOOD PRODUCTS (1,983-1,989 observations; Pseudo-R2=0.27-0.28)				
$DF1_i$	12.6416 b	12.4587 b	16.1439 a	16.1207 a
$DF5_i$	37.5931 a	35.1289 a	38.7532 a	35.8560 a
$DF9_i$	11.8310	11.9554	13.1603	13.2341
Test: $DF1_i=DF5_i=DF9_i$	2.56 c	2.29 c	2.30 c	1.91
BEVERAGES (167 observations; Pseudo-R2=0.30; no 3-digit dummies)				
$DF1_i$	19.1976	22.8589 c	19.3134	20.9971
$DF5_i$	-86.2390 b	-86.2142 a	-85.8394 b	-87.5944 a
$DF9_i$	-57.8945 a	-50.6144 a	-58.2841 a	-47.5429 a
Test: $DF1_i=DF5_i=DF9_i$	8.43 a	12.29 a	6.75 a	8.96 a
TEXTILES (953-959 observations; Pseudo-R^2=0.22)				
$DF1_i$	0.7537	0.8041	0.8285	0.8710
$DF5_i$	-0.1932	-0.1884	-0.3026	-0.2847
$DF9_i$	-0.7258	-0.6791	-0.3692	-0.3347
Test: $DF1_i=DF5_i=DF9_i$	0.60	0.61	0.51	0.52
APPAREL (894-897 observations; Pseudo-R2=0.18)				
$DF1_i$	16.9266	17.9842 c	4-digit & 3 digit categories	
$DF5_i$	22.0336	25.9962	are identical	
$DF9_i$	58.4210 a	59.5371 a		
Test: $DF1_i=DF5_i=DF9_i$	1.73	1.59		
LEATHER (147-151 observations; Pseudo-R2=0.19-0.21)				
$DF1_i$	-6.9743	-10.2583	-14.6068	-12.9462
$DF5_i$	34.4320 a	28.2590	13.5851	22.0107
$DF9_i$	47.7325 b	46.3196 b	34.2724 c	40.4391 c
Test: $DF1_i=DF5_i=DF9_i$	5.20 a	3.99 b	2.80 c	3.49 b
FOOTWEAR (192-193 observations; Pseudo-R2=0.19, no 3- or 4-digit dummies)				
$DF1_i$	-37.5707 a	-43.6288 a	4-digit & 3 digit categories	
$DF5_i$	4.6527	13.5985	are identical	
$DF9_i$	99.5829 a	105.1374 a		
Test: $DF1_i=DF5_i=DF9_i$	9.86 a	12.88 a		
WOOD PRODUCTS (540-544 observations; Pseudo-R2=0.24-0.25)				
$DF1_i$	12.1705	11.7164	6.3341	4.3575
$DF5_i$	-30.8580 a	-55.8687 a	-29.6701 a	-45.5819 a
$DF9_i$	26.0682 c	23.9381 c	22.8279	19.5935
Test: $DF1_i=DF5_i=DF9_i$	8.72 a	29.30 a	5.20 a	11.18 a
PAPER PRODUCTS (486 observations; Pseudo-R2=0.26-0.27)				
$DF1_i$	5.8875	1.4731	8.0029	2.9066
$DF5_i$	7.3743	3.2299	-1.7922	-4.8177
$DF9_i$	18.6185 b	18.2517 b	15.7320	17.0999 c
Test: $DF1_i=DF5_i=DF9_i$	0.62	0.84	0.66	1.05

Table 5 (continued)

Independent variable	3-digit industry dummies		4-digit industry dummies	
or statistic	Equation (1)	Equation (2)	Equation (1)	Equation (2)
CHEMICALS (869-870 observations; Pseudo-R^2=0.16)				
$DF1_i$	5.3664	5.1027	5.8591	5.5133
$DF5_i$	14.9806 b	14.5457 c	13.5455 c	13.3298 c
$DF9_i$	16.4077 a	15.4246 a	18.4594 a	17.7401 a
Test: $DF1_i=DF5_i=DF9_i$	1.65	1.43	1.83	1.69
RUBBER PRODUCTS (331-332 observations; Pseudo-R^2=0.18-0.19)				
$DF1_i$	-12.9807 b	-8.7928	-11.0197 c	-6.8881
$DF5_i$	11.3778	15.8978 b	11.0614	16.8829 b
$DF9_i$	4.9093	10.6292	6.5681	13.2559 c
Test: $DF1_i=DF5_i=DF9_i$	4.03 b	4.33 b	4.06 b	4.62 a
PLASTICS (1,004-1,005 observations; Pseudo-R^2=0.21; no 3- or 4-digit dummies)				
$DF1_i$	4.6665	4.4907	4-digit & 3 digit categories	
$DF5_i$	15.8722	18.4071 c	are identical	
$DF9_i$	20.7537 a	22.2606 a		
Test: $DF1_i=DF5_i=DF9_i$	2.07	2.72 c		
NON-METALLIC MINERAL PRODUCTS (890-894 observations; Pseudo-R^2=0.25-0.27)				
$DF1_i$	13.0016	10.5544	11.6763	11.5039
$DF5_i$	19.6126 c	23.3807 b	17.9874	19.7564
$DF9_i$	25.0683 b	20.7169 c	18.1048 b	13.7290
Test: $DF1_i=DF5_i=DF9_i$	0.45	0.55	0.20	0.17
BASIC METALS (372 observations; Pseudo-R2=0.22-0.23)				
$DF1_i$	-8.4504	-6.1531	-8.2128	-5.8052
$DF5_i$	16.1751	23.5286	16.9883	24.3527 c
$DF9_i$	21.4522 b	24.6034 a	22.0300 a	24.9297 a
Test: $DF1_i=DF5_i=DF9_i$	4.54 a	4.35 a	21.05 a	4.21 b
METAL PRODUCTS (1,241-1,242 observations; Pseudo-R2=0.24)				
$DF1_i$	11.1999 b	10.7901 b	13.9642 a	13.2235 b
$DF5_i$	18.3954 b	18.9223 b	16.8725 c	17.6731 c
$DF9_i$	31.2667 a	28.8647 a	34.3739 a	31.8335 a
Test: $DF1_i=DF5_i=DF9_i$	2.89 c	2.56 c	3.34 b	2.89 c
NON-ELECTRIC MACHINERY (701-704 observations; Pseudo-R2=0.21-0.22)				
$DF1_i$	-1.6621	-3.2780	0.0192	-1.6360
$DF5_i$	0.1064	-2.0678	2.3078	0.1809
$DF9_i$	11.7474 b	11.5456 b	10.8478 c	11.5735 b
Test: $DF1_i=DF5_i=DF9_i$	2.47 c	3.15 b	1.63	2.60 c
ELECTRONICS-RELATED MACHINERY (814-817 observations; Pseudo-R^2=0.21)				
$DF1_i$	3.2318	3.2166	3.1082	3.1003
$DF5_i$	13.2053 b	11.4802 c	12.9649 b	11.2881 c
$DF9_i$	14.7191 a	14.6135 a	14.6078 a	14.4989 a
Test: $DF1_i=DF5_i=DF9_i$	1.51	1.46	1.52	1.46

Table 5 (continued)

Independent variable or statistic	3-digit industry dummies		4-digit industry dummies	
	Equation (1)	Equation (2)	Equation (1)	Equation (2)
MOTOR VEHICLES (449 observations; Pseudo-R^2=0.21)				
$DF1_i$	6.0621	6.3948	4-digit & 3 digit categories	
$DF5_i$	-12.8193 c	-11.2924	are identical	
$DF9_i$	1.6848	2.8073		
Test: $DF1_i=DF5_i=DF9_i$	2.85 c	2.66 c		
OTHER TRANSPORT MACHINERY (159 observations; Pseudo-R^2=0.31)				
$DF1_i$	16.4380	12.3009	16.3152	11.6822
$DF5_i$	-4.9919	-11.8793	-3.8801	-12.3564
$DF9_i$	51.1992 c	26.2200	53.2373 b	29.1965
Test: $DF1_i=DF5_i=DF9_i$	1.30	0.58	1.32	0.63
FURNITURE (466 observations; Pseudo-R^2=0.19; no 3- or 4-digit dummies)				
$DF1_i$	3.1979	0.5808	4-digit & 3 digit categories	
$DF5_i$	-1.3404	4.2252	are identical	
$DF9_i$	36.3836	40.9637		
Test: $DF1_i=DF5_i=DF9_i$	0.41	0.54		
MISCELLANEOUS MANUFACTURES (606-608 observations; Pseudo-R^2=0.15)				
$DF1_i$	13.8128	15.1430 c	10.0287	11.4728
$DF5_i$	16.5036	12.2583	17.4389	13.9054
$DF9_i$	42.6890 a	39.4849 a	40.5026 a	37.8590 a
Test: $DF1_i=DF5_i=DF9_i$	3.64 b	2.97 b	3.85 b	3.04 b

Notes: a=signficant at the 1% level, b=significant at the 5% level, c=significant at the 10% level (all p-values based on robust standard errors); estimated equations also include 3- and 4-digit industry dummies as indicated and relevant (see explanation in the text); for further sample details and precise p-values, see Appendix Table 5.

Appendix Table 1: Sampling Details from the Database on Thai Manufacturing Plants

Sample	Number of plants	Thousands		Values in billion baht			
		Workers	Paid workers	Fixed assets (avg.)	Exports	Output	Value added
All plants in database underlying National Statistical Office (2009)							
All plants	73,931	3,726.4	3,591.5	2,972.9	2,475.6	7,146.6	1,716.6
16+ workers	26,293	3,476.9	3,422.9	2,882.6	2,473.4	7,042.2	1,672.5
20+ workers	22,934	3,418.6	3,371.0	2,859.4	2,471.7	7,001.2	1,661.7
Extreme values	4,169	292.2	256.9	64.2	59.7	147.6	25.5
Duplicates eliminated	4,818	607.3	604.3	391.7	399.1	997.9	257.6
20+ workers, sample	13,947	2,519.1	2,509.8	2,403.6	2,012.9	5,855.8	1,378.6
Local plants (foreign shares 0-9%)							
All plants	71,274	2,782.5	2,648.9	1,764.9	1,106.3	4,093.3	1,007.1
16+ workers	23,777	2,534.5	2,481.7	1,676.1	1,104.8	3,993.9	963.8
20+ workers	20,503	2,477.7	2,431.3	1,654.5	1,103.9	3,956.4	953.6
Extreme values	4,080	254.7	219.4	30.3	21.5	82.4	15.0
Duplicates eliminated	4,463	495.6	492.9	268.3	170.9	645.4	144.2
20+ workers, sample	11,960	1,727.4	1,719.0	1,356.0	911.5	3,228.6	794.3
Minority-foreign plants in database (foreign shares 10-49%)							
All plants	1,220	304.9	304.6	381.2	298.9	992.4	166.3
16+ workers	1,123	303.9	303.6	380.5	298.3	990.4	165.8
20+ workers	1,063	302.9	302.6	379.6	298.1	988.6	165.6
Extreme values	33	19.4	19.4	4.5	22.7	38.1	6.6
Duplicates eliminated	121	20.3	20.3	22.1	11.9	42.2	9.6
Sample plants	909	263.1	262.9	353.0	263.4	908.3	149.4
Majority-foreign plants in database (foreign shares 50-89%)							
All plants	440	178.1	178.0	270.4	183.9	495.7	95.7
16+ workers	420	177.9	177.8	270.2	183.8	495.0	95.6
20+ workers	409	177.7	177.6	269.9	183.4	494.0	95.5
Extreme values	17	3.3	3.3	25.7	3.5	8.2	0.8
Duplicates eliminated	37	18.1	18.1	18.6	15.0	34.5	7.0
Sample plants	355	156.3	156.2	225.6	164.9	451.3	87.6
Heavily-foreign plants in database (foreign shares 90-100%)							
All plants	997	460.8	460.1	556.5	886.6	1,565.2	447.6
16+ workers	973	460.6	459.8	555.8	886.5	1,563.0	447.2
20+ workers	959	460.3	459.6	555.3	886.4	1,562.2	447.1
Extreme values	39	14.8	14.8	3.7	12.0	18.9	3.1
Duplicates eliminated	197	73.3	73.0	82.7	201.3	275.7	96.8
Sample plants	723	372.2	371.8	469.0	673.1	1,267.6	347.2

Notes: Fixed assets are averages of initial and ending stocks abd exoirts are estimated as the product of export propensities and output output from data underlying National Statistical Office (2009).

Appendix Table 2a: Exports of Sample Plants by Industry and Owner (billion baht)

Industry	Total	Local	MNEs by foreign share		
			10-49%	50-89%	90%+
Manufacturing	2,012.88	911.49	263.39	164.89	673.11
Sample industries	1,949.97	905.64	210.63	160.95	672.76
Food products	231.74	181.82	24.85	9.53	15.54
Beverages	6.85	3.64	3.12	0.00	0.09
Textiles	76.76	49.30	4.43	18.38	4.65
Apparel	77.11	52.70	14.95	1.08	8.38
Leather	11.63	9.93	0.02	0.38	1.30
Footwear	6.58	5.86	0.32	0.08	0.32
Wood products	16.14	14.42	1.44	0.12	0.16
Paper products	22.39	4.72	1.35	0.34	15.97
Chemicals	93.69	51.47	9.07	8.68	24.47
Rubber products	123.50	62.69	16.30	12.35	32.15
Plastics	35.02	16.92	4.29	3.31	10.49
Non-metallic mineral products	23.34	18.49	2.29	0.73	1.82
Basic metals	43.91	16.63	11.06	0.43	15.79
Metal products	62.62	19.32	4.95	1.54	36.81
Non-electric machinery	230.88	93.80	66.44	19.61	51.03
Electronics-related machinery	689.17	208.91	23.57	63.66	393.03
Motor vehicles	97.15	50.21	3.65	8.36	34.92
Other transport machinery	12.69	2.63	4.30	5.60	0.15
Furniture	16.76	13.52	1.16	1.51	0.57
Miscellaneous manufactures	72.07	28.62	13.07	5.27	25.11
Excluded industries	62.91	5.86	52.76	3.94	0.35
Tobacco	2.16	0.80	1.37	0.00	0.00
Publishing	1.70	0.63	1.00	0.00	0.08
Petroleum products	58.67	4.33	50.40	3.94	0.00
Recycling	0.38	0.11	0.00	0.00	0.27

Note: Exports are estimated as the product of export propensities and output.

Source: Compilations from data underlying National Statistical Office (2009).

Appendix Table 2b: Output of Sample Plants by Industry and Owner (billion baht)

Industry	Total	Local	MNEs by foreign share		
			10-49%	50-89%	90%+
Manufacturing	5,855.75	3,228.59	908.28	451.29	1,267.59
Sample industries	5,386.92	3,063.42	610.66	447.20	1,265.64
Food products	729.21	638.49	46.40	15.25	29.06
Beverages	161.43	129.74	26.03	4.72	0.93
Textiles	221.96	173.33	11.58	30.12	6.94
Apparel	137.86	102.92	24.02	1.76	9.17
Leather	34.34	31.10	1.07	0.84	1.34
Footwear	17.74	15.90	1.33	0.08	0.43
Wood products	51.90	47.80	2.87	0.89	0.34
Paper products	150.39	92.79	24.11	2.45	31.04
Chemicals	431.31	281.65	52.20	30.23	67.23
Rubber products	224.79	129.23	34.66	18.89	42.02
Plastics	165.79	109.98	18.96	10.45	26.39
Non-metallic mineral products	183.49	165.73	8.79	3.13	5.84
Basic metals	243.61	147.04	39.74	24.42	32.42
Metal products	249.78	150.70	35.46	7.02	56.61
Non-electric machinery	335.21	145.81	74.68	33.15	81.57
Electronics-related machinery	1,038.37	316.30	79.36	90.76	551.94
Motor vehicles	708.61	260.41	73.70	83.84	290.66
Other transport machinery	145.34	32.09	31.23	81.07	0.94
Furniture	51.46	42.91	5.37	1.89	1.29
Miscellaneous manufactures	104.31	49.51	19.09	6.24	29.47
Excluded industries	468.83	165.17	297.62	4.09	1.95
Tobacco	44.25	42.65	1.60	0.00	0.00
Publishing	61.37	49.54	9.90	0.26	1.67
Petroleum products	362.03	72.07	286.13	3.83	0.00
Recycling	1.19	0.91	0.00	0.00	0.28

Source: Compilations from data underlying National Statistical Office (2009).

Appendix Table 2c: Number of Sample Plants by Industry and Owner

Industry	Total	Local	MNEs by foreign share		
			10-49%	50-89%	90%+
Manufacturing	13,947	11,960	909	355	723
Sample industries	13,306	11,350	890	352	714
Food products	1,989	1,861	81	21	26
Beverages	167	156	8	2	1
Textiles	959	860	56	27	16
Apparel	897	831	45	10	11
Leather	193	170	13	6	4
Footwear	151	136	10	1	4
Wood products	544	527	11	3	3
Paper products	486	432	36	7	11
Chemicals	870	718	72	30	50
Rubber products	332	252	37	15	28
Plastics	1,005	836	69	31	69
Non-metallic mineral products	894	833	39	9	13
Basic metals	372	308	35	6	23
Metal products	1,242	1,064	93	26	59
Non-electric machinery	704	549	61	34	60
Electronics-related machinery	817	494	79	53	191
Motor vehicles	449	303	36	39	71
Other transport machinery	159	137	13	6	3
Furniture	468	437	20	6	5
Miscellaneous manufactures	608	446	76	20	66
Excluded industries	641	610	19	3	9
Tobacco	29	28	1	0	0
Publishing	529	505	14	2	8
Petroleum products	60	55	4	1	0
Recycling	23	22	0	0	1

Source: Compilations from data underlying National Statistical Office (2009).

Appendix Table 3: Export Propensities of Sample Plants (percent)

Industry	Local	MNCs by foreign share		
		10-49%	50-89%	90%+
Manufacturing (plant mean)	11.62	30.28	39.98	50.68
Sample industries (plant mean)	12.15	30.57	40.04	51.14
Food products	13.68	50.35	54.29	46.81
Beverages	4.16	25.13	0.00	10.00
Textiles	10.72	28.57	60.63	54.19
Apparel	21.69	55.73	54.00	96.64
Leather	17.59	5.62	24.83	74.75
Footwear	21.63	28.00	95.00	92.25
Wood products	15.19	44.91	5.00	64.00
Paper products	5.94	13.92	24.29	22.73
Chemicals	7.60	18.71	24.43	33.18
Rubber products	28.10	36.92	64.67	64.89
Plastics	6.30	20.72	31.55	37.87
Non-metallic mineral products	7.44	26.21	49.22	53.85
Basic metals	8.81	13.80	11.83	44.65
Metal products	2.90	15.25	29.00	34.97
Non-electric machinery	8.82	26.56	29.35	47.37
Electronics-related machinery	15.13	31.56	51.38	54.84
Motor vehicles	8.24	19.81	17.05	36.93
Other transport machinery	5.30	13.23	32.50	33.33
Furniture	14.02	31.75	51.83	80.00
Miscellaneous manufactures	37.16	62.82	75.35	89.80
Excluded industries				
Tobacco	5.39	92.00	-	-
Publishing	1.06	10.79	0.00	3.38
Petroleum products	4.65	18.25	100.00	-
Recycling	8.64	-	-	100.00

- = not available (0 plants in category)

Source: Compilations from data underlying National Statistical Office (2009).

Appendix Table 4: Estimates of Slope Coefficients and Indicators for Equations (1) and (2) in 20 Sample Industries Combined (Tobit estimates; all p-values based on robust standard errors)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
20 SAMPLE INDUSTRIES COMBINED								
LOU_i	44.8985	0.00	45.7469	0.00	49.2034	0.00	50.3082	0.00
LOU_i^2	-1.0766	0.00	-1.0849	0.00	-1.1845	0.00	-1.2011	0.00
LYR_i	0.5804	0.87	1.1007	0.76	0.1503	0.97	0.4637	0.90
LYR_i^2	0.0140	0.99	-0.1699	0.83	0.1110	0.88	-0.0062	0.99
LKL_i	2.4828	0.66	-	-	2.3613	0.67	-	-
LKL_i^2	-0.1745	0.43	-	-	-0.1361	0.53	-	-
LPL_i	13.3781	0.00	-	-	9.8368	0.02	-	-
LPL_i^2	1.5242	0.57	-	-	0.6130	0.82	-	-
LVL_i	-	-	-7.8888	0.36	-	-	-7.9833	0.34
LVL_i^2	-	-	0.1935	0.57	-	-	0.2275	0.50
$DBOI_i$	112.4571	0.00	112.1096	0.00	108.8477	0.00	108.5754	0.00
$DF1_i$	7.3738	0.00	6.7564	0.00	7.4226	0.00	6.9843	0.00
$DF5_i$	13.3433	0.00	12.3469	0.00	13.1321	0.00	12.5465	0.00
$DF9_i$	20.7570	0.00	19.7657	0.00	20.6866	0.00	20.0637	0.00
Test: $DF1_i=DF5_i=DF9_i$	13.46	0.00	12.75	0.00	13.71	0.00	13.34	0.00
F-statistic	158.30	0.00	164.32	0.00	87.77	0.00	89.33	0.00
Obs XS_i=0/ =100	9,060	575	9,099	575	9,060	575	9,099	575
All Obs./Pseudo-R^2	13,264	0.22	13,306	0.22	13,264	0.22	13,306	0.22

Note: Test: $DF1_i=DF5_i=DF9_i$ is a Wald Statistic testing the null hypothesis that coefficients on the three foreign ownership dummies are equal; estimated equations also include 3- or 4-digit industry dummies as indicated and relevant (see explanation in the text; detailed estimates including all dummies and the constant are available from authors).

Appendix Table 5: Estimates of Slope Coefficients for Equations (1) and (2) for 20 Individual Sample Industries (Tobit estimates; all p-values based on robust standard errors)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
FOOD PRODUCTS (ISIC 151,152,153,154)								
LOU_i	61.3702	0.00	61.7332	0.00	53.8037	0.00	57.7508	0.00
LOU_i^2	-1.5249	0.00	-1.5073	0.00	-1.3193	0.00	-1.4059	0.00
LYR_i	10.7668	0.29	14.7433	0.14	11.2850	0.25	14.9644	0.12
LYR_i^2	-2.2072	0.27	-3.2024	0.11	-2.1621	0.27	-2.9504	0.13
LKL_i	45.0727	0.01	-	-	46.2761	0.00	-	-
LKL_i^2	-1.8796	0.00	-	-	-1.8866	0.00	-	-
LPL_i	45.5993	0.00	-	-	30.2036	0.01	-	-
LPL_i^2	20.8828	0.01	-	-	15.6533	0.05	-	-
LVL_i	-	-	-13.5502	0.46	-	-	-18.8714	0.29
LVL_i^2	-	-	0.3230	0.66	-	-	0.6121	0.38
$DBOI_i$	129.2486	0.00	129.7774	0.00	122.8611	0.00	123.1868	0.00
$DF1_i$	12.6416	0.02	12.4587	0.03	16.1439	0.00	16.1207	0.00
$DF5_i$	37.5931	0.00	35.1289	0.00	38.7532	0.00	35.8560	0.00
$DF9_i$	11.8310	0.26	11.9554	0.29	13.1603	0.20	13.2341	0.21
Test: $DF1_i=DF5_i=DF9_i$	2.56	0.08	2.29	0.10	2.30	0.10	1.91	0.15
F-statistic	100.32	0.00	112.61	0.00	68.48	0.00	72.37	0.00
Obs XS_i=0/ =100	1,424	96	1,430	96	1,424	96	1,430	96
All Obs./Pseudo-R^2	1,983	0.27	1,989	0.27	1,983	0.28	1,989	0.28
BEVERAGES (ISIC 155, no 3-digit industry dummies)								
LOU_i	113.7994	0.01	124.4523	0.01	113.9273	0.01	122.7557	0.01
LOU_i^2	-2.9608	0.01	-3.2493	0.01	-2.9643	0.01	-3.2120	0.01
LYR_i	-30.8684	0.17	-32.3573	0.15	-31.1076	0.19	-30.4921	0.19
LYR_i^2	4.8525	0.35	5.1683	0.28	4.8999	0.38	4.7930	0.35
LKL_i	49.4209	0.38	-	-	50.1545	0.39	-	-
LKL_i^2	-1.8736	0.37	-	-	-1.9021	0.38	-	-
LPL_i	-7.1864	0.87	-	-	-7.5472	0.87	-	-
LPL_i^2	-10.2818	0.74	-	-	-10.4093	0.74	-	-
LVL_i	-	-	-19.7035	0.73	-	-	-22.1393	0.71
LVL_i^2	-	-	0.6981	0.73	-	-	0.8273	0.71
$DBOI_i$	113.3978	0.00	115.4144	0.00	113.2525	0.00	116.4725	0.00
$DF1_i$	19.1976	0.28	22.8589	0.10	19.3134	0.32	20.9971	0.18
$DF5_i$	-86.2390	0.01	-86.2142	0.00	-85.8394	0.03	-87.5944	0.00
$DF9_i$	-57.8945	0.00	-50.6144	0.00	-58.2841	0.00	-47.5429	0.00
Test: $DF1_i=DF5_i=DF9_i$	8.43	0.00	12.29	0.00	6.75	0.00	8.96	0.00
F-statistic	12.42	0.00	12.09	0.00	11.47	0.00	11.31	0.00
Obs XS_i=0/ =100	139	3	139	3	139	3	139	3
All Obs./Pseudo-R^2	167	0.30	167	0.30	167	0.30	167	0.30

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
TEXTILES (ISIC 17)								
LOU_i	27.6674	0.25	27.5714	0.21	28.8329	0.25	27.6363	0.22
LOU_i^2	-0.5690	0.37	-0.5402	0.35	-0.6002	0.36	-0.5420	0.37
LYR_i	22.4960	0.08	17.7440	0.14	23.2619	0.08	18.2845	0.14
LYR_i^2	-4.5632	0.10	-3.5951	0.17	-4.7546	0.09	-3.7416	0.17
LKL_i	-2.7769	0.91	-	-	-2.3467	0.92	-	-
LKL_i^2	0.2001	0.83	-	-	0.1983	0.83	-	-
LPL_i	20.7797	0.31	-	-	20.9523	0.31	-	-
LPL_i^2	-3.5762	0.74	-	-	-3.2625	0.77	-	-
LVL_i	-	-	-37.7398	0.30	-	-	-34.6819	0.34
LVL_i^2	-	-	1.4968	0.31	-	-	1.3798	0.35
$DBOI_i$	101.0844	0.00	102.0417	0.00	101.0072	0.00	102.2183	0.00
$DF1_i$	29.9043	0.00	27.9150	0.00	30.6898	0.00	28.5452	0.00
$DF5_i$	22.7910	0.00	22.4585	0.01	23.1780	0.00	22.9882	0.00
$DF9_i$	17.1700	0.01	16.2839	0.01	16.5481	0.01	15.9669	0.02
Test: $DF1_i=DF5_i=DF9_i$	0.86	0.42	0.70	0.50	0.99	0.37	0.75	0.47
F-statistic	51.23	0.00	59.10	0.00	42.21	0.00	46.59	0.00
Obs XS_i=0/ =100	702	23	707	23	702	23	707	23
All Obs./Pseudo-R^2	953	0.22	959	0.22	953	0.22	959	0.22
APPAREL (ISIC 18)								
LOU_i	154.5548	0.00	149.0271	0.00	4-digit & 3 digit categories			
LOU_i^2	-3.8908	0.00	-3.7433	0.00	are identical			
LYR_i	-33.9519	0.02	-29.0040	0.04				
LYR_i^2	8.3434	0.02	7.1698	0.04				
LKL_i	63.1906	0.10	-	-				
LKL_i^2	-2.5565	0.11	-	-				
LPL_i	50.0988	0.06	-	-				
LPL_i^2	12.5981	0.21	-	-				
LVL_i	-	-	49.1583	0.44				
LVL_i^2	-	-	-1.9634	0.47				
$DBOI_i$	121.6452	0.00	125.6534	0.00				
$DF1_i$	16.9266	0.12	17.9842	0.10				
$DF5_i$	22.0336	0.25	25.9962	0.18				
$DF9_i$	58.4210	0.00	59.5371	0.01				
Test: $DF1_i=DF5_i=DF9_i$	1.73	0.18	1.59	0.20				
F-statistic	39.56	0.00	45.77	0.00				
Obs XS_i=0/ =100	567	85	570	85				
All Obs./Pseudo-R^2	894	0.18	897	0.18				

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
LEATHER (ISIC 191)								
LOU_i	-70.5414	0.24	-75.2369	0.20	-64.0862	0.24	-66.3018	0.22
LOU_i^2	2.1382	0.20	2.3642	0.15	2.0376	0.18	2.1489	0.16
LYR_i	23.1160	0.12	28.5161	0.07	27.2810	0.05	28.3073	0.08
LYR_i^2	-1.3448	0.75	-2.7073	0.53	-1.4905	0.70	-2.1868	0.62
LKL_i	-45.4346	0.12	-	-	-49.7445	0.09	-	-
LKL_i^2	1.8958	0.12	-	-	2.3232	0.06	-	-
LPL_i	53.8487	0.17	-	-	69.9054	0.06	-	-
LPL_i^2	40.5954	0.23	-	-	46.1944	0.12	-	-
LVL_i	-	-	71.4996	0.41	-	-	17.6753	0.84
LVL_i^2	-	-	-3.3529	0.35	-	-	-0.9495	0.79
$DBOI_i$	98.7859	0.00	101.8768	0.00	97.3684	0.00	99.4029	0.00
$DF1_i$	-6.9743	0.60	-10.2583	0.44	-14.6068	0.25	-12.9462	0.30
$DF5_i$	34.4320	0.00	28.2590	0.13	13.5851	0.26	22.0107	0.24
$DF9_i$	47.7325	0.02	46.3196	0.03	34.2724	0.08	40.4391	0.06
Test: $DF1_i=DF5_i=DF9_i$	5.20	0.01	3.99	0.02	2.80	0.06	3.49	0.03
F-statistic	63.00	0.00	80.68	0.00	72.89	0.00	76.74	0.00
Obs XS_i=0/ =100	82	5	86	5	82	5	86	5
All Obs./Pseudo-R^2	147	0.19	151	0.20	147	0.21	151	0.20
FOOTWEAR (ISIC 192, no 3- or 4-digit industry dummies)								
LOU_i	156.9788	0.02	137.2675	0.07	4-digit & 3 digit categories			
LOU_i^2	-4.1642	0.02	-3.6011	0.08	are identical			
LYR_i	7.6131	0.80	21.9560	0.54				
LYR_i^2	-1.9569	0.73	-4.4674	0.50				
LKL_i	159.6563	0.03	-	-				
LKL_i^2	-6.8318	0.02	-	-				
LPL_i	-168.314	0.16	-	-				
LPL_i^2	-376.833	0.11	-	-				
LVL_i	-	-	20.5568	0.80				
LVL_i^2	-	-	-0.8637	0.79				
$DBOI_i$	113.1505	0.00	111.2371	0.00				
$DF1_i$	-37.5707	0.00	-43.6288	0.00				
$DF5_i$	4.6527	0.80	13.5985	0.40				
$DF9_i$	99.5829	0.00	105.1374	0.00				
Test: $DF1_i=DF5_i=DF9_i$	9.86	0.00	12.88	0.00				
F-statistic	13.35	0.00	14.66	0.00				
Obs XS_i=0/ =100	123	11	124	11				
All Obs./Pseudo-R^2	192	0.19	193	0.19				

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
WOOD PRODUCTS (ISIC 20)								
LOU_i	89.3915	0.11	111.0702	0.04	101.0119	0.06	105.2489	0.04
LOU_i^2	-2.2706	0.14	-2.9200	0.05	-2.5101	0.10	-2.6628	0.06
LYR_i	30.2422	0.03	26.6779	0.05	21.7490	0.09	15.1156	0.24
LYR_i^2	-4.3578	0.22	-3.3862	0.34	-2.8106	0.38	-1.2516	0.70
LKL_i	16.4017	0.70	-	-	8.0349	0.84	-	-
LKL_i^2	-1.0262	0.55	-	-	-0.6331	0.69	-	-
LPL_i	24.6169	0.23	-	-	13.2217	0.52	-	-
LPL_i^2	11.5232	0.21	-	-	8.7326	0.34	-	-
LVL_i	-	-	46.5727	0.27	-	-	66.4452	0.09
LVL_i^2	-	-	-2.1177	0.21	-	-	-2.8545	0.07
$DBOI_i$	134.0546	0.00	131.9681	0.00	124.0384	0.00	122.3038	0.00
$DF1_i$	12.1705	0.21	11.7164	0.21	6.3341	0.54	4.3575	0.66
$DF5_i$	-30.8580	0.00	-55.8687	0.00	-29.6701	0.01	-45.5819	0.00
$DF9_i$	26.0682	0.10	23.9381	0.08	22.8279	0.29	19.5935	0.35
Test: $DF1_i=DF5_i=DF9_i$	8.72	0.00	29.30	0.00	5.20	0.01	11.18	0.00
F-statistic	49.50	0.00	55.13	0.00	37.42	0.00	0.00	0.00
Obs XS_i=0/ =100	390	13	394	13	390	13	394	13
All Obs./Pseudo-R^2	540	0.24	544	0.24	540	0.25	544	0.25
PAPER PRODUCTS (ISIC 21)								
LOU_i	-22.6306	0.48	-7.6158	0.81	-30.4160	0.32	-15.5073	0.59
LOU_i^2	0.3324	0.70	0.0626	0.94	0.5683	0.49	0.3052	0.69
LYR_i	-1.2640	0.96	-0.8680	0.98	6.1081	0.83	6.0853	0.84
LYR_i^2	0.0004	1.00	-0.2884	0.96	-1.6379	0.76	-1.8419	0.75
LKL_i	29.1070	0.42	-	-	37.3661	0.29	-	-
LKL_i^2	-0.9875	0.47	-	-	-1.2927	0.33	-	-
LPL_i	-45.4769	0.07	-	-	-39.3518	0.10	-	-
LPL_i^2	-28.1351	0.02	-	-	-26.8423	0.02	-	-
LVL_i	-	-	-17.4442	0.80	-	-	4.8914	0.94
LVL_i^2	-	-	0.4295	0.87	-	-	-0.4649	0.86
$DBOI_i$	131.3337	0.00	127.5951	0.00	124.3675	0.00	120.5320	0.00
$DF1_i$	5.8875	0.58	1.4731	0.90	8.0029	0.39	2.9066	0.78
$DF5_i$	7.3743	0.54	3.2299	0.80	-1.7922	0.89	-4.8177	0.73
$DF9_i$	18.6185	0.05	18.2517	0.05	15.7320	0.13	17.0999	0.08
Test: $DF1_i=DF5_i=DF9_i$	0.62	0.54	0.84	0.43	0.66	0.52	1.05	0.35
F-statistic	12.17	0.00	14.30	0.00	11.13	0.00	13.24	0.00
Obs XS_i=0/ =100	387	12	387	12	387	12	387	12
All Obs./Pseudo-R^2	486	0.26	486	0.26	486	0.27	486	0.27

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
CHEMICALS (ISIC 24)								
LOU_i	24.4703	0.13	8.9938	0.57	30.8982	0.06	16.0781	0.34
LOU_i^2	-0.6348	0.13	-0.1988	0.63	-0.8018	0.06	-0.3838	0.38
LYR_i	10.6639	0.17	10.2189	0.20	12.2501	0.13	11.8557	0.15
LYR_i^2	-2.2401	0.16	-2.2078	0.18	-2.4941	0.13	-2.4466	0.14
LKL_i	-28.8168	0.03	-	-	-30.8084	0.02	-	-
LKL_i^2	1.0790	0.02	-	-	1.1519	0.01	-	-
LPL_i	-1.5704	0.89	-	-	-1.9919	0.85	-	-
LPL_i^2	-7.8550	0.31	-	-	-6.4680	0.36	-	-
LVL_i	-	-	-2.1115	0.91	-	-	-4.7281	0.79
LVL_i^2	-	-	0.0079	0.99	-	-	0.1143	0.87
$DBOI_i$	70.0764	0.00	70.3974	0.00	68.4600	0.00	68.6238	0.00
$DF1_i$	5.3664	0.27	5.1027	0.29	5.8591	0.23	5.5133	0.26
$DF5_i$	14.9806	0.04	14.5457	0.05	13.5455	0.06	13.3298	0.07
$DF9_i$	16.4077	0.00	15.4246	0.01	18.4594	0.00	17.7401	0.00
Test: $DF1_i$=$DF5_i$=$DF9_i$	1.65	0.19	1.43	0.24	1.83	0.16	1.69	0.19
F-statistic	29.41	0.00	34.16	0.00	22.31	0.00	24.82	0.00
Obs XS_i=0/ =100	534	9	535	9	534	9	535	9
All Obs./Pseudo-R^2	869	0.16	870	0.16	869	0.16	870	0.16
RUBBER PRODUCTS (ISIC 251, no 3-digit industry dummies)								
LOU_i	28.5320	0.31	44.3480	0.11	21.4476	0.41	35.7419	0.20
LOU_i^2	-0.5785	0.42	-1.0142	0.16	-0.3888	0.56	-0.7617	0.29
LYR_i	-2.4628	0.88	-6.4963	0.72	-2.1536	0.89	-7.2039	0.67
LYR_i^2	0.1363	0.97	2.1253	0.58	0.6369	0.84	2.6412	0.46
LKL_i	-62.0428	0.04	-	-	-68.3719	0.03	-	-
LKL_i^2	2.3981	0.05	-	-	2.7312	0.03	-	-
LPL_i	-37.2199	0.28	-	-	-4.3112	0.90	-	-
LPL_i^2	-115.407	0.01	-	-	-84.8908	0.05	-	-
LVL_i	-	-	-101.415	0.00	-	-	-82.7374	0.00
LVL_i^2	-	-	3.9733	0.00	-	-	3.2177	0.00
$DBOI_i$	99.3440	0.00	97.6580	0.00	94.9031	0.00	93.0892	0.00
$DF1_i$	-12.9807	0.04	-8.7928	0.14	-11.0197	0.06	-6.8881	0.24
$DF5_i$	11.3778	0.19	15.8978	0.05	11.0614	0.17	16.8829	0.02
$DF9_i$	4.9093	0.57	10.6292	0.18	6.5681	0.43	13.2559	0.10
Test: $DF1_i$=$DF5_i$=$DF9_i$	4.03	0.02	4.33	0.01	4.06	0.02	4.62	0.01
F-statistic	47.65	0.00	56.61	0.00	46.98	0.00	48.65	0.00
Obs XS_i=0/ =100	151	13	151	13	151	13	151	13
All Obs./Pseudo-R^2	331	0.18	332	0.18	331	0.19	332	0.18

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
PLASTICS (ISIC 252, no 3- or 4-digit industry dummies)								
LOU_i	21.2365	0.59	20.9478	0.58	4-digit & 3 digit categories			
LOU_i^2	-0.5917	0.58	-0.5488	0.59	are identical			
LYR_i	-11.0585	0.43	-9.5811	0.47				
LYR_i^2	2.9148	0.35	2.4473	0.42				
LKL_i	-25.7759	0.39	-	-				
LKL_i^2	1.0935	0.35	-	-				
LPL_i	0.4740	0.98	-	-				
LPL_i^2	-0.4155	0.98	-	-				
LVL_i	-	-	-73.6359	0.02				
LVL_i^2	-	-	2.8435	0.03				
$DBOI_i$	114.6588	0.00	113.3287	0.00				
$DF1_i$	4.6665	0.49	4.4907	0.49				
$DF5_i$	15.8722	0.15	18.4071	0.09				
$DF9_i$	20.7537	0.00	22.2606	0.00				
Test: $DF1_i=DF5_i=DF9_i$	2.07	0.13	2.72	0.07				
F-statistic	31.66	0.00	38.27	0.00				
Obs $XS_i=0/=100$	738	27	738	27				
All Obs./Pseudo-R^2	1,004	0.21	1,005	0.21				
NON-METALLIC METAL PRODUCTS (ISIC 26)								
LOU_i	17.6439	0.43	31.4030	0.15	56.1400	0.02	76.2013	0.00
LOU_i^2	-0.5410	0.37	-0.9370	0.12	-1.5463	0.01	-2.1290	0.00
LYR_i	-20.5638	0.14	-19.4970	0.16	-23.8142	0.10	-23.1656	0.11
LYR_i^2	4.1529	0.19	3.7822	0.24	4.2000	0.19	4.0567	0.19
LKL_i	14.0010	0.58	-	-	11.8786	0.60	-	-
LKL_i^2	-0.8006	0.41	-	-	-0.5833	0.50	-	-
LPL_i	7.5805	0.72	-	-	-13.9965	0.50	-	-
LPL_i^2	-4.1742	0.75	-	-	-12.9112	0.31	-	-
LVL_i	-	-	-37.1994	0.25	-	-	-51.7201	0.08
LVL_i^2	-	-	1.3607	0.30	-	-	2.1443	0.07
$DBOI_i$	124.1426	0.00	126.7452	0.00	105.7978	0.00	107.0115	0.00
$DF1_i$	13.0016	0.12	10.5544	0.25	11.6763	0.13	11.5039	0.14
$DF5_i$	19.6126	0.09	23.3807	0.03	17.9874	0.17	19.7564	0.11
$DF9_i$	25.0683	0.02	20.7169	0.06	18.1048	0.04	13.7290	0.11
Test: $DF1_i=DF5_i=DF9_i$	0.45	0.64	0.55	0.58	0.20	0.82	0.17	0.84
F-statistic	39.11	0.00	44.57	0.00	31.64	0.00	35.34	0.00
Obs $XS_i=0/=100$	712	13	716	4	712	13	716	4
All Obs./Pseudo-R^2	890	0.25	894	0.25	890	0.27	894	0.27

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
BASIC METALS (ISIC 27)								
LOU_i	4.4779	0.89	6.4601	0.83	13.2229	0.69	13.2116	0.65
LOU_i^2	-0.4325	0.62	-0.4514	0.55	-0.6509	0.45	-0.6147	0.41
LYR_i	-0.4473	0.99	14.8501	0.55	-1.6848	0.94	14.3586	0.57
LYR_i^2	1.4314	0.75	-1.6566	0.72	1.7005	0.71	-1.5730	0.74
LKL_i	15.8248	0.61	-	-	11.1441	0.72	-	-
LKL_i^2	-0.1436	0.90	-	-	0.0254	0.98	-	-
LPL_i	-57.9316	0.13	-	-	-59.3582	0.12	-	-
LPL_i^2	-60.0221	0.22	-	-	-60.7817	0.22	-	-
LVL_i	-	-	-32.1845	0.43	-	-	-31.1556	0.45
LVL_i^2	-	-	1.5945	0.27	-	-	1.5427	0.30
$DBOI_i$	125.7904	0.00	121.4384	0.00	126.7159	0.00	122.0830	0.00
$DF1_i$	-8.4504	0.23	-6.1531	0.44	-8.2128	0.26	-5.8052	0.48
$DF5_i$	16.1751	0.39	23.5286	0.11	16.9883	0.36	24.3527	0.09
$DF9_i$	21.4522	0.01	24.6034	0.01	22.0300	0.01	24.9297	0.01
Test: $DF1_i=DF5_i=DF9_i$	4.54	0.01	4.35	0.01	21.05	0.00	4.21	0.02
F-statistic	22.56	0.00	23.33	0.00	4.43	0.01	21.10	0.00
Obs XS_i=0/ =100	259	6	259	6	259	6	259	6
All Obs./Pseudo-R^2	372	0.23	372	0.22	372	0.23	372	0.22
METAL PRODUCTS (ISIC 28)								
LOU_i	42.9051	0.04	44.1903	0.04	39.0592	0.04	41.4977	0.05
LOU_i^2	-1.0301	0.06	-1.0294	0.08	-0.9331	0.07	-0.9693	0.08
LYR_i	-4.9882	0.75	-3.3341	0.83	-9.0088	0.52	-7.0402	0.61
LYR_i^2	2.1043	0.51	1.7938	0.56	2.9541	0.32	2.5878	0.37
LKL_i	7.9526	0.75	-	-	14.4983	0.56	-	-
LKL_i^2	-0.4155	0.68	-	-	-0.6702	0.50	-	-
LPL_i	-29.2725	0.29	-	-	-35.1530	0.20	-	-
LPL_i^2	-45.2077	0.18	-	-	-53.6369	0.10	-	-
LVL_i	-	-	2.4686	0.96	-	-	-2.0949	0.96
LVL_i^2	-	-	-0.3259	0.86	-	-	-0.1197	0.95
$DBOI_i$	87.7567	0.00	86.7530	0.00	85.2827	0.00	84.5852	0.00
$DF1_i$	11.1999	0.04	10.7901	0.04	13.9642	0.01	13.2235	0.01
$DF5_i$	18.3954	0.03	18.9223	0.03	16.8725	0.07	17.6731	0.06
$DF9_i$	31.2667	0.00	28.8647	0.00	34.3739	0.00	31.8335	0.00
Test: $DF1_i=DF5_i=DF9_i$	2.89	0.06	2.56	0.08	3.34	0.04	2.89	0.06
F-statistic	27.25	0.00	31.50	0.00	22.00	0.00	23.90	0.00
Obs XS_i=0/ =100	1,014	11	1,015	11	1,014	11	1,015	11
All Obs./Pseudo-R^2	1,241	0.24	1,242	0.24	1,241	0.24	1,242	0.24

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
NON-ELECTRIC MACHINERY (ISIC 29)								
LOU_i	-9.6429	0.52	-15.0571	0.35	-8.4666	0.55	-10.5015	0.46
LOU_i^2	0.4365	0.25	0.5599	0.17	0.3982	0.27	0.4245	0.25
LYR_i	41.8711	0.00	40.7714	0.00	44.9150	0.00	40.6848	0.00
LYR_i^2	-8.6804	0.00	-8.3508	0.00	-9.5929	0.00	-8.5520	0.00
LKL_i	-20.4913	0.13	-	-	-18.4695	0.19	-	-
LKL_i^2	0.7471	0.15	-	-	0.6857	0.21	-	-
LPL_i	-18.7793	0.22	-	-	-30.5424	0.05	-	-
LPL_i^2	-23.3173	0.02	-	-	-30.9308	0.00	-	-
LVL_i	-	-	0.1058	1.00	-	-	-7.2227	0.80
LVL_i^2	-	-	0.0795	0.94	-	-	0.3974	0.72
$DBOI_i$	86.7070	0.00	86.7948	0.00	83.1714	0.00	83.3490	0.00
$DF1_i$	-1.6621	0.78	-3.2780	0.57	0.0192	1.00	-1.6360	0.78
$DF5_i$	0.1064	0.98	-2.0678	0.69	2.3078	0.62	0.1809	0.97
$DF9_i$	11.7474	0.04	11.5456	0.04	10.8478	0.06	11.5735	0.04
Test: $DF1_i=DF5_i=DF9_i$	2.47	0.09	3.15	0.04	1.63	0.20	2.60	0.07
F-statistic	41.36	0.00	45.20	0.00	34.28	0.00	39.36	0.00
Obs XS_i=0/ =100	440	11	443	11	440	11	443	11
All Obs./Pseudo-R^2	701	0.21	704	0.21	701	0.22	704	0.22
ELECTRONICS-RELATED MACHINERY (ISIC 30,31,32,33)								
LOU_i	-7.2323	0.67	-18.0387	0.32	-7.0070	0.68	-17.7481	0.33
LOU_i^2	0.3241	0.44	0.6311	0.18	0.3192	0.45	0.6245	0.18
LYR_i	-12.3886	0.33	-11.4706	0.34	-12.2198	0.34	-11.3278	0.35
LYR_i^2	2.3300	0.41	2.1043	0.44	2.2708	0.43	2.0484	0.45
LKL_i	-28.0656	0.26	-	-	-27.6658	0.27	-	-
LKL_i^2	1.1042	0.25	-	-	1.0891	0.26	-	-
LPL_i	16.4648	0.28	-	-	15.7223	0.30	-	-
LPL_i^2	6.1881	0.56	-	-	5.6572	0.59	-	-
LVL_i	-	-	44.4311	0.12	-	-	44.4848	0.12
LVL_i^2	-	-	-1.9152	0.09	-	-	-1.9160	0.09
$DBOI_i$	114.0448	0.00	112.6724	0.00	113.8150	0.00	112.4040	0.00
$DF1_i$	3.2318	0.61	3.2166	0.61	3.1082	0.62	3.1003	0.62
$DF5_i$	13.2053	0.05	11.4802	0.09	12.9649	0.05	11.2881	0.09
$DF9_i$	14.7191	0.00	14.6135	0.00	14.6078	0.00	14.4989	0.00
Test: $DF1_i=DF5_i=DF9_i$	1.51	0.22	1.46	0.23	1.52	0.22	1.46	0.23
F-statistic	36.13	0.00	41.03	0.00	54.09	0.00	58.59	0.00
Obs XS_i=0/ =100	410	64	413	64	410	64	413	64
All Obs./Pseudo-R^2	814	0.21	817	0.21	814	0.21	817	0.21

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
MOTOR VEHICLES (ISIC 34)								
LOU_i	-32.2191	0.06	-28.5417	0.10	4-digit & 3 digit categories			
LOU_i^2	0.7047	0.10	0.6114	0.16	are identical			
LYR_i	-16.6412	0.07	-15.7141	0.08				
LYR_i^2	1.4545	0.53	1.4027	0.53				
LKL_i	-13.0692	0.35	-	-				
LKL_i^2	0.4799	0.34	-	-				
LPL_i	-22.4521	0.41	-	-				
LPL_i^2	-22.7416	0.47	-	-				
LVL_i	-	-	-25.7391	0.30				
LVL_i^2	-	-	0.9722	0.32				
$DBOI_i$	113.0596	0.00	113.0435	0.00				
$DF1_i$	6.0621	0.53	6.3948	0.50				
$DF5_i$	-12.8193	0.08	-11.2924	0.11				
$DF9_i$	1.6848	0.82	2.8073	0.70				
Test: $DF1_i=DF5_i=DF9_i$	2.85	0.06	2.66	0.07				
F-statistic	25.37	0.00	28.69	0.00				
Obs XS_i=0/ =100	283	10	283	10				
All Obs./Pseudo-R^2	449	0.21	449	0.21				
OTHER TRANSPORT MACHINERY (ISIC 35)								
LOU_i	10.9238	0.71	-47.3048	0.34	10.4748	0.73	-51.2932	0.31
LOU_i^2	-0.0232	0.98	1.5070	0.27	-0.0158	0.98	1.5957	0.25
LYR_i	101.0703	0.26	94.2725	0.29	95.5855	0.29	86.0753	0.34
LYR_i^2	-20.0299	0.25	-18.7159	0.28	-18.8236	0.29	-16.8972	0.34
LKL_i	125.5604	0.13	-	-	112.4592	0.13	-	-
LKL_i^2	-5.4862	0.10	-	-	-4.9603	0.10	-	-
LPL_i	-11.8751	0.88	-	-	-25.2448	0.75	-	-
LPL_i^2	-82.6245	0.53	-	-	-100.042	0.51	-	-
LVL_i	-	-	251.5247	0.01	-	-	266.7401	0.01
LVL_i^2	-	-	-10.5612	0.01	-	-	-11.0851	0.01
$DBOI_i$	83.7150	0.00	76.2475	0.00	84.3687	0.00	79.0185	0.00
$DF1_i$	16.4380	0.19	12.3009	0.34	16.3152	0.19	11.6822	0.35
$DF5_i$	-4.9919	0.83	-11.8793	0.64	-3.8801	0.86	-12.3564	0.63
$DF9_i$	51.1992	0.06	26.2200	0.36	53.2373	0.05	29.1965	0.30
Test: $DF1_i=DF5_i=DF9_i$	1.30	0.28	0.58	0.56	1.32	0.27	0.63	0.53
F-statistic	6.21	0.00	8.32	0.00	8.32	0.00	11.78	0.00
Obs XS_i=0/ =100	126	5	126	5	126	5	126	5
All Obs./Pseudo-R^2	159	0.31	159	0.31	159	0.31	159	0.31

Appendix Table 5 (continued)

Independent variable, statistic, or indicator	3-digit industry dummies				4-digit industry dummies			
	Equation (1)		Equation (2)		Equation (1)		Equation (2)	
	Value	P-val.	Value	P-val.	Value	P-val.	Value	P-val.
FURNITURE (ISIC 361; no 3- or 4-digit industry dummies)								
LOU_i	41.6936	0.55	44.9749	0.67	4-digit & 3 digit categories			
LOU_i^2	-0.8397	0.67	-0.9115	0.61	are identical			
LYR_i	15.1346	0.53	12.3364	0.53				
LYR_i^2	-3.4594	0.52	-3.3943	0.83				
LKL_i	36.1734	0.56	-	-				
LKL_i^2	-1.5476	0.54	-	-				
LPL_i	44.8154	0.30	-	-				
LPL_i^2	-26.8228	0.45	-	-				
LVL_i	-	-	17.3472	0.83				
LVL_i^2	-	-	-0.8842	0.79				
$DBOI_i$	131.7225	0.00	133.0739	0.00				
$DF1_i$	3.1979	0.88	0.5808	0.98				
$DF5_i$	-1.3404	0.96	4.2252	0.89				
$DF9_i$	36.3836	0.32	40.9637	0.25				
Test: $DF1_i=DF5_i=DF9_i$	0.41	0.67	0.54	0.58				
F-statistic	20.18	0.00	23.62	0.00				
Obs XS_i=0/ =100	338	24	340	24				
All Obs./Pseudo-R^2	466	0.19	468	0.19				
MISCELLANEOUS MANUFACTURING (ISIC 369; no 3-digit industry dummies)								
LOU_i	197.3437	0.00	186.4923	0.00	187.1202	0.00	179.1043	0.00
LOU_i^2	-5.0935	0.00	-4.8104	0.00	-4.8476	0.00	-4.6241	0.00
LYR_i	-27.5396	0.09	-29.1625	0.08	-27.2323	0.09	-28.9825	0.07
LYR_i^2	3.5582	0.34	3.6967	0.33	4.3175	0.24	4.5096	0.22
LKL_i	-35.8484	0.41	-	-	-47.6251	0.28	-	-
LKL_i^2	1.2955	0.48	-	-	1.8361	0.32	-	-
LPL_i	-56.1672	0.01	-	-	-43.2982	0.04	-	-
LPL_i^2	-25.8295	0.00	-	-	-22.5741	0.00	-	-
LVL_i	-	-	108.8245	0.01	-	-	93.4141	0.03
LVL_i^2	-	-	-4.3959	0.02	-	-	-3.8633	0.03
$DBOI_i$	105.3984	0.00	103.7458	0.00	105.4551	0.00	103.5023	0.00
$DF1_i$	13.8128	0.11	15.1430	0.09	10.0287	0.24	11.4728	0.19
$DF5_i$	16.5036	0.16	12.2583	0.31	17.4389	0.15	13.9054	0.26
$DF9_i$	42.6890	0.00	39.4849	0.00	40.5026	0.00	37.8590	0.00
Test: $DF1_i=DF5_i=DF9_i$	3.64	0.03	2.97	0.05	3.85	0.02	3.04	0.05
F-statistic	36.99	0.00	43.32	0.00	28.33	0.00	31.64	0.00
Obs XS_i=0/ =100	241	134	243	134	241	134	243	134
All Obs./Pseudo-R^2	606	0.15	608	0.15	606	0.15	608	0.15

Note: Test: $DF1_i=DF5_i=DF9_i$ is a Wald Statistic testing the null hypothesis that coefficients on the three foreign ownership dummies are equal; estimated equations also include 3- or 4-digit industry dummies as indicated and relevant (see explanation in the text; detailed estimates including all dummies and the constant are available from authors).

Chapter 2
Foreign Multinationals and Vietnamese Firm Exports, 2010-2013

Kien Trung Nguyen (corresponding author)
The University of Danang, School of Economics, kien.nt@due.edu.vn
and
Eric D. Ramstetter
Asian Growth Research Institute, Kyushu University, and Thammasat University,
ramstetter@gmail.com

Abstract

This paper examines the role foreign multinational enterprises (MNEs) played in Vietnamese firm exports during 2010-2013. Consistent with patterns observed in commodity export data, MNEs are found to account for the majority of firm exports during this period. Wholly-foreign MNEs (WFs), which accounted for the vast majority of MNE production in Vietnam, accounted for most MNE exports. Both WFs and MNE joint ventures (JV) made larger direct contributions to exports than to production or employment, as observed in other Asian developing economies. There was a strong tendency for WFs to have the highest export propensities (export-turnover ratios) followed by JVs. Manufacturing firms exported over four-fifths of the total in most years. Tobit estimates that controlled for the effects of firm size, capital intensity, liquidity, location, and industry affiliation for manufacturers indicate WFs also had the highest conditional export propensities, followed by JVs, private firms, while export propensities tended to be similar in state-owned enterprises (SOEs) and private firms in most industries. Because Vietnam imposes few ownership restrictions on MNEs, these results imply that MNEs generally prefer to export from WFs rather than JVs, and are consistent with previous results for Thailand and Indonesia, for example.

JEL Classification Codes: F14, F23, L33, L60, L81, O53
Keywords: Multinational enterprises, state-owned enterprises, ownership, exports

Acknowledgement: This paper is one result of the Asian Growth Research Institute (AGI) project "Foreign Multinationals and Trade in Southeast Asian Manufacturing". We thank AGI for financial and logistic support. A preliminary version of the paper was presented at the 13th Annual Meeting of Asia-Pacific Trade Seminars on 16-17 June 2017 in Hanoi, Vietnam. We are grateful for comments from Bin Ni and other session participants. However, the authors are solely responsible for the content of this paper, including all remaining errors and opinions expressed.

1. Introduction

Previous literature suggests that foreign multinational enterprises (MNEs) will tend to have relatively large amounts of generally intangible, firm-specific assets related to production technology, marketing, and management, among other aspects of firm performance compared to non-MNEs. These differences are often thought to lead relatively high productivity, wages, and export propensities in MNEs, for example. Previous research on other Southeast Asian economies (Indonesia, Malaysia, and Thailand) also indicates that MNE-local or MNE-(local) private differentials were often significant for wages and export propensities. For Vietnam, the evidence suggests that significant productivity differentials were more prevalent than for other Southeast Asian economies, but that significant wage differentials were more common than corresponding productivity differentials. However, we know of no previous, detailed comparisons of export values or export propensities in MNEs and local firms for Vietnam, largely because comprehensive data have only become available in enterprise surveys for 2010 forward, and because compilations quickly reveal important problems with these data.[1] Correspondingly, we believe this is one of the first attempts to examine the relationship of export propensities to ownership in Vietnam using more realistic, cleaned export data.

The analysis focuses on two questions emerging from the previous literature. First, do foreign MNEs have a relatively high probability of exporting large proportions of their turnover (sales) compared to local firms, which are predominantly non-MNEs? Second, do wholly-foreign MNEs (WFs) have a relatively high probability of having relatively high export propensities compared to MNE joint ventures (JVs)? The paper begins with a brief review of the relevant literature in Section 2 followed by analysis of descriptive statistics

[1] Ramstetter and Nguyen (2016) provide preliminary evidence from these data showing that many firms report obviously unrealistic export values. Central Institute of Economic Management et al. (2015), pp. 31-38 provides some analysis of the relationship between export status and ownership from alternative Vietnam Technology and Competitiveness Surveys, but focuses on transfer from customers and provides no industry detail or information on export values or propensities. Phan and Ramstetter (2009) compare export propensities among projects of different MNE ownership groups, but their data have no information on local firms.

available from aggregate commodity export data and compilations of firm-level data in Section 3, including unconditional, ownership-related differentials in mean export propensities. They are then compared to conditional differentials, which account for the influences of firm size, capital intensity, and equity-asset ratios, as well as location, year, and industry using a tobit model described in Section 4 and econometric results summarized in Section 5. Because of large differences in slope coefficients among industries, the focus is on results for 13 relatively homogeneous industry groups. Because state-owned enterprises (SOEs) are important in several Vietnamese industries, and many economists think SOEs do not usually performas well as private firms, our comparisons are also careful to distinguish SOEs and private firms. Finally Section 6 concludes, focusing on the future research agenda.

2. Literature Review

MNEs are likely to possess relatively large amounts of knowledge-based, intangible, firm-specific assets related to production technology, marketing, and entrepreneurship. Thus, MNEs should be more productive than non-MNEs (Buckley and Casson 1992; Casson 1987; Caves 2007; Dunning 1993; Rugman 1980, 1985). Correspondingly, MNEs tend to be larger firm size and have higher factor productivity, factor returns, and/or higher capital or technology intensity. In contrast, economists generally assume that SOEs tend to be more inefficient than private firms because SOE managers have relatively weak incentives to minimize costs. The evidence suggests that both MNEs and SOEs have tended to have relatively high productivity in Vietnam, though ownership-related productivity differentials were often insignificant in industry-group samples (Ramstetter and Phan 2013).[2]

[2] Evidence that MNEs pay significantly higher wages than local firms is more common in Vietnam (Nguyen and Ramstetter 2015, 2017) and other Southeast Asian economies, even when productivity differentials were not significant. For studies of Indonesia, see Takii (2004) on productivity and Lipsey and Sjöholm (2004) and Ramstetter and Narjoko (2013) on wages. For studies of Malaysia, see Haji Ahmad (2010) and Oguchi et al.

The theoretical literature often focuses on the tendency for MNEs to possess relatively large amounts of technology-related intangible assets such as the results of research and development (R&D) or patents, for example. Possession of these assets in relatively large amounts implies that MNEs tend to have relatively high productivity. Correspondingly, MNEs may tend to export more than non-MNEs because exporting firms first tend to be more productive than non-exporters and MNEs have relatively high productivity. However, it is very difficult to sort out the direction of causality. Does high productivity lead to exporting, or does exporting force firms to become more productive, or does causality run both directions (Bernard and Jensen 2004, Melitz 2003)?

On the other hand, it is clear MNEs also invest substantial resources in international marketing networks. These investments are sunk costs and accumulation of related assets is a key reason that some firms become able to export relatively cheaply (Roberts and Tybout 1997). Moreover, it seems equally clear that MNEs invest more in their international marketing networks than non-MNEs. Thus, even if ownership-related productivity differentials are not pervasive, it is highly possible that MNEs might have higher export propensities than non-MNEs because their investments in international marketing networks lead to lower exporting costs in MNEs. This is an important part of the story told by the previous studies of Indonesia (Ramstetter and Takii 2006; Sjöholm and Takii 2006) and Thailand (Ramstetter and Umemoto 2006), which indicate MNEs are more likely to export, and more likely to export large portions of their output than local plants.

The other potentially important part the story relates to evidence that export propensities tend to be highest in wholly-foreign MNEs or MNEs with very large foreign ownership shares of 90 percent or more, and that these ownership-related differences remain statistically significant after accounting for related firm- or plant-level characteristics (see studies cited in

(2002) on productivity and Ramstetter (2014) on wages. For studies of Thailand, see Ramstetter (2006) on productivity and Movshuk and Matsuoka-Movshuk (2006) on wages.

footnote 1). This evidence is also related to an important policy-oriented study by Moran (2001), who argues that MNE affiliates that are well integrated into the parent's network are likely to be better equipped to contribute to host economies than are affiliates which are isolated from the parent-controlled network by ownership restrictions or local content requirements. Moran's argument also suggests that productivity should be higher in MNEs with relatively large foreign ownership shares, but empirical evidence is often inconsistent with this latter hypothesis in Indonesia (Takii 2004), Thailand (Ramstetter 2004), or Vietnam (Ramstetter and Phan 2013), for example.

Although the existing evidence for Southeast Asia suggests that the level of foreign ownership is not strongly related to productivity, other evidence indicates that WFs or MNEs with large foreign ownership shares (e.g., 90 percent or more) have higher export propensities than other MNEs in Indonesia (Ramstetter and Takii 2006), Thailand (Ramstetter and Umemoto 2006), and Vietnam (Phan and Ramstetter 2009). This in turn suggests that parent MNEs often restrict access of affiliates with smaller ownership shares to exporting networks, more than they restrict access to technology-related firm-specific assets. Part of the reason may be that most MNE affiliates in Vietnam and other developing economies utilize relatively simple technologies which are useful in labor-intensive assembly activities. Correspondingly, the risk of leaking sophisticated technologies through minority-owned affiliates in developing economies is likely to be relatively small. On the other hand, the risks of minority-owned affiliates oversupplying specific markets may be large. This risk is also reflected by the fact that MNEs sometimes force local partners in their minority-owned affiliates to sign agreements forbidding them from exporting the MNE's products.

In addition, several developing economies in Southeast Asia and elsewhere relaxed ownership restrictions and local content requirements for MNEs exporting large portions of their output. In these cases, which were relatively common during periods studied by previous

literature (e.g., the 1980s and 1990s in Indonesia and Thailand), strong correlations between foreign ownership shares and export propensities may also have resulted from policy biases, in addition to MNE strategies. On the other hand, in Vietnam foreign ownership restrictions have never been particularly strict after the promulgation of the first foreign investment law in 1988, soon after Doi Moi.[3] Moreover, informal biases against MNEs weakened substantially after the promulgation of the Enterprise Law in 2000, the Law's subsequent implementation (Van Arkadie and Mallon 2003), reforms related to the implementation of the Bilateral Trade Agreement between Vietnam and the United States in 2001, the implementation of the ASEAN Free Trade Agreement in 2005, and further reforms related to Vietnam's WTO accession in early 2007.Thus, previous evidence for MNE projects in 2000-2001 (Phan and Ramstetter 2009) and the evidence for 2010-2013 presented below probably reflects the influence of MNE strategy more than any remaining policy bias against WFs.

3. MNE Exports and Ownership-Related Differences in Export Propensities

Economy-wide estimates from commodity trade data show that both MNE export values and the MNE shares of Vietnam's exports rose rapidly over the last two decades. MNE shares increased particularly rapidly from 27 percent in 1995 to 47 percent in 2000 and 57 percent in 2005 (Table 1). Shares remained at 57-58 percent in 2005-2007 and 2011, but fell to 53-55 percent in 2008-2010, suggesting the World Financial Crisis had a larger impact on MNE exports than non-MNE exports. In 2009, export values also shrunk by 12 percent for MNEs, but only 5.1 percent for non-MNEs. After the crisis, relatively rapid increases of MNE exports resumed, with MNE shares rising to 63-67 percent in 2012-2014 and 71 percent in 2015.

Compilations of monthly trade data reports show that oil accounted for 30-40 percent of

[3] Nonetheless, implementation and formal policy often diverged in Vietnam, with government officials effectively limiting foreign ownership shares in a number of cases, especially before the promulgation of the Enterprise Law in 2000.

MNE exports in 2005-2008, but under 10 percent since 2013 and only 2 percent in 2015 (Table 1). Correspondingly, MNE shares of non-oil exports were substantially lower than shares of all exports in 2005-2006 (45-46 percent vs. 57-58 percent). However, this difference became much smaller in recent years, even in years when oil prices and oil export values were still relatively high (e.g., 60 vs. 63 percent in 2012, 65-66 vs. 67 percent in 2013 and 2014). Most non-oil exports are manufactures.

Because MNE shares of exports were much larger than corresponding shares of production, export propensities were much larger in MNEs than in non-MNEs (Table 1). For example, in 1995, the export-GDP ratio was 1.1 in MNEs, and increased to 2.1-2.2 in 2005-2007 and over 3.2 by 2015. On the other hand, there was a sharp decline in 2009, following a more modest decline the year previous, again reflecting the strong effects of the World Financial Crisis on MNE exports. Most importantly, export-GDP ratios were over 5 times larger in MNEs than in non-MNEs for 1995, 2000, and 2005-2015, and almost 11 by 2015. Although export-GDP ratios are not ideal measures of export propensities because exports include intermediate expenditures, while GDP does not, the data in Table 1 provides strong evidence that MNEs tend to export relatively large proportions of output than non-MNEs in Vietnam.

Manufactured exports have accounted for most of the growth in Vietnam's exports in recent years. Using a broad definition of manufacturing exports designed to be consistent with the 1993 revision of the Vietnam Standard Industrial Classification (VSIC), manufacturing exports increased from under $9 billion in 2000 to over $58 billion in 2010, and manufacturing's share of the total increased from 61 to 81 percent (Table 2).[4] Traditional, mainly resource- or labor-intensive manufactures (e.g., food products, apparel, textiles) were among the most important exports through 2010. For 2010-2013, compilations based on the

[4] The VSIC is similar to the International Standard Industrial Classification (ISIC), but more detailed in some categories. The older, 1993 version (VSIC93) is similar to ISIC revision 3 while the newer, 2007 version (VSIC07) is similar to ISIC revision 4.

Standard International Trade Classification (SITC) indicate that apparel (13-14 percent of the total) and leather and footwear (7-8 percent) have remained relatively large. On the other hand, food and related exports have grown relatively slowly (the combined share falling from 19 to 14 percent). About one-fourth of the SITC food category was probably non-manufactured, primary products. On the other hand, the rapid growth of electronic and electric machinery exports was conspicuous. By 2012 and 2013 this was by far the largest category, accounting for 24 and 30 percent of total exports, respectively. Large and rapidly growing exports from Samsung were a major reason for this pattern.[5]

Vietnam has conducted relatively comprehensive enterprise surveys since 2000 and surveys from 2010 have included questions about export values which should allow more precise and detailed examination of ownership-related differences in export propensities than previously possible.[6] However, sums of direct export values reported by medium-large firms with 20 or more employees amounted to more than two-fold of the total reported in commodity trade data (e.g., totals in Tables 2, which are identical to totals used to calculate annual estimates of MNE shares in Table 1) for 2010 and 2014, and 7.5 times the total for 2013. Inspection of firm-level time series indicates that unrealistic values were recorded for several firms in some years.[7] The fact that export values often exceed reported sales values, which is theoretically impossible, is another indication of unrealistic reporting. We have thus adjusted reported export values to be less than or equal to sales. In addition, we restrict samples to medium-

[5] In 2013, Samsung's exports were reported at US$24 billion or 18 percent of the total in Table 2 (http://english.thesaigontimes.vn/33443/Samsung-Vietnam%E2%80%99s-2013-exports-generate-US$24-billion.html). Intel's 2013 export revenue was reported to be another US$2 billion (http://www.vietnam-briefing.com/news/intel-builds-first-made-vietnam-cpu.html/). And other MNEs such as Fujitsu probably continue to export substantial amounts as well (note that Fujitsu was the largest exporter in Vietnam, accounting for 3-4 percent of Vietnam's total in 2000-2001, Ramstetter and Phan 2009, p. 576).

[6] Enterprise surveys cover all non-household firms with over 10 employees in all industries, but exclude household firms and organizations other than firms, and collect limited information from firms with 10 or fewer employees (Jammal et al, 2006).

[7] For example some large exporters report exports that were 1000s of times larger in only one year than in other years. Although this is not impossible, reporting or input error is a more likely cause in many cases. Much more extensive inspection of firm-level data, including comparisons to trends of related indicators (e.g. sales, employment, fixed assets) is required before more definitive conclusions can be reached.

large firms with 20 or more workers, because we do not think it is meaningful to compare predominantly local, private, small firms with MNEs and SOEs, which are predominantly large. Removing smaller firms also eliminates many outliers and unrealistic values from the data. It was also necessary to eliminate other medium-large firms reporting non-positive values for fixed assets and/or sales.

These adjustments eliminate obvious over reporting of exports with the firm totals in Table 3 increasing from US$41 billion in 2010 to US$102 billion in 2013. However, sample coverage was uneven with ratios of firm sums to merchandise totals reported in Table 2 increasing from 56 percent in 2010 to 62 percent in 2011, 67 percent in 2012, and 77 percent in 2013. In other words, the coverage of the firm export data appears to have improved markedly in 2010-2013. Corresponding ratios of MNE (WF+JV) exports to estimates of MNE merchandise exports in Table 1 also increased and were somewhat larger (65 percent in 2010, 70-71 percent in 2011-2012 and 86 percent in 2013), indicating that our samples cover MNEs better than non-MNEs. As a result, MNE shares of firm exports were somewhat larger than corresponding shares of merchandise exports, 63-64 percent in 2010-2011, 67 percent in 2012, and 74 percent in 2013. The difference in the two measures of MNE shares was relatively small in 2012 (4 percentage points) but larger in other years (7-9 percentage points) This is not surprising because most MNEs are relatively large and conspicuous, making them more likely to report realistic information.[8]

There are several potentially important sources of discrepancies between compilations of firm exports and merchandise exports. Firm surveys explicitly ask firms to report direct merchandise exports only, but some firms may not realize their exports pass through other firms or may not distinguish direct and indirect exports in their accounting. Thus, some

[8] Similarly, comparisons of our compilations with published totals in Appendix Table 1 indicates that ratios of employment in sample firms to total firm employment were very large for WFs (90-96 percent), but smaller for JVs (68-74 percent) and only about one half (49-51 percent) for SOEs and private firms.

exports passing through more than one firm are likely to be double counted, especially when wholesale traders are included in the total. Second, some firms may include export sales of both merchandise and services. Third, the timing of export reporting may differ in the firm surveys and the merchandise trade data. Fourth, some firms do not report information for some years.

If one looks at the industry detail in Table 3, some of the totals seem obviously unrealistic. The most conspicuous example is in the largest category of computers and electric machinery for 2012, when exports were US$12 million, the same as in 2011. The sum of this category and electric machinery, which is composed of products similar to the electric and electronic machinery category in Table 2, was also the same in 2011-2012 at US$15 billion. The merchandise trade data indicate relatively rapid increases in all years. The ratio of the sum of related categories in the firm data to the merchandise category was only 54 percent in 2012, compared to 94-98 percent in 2010-2011 and 2013. Because WFs dominate this industry group accounting for 93-97 percent of firm exports and differences between MNE shares of total firm exports and merchandise exports were relatively small in 2012 (only 4 percentage points compared to 7-9 percent points in other years, Tables 1 and 2), the firm data appear to omit at least a few large WF exporters in 2012.

Another important example of discrepancies is observed in textiles, apparel, leather, and footwear.[9] According to the firm data, the sum of these exports rose rather steadily from US$9 billion in 2010 to US$19 billion in 2013. However, ratios of the firm sum to the corresponding merchandise sums were only 47 percent in 2010 and 56-61 percent of it 2011-2014. One possibility is that exporters in these industries use wholesale traders as intermediaries, but exports of all wholesale traders were only US$3-6 billion or 33-53 percent of the US$10-12 billion difference between the sums from the firm and merchandise data.

[9] Because several firms export multiple products in more than one of these categories, it is more meaningful to compare sums of these categories rather than the values for individual categories.

Thus, there is strong evidence that the firm data are omit important exports in these categories for all years. Ratios of firm exports to corresponding merchandise categories were also conspicuously low in non-metallic mineral products (3-5 percent) suggesting that firms in other industries were the source of the rapid growth of these exports and/or that these samples omit important exporters in this industry. The fact that firm-level data omit exports is not unusual, but it is important to recognize that these firm samples cover only a portion of Vietnam's exports, and that sample coverage varies greatly among industries and years.

On the other hand, samples were reasonably large, exceeding 100 firms in all years for all industries listed in Tables 3-4 except non-metallic mineral products, and exceeding 300 in all other industries except motor vehicles and other transportation machinery (Appendix Table 3). Thus, comparisons of export propensities among ownership groups in Table 4 and the following econometric analysis should be meaningful. As expected, these comparisons reveal that mean export propensities were by far the highest in WFs, 49-51 percent if all industries are included, second highest in JVs (21-26 percent), and much lower in SOEs (5-6 percent) and private firms (4-5 percent).

Propensities were somewhat higher in manufacturing firms and especially in the 15 sample manufacturing industries, 54-56 percent in WFs, 31-41 percent in JVs, 14-15 percent in JVs, and 11-13 percent in private firms (Table 4). We focus on these 15 manufacturing industries because they account for the vast majority of firm exports (71-79 percent of all firms and 88-92 percent of manufacturing firms, Table 3) and samples are usually large enough to facilitate meaningful, industry-level analysis. WFs had the highest export propensities in 12-13 of these 15 industries in all years, with JVs having the highest propensities in the remaining 2-3 industries (wood products in all years, leather and footwear in 2011-2013, paper products in 2012, and other transportation machinery in 2010). Moreover, differences between WFs and JVs were 10 percentage points or more in most (9-12) industries, while WF-SOE and WF-

private differentials were 30 percentage points or more in at least nine industries in every year. Export propensities were relatively high (60 percent or more) in at least 3 of the 4 years for WFs and JVs in apparel and leather and footwear and for WFs in food products and electric machinery, and JVs in wood products, but never reached similar levels for SOEs or private firms in any industry and year in the sample. In short, these data suggest a very strong tendency for WFs to have the highest export propensities followed by JVs, while SOEs and private firms exported much smaller portions of their sales.

4. Firm Characteristics and Ownership-Related Differences in Export Propensities

The previous studies reviewed in Section 2 suggest that export propensities are influenced by firm characteristics such as size, factor intensity, location, and industry affiliation. In Vietnam's case we also investigate if firm's equity-asset ratio is related to the export propensity because it may reflect the extent to which a firm is constrained financially. In order to investigate whether significant ownership effects remain after accounting for these firm-characteristics, the following equation is estimated:

$$XS_{ijt}=a_0+a_1(L_{ijt})+a_2(KL_{ijt})+a_3(EA_{ijt})+a_4(DSOE_{ijt})+a_5(DJV_{ijt})+a_6(DWF_{ijt})+a_7(\boldsymbol{DR}_{ijt})+\varepsilon_{ijt} \quad (1)$$

where

XS_{ijt}= Export propensity of firm i in industry j in year t, defined as percent (0-100).

L_{ijt}= Natural log of the number of employees of firm i in industry j in year t.

KL_{ijt}= Natural log of capital intensity (fixed asset-labor ratio) of firm i in industry j in year t, where fixed assets are converted to 2010 prices national accounts' deflators for gross fixed capital formation from General Statistics Office (various years b).

EA_{ijt}= Equity-total asset ratio of firm i in industry j in year t

$DSOE_{itj}$= A dummy variable =1 if a firm i in industry j in year t is a SOE, =0 if not.

DJV_{itj}= A dummy variable =1 if a firm i in industry j in year t is a JV, =0 if not.

DWF_{ijt}= A dummy variable =1 if a firm *i* in industry *j* in year *t* is a WF, =0 if not.

$\boldsymbol{DR}_{ijt}$= A vector of 6 dummy variables identifying the region of firm *i* in industry *j* in year *t* (Hanoi [the base region], Red River delta, Northern midlands, Central region, Southeast region, Ho Chi Minh City, and Mekong delta).

ε_{ijt}= A stochastic error term.

Because we are concerned about the possibility of simultaneity bias resulting from the influence the export propensity may have on firm size, capital intensity, or equity-asset ratios, we lag these variables one year in one specification. However, lagging these variables substantially reduces sample size, so we examine whether major results differ between the lagged specification in 2011-2013 and a contemporaneous specification for 2010-2014, finding that most major results are similar. Because the dependent variable is limited to the 0-100 range we use a pooled tobit estimator.[10] All estimates use robust standard errors to account for heteroscedasticity related to the scale variables (labor and capital intensity) and region dummies to account for the influence of geography on exporting.

When the equation is estimated in large, heterogeneous samples of 15 sample industries, 14 intercept dummy variables are used to account for industry effects. However, because results suggest large differences in slope coefficients among industries, we also estimate equations for 13 more homogeneously defined industry groups. Because two of these industry groups are combinations of 2-digit categories (electric and non-electric machinery and transportation machinery), a single intercept dummy is used in these cases.[11]

The sign of a_1 is expected to be positive because larger firms generally have relatively high productivity and lower exporting costs than smaller ones. Results were consistent with

[10] We plan to add panel, random effects tobit estimates in a future revision, because we are interested in investigating how alternative econometric assumptions affect the results. We do not know of an unbiased, fixed effects, tobit estimator and we are more interested in results from pooled tobit or the random effects, panel tobit estimates because they tell us more about how ownership types are related to export propensities, whereas fixed effects estimates would reveal how changes in ownership are related to export propensities.

[11] These industries have been combined because we had trouble obtaining results for non-electric machinery and other transportation machinery, probably because of collinearity among region and ownership dummies.

expectations with the coefficient being positive and highly significant at the 1 percent level in all samples and specifications examined (Table 5). Because capital-intensive firms are also characterized by high productivity and low export costs in many cases a_2 is also likely to be positive in many samples. However, Vietnam has an abundance of labor which may make capital-intensive products be relatively costly with a_2 becoming negative as a result. Results yielded positive and highly significant coefficients for both contemporaneous and lagged specification in all 15 sample industries and in eight of the 13 more homogenous, industry groups. In one industry (paper products) the coefficient was negative and highly significant and in the other four industries this coefficient was not consistently significant at the standard 5 percent level, but it was positive and significant in the lagged specification for basic metals.

We expected a_3 to be positive because we thought higher equity-asset ratios reflected relatively loose financial constraints, which should make it easier for firms to cover export costs. However, when significant, this coefficient was negative (Table 5). One possibility is that high equity-asset ratios, or equivalently low loan-asset ratios, are prevalent in firms that are financially constrained. In other words, equity-asset ratios could be high because banks are reluctant to lend to the firms in question.

Table 5 also shows the pseudo R-squared which illustrates how well the model fits the data. The lowest values were 0.05 in food products, 0.06 in wood products, and 0.07-0.08 in textiles and highest ones were 0.12-0.14 in metal products, computers and electronic machinery, electric and non-electric machinery, and transportation machinery. Thus, the model doesn't fit the data particularly well, but this is not unusual in large, pooled samples of firm-level data. And the results clearly indicate that the three control variables are correlated with export propensities, making it of interest to investigate whether ownership is significantly correlated with export propensities after accounting for these influences.

Coefficients on the dummy variables identifying WFs were positive and highly significant in all estimates (Table 6). Coefficients on the JV dummy were positive and highly significant for all 15 sample industries combined and in 12 of the 13 industry-level samples, food products being the exception. Industry-level results reveal large variation in coefficients on these MNE dummies (and in other slope coefficients, Table 5). Correspondingly, we think the industry-level results provide more reliable estimates of ownership-related differentials than the aggregate results and focus on them. The largest coefficients on the WF dummy were in transportation machinery (122-124), electric followed by basic metals and non-electric machinery (89-95), while the smallest ones were in furniture (37-40). JV dummy coefficients were largest in wood products and paper products (105-111) and smallest in furniture (26), if the insignificant coefficient in food products is excluded. In short, there is a very strong tendency for WFs and JVs to have higher export propensities than private firms, but the extent of these differentials varies greatly among industries.

On the other hand, most industry-level coefficients on the SOE dummy were insignificant, and their signs were inconsistent when significant (Table 6). Coefficients were negative in wood products and basic metals, but positive in transportation machinery, and in the contemporaneous specification for metal products, but this coefficient was only weakly significant at the 10 percent level in the lagged specification. When all industries were combined, the coefficient was significantly negative, but here again the substantial variation of coefficients among industries makes the aggregate result of limited use. The industry-level results suggest SOE-private differentials in export propensities were generally insignificant, in marked contrast to highly significant WF-private and JV-private differentials. The patterns were more or less consistent with those observed in unconditional differences in Table 4.

Results are also consistent with patterns observed in Table 4 in indicating that conditional WF-private differentials were substantially larger than JV-private differentials in most

industries (Table 6). For example, the coefficient on the WF dummy was larger than the coefficient on the JV dummy by 30 percent or more in nine industries and by 90 percent or more in three industries (food products, textiles, and transportation machinery). On the other hand, the JV coefficient was larger in only two industries, wood products and paper products. Thus, even after accounting for the influences of firm size, capital intensity, and equity-asset ratios, as well as firm location, there is strong evidence that export propensities tended to be highest in WFs followed by JVs, and of similar magnitude among SOEs and private firms in most manufacturing industries.

5. Conclusion

This paper has examined the role foreign multinational enterprises (MNEs) played in Vietnamese firm exports during 2010-2013. Consistent with patterns observed in commodity export data, MNEs are found to account for the majority of firm exports during this period. Wholly-foreign MNEs (WFs), which accounted for the vast majority of MNE production in Vietnam, accounted for most MNE exports. Both WFs and MNE joint ventures (JV) made larger direct contributions to exports than to production or employment, as observed in other Asian developing economies. There was a strong tendency for WFs to have the highest export propensities (export-turnover ratios) followed by JVs. Manufacturing firms exported over four-fifths of the total in most years, with WFs accounting for two-thirds to three-fourths of the manufacturing total. Tobit estimates that controlled for the effects of firm size, capital intensity, liquidity, location, and industry affiliation for sample manufacturers indicate WFs also had the highest conditional export propensities followed by JVs, while export propensities tended to be similar in state-owned enterprises (SOEs) and private firms in most industries. Because Vietnam imposes few ownership restrictions on MNEs, these results

imply that MNEs generally prefer to export from WFs rather than JVs, and are consistent with previous results for Thailand and Indonesia, for example.

Although these results are straightforward and probably reasonable, there are several important tasks remaining for future research. First, robustness should be checked by comparing results of alternative specifications and estimation techniques. In particular, it would be helpful to compare results of random effects tobit estimates. Comparisons to results from a two-step estimation procedure similar to that in Athukorala et al. (1995) are also potentially important. Second, it is also important to add years and further refine data cleaning procedures for firms reporting unrealistic values for exports and other key variables. In this respect, we hope to add data for 2014 and 2015 in the near future.

References:

Athukorala, Premachandra, Sisira Jayasuriya, and Edward Oczkowski (1995), "Multinational firms and export performance in developing countries: Some analytical issues and new empirical evidence, *Journal of Development Economics*, 46(1), 109-122 .

Athukorala Prema-chandra and Tran Quang Tien (2012), "Foreign direct investment in industrial transition: the experience of Vietnam", *Journal of the Asia Pacific Economy*, 17(3), 446-463.

Bernard, Andrew B. and J. Bradford Jensen (2004), "Why Some Firms Export", *Review of Economics and Statistics*, 86(2), 561-569.

Buckley, Peter J. and Mark Casson (1992), *The Future of the Multinational Enterprise*, 2nd Edition. London: Macmillan.

Casson, Mark (1987), *The Firm and the Market: Studies on the Multinational and the Scope of the Firm*. Cambridge, MA: MIT Press.

Caves, Richard E. (2007), *Multinational enterprise and economic analysis* (3rd ed.). Cambridge, UK: Cambridge University Press.

Central Institute for Economic Management (CIEM), General Statistics Office, and Development Economics Research Group, University of Copenhagen (2015), "Firm-level Technology and Competitiveness in Vietnam, Evidence from 2010-2014 Surveys", http://www.econ.ku.dk/ftarp/Publications/Docs/Sacnned%20Pubs/Tech%20report%202009-2013%20April%202015.pdf.

Dunning, John H. (1993), *Multinational Enterprises and the Global Economy*. Workingham, U.K.: Addison-Wesley Publishing Co.

General Statistics Office (2016), *Business Results of Vietnamese Enterprises in the Period 2010-2014*, Hanoi: Statistical Publishing House, downloaded in October 2016 from http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=16020.

General Statistics Office (various years a), International Merchandise Trade Vietnam, 2001, 2006, and 2010 issues. Hanoi: Statistical Publishing House, 2006 and 2010 available from http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=7276 http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=13437

General Statistics Office (various years b), "National Accounts", and "Trade, Price, and Tourism", data downloaded from the "Statistics/Statistical Data" section of the GSO web page in December 2016 (http://www.gso.gov.vn/Default_en.aspx?tabid=766) and January 2011 (2011 url no longer working, excel copies available from the authors).

General Statistics Office (various years c), "Socio-economic information in YEAR [YEAR=2005-2015]", from the "Statistics/Monthly Statistical Information" section of the GSO website (http://www.gso.gov.vn/default_en.aspx?tabid=622), downloaded in January of the following year.

Haji Ahmad, Shahrazat Binti. 2010. A Quantitative Study on the Productivity of the Manufacturing Industry in Malaysia. Ph.D. Dissertation, University of Kitakyushu.

Jammal, Y., D.T. Thang, and P.D. Thuy (2006), "Vietnam Annual Enterprise Survey", Report of GSO/UNDP/DFID Project 00040722 "Support to Socio-Economic Development Monitoring", General Statistics Office, Hanoi.

Lipsey, Robert E., and Fredrik Sjöholm (2004), "Foreign Direct Investment, Education, and Wages in Indonesian Manufacturing", *Journal of Development Economics*, 73(1), 415-22.

Movshuk, Oleksandr and Atsuko Matsuoka-Movshuk (2006), "Multinational Corporations and Wages in Thai Manufacturing?" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 54-81.

Melitz, Marc J. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, 71(6), 1695-1725.

Moran, Theodore H. (2001), *Parental Supervision: The New Paradigm for Foreign Direct Investment and Development*. Washington, D.C.: Institute for International Economics.

Nguyen, Kien Trung and Eric D. Ramstetter (2015), "Ownership-related Wage Differentials by Occupation in Vietnamese Manufacturing", Working Paper 2015-06, Kitakyushu: Asian Growth Research Institute.

Nguyen, Kien Trung and Eric D. Ramstetter (2017), "Wage Differentials among Ownership Groups and Worker Quality in Vietnamese Manufacturing", *Global Economic Review: Perspectives on East Asian Economies and Industries*, 45(3), 232-250.

Oguchi, Noriyoshi, Nor Aini Mohd. Amdzah, Zainon Bakar, Rauzah Zainal Abidin, and Mazlina Shafii. 2002. Productivity of Foreign and Domestic Firms in Malaysian Manufacturing Industry. *Asian Economic Journal*. 16 (3): 215-228.

Phan, Minh Ngoc and Eric D. Ramstetter (2009), "Foreign Ownership and Exports in Vietnamese Manufacturing" *Singapore Economic Review*, 54(4), pp. 569-588

Ramstetter, Eric D. (2006), "Are Productivity Differentials Important in Thai Manufacturing?" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 114-142.

Ramstetter, Eric D. (2014), Wage Differentials between Multinationals and Local Plants and Worker Quality in Malaysian manufacturing, *Asian Development Review*, 31(2), 55-76.

Ramstetter, Eric D. and Phan Minh Ngoc (2013), "Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing", *Journal of Asian Economics*, 25, 28-42.

Ramstetter, Eric D. and Dionisius Narjoko (2013), "Wage Differentials between Foreign Multinationals and Local Plants and Worker Education in Indonesian Manufacturing", Working Paper 2013-23, Kitakyushu: International Centre for the Study of Development.

Ramstetter, Eric D. and Kien Trung Nguyen (2016), "Multinational Enterprises and Vietnam's Exports: Comparing Economy-wide and Firm-level Evidence", Working Paper 2016-22, Kitakyushu: Asian Growth Research Institute, http://en.agi.or.jp/workingpapers/WP2016-23.pdf.

Ramstetter, Eric D. and Phan Minh Ngoc (2013), "Productivity, ownership, and producer concentration in transition: Further evidence from Vietnamese manufacturing", *Journal of Asian Economics*, 25, 28-42.

Ramstetter, Eric D. and Sadayuki Takii (2006), "Exporting and Foreign Ownership in Indonesian Manufacturing 1990-2000", *Economics and Finance in Indonesia*, 54(3), 317-345.

Ramstetter, Eric D. and Masaaru Umemoto (2006), "Exports and Foreign Ownership in Thai Manufacturing" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 194-219.

Roberts, Mark J. and James R. Tybout (1997), "The Decision to Export in Colombia: an Empirical Model of Entry with Sunk Costs", *American Economic Review*, 87(4), 545-564.

Rugman, Alan M., (1980) "Internalization as a General Theory of Foreign Direct Investment: A Re-Appraisal of the Literature", *Weltwirtschaftliches Archiv*, 116(2), 365-379.

Rugman, Alan M. (1985) "Internalization is Still a General Theory of Foreign Direct Investment", *Weltwirtschaftliches Archiv*, 121(3), 570-575.

Sjöholm, Fredrik and Sadayuki Takii (2006), "Multinational Companies and Exports in Indonesian Manufacturing Exports" in Eric D. Ramstetter and Fredrik Sjöholm, eds., *Multinationals in Indonesia and Thailand: Wages, Productivity and Exports*. Hampshire, UK: Palgrave-Macmillan, 173-193.

Takii, Sadayuki (2004), "Productivity differentials between local and foreign plants in Indonesian manufacturing, 1995", *World Development*, vol. 32, no. 11, pp. 1957-69.

United Nations COMTRADE (2016), SITC revision 3 data downloaded from the COMTRADE database, July 2016, http://comtrade.un.org/db/dqBasicQuery.aspx.

Van Arkadie, Brian and Raymond Mallon (2003), *Vietnam: a transition tiger?* Canberra: Asia Pacific Press at the Australian National University.

Table 1: Commodity Exports of Foreign MNEs & MNE shares of Vietnam's exports and Export-GDP Ratios in MNEs and non-MNEs

	Annual estimates					Cumulative Monthly			
	Exports		Export/GDP ratio			Exports		Non-oil exports	
Year	US$bil	% share	MNE	non-MNE	MNE/ nonMNE	US$bil	% share	US$bil	% share
1995	1.473	27.03	1.127	0.205	5.508	-	-	-	-
2000	6.810	47.02	1.646	0.284	5.799	-	-	-	-
2005	18.554	57.18	2.123	0.284	7.473	18.517	57.45	11.130	44.80
2006	23.061	57.90	2.162	0.301	7.184	22.865	57.73	14.542	46.49
2007	27.775	57.19	2.115	0.323	6.542	27.832	57.52	19.355	48.50
2008	34.523	55.07	1.999	0.344	5.809	34.905	55.49	24.455	46.62
2009	30.372	53.19	1.655	0.305	5.427	29.854	52.76	23.644	46.94
2010	39.152	54.20	2.229	0.336	6.627	38.828	54.21	33.884	50.81
2011	55.124	56.88	2.597	0.366	7.104	55.114	56.87	47.873	53.39
2012	72.252	63.09	2.892	0.323	8.949	72.274	63.08	64.045	60.22
2013	88.150	66.76	2.965	0.310	9.559	88.190	66.74	80.913	64.80
2014	101.180	67.36	3.038	0.321	9.472	101.218	67.40	93.989	65.75
2015	114.267	70.53	3.190	0.294	10.852	114.274	70.52	110.619	69.84

Notes and sources: Annual data from General Statistics Office (various years b); cumulative monthly estimates from General Statistics Office (various years c); MNE shares of crude exports were 100 percent in 2005-2015.

Table 2: Commodity Exports by SITC (US$ millions)

Commodity or industry, code	2000	2010	2011	2012	2013
By SITC rev 3, total	14,483	72,237	96,906	114,529	132,033
Manufactures, excluding food, etc., 5-8	6,193	46,666	62,664	78,978	97,961
Textiles, 65	299	3,061	3,770	3,894	4,612
Apparel, 84	1,821	10,390	13,149	14,443	17,148
Leather & Footwear, 61, 85	1,481	5,489	6,987	7,793	9,025
Wood manufactures, 63	93	247	312	390	536
Paper manufactures, 64	59	372	418	503	537
Plastics & Rubber, 57-58, 62	46	1,214	1,456	1,893	1,753
Non-metallic mineral products, 66	172	936	1,247	1,816	2,305
Metals & metal products, 67-69	120	2,738	3,854	4,202	4,695
Electronic & electric machinery 75-77,87-88	1,064	9,309	15,857	27,795	40,009
Non-electric machinery, 71-74	135	1,698	2,352	2,871	2,894
Road vehicles, 78	74	721	969	1,304	1,586
Other transportation machinery, 79	26	531	808	1,082	877
Furniture, bedding, etc., 82	232	2,960	3,140	3,640	4,032
Miscellaneous manufactures, 89	281	4,636	4,793	2,930	3,112
Other manufactures	291	2,363	3,550	4,421	4,839
Food, beverages, tobacco, 0-1	3,554	13,729	17,701	19,173	18,787
Mineral fuels, 3	3,825	7,980	11,008	11,353	9,685
Others, 2, 4, 9	912	3,862	5,533	5,024	5,600
ADDENDUM: by VSIC93 (≈ISIC rev 3), total	14,483	72,237	-	-	-
Manufactures, D	8,831	58,384	-	-	-
Food, beverages, tobacco, 15-16	2,391	10,029	-	-	-
Textiles, 17	409	5,249	-	-	-
Apparel, 18	1,696	7,941	-	-	-
Leather & footwear, 19	1,647	6,285	-	-	-
Plastics & rubber, 25	125	1,974	-	-	-
Metals & metal products, 27-28	120	2,846	-	-	-
Electronic & electric machinery, 30-33	1,101	10,014	-	-	-
Furniture, miscellaneous manufacturing, 36	400	6,452	-	-	-
Other manufacturing	943	7,594	-	-	-
Mining & quarrying, C	3,628	6,825	-	-	-

Sources: General Statistics Office (various years a), United Nations COMTRADE (2016).

Table 3: Exports of firms with 20 or more employees and positive output and capital (US$ billions)

	All firms				WFs				JVs			
Industry (VSIC07≈ISIC rev 4)	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
All industries	40.766	60.315	76.621	102.06	23.809	36.418	42.114	67.963	1.789	2.232	9.070	7.680
Manufacturing	34.737	52.422	61.262	87.763	23.376	35.679	41.511	66.948	1.725	2.181	3.562	2.465
Sample manufacturing	30.679	46.938	54.285	80.729	20.878	32.663	37.503	62.824	1.517	1.941	3.356	2.217
Food products	3.881	5.963	6.691	6.675	0.283	0.493	0.801	0.654	0.041	0.085	0.077	0.043
Textiles	2.190	3.917	4.330	4.964	1.429	3.130	3.401	3.750	0.020	0.029	0.066	0.107
Apparel	3.093	4.763	5.504	6.649	1.957	2.787	3.328	4.003	0.083	0.139	0.158	0.125
Leather & footwear	3.544	4.675	5.677	7.018	2.904	3.922	4.819	5.867	0.177	0.203	0.220	0.265
Wood products	0.608	0.903	0.990	1.133	0.122	0.133	0.180	0.241	0.117	0.170	0.169	0.210
Paper products	0.373	0.489	0.640	0.754	0.239	0.373	0.419	0.477	0.002	0.011	0.026	0.021
Rubber & plastics	1.834	2.779	3.287	3.282	1.339	1.995	2.473	2.363	0.083	0.124	0.123	0.081
Basic metals	1.215	1.711	2.335	2.646	0.720	0.781	1.270	1.267	0.056	0.206	0.254	0.366
Metal products	0.146	0.415	0.654	0.693	0.107	0.213	0.311	0.253	0.013	0.006	0.005	0.004
Computers, electronic machinery	6.556	12.151	11.767	34.121	6.200	11.859	11.142	33.685	0.160	0.050	0.424	0.096
Electric machinery	2.590	2.831	3.339	4.022	2.272	2.496	3.056	3.482	0.237	0.250	0.206	0.364
Non-electric machinery	0.876	1.171	1.317	1.551	0.831	1.046	1.183	1.386	0.010	0.033	0.014	0.034
Motor vehicles	0.623	1.503	2.849	2.338	0.535	1.389	1.978	2.265	0.086	0.087	0.832	0.033
Other transportation machinery	0.436	0.602	1.063	0.407	0.037	0.041	0.528	0.279	0.296	0.362	0.466	0.007
Furniture	2.715	3.063	3.841	4.476	1.904	2.005	2.614	2.854	0.138	0.186	0.316	0.461
Excluded manufacturing	4.057	5.485	6.977	7.035	2.498	3.016	4.008	4.124	0.208	0.240	0.206	0.248
Agriculture	0.282	0.752	0.600	0.448	0.006	0.043	0.053	0.060	0.006	0.004	0.005	0.009
Mining	2.324	2.460	8.688	7.883	0.339	0.082	0.083	0.075	0.043	0.047	5.502	5.203
Wholesale trade	3.307	4.604	5.674	5.469	0.083	0.601	0.454	0.794	0.005	0.000	0.001	0.001
Other industries	0.115	0.076	0.396	0.500	0.005	0.014	0.013	0.086	0.011	0.000	0.001	0.002

Table 3 (continued)

Industry (VSIC07)	SOEs				Private firms			
	2010	2011	2012	2013	2010	2011	2012	2013
All industries	5.472	6.117	8.561	6.238	9.695	15.548	16.875	20.182
Manufacturing	1.406	1.847	1.868	2.105	8.230	12.716	14.322	16.245
Sample manufacturing	0.972	1.230	1.018	1.276	7.313	11.104	12.409	14.411
Food products	0.224	0.270	0.245	0.168	3.334	5.114	5.569	5.810
Textiles	0.155	0.185	0.192	0.191	0.587	0.573	0.671	0.916
Apparel	0.185	0.222	0.114	0.280	0.868	1.615	1.905	2.242
Leather & footwear	0.031	0.029	0.029	0.027	0.432	0.521	0.609	0.860
Wood products	0.032	0.030	0.022	0.014	0.337	0.570	0.618	0.668
Paper products	0.005	0.006	0.004	0.008	0.128	0.099	0.190	0.248
Rubber & plastics	0.065	0.095	0.088	0.105	0.347	0.565	0.604	0.734
Basic metals	0.057	0.085	0.119	0.181	0.383	0.639	0.693	0.832
Metal products	0.008	0.026	0.037	0.039	0.019	0.171	0.302	0.397
Computers, electronic machinery	0.040	0.017	0.019	0.019	0.156	0.225	0.182	0.322
Electric machinery	0.041	0.027	0.029	0.029	0.041	0.058	0.048	0.147
Non-electric machinery	0.011	0.015	0.016	0.032	0.024	0.078	0.104	0.099
Motor vehicles	0.002	0.002	0.003	0.032	0.000	0.026	0.037	0.009
Other transportation machinery	0.103	0.199	0.068	0.120	0.001	0.000	0.001	0.001
Furniture	0.014	0.022	0.035	0.033	0.659	0.850	0.876	1.128
Excluded manufacturing	0.435	0.617	0.850	0.829	0.917	1.612	1.913	1.834
Agriculture	0.265	0.691	0.529	0.345	0.005	0.014	0.014	0.034
Mining	1.913	2.241	3.003	2.508	0.030	0.090	0.100	0.097
Wholesale trade	1.842	1.305	2.871	1.241	1.378	2.698	2.348	3.432
Other industries	0.046	0.033	0.289	0.039	0.053	0.030	0.093	0.373

Note: For VSIC07 definitions see Appendix Table 1.

Sources: Authors' compilation of firm-level data supplied by General Statistics Office.

Table 4: Export propensities of firms with 20+ employees and positive turnover and fixed assets (percent)

	WFs				JVs				SOEs				Private firms			
Industry (VSIC07≈ISIC rev 4)	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
All industries	51	50	49	51	21	23	25	26	6	6	6	5	4	5	4	5
Manufacturing	53	52	52	54	26	31	34	36	12	11	10	11	9	10	10	12
Sample manufacturing	55	54	54	56	31	35	40	41	14	15	14	15	11	11	11	13
Food products	62	63	68	61	33	32	45	35	47	47	44	37	28	31	44	37
Textiles	47	45	48	47	23	26	29	30	23	21	20	22	10	9	20	22
Apparel	67	66	68	73	58	63	61	62	51	50	43	52	20	21	43	52
Leather & footwear	73	70	69	71	64	77	75	90	42	33	37	44	20	20	37	44
Wood products	57	53	48	54	69	60	69	73	17	12	13	10	13	14	13	10
Paper products	38	40	40	40	13	29	63	36	4	3	2	4	4	4	2	4
Rubber & plastics	51	53	50	50	32	36	49	50	8	12	10	10	6	7	10	10
Basic metals	36	37	38	34	12	25	19	25	2	2	2	2	4	3	2	2
Metal products	22	38	34	34	12	10	13	19	5	8	9	7	1	2	9	7
Computers, electronic machinery	52	51	52	51	16	22	37	34	10	8	17	8	3	3	17	8
Electric machinery	62	62	63	69	36	27	25	36	3	3	3	3	3	3	3	3
Non-electric machinery	50	41	44	44	27	30	25	27	3	3	4	17	4	4	4	17
Motor vehicles	36	42	42	47	8	10	14	3	0	0	1	8	0	1	1	8
Other transportation machinery	49	74	78	66	99	52	76	50	12	17	12	12	0	0	12	12
Furniture	59	57	54	57	32	43	43	50	11	15	31	27	19	21	31	27
Excluded manufacturing	42	42	41	43	13	18	18	21	6	5	6	5	4	5	6	5
Agriculture	21	26	22	23	31	26	16	46	2	3	3	3	0	0	35	0
Mining	68	60	41	35	19	10	33	31	5	5	7	6	2	2	48	2
Wholesale trade	12	14	10	14	11	2	7	3	12	12	13	9	3	4	46	4
Other industries	3	2	1	2	0	0	0	0	0	0	0	0	0	0	21	0

Note: For VSIC07 definitions see Appendix Table 1.

Sources: Authors' compilation of firm-level data supplied by General Statistics Office.

Table 5: Coefficients on main control variables and pseudo R-squared from tobit estimates of conditional ownership-related differences in export propensities using equation (1)

	Labor (Size)		Capital intensity		Equity-asset ratio		Psuedo R-squared	
Industry	contem-poraneous	lagged	contem-poraneous	lagged	contem-poraneous	lagged	contem-poran-eous	lagged
15 sample industries combined	27.187***	24.704***	4.229***	5.101***	-5.196***	-7.466***	0.1029	0.1011
Food products	27.609***	25.097***	10.681***	9.164***	-21.578***	-28.879***	0.0514	0.0505
Textiles	23.847***	21.721***	-0.017	1.117	-9.899***	-11.629**	0.0758	0.0725
Apparel	40.497***	35.490***	6.640***	9.765***	-10.012***	-9.005***	0.0848	0.0806
Leather & footwear	26.263***	24.158***	3.538***	5.847***	-2.217	-6.612**	0.0907	0.0875
Wood products	37.294***	33.434***	9.419***	8.048***	-20.905***	-16.025**	0.0622	0.0598
Paper products	26.404***	24.786***	-4.836***	-5.309***	-8.844	-4.371	0.1080	0.1066
Rubber & plastics	21.316***	19.855***	1.381*	1.792*	-4.608	-5.535*	0.0922	0.0876
Basic metals	25.905***	22.968***	1.057	3.389***	1.691	0.112	0.0911	0.0855
Metal products	24.476***	24.508***	8.990***	8.614***	-16.894**	-16.038*	0.1382	0.1394
Computers, electronic machinery	21.489***	21.367***	6.915***	8.718***	-7.650**	-9.090**	0.1367	0.1347
Electric & non-electronic machinery	20.040***	18.197***	3.025***	3.372***	3.257	-3.177	0.1345	0.1307
Transporation machinery	19.640***	16.360***	0.491	1.262	-8.978	1.691	0.1357	0.1231
Furniture	27.564***	24.653***	2.637***	3.597***	-16.239***	-17.579***	0.0926	0.0865

Notes: *** p<0.01, ** p<0.05, * p<0.10; in the lagged specification L, KL, and EA are lagged one year; esitmates also include year dummies and 6 region dummies (Hanoi is the base region), the result for all sample industries includes 14 industry dummies (food products is the base industry); results for electric and non-electric machinery and for transportation machinery include one 2-digit industry dummy each (using non-electric machinery and other transportation machinery as base industries); full results with other slope coefficients, the constant, coefficients on year, region, and industry dummies, and sample size information are in Appendix Tables 4 and 5a-5m.

Table 6: Coefficients on ownership dummies from tobit estimates of conditional ownership-related differences in export propensities using equation (1)

	WF dummy		JV dummy		SOE dummy	
Industry	contem-poraneous	lagged	contem-poraneous	lagged	contem-poraneous	lagged
15 sample industries combined	73.290***	71.214***	54.012***	51.802***	-6.722***	-7.228***
Food products	49.415***	50.445***	1.140	5.491	-9.959	-13.857
Textiles	70.693***	68.555***	37.036***	33.406***	7.895	5.737
Apparel	52.560***	52.272***	46.165***	44.429***	2.652	2.157
Leather & footwear	77.773***	72.535***	58.595***	61.227***	27.253*	24.766
Wood products	64.651***	57.872***	111.703***	104.969***	-31.968***	-35.525***
Paper products	91.634***	93.028***	109.090***	109.847***	-11.124	-11.335
Rubber & plastics	77.117***	75.488***	66.060***	64.174***	-4.854	-0.645
Basic metals	95.768***	89.118***	72.328***	67.853***	-18.409***	-18.062***
Metal products	81.706***	83.099***	63.857***	56.923***	19.220**	18.094*
Computers, electronic machinery	87.595***	84.454***	63.397***	61.651***	-1.502	-2.743
Electric & non-electronic machinery	90.604***	92.416***	62.537***	62.655***	-2.997	0.784
Transporation machinery	123.982***	122.312***	65.098***	62.455***	23.246***	25.042***
Furniture	40.221***	37.229***	25.860***	26.199***	0.939	5.913

Notes: *** p<0.01, ** p<0.05, * p<0.10; in the lagged specification L, KL, and EA are lagged one year; esitmates also include year dummies and 6 region dummies (Hanoi is the base region), the result for all sample industries includes 14 industry dummies (food products is the base industry); results for electric and non-electric machinery and for transportation machinery include one 2-digit industry dummy each (using non-electric machinery and other transportation machinery as base industries); full results with other slope coefficients, the constant, coefficients on year, region, and industry dummies, and sample size information are in Appendix Tables 4 and 5a-5m.

Appendix Table 1: Vietnam Standard Industrial Classification Codes, 2007 revision

Industry	VSIC07 codes
Manufacturing	
Sample manufacturing	
Food products	10
Textiles	13
Apparel	14
Leather & footwear	15
Wood products	16
Paper products	17
Rubber & plastics	22
Basic metals	24
Metal products	25
Computers, electronic machinery	26
Electric machinery	27
Non-electric machinery	28
Motor vehicles	29
Other transportation machinery	30
Furniture	31
Excluded manufacturing	
Beverages	11
Tobacco	12
Printing and publishing	18
Oil & coal products	19
Chemicals	20
Pharmaceuticals	21
Non-metallic mineral products	23
Non-manufacturing	
Agriculture	1-3
Mining	5-9
Wholesale trade	45-46
Other industries	

Note: The VSIC 2007 revsion is almost identical to revsion 4 of the ISIC at this level of aggregation.

Appendix Table 2: Employees of firms with 20 or more employees and positive output and capital (thousands)

	WFs				JVs				SOEs				Private firms			
Industry (VSIC07)	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
All industries	1,821	2,137	2,334	2,517	182	189	181	183	871	845	863	818	3,297	3,679	3,779	3,598
all firms, published totals	1,902	2,289	2,476	2,783	254	262	244	268	1,692	1,664	1,606	1,660	5,983	6,681	6,759	6,855
Manufacturing	1,789	2,100	2,297	2,474	155	163	149	149	319	294	282	277	1,739	1,898	1,929	1,897
Sample manufacturing	1,630	1,918	2,103	2,268	126	136	128	125	240	213	196	191	1,504	1,635	1,649	1,630
Food products	16	17	17	19	5	8	8	6	18	21	21	16	213	234	225	223
Textiles	60	74	72	75	4	5	5	6	21	16	13	17	76	83	85	83
Apparel	429	483	534	584	22	22	22	18	44	32	26	26	307	367	387	403
Leather & footwear	492	582	623	689	25	28	23	25	9	14	6	5	159	161	172	175
Wood products	11	14	15	16	2	2	2	2	8	5	6	5	74	77	76	76
Paper products	19	23	23	23	0	0	1	1	7	6	6	5	54	59	61	60
Rubber & plastics	83	83	89	95	6	7	5	5	10	11	11	11	82	85	89	89
Basic metals	23	27	31	31	13	11	12	10	56	50	50	51	229	241	232	214
Metal products	9	8	10	10	2	2	1	1	10	8	8	9	35	46	47	46
Computers, electronic machinery	205	277	328	345	5	4	5	4	9	5	5	5	53	59	56	56
Electric machinery	81	88	101	100	5	6	6	7	6	6	6	5	30	26	26	26
Non-electric machinery	29	34	35	38	1	2	2	2	5	5	4	4	32	34	33	31
Motor vehicles	27	51	62	70	5	6	4	5	8	8	8	7	13	12	13	12
Other transportation machinery	2	2	4	5	3	4	3	3	25	22	23	19	12	8	7	5
Furniture	142	155	160	168	27	31	30	30	7	5	4	5	135	143	139	132
Excluded manufacturing	160	182	194	207	29	27	21	24	79	82	86	86	235	262	280	268
Agriculture	9	7	8	8	1	1	1	1	171	168	188	172	91	89	91	85
Mining	1	1	1	1	9	3	10	12	111	120	130	114	59	64	62	50
Wholesale trade	7	11	10	14	1	2	1	1	26	27	27	26	219	206	221	213
Other industries	14	19	19	20	16	21	20	19	243	235	235	228	1,189	1,423	1,476	1,353

Note: For VSIC07 definitions see Appendix Table 1

Sources: Authors' compilation of firm-level data supplied by General Statistics Office.

Appendix Table 3: Number of firms with 20 or more employees and positive output and capital

	WFs				JVs				SOEs				Private firms			
Industry (VSIC07)	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
All industries	3,624	4,088	4,311	4,163	517	553	552	530	1,715	1,738	1,750	1,672	31,386	37,612	39,267	36,333
all firms, published totals	5,989	7,516	7,523	8,632	1,259	1,494	1,453	1,588	3,281	3,265	3,239	3,199	268,831	312,416	334,562	359,794
Manufacturing	3,432	3,824	4,029	3,899	382	396	392	366	611	599	612	585	12,780	14,776	15,353	14,315
Sample manufacturing	2,801	3,146	3,311	3,214	282	295	291	272	401	372	371	357	10,451	12,026	12,426	11,585
Food products	64	73	74	79	15	21	24	18	27	26	24	21	789	915	992	929
Textiles	216	267	259	247	17	17	19	19	27	26	27	26	609	697	705	653
Apparel	506	553	571	553	35	34	36	32	32	29	27	28	1,298	1,616	1,741	1,588
Leather & footwear	198	236	259	254	9	9	10	10	10	12	7	6	372	435	457	440
Wood products	67	75	83	77	20	19	17	20	20	19	17	15	964	1,066	1,115	1,011
Paper products	102	117	118	114	2	4	4	4	16	14	15	12	696	762	776	727
Rubber & plastics	370	398	408	395	24	26	23	22	19	22	22	23	850	968	996	940
Basic metals	102	124	152	142	45	45	48	42	108	91	95	93	1,856	2,155	2,185	2,033
Metal products	44	45	62	54	13	12	11	10	22	26	27	25	529	714	702	671
Computers, electronic machinery	493	549	578	574	39	34	36	32	25	17	18	17	835	905	939	884
Electric machinery	112	141	153	146	10	11	10	11	13	15	15	13	169	208	217	206
Non-electric machinery	109	123	141	143	12	17	16	12	13	16	17	17	372	412	403	406
Motor vehicles	110	129	134	131	12	15	10	13	17	18	16	14	67	71	86	77
Other transportation machinery	6	4	9	9	1	2	2	2	37	31	35	37	123	87	85	65
Furniture	302	312	310	296	28	29	25	25	15	10	9	10	922	1,015	1,027	955
Excluded manufacturing	631	678	718	685	100	101	101	94	210	227	241	228	2,329	2,750	2,927	2,730
Agriculture	44	52	52	49	7	8	7	6	362	372	366	354	2,120	2,112	2,129	2,004
Mining	11	8	8	9	13	14	13	11	68	71	77	68	816	907	851	748
Wholesale trade	33	61	67	68	12	12	11	13	122	132	137	132	2,888	3,811	4,186	3,990
Other industries	104	143	155	138	103	123	129	134	552	564	558	533	12,782	16,006	16,748	15,276

Note: For VSIC07 definitions see Appendix Table 1.

Sources: Authors' compilation of firm-level data supplied by General Statistics Office; published totals from General Statistics Office (2016).

Appendix Table 4: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), all sample manufacturing industries combined

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	27.187***	0.346	24.704***	0.384
KL =capital intensity	4.229***	0.298	5.101***	0.344
EA =equity-asset ratio	-5.196***	1.845	-7.466***	1.200
DSOE =SOE dummy	-6.722***	2.274	-7.228***	2.568
DJV =JV dummy	54.012***	2.497	51.802***	2.909
DWF =WF dummy	73.290***	1.067	71.214***	1.220
Year dummies				
2011	6.346***	1.133	-	-
2012	4.616***	1.137	0.215	1.111
2013	9.382***	1.151	2.040*	1.116
Region dummies (Hanoi is the base)				
2=Red River delta	13.586***	1.614	15.235***	1.841
3=Northern midlands	7.926***	2.419	9.371***	2.731
4=Central region	17.043***	1.783	16.990***	2.036
5=Southeast region	29.615***	1.557	28.307***	1.790
6=Ho Chi Minh City	24.249***	1.572	27.058***	1.809
7=Mekong delta	17.657***	2.064	21.212***	2.357
Industry dummies (VSIC10=food products is base; see Appendix Table 6 for definitions)				
VSIC07=13	-37.077***	2.109	-37.951***	2.425
VSIC07=14	-13.383***	1.864	-8.156***	2.164
VSIC07=15	-28.942***	2.368	-23.679***	2.715
VSIC07=16	-16.973***	2.118	-15.838***	2.456
VSIC07=17	-59.505***	2.323	-61.677***	2.666
VSIC07=22	-35.142***	1.872	-34.615***	2.148
VSIC07=24	-77.262***	1.955	-78.346***	2.244
VSIC07=25	-78.056***	2.736	-77.161***	3.134
VSIC07=26	-45.137***	1.915	-44.384***	2.212
VSIC07=27	-37.779***	2.519	-38.099***	2.881
VSIC07=28	-48.194***	2.464	-50.032***	2.816
VSIC07=29	-60.170***	3.000	-56.826***	3.441
VSIC07=30	-86.823***	5.599	-85.593***	6.635
VSIC07=31	-20.599***	1.875	-19.873***	2.171
Constant	-173.217***	3.078	-154.396***	3.352
Psuedo-R-squared	0.1029		0.1011	
Observations	61,528		43,127	
Observations, XS=0	40,790		27,668	
Observations, XS=100	3,671		2,812	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5a: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), food products

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	27.609***	1.039	25.097***	1.178
KL =capital intensity	10.681***	1.012	9.164***	1.176
EA =equity-asset ratio	-21.578***	3.124	-28.879***	4.544
DSOE =SOE dummy	-9.959	7.782	-13.857	9.359
DJV =JV dummy	1.140	10.319	5.491	12.220
DWF =WF dummy	49.415***	4.186	50.445***	5.082
Year dummies				
2011	9.292***	3.568	-	-
2012	4.433	3.509	-3.051	3.484
2013	1.135	3.628	-9.182***	3.561
Region dummies (Hanoi is the base)				
2=Red River delta	53.039***	13.050	47.182***	14.584
3=Northern midlands	83.173***	15.127	78.171***	16.882
4=Central region	53.994***	12.457	45.031***	13.806
5=Southeast region	32.027**	12.528	24.133*	13.898
6=Ho Chi Minh City	61.173***	12.690	54.589***	14.102
7=Mekong delta	38.910***	12.406	33.577**	13.763
Constant	-209.841***	14.033	-168.927***	15.663
Psuedo-R-squared	0.0514		0.0505	
Observations	4,082		2,893	
Observations, XS=0	2,086		1,420	
Observations, XS=100	219		172	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5b: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), textiles

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	23.847***	1.162	21.721***	1.311
KL =capital intensity	-0.017	0.942	1.117	1.110
EA =equity-asset ratio	-9.899***	3.558	-11.629**	4.660
DSOE =SOE dummy	7.895	6.510	5.737	7.576
DJV =JV dummy	37.036***	8.610	33.406***	10.034
DWF =WF dummy	70.693***	3.736	68.555***	4.283
Year dummies				
2011	-2.794	3.826	-	-
2012	4.880	3.857	4.208	3.765
2013	6.600*	3.873	6.888*	3.764
Region dummies (Hanoi is the base)				
2=Red River delta	17.000***	5.244	15.166**	6.091
3=Northern midlands	-61.820***	13.917	-52.671***	15.101
4=Central region	18.746***	6.847	20.982***	7.902
5=Southeast region	11.719**	5.553	9.933	6.405
6=Ho Chi Minh City	-2.592	5.410	2.504	6.253
7=Mekong delta	20.409**	8.065	32.475***	9.551
Constant	-156.027***	7.857	-147.365***	8.864
Psuedo-R-squared	0.0758		0.0725	
Observations	3,822		2,708	
Observations, XS=0	2,415		1,660	
Observations, XS=100	163		117	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5c: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), apparel

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	40.497***	1.137	35.490***	1.252
KL =capital intensity	6.640***	0.927	9.765***	1.051
EA =equity-asset ratio	-10.012***	1.983	-9.005***	2.466
DSOE =SOE dummy	2.652	10.662	2.157	11.971
DJV =JV dummy	46.165***	8.821	44.429***	10.383
DWF =WF dummy	52.560***	3.316	52.272***	3.750
Year dummies				
2011	10.938***	3.692	-	-
2012	4.698	3.635	0.093	3.568
2013	17.910***	3.689	5.012	3.593
Region dummies (Hanoi is the base)				
2=Red River delta	-3.388	5.023	1.313	5.718
3=Northern midlands	16.882**	7.615	20.687**	8.606
4=Central region	-26.592***	6.136	-26.794***	6.905
5=Southeast region	-4.980	5.463	-3.656	6.307
6=Ho Chi Minh City	-6.424	4.691	0.001	5.392
7=Mekong delta	-34.114***	7.484	-29.014***	8.428
Constant	-240.682***	7.946	-207.750***	8.571
Psuedo-R-squared	0.0848		0.0806	
Observations	8,663		5,985	
Observations, XS=0	4,805		3,102	
Observations, XS=100	1,326		1,019	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5d: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), leather & footwear

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	26.263***	1.339	24.158***	1.476
KL =capital intensity	3.538***	1.179	5.847***	1.297
EA =equity-asset ratio	-2.217	1.872	-6.612**	2.972
DSOE =SOE dummy	27.253*	15.615	24.766	17.878
DJV =JV dummy	58.595***	12.269	61.227***	13.329
DWF =WF dummy	77.773***	4.752	72.535***	5.309
Year dummies				
2011	5.803	5.360	-	-
2012	8.548	5.366	5.666	5.249
2013	4.950	5.360	-4.131	5.143
Region dummies (Hanoi is the base)				
2=Red River delta	5.034	10.315	13.811	12.031
3=Northern midlands	-30.018	31.376	-5.658	33.848
4=Central region	-54.841***	14.880	-40.910**	16.547
5=Southeast region	-14.795	9.666	-7.107	11.182
6=Ho Chi Minh City	0.681	9.463	10.356	11.083
7=Mekong delta	-38.856***	11.125	-22.926*	12.848
Constant	-167.685***	12.497	-155.188***	14.202
Psuedo-R-squared	0.0907		0.0875	
Observations	2,722		1,914	
Observations, XS=0	1,370		901	
Observations, XS=100	415		317	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5e: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), wood products

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	37.294***	2.014	33.434***	2.247
KL =capital intensity	9.419***	1.283	8.048***	1.473
EA =equity-asset ratio	-20.905***	6.451	-16.025**	7.443
DSOE =SOE dummy	-31.968***	11.304	-35.525***	13.179
DJV =JV dummy	111.703***	9.071	104.969***	11.438
DWF =WF dummy	64.651***	6.041	57.872***	6.913
Year dummies				
2011	7.150	4.977	-	-
2012	-5.303	5.068	-10.136**	5.044
2013	4.813	5.011	-1.460	4.950
Region dummies (Hanoi is the base)				
2=Red River delta	-34.525***	7.447	-35.674***	8.766
3=Northern midlands	-16.507**	8.076	-9.010	9.367
4=Central region	-25.972***	6.416	-26.374***	7.543
5=Southeast region	-13.406**	6.305	-10.467	7.360
6=Ho Chi Minh City	13.156	8.509	25.771**	10.061
7=Mekong delta	62.248***	7.976	60.940***	9.223
Constant	-222.952***	12.035	-190.741***	13.365
Psuedo-R-squared	0.0622		0.0598	
Observations	4,598		3,126	
Observations, XS=0	3,333		2,201	
Observations, XS=100	168		122	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5f: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), paper products

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	26.404***	1.892	24.786***	2.165
KL =capital intensity	-4.836***	1.449	-5.309***	1.628
EA =equity-asset ratio	-8.844	5.724	-4.371	7.059
DSOE =SOE dummy	-11.124	10.021	-11.335	12.143
DJV =JV dummy	109.090***	18.525	109.847***	23.244
DWF =WF dummy	91.634***	5.201	93.028***	5.901
Year dummies				
2011	0.167	4.857	-	-
2012	7.863	4.877	2.364	4.734
2013	11.020**	5.042	10.277**	4.906
Region dummies (Hanoi is the base)				
2=Red River delta	38.925***	6.744	40.134***	8.171
3=Northern midlands	59.427***	8.819	53.998***	10.521
4=Central region	3.730	7.977	4.732	9.447
5=Southeast region	25.886***	7.059	17.308**	8.486
6=Ho Chi Minh City	19.026***	6.832	20.349**	8.341
7=Mekong delta	34.097***	8.869	32.136***	10.530
Constant	-194.103***	12.244	-181.130***	14.225
Psuedo-R-squared	0.1080		0.1066	
Observations	3,481		2,475	
Observations, XS=0	2,768		1,946	
Observations, XS=100	78		59	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5g: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), rubber & plastics

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	21.316***	0.970	19.855***	1.080
KL =capital intensity	1.381*	0.839	1.792*	0.968
EA =equity-asset ratio	-4.608	2.915	-5.535*	3.221
DSOE =SOE dummy	-4.854	6.096	-0.645	6.689
DJV =JV dummy	66.060***	6.947	64.174***	8.317
DWF =WF dummy	77.117***	2.593	75.488***	3.003
Year dummies				
2011	9.622***	2.862	-	-
2012	8.634***	2.904	1.730	2.833
2013	14.051***	2.930	5.109*	2.862
Region dummies (Hanoi is the base)				
2=Red River delta	16.922***	4.264	18.970***	4.889
3=Northern midlands	20.119***	5.691	20.490***	6.408
4=Central region	15.813***	5.617	16.704***	6.467
5=Southeast region	27.538***	4.094	24.021***	4.721
6=Ho Chi Minh City	29.247***	3.789	28.757***	4.383
7=Mekong delta	17.037***	5.233	20.810***	5.879
Constant	-168.282***	6.757	-150.931***	7.471
Psuedo-R-squared	0.0922		0.0876	
Observations	5,503		3,909	
Observations, XS=0	3,324		2,263	
Observations, XS=100	236		194	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5h: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), basic metals

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	25.905***	1.289	22.968***	1.397
KL =capital intensity	1.057	1.027	3.389***	1.161
EA =equity-asset ratio	1.691	3.272	0.112	4.018
DSOE =SOE dummy	-18.409***	5.540	-18.062***	5.987
DJV =JV dummy	72.328***	7.430	67.853***	8.642
DWF =WF dummy	95.768***	4.826	89.118***	5.251
Year dummies				
2011	7.302*	3.993	-	-
2012	9.080**	3.986	-0.954	3.677
2013	13.315***	4.030	2.045	3.713
Region dummies (Hanoi is the base)				
2=Red River delta	-9.787*	5.530	-6.728	6.068
3=Northern midlands	-10.818	6.603	-11.701	7.201
4=Central region	17.230***	5.674	19.438***	6.224
5=Southeast region	50.712***	5.730	50.828***	6.436
6=Ho Chi Minh City	41.801***	6.681	41.811***	7.725
7=Mekong delta	14.441**	7.244	22.047***	7.955
Constant	-241.270***	9.646	-223.117***	10.356
Psuedo-R-squared	0.0911		0.0855	
Observations	9,310		6,552	
Observations, XS=0	8,059		5,609	
Observations, XS=100	111		76	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5i: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), metal products

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	24.476***	2.262	24.508***	2.533
KL =capital intensity	8.990***	1.908	8.614***	2.155
EA =equity-asset ratio	-16.894**	7.273	-16.038*	8.816
DSOE =SOE dummy	19.220**	9.032	18.094*	9.743
DJV =JV dummy	63.857***	10.729	56.923***	12.539
DWF =WF dummy	81.706***	8.008	83.099***	9.490
Year dummies				
2011	17.545**	7.099	-	-
2012	8.661	6.849	1.172	6.420
2013	16.575**	7.118	4.930	6.527
Region dummies (Hanoi is the base)				
2=Red River delta	15.860**	6.852	9.784	7.466
3=Northern midlands	-18.471	15.161	-13.560	15.600
4=Central region	-0.759	8.829	5.170	9.236
5=Southeast region	39.281***	8.530	32.265***	10.035
6=Ho Chi Minh City	48.246***	7.052	53.109***	8.045
7=Mekong delta	43.588***	10.811	39.082***	12.901
Constant	-260.287***	18.117	-240.853***	19.891
Psuedo-R-squared	0.1382		0.1394	
Observations	2,963		2,071	
Observations, XS=0	2,462		1,829	
Observations, XS=100	28		21	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5j: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), computers & electronic machinery

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	21.489***	0.956	21.367***	1.107
KL =capital intensity	6.915***	0.888	8.718***	1.114
EA =equity-asset ratio	-7.650**	2.973	-9.090**	3.754
DSOE =SOE dummy	-1.502	11.115	-2.743	13.850
DJV =JV dummy	63.397***	5.680	61.651***	6.915
DWF =WF dummy	87.595***	2.892	84.454***	3.471
Year dummies				
2011	5.026	3.064	-	-
2012	2.633	3.090	2.465	3.208
2013	3.586	3.134	-1.340	3.199
Region dummies (Hanoi is the base)				
2=Red River delta	12.504***	3.952	16.333***	4.678
3=Northern midlands	-15.937**	6.902	-15.161*	7.911
4=Central region	11.025	6.827	15.197*	8.120
5=Southeast region	37.283***	3.834	36.689***	4.561
6=Ho Chi Minh City	31.954***	3.786	34.163***	4.526
7=Mekong delta	28.205***	7.869	31.335***	9.274
Constant	-206.158***	7.183	-205.549***	8.469
Psuedo-R-squared	0.1367		0.1347	
Observations	5,966		4,127	
Observations, XS=0	3,799		2,544	
Observations, XS=100	370		301	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5k: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), electric & non-electronic machinery

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	20.040***	1.049	18.197***	1.205
KL =capital intensity	3.025***	1.080	3.372***	1.240
EA =equity-asset ratio	3.257	4.716	-3.177	5.387
DSOE =SOE dummy	-2.997	5.549	0.784	6.395
DJV =JV dummy	62.537***	6.608	62.655***	7.344
DWF =WF dummy	90.604***	3.276	92.416***	3.835
Year dummies				
2011	0.259	3.586	-	-
2012	1.915	3.565	1.558	3.596
2013	7.260**	3.566	6.934*	3.558
Region dummies (Hanoi is the base)				
2=Red River delta	19.101***	3.893	18.387***	4.475
3=Northern midlands	-54.373***	15.016	-44.108***	16.534
4=Central region	13.300	8.983	18.732*	9.983
5=Southeast region	23.343***	4.059	18.740***	4.748
6=Ho Chi Minh City	28.162***	3.659	29.008***	4.267
7=Mekong delta	0.210	7.085	7.617	7.972
Industry dummy				
VSIC07=28	-6.620***	2.539	-8.533***	2.952
Constant	-171.871***	8.103	-158.648***	9.398
Psuedo-R-squared	0.1345		0.1307	
Observations	3,750		2,645	
Observations, XS=0	2,436		1,669	
Observations, XS=100	190		140	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5l: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), transportation machinery

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	19.640***	1.821	16.360***	2.075
KL =capital intensity	0.491	1.725	1.262	1.945
EA =equity-asset ratio	-8.978	6.199	1.691	7.677
DSOE =SOE dummy	23.246***	7.711	25.042***	8.521
DJV =JV dummy	65.098***	10.618	62.455***	12.565
DWF =WF dummy	123.982***	7.543	122.312***	8.684
Year dummies				
2011	8.692	6.102	-	-
2012	15.211**	6.187	5.551	6.156
2013	19.358***	6.239	9.129	6.091
Region dummies (Hanoi is the base)				
2=Red River delta	3.623	7.593	13.026	8.588
3=Northern midlands	2.347	11.203	5.476	13.417
4=Central region	4.580	9.619	10.797	11.232
5=Southeast region	4.758	7.889	3.393	9.211
6=Ho Chi Minh City	10.843	9.796	11.126	11.322
7=Mekong delta	13.767	12.390	10.920	13.103
Industry dummy				
VSIC07=30	0.554	6.817	-1.828	7.746
Constant	-199.196***	15.646	-180.459***	18.100
Psuedo-R-squared	0.1357		0.1231	
Observations	1,481		1,001	
Observations, XS=0	949		598	
Observations, XS=100	89		70	

Note: *** p<0.01, ** p<0.05, * p<0.10

Appendix Table 5m: Tobit estimates of conditional ownership-related differences in export propensities from equation (1), furniture

Independent variable, indicator	Contemporaneous specification, 2010-2013		Lagged specification, 2011-2013	
	Coefficient	Robust standard error	Coefficient	Robust standard error
L =labor	27.564***	0.918	24.653***	1.033
KL =capital intensity	2.637***	0.851	3.597***	0.981
EA =equity-asset ratio	-16.239***	4.177	-17.579***	4.185
DSOE =SOE dummy	0.939	7.839	5.913	8.642
DJV =JV dummy	25.860***	6.411	26.199***	6.624
DWF =WF dummy	40.221***	2.662	37.229***	3.022
Year dummies				
2011	4.504	2.868	-	-
2012	0.009	2.931	-1.441	2.863
2013	4.657	2.993	-0.192	2.925
Region dummies (Hanoi is the base)				
2=Red River delta	13.073**	5.274	12.504**	5.828
3=Northern midlands	-13.518	22.087	-3.436	24.622
4=Central region	69.194***	4.162	65.497***	4.689
5=Southeast region	79.297***	3.674	78.245***	4.048
6=Ho Chi Minh City	64.355***	4.484	67.508***	5.075
7=Mekong delta	33.546***	10.330	38.058***	12.472
Constant	-206.396***	7.032	-186.569***	7.573
Psuedo-R-squared	0.0926		0.0865	
Observations	5,287		3,722	
Observations, XS=0	2,879		1,927	
Observations, XS=100	283		204	

Note: *** p<0.01, ** p<0.05, * p<0.10