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Globalizing Corporate Activities in East Asia and Impact on Domestic Operations: Further evidence from Japanese manufacturing firms*

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Abstract

This paper empirically investigates the pattern of globalizing corporate activities of Japanese manufacturing firms and its impact on their domestic operations and international trade, using 1998-2006 firm level data. More specifically, we compare changes in the domestic operations and international trade of firms expanding operations in East Asia against firms not expanding operations in two periods, 1998-2002 and 2002-2006. For our analysis in the latter period, we also incorporate the information on the firms' globalizing behavior in the former period. In addition, we conduct analyses to compare changes of firms becoming MNEs with firms choosing to remain domestic, and we also compare MNEs that are expanding operations with those not expanding operations. Although the globalization of corporate activities in less developed countries is thought to negatively affect operations and employment at home, our analysis finds that Japanese manufacturing firms expanding operations in East Asia are more likely to increase domestic employment and both the number of domestic affiliates and establishments. Such a tendency is particularly observed in the latter period, when the international division of labor in the region is more active. Furthermore, manufacturing firms that expand operations in East Asia tend to intensify their export and import activities in the region, suggesting the existence of complementary operations. At the individual firm level, the fragmentation of production by Japanese manufacturing firms seems to generate additional jobs and boost operations at home by effectively utilizing the mechanics of production process-wise division of labor in East Asia.

Keywords: Japanese manufacturing firms, East Asia, fragmentation, and domestic operations.
JEL classification: D22; F23; L23

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1. Introduction

In East Asia, international production/distribution networks began to be formulated in the 1990s and further developed in recent years, which was accompanied by drastic increases in vertical back-and-forth transactions of parts and components.[3] Japanese firms have been major players in the networks. Since the late 1990s in particular, Japanese investment in East Asia has accelerated; as Figure 1 describes, an upward trend is vividly observed for direct investment position of Japan in East Asia based on the balance of payments statistics. Moreover, a predominant portion of the investment is in manufacturing sectors. Although the global financial crisis occurred in fall 2008, Japanese manufacturing investment in East Asia has quickly recovered.

== Figure 1==

Outsourcing and off-shoring in lower-income countries by multinational enterprises (MNEs) raise concerns about activities in high-income countries. A popular argument claims that domestic employment and operations may shrink due to the relocation of economic activities taking advantage of a large wage gap between developed and developing countries. In particular, the fear of losing jobs, in both manufacturing and services sectors, and possible disruptive effects on wealthier society seem to be strong in journalistic as well as intellectual literature in Europe and North America.[4] However, even in the case when foreign direct investment (FDI) is pursuing inexpensive labor in developing countries, the effect of FDI on domestic operations is not necessarily negative; it depends on to what extent the cost reduction through FDI allows the firm to strengthen its competitiveness and whether the firm maintains activities at home that are complementary to operations abroad, sometimes further shifting their activities to the procurement of specialized parts and components, headquarters functions, and the development of new products. Figure 2 illustrates an example of complementary operations. When a firm realizes cost reduction by

[3] See Kimura and Ando (2005), Ando and Kimura (2009), Ando (2006), and Kimura (2006) for empirical analyses and established facts on production/distribution networks in East Asia. For theoretical framework for production sharing, see the fragmentation theory; Jones and Kierzkowski (1990) and Arndt and Kierzkowski (2001).

[4] See for example Samuelson (2004) and Blinder (2006).

fragmentation with FDI in lower income countries, for instance, it may be able to sell more products at cheaper prices than before. Larger sales requires an increase in the production of both final goods and intermediate inputs including specialized parts and components (P&C), as well as larger research and development (R&D) activities for new products and more extensive headquarter (HQ) services. If the firm shifts home activities to those that are complementary to activities abroad, it would rather expand domestic employment even if it might reduce employment in assembly lines.

== Figure 2 ==

As Becker, Ekholm, Jackle, and Muendler (2005) address, the effect of FDI on labor market at home is inherently an empirical issue. Their analysis of German MNEs for 2000 and Swedish MNEs for 1998 finds that affiliate employment abroad tends to substitute for parent employment. Blomstrom, Fors, and Lipsey (1997) demonstrate that affiliate production in developing countries has a stronger negative effect on parent employment in the U.S. for 1989, while Swedish parents employ more labor at home for 1970-1994.[5] Rather than focusing on MNEs only as in the previous literature including above-mentioned studies, Federico and Minerva (2008) assess the impact of Italy's outward FDI in the period between 1996 and 2001, comparing employment performance across local provinces, and find that FDI is associated with faster employment growth at home, relatively to the national industry average.

Japan has been a typical country with "hollowing-out (Kūdōka)" concerns since the mid-1980s, reflecting the rapid development of international division of labor in East Asia. In particular, Japan is located in the neighborhood of extremely attractive China and has recently been expanding manufacturing operations there. Fukao and Amano (2004) provide an extensive literature survey on the effect of outward FDI by Japanese firms on skill composition in labor demand at home at the macro level, at the

[5] See Brown and Spletzer (2005) for the relationship between off-shoring and mass layoffs in the U.S. The recent study by Ebenstein, Harrison, McMillan, and Phillips (2009) links industry-level data on offshoring activities of U.S. MNEs, import penetration, and export shares with individual level worker data and measures the impact on the wages of domestic workers. They find that offshoring to high wage countries is positively correlated with U.S manufacturing employment while offshoring to low wage countries is negatively associated.

industry level,[6] and at the firm level, suggesting possible job creation or at least job retainment on the side of skilled labor with globalizing corporate activities.[7] At the same time, they emphasize the importance of further comprehensive research at the firm level; for instance, Yamashita and Fukao (2010) examine whether the expansion of overseas operations of manufacturing MNEs reduces home employment, using parent-affiliate panel dataset of Japanese MNEs in the period 1991-2002. On the other hand, Ando and Kimura (2010) investigate the expansion of operations abroad, mainly in East Asia, by Japanese firms and their domestic operations and international trade, using the firm level data in 1998-2004 that includes both firms with and without operations abroad.

With an extension of the analysis by Ando and Kimura (2010), the paper further attempts to investigate globalizing activities of Japanese firms, with a particular emphasis on East Asia, and their domestic operations by using comprehensive firm-level panel data including both firms with and without operations abroad, unlike most of the previous studies using data only for MNEs. More specifically, we compare changes in domestic operations in terms of employment, establishments and affiliates at home and international trade of firms expanding operations in East Asia with those of firms not expanding operations in two periods, 1998-2002 and 2002-2006. For the analysis in the latter period, we also incorporate the information on the globalizing behavior in the former period. In addition, we conduct analyses to compare changes of firms becoming MNE with those of firms remaining domestic and also to compare MNEs expanding operations with those of MNEs not expanding operations.[8] By

[6] Also see Ito and Fukao (2005) for the analysis at the detailed industry level. They address that Japanese manufacturing industries realized skill upgrading as a result of the international division of labor with Asian economies.

[7] Head and Ries (2002) investigate the influence of offshore production by Japanese multinationals on domestic skill intensity at the firm level, using Toyo Keizai's survey on Japanese Overseas Investment 1992-1993 (1070 firms), and find that additional foreign affiliate employment in low-income countries raise skill intensity expressed as non-production share of the wage bill at home. For other studies on the effect of offshoring on the skill composition of domestic labor demand at the firm level, see Ekholm and Hakkala (2006) with evidences from Sweden and Hijzen, Gorg, and Hine (2005) with evidences from the United Kingdom.

[8] Hijzen, Inui, and Todo (2007) investigate the causal effect of becoming a multinational or establishing the first foreign affiliate during the sample period between 1995 and 2002, on home performance, by adopting propensity matching techniques in

analyzing these patterns, we would like to discuss whether the hollowing-out of industries exists directly due to globalizing activities at the firm level and whether domestic operations and operations in East Asia are substitutive or complementary. In particular, we are interested in the implication of production fragmentation, typically in machinery industries, for retaining domestic operations through assigning different activities at home and in East Asia.

The rest of this paper is organized as follows: section 2 provides data description of micro data employed in our paper and descriptively examines patterns of globalizing activities of Japanese firms and their domestic operations. Then, section 3 quantitatively investigates those patterns, employing logit and ordinary least squares (OLS) regression analyses, and section 4 concludes.

2. Japanese investment in East Asia at the firm level: overview

2.1 Data description

The analysis in sections 2 and 3 is based on the firm-level statistics, which is conducted by the Ministry of Economy, Trade, and Industry (METI), Government of Japan (the former name was the Ministry of International Trade and Industry (MITI)): *The Basic Survey of Business Structure and Activity*. This database provides detailed information on (parent) firms located in Japan as well as the number, industry, and regional location of their foreign affiliates with no less than 20 percent Japanese ownership. Note that the location of foreign affiliates is not identified on the country basis; the questionnaires from *the 1997F/Y Basic Survey* include only East Asia, North America, and Europe as regional categories.[9]

The samples in the survey cover firms with more than 50 workers, capital of more than 30 million yen, and establishments in mining, manufacturing, wholesale/retail trade, and restaurants. Our study employs this survey for the latest available years from *the 1999F/Y Basic Survey* (data for 1998) to *the 2007F/Y Basic*

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combination with a difference-in-difference estimator. They find that Japanese outward FDI tends to strengthen the economic activities in terms of output and employment, but not productivity.

[9] "East Asia" includes all Asian countries east of Pakistan. Note that Japanese FDI to South Asia is barely visible in this period.

Survey (data for 2006).

2.2 Characteristics of Japanese firms investing in East Asia

This subsection investigates globalizing patterns of Japanese firms, with a particular emphasis on firms investing in East Asia. To shed light on the features for East Asia, we compare them with firms investing in North America and Europe. Table 1 presents the number of 1) all sized firms and 2) small and medium enterprises (SMEs) with affiliates in East Asia/North America/Europe and the number of affiliates in East Asia/North America/Europe by the industry of parent firms and by the industry of affiliates.[10] In 2006, 4,547 out of 27,917 firms located in Japan (in the data set) have affiliates abroad. Among them, 3,978 firms have affiliates in East Asia. That is, 87.5 percent of the Japanese firms going abroad have at least one affiliate in East Asia.

== Table 1 ==

Japanese manufacturing parent firms, particularly machinery parent firms, are active investors in East Asia; close to 70 percent of the Japanese firms with affiliates in East Asia are in the manufacturing sector and over half of them are in machinery industries. Moreover, Japanese manufacturing affiliates, regardless of the industries of their parent firms, account for 59 percent of the total Japanese affiliates in the region, while 36 percent for both North America and Europe.

A parent firm often conducts various types of operations at the same time and establishes foreign affiliates in order to conduct a subset of those activities.[11] Japanese manufacturing parent firms have 72 percent of their total affiliates in East Asia in the manufacturing sector. The corresponding portion is even higher for manufacturing SMEs; 84 percent of their affiliates in East Asia are manufacturing. Such investment patterns by SMEs reflect a typical strategy for firms involved in manufacturing activities, aimed at supplying intermediate goods for other firms and/or for their own affiliates and forming a critical mass of industrial clusters in the manufacturing sector. In contrast with the case of East Asia, the share of non-manufacturing affiliates in all

[10] SMEs are here defined as firms with regular workers of less than 300.
[11] The industrial classification is based on the largest activities in terms of the value of sales.

affiliates in North America/Europe of Japanese manufacturing firms is high; more than half of affiliates of manufacturing parent SMEs are non-manufacturing affiliates, typically whole sales affilaites. It indicates that Japanese manufacturing investment in North America or Europe aims at selling their products or producing goods to be sold there, rather than being involved in dense vertical production chains as is the case in East Asia.

Table 2 in turn presents globalizing patterns of Japanese firms for 1998-2002 and 2002-2006 in the two-year balanced panel data (1998&2002 or 2002&2006) as well as in the three-year-balanced panel data (1998&2002&2006). Although the expansion of globalizing activities at the firm level may be measured in various ways, this paper regards an increase in the number of affiliates in East Asia as the indication of globalizing activities.[12] As Ando and Kimura (2010) addresses, most Japanese firms expanding operations abroad enlarge their activities in East Asia particularly in the manufacturing sector. Therefore, the paper places a focus on their expanding activities in East Asia.

== Table 2 ==

During four years in the former period, seven percent of firms in all industries and nine percent of manufacturing firms in the sample expand their operations in East Asia. The corresponding portions are even higher during four years in the latter period: 10 percent of firm in all industries and 13 percent of manufacturing firms. Interestingly, many firms that establish their affiliates for the first time in East Asia are SMEs; around 60 percent of firms with the first affiliate in East Asia in the sample period are SMEs, regardless of whether they are firms in all sectors or only in the manufacturing sector and whether it is in the former period or the latter period. Their active FDI certainly contributes to the development of vertical production chains in the region.

Let us look at changes in domestic operations by the type of firms. In the period 1998-2002, 65 percent of the firms in the two-year-balanced panel dataset simply

[12] Matsuura and Nagata (2005) investigate patterns of domestic job creation and destruction by Japanese firms, using unbalanced panel data from 1991-2002.

maintain or reduce domestic employment, and aggregate employment in the domestic market drops, mainly in the manufacturing sector (Tables 3 and 4).[13] Even in the manufacturing sector, however, the share of firms increasing domestic employment is relatively high for firms expanding operations in East Asia (33 percent), particularly those starting operations in East Asia (by establishing their first affiliate in the region during the sample period) (38 percent), compared with those retreating operations or remaining intact in East Asia (by withdrawing (some of) their affiliates or simply maintaining their affiliates in the region) (25 percent to 29 percent) and those without entry in the region (32 percent). The corresponding figures in the period 2002-2006 demonstrate more vividly features of globalizing firms; the portion of firms increasing domestic employment is 64 percent for those with expansion in East Asia, in contrast with 48 percent to 53 percent for firms in other categories.

== Table 3 ==

== Table 4 ==

The average growth rates of domestic employment at the firms level is also higher for those expanding operations in East Asia as a whole (12.6 percent), particularly for those starting operations in East Asia (16.1 percent), compared with those without entry in East Asia (5.2 percent), those with shrinkage (2.2 percent and 0.7 percent (exit)), and those intact (4.5 percent). As a result, an aggregate change in domestic employment is positive even for manufacturing firms during the latter period, while it is negative during the former period.

Moreover, the share of firms increasing domestic employment is much higher for SMEs expanding operations in East Asia than that for those not expanding activities in East Asia not only in the latter period but also in the former period; for manufacturing SMEs, the ratios in the period 1998-2002 are 42 percent for SMEs expanding operations in East Asia (67 percent in the period 2002-2006) while 36 percent for those with no entry (51 percent), 24 percent for those shrinking (54 percent), 35 percent for those with

[13] Figures for discussion in the rest of this section are based on Table 3, prepared using the two-year-balanced panel data.

exit (52 percent), and 33 percent for those remaining (56 percent). Furthermore, SMEs expanding operations in East Asia, including those in the manufacturing sector, have much higher average growth rates of domestic employment and indeed contribute to net domestic job creation at the aggregate level.

Besides, firms expanding operations in East Asia increase in the number of domestic establishments and domestic affiliates, rather than diminishing domestic operations; firms expanding operations in East Asia have much higher shares than those not expanding operations in terms of the portion of firms increasing the number of domestic establishments in the period 2002-2006 as well as the portion of firms increasing the number of domestic affiliates in both periods. All of the above-mentioned features indicate that intensified globalizing activities of Japanese firms through FDI in East Asia might be complements of domestic operations, rather than substitutes, and reduce direct negative impacts on employment, establishments, and affiliates at home, particularly in more recent period.

3. Globalizing corporate activities and domestic operations at the firm level

While the last section observes robust correlation between globalizing corporate activities and domestic operation, this section rather formally analyzes the relationship with econometric. Given the fact that most Japanese firms expanding operations abroad activate their operations in East Asia, this section investigates how these firms with expanding activities in East Asia reorganize domestic operations and export/import activities compared with other firms, employing logit/OLS regression analyses.

3.1 Empirical method and data

In regression analyses, we have to explicitly address a well-specified economic causality in order to avoid biased estimates. A typical pattern of globalizing decisions of corporate firms and subsequent adjustment of domestic operations is shown in Figure 3. The starting point is a corporate firm's decision on globalizing its activities. Our econometric exercise tries to capture evidences on the causality from the globalizing decision to the firm's adjustment in domestic operations. We therefore employ the establishment of a foreign affiliate as an instrument for the globalizing

decision. This instrument is ideal in that it has a strong correlation with the globalizing decision. A difficulty is that we do not know a precise time lag between the globalizing decision and the observed formal establishment of a foreign affiliate. The timing of the establishment of a foreign affiliate may be likely to be earlier than the corresponding domestic adjustments, but the reserve ordering may also be the possibility. In our judgment, a 4-year period seems to be a minimal duration to reasonably capture the causality from globalizing decisions to the corresponding domestic adjustments; indeed, regressions with shorter periods present unstable results. Another complication due to having multiple foreign affiliates is discussed below.

== Figure 3 ==

The basic equation for our logit/OLS estimation analyses ends up with as follows:

$$Y_{t_0}^{t} = \beta_0 + \beta_1 X_{t_0}^{t} + \beta_2 S_{t_0} + \beta_3 KL_{t_0} + \beta_4 EX_{t_0} + \beta_5 RD_{t_0} + \beta_6 AD_{t_0} + \beta_7 FC_{t_0} + \varepsilon \quad (1),$$

where $Y_{t_0}^{t}$ expresses a change in domestic operations or a change in export/import activities with East Asia from base year t_0 to the targeted year t. As for domestic operations, 0/1 binary variables are used for a change in domestic employment, in the number of domestic establishments, and in the number of domestic affiliates; $Y_{t_0}^{t}$ is one if a firm does not reduce domestic employment/the number of domestic establishments/the number of affiliates and is zero otherwise. Another variable for a change in domestic employment, $Y_{t_0}^{t}$, a growth rate of domestic employment, is also used. As for export/import activities with East Asia, a change in the ratio of exports to/imports from East Asia in total sales/purchases is applied; $Y_{t_0}^{t}$ is a difference obtained by subtracting the ratio for the base year from the ratio for the targeted year.

$X_{t_0}^{t}$ is an instrument for a firm's globalizing decision and a binary variable for expanding corporate activities in East Asia; $X_{t_0}^{t}$ is one if a firm increases in the number of affiliates in East Asia from the base year to the targeted year and is zero otherwise. Regarding domestic operations, if a firm increases domestic employment/ the number of domestic establishments/the number of domestic affiliates with their globalizing activities, or their activities in East Asia are complements of domestic

operations, the coefficient for $X_{t_0}^t$ is going to be positive. In the case of transactions with East Asia, if a firm expanding operations in East Asia relatively intensifies transactions with that region, the coefficient for $X_{t_0}^t$ is expected to be positive. In particular, if FDI and exports are complements rather than substitutes, the coefficient is expected to be positive.

Other independent variables are included as conventional control variables for the base year: the size of firm in terms of the number of regular workers in Japan (natural log) (S_{t_0}), the capital-labor ratio in terms of tangible assets per regular workers (natural log) (KL_{t_0}), the foreign sales ratio (in total sales) (EX_{t_0}), an in-house R&D expenditure ratio (in total sales) (RD_{t_0}), the advertisement expenditure ratio (in total sales) (AD_{t_0}), and the foreign capital ratio (FC_{t_0}); these are all for domestic (parent) firms.[14] Note that to control industry characteristics, industry dummies are also included as identified.

As discussed in section 2, the reorganization of domestic operations may be different according to the size of the firm. The variable of firm size is included to control such differences if at all. Capital-labor ratio, foreign sales, R&D expenditure, and advertisement expenditure are variables representing firm specific intangible assets. As a firm expanding operations abroad would have superior technology (or more capital-intensive technology), the coefficient for tangible assets per worker is expected to be positive. A firm's relatively large foreign sales would indicate that the firm is exposed to the global market and internationally competitive and may be significantly involved in production sharing activities. Therefore, the coefficient for the variable of foreign sales is expected to be positive, particularly for relatively strengthened export/import activities with East Asia. The expenditure to R&D and advertisement activities would imply a firm's intangible assets and technological competitiveness, and thus, the coefficient for these variables is expected to be positive. A variable for foreign capital is included to examine whether any significant difference exists between purely domestic firms and firms with (higher) foreign capital in Japan.

For each of dependent variables mentioned above, logit estimation analysis is conducted when they are binary variables measuring changes in domestic operations,

[14] The foreign capital ratio of a firm is denoted from zero to 1000: 10 times percentage of the ratio of foreign capital to total capital of a firm.

while OLS estimation analysis is conducted when they are a growth rate of domestic employment or a change in exports to/imports from East Asia as a share of total sales/purchases. In addition, the sample set is divided into manufacturing firms and non-manufacturing firms, considering that their FDI strategies would be different.

Our benchmark analyses are conducted individually based on equation (1) for the period from 1998 (base year) to 2002 (targeted year) and from 2002 (base year) to 2006 (targeted year), using the three-year-balanced panel dataset, for manufacturing firms. To see whether there are significant features for machinery firms that are the major players in the production networks in East Asia, we also conduct same analysis separately for machinery firms and non-machinery manufacturing firms.

How to control time-invariant firm-specific elements is certainly an analytical challenge. Because we have only two sets of 4-year changes, our dataset is too short to introduce firm-specific dummies. To take care of this concern at least partially, the following equation (2) is also used for the analysis in the latter period, 2002-2006.

$$Y_{t_0}^{t} = \beta_0 + \beta_{11} X_{1t_0}^{t} + \beta_{12} X_{2t_0}^{t} + \beta_{13} X_{3t_0}^{t} + \beta_2 S_{t_0} + \beta_3 KL_{t_0} + \beta_4 EX_{t_0} + \beta_5 RD_{t_0} + \beta_6 AD_{t_0} + \beta_7 FC_{t_0} + \varepsilon \quad (2).$$

$X_{it_0}^{t}$ ($i = 1,2,3$) is a binary variable for globalizing patterns for 1998-2002 and 2002-2006[15]; $X_{1t_0}^{t}$ is one if a firm increases in the number of affiliates in East Asia in both periods, 1998-2002 and 2002-2006 and is zero otherwise (exp1-exp2). $X_{2t_0}^{t}$ is one if a firm does not increase in the number of affiliates in East Asia during the former period while it increases during the latter period (nonexp1-exp2). $X_{3t_0}^{t}$ is one if a firm increases in the number of affiliates in East Asia during the former period while it does not increase during the latter period (exp1-nonexp2). If the globalizing firm tends to adjust domestic operations during the same period, the coefficients for $X_{1t_0}^{t}$ and $X_{2t_0}^{t}$ should be positive and higher than the coefficient for $X_{3t_0}^{t}$.

== Table 5 ==

We may worry about the fact that a number of firms have multiple foreign

[15] See Table 5 for the number of globalizing firms in 2002-2006, combined with the information of globalizing patterns in 1998-2002, and shares of corresponding firms.

affiliates in East Asia (and the rest of the world). For the robustness check, we also conduct analysis of the impact of becoming multinational enterprise (MNE) by comparing changes of firms becoming MNE (establishing the first affiliate in East Asia) with those of firms remaining domestic.[16] Furthermore, we conduct analysis focusing only on MNEs by comparing MNEs expanding operations in the region with MNEs not expanding operations.[17] Note that both estimations are based on equation (1).

3.2 Empirical results

Tables 6 to 8 report results of logit regression analyses and OLS regression analyses in the period (a) 1998-2002 and (b) 2002-2006 for manufacturing firms (Table 6), machinery firms (Table 7), and non-machinery manufacturing firms (Table 8).[18] As Tables 3 and 4 suggest, to control the size of firm must be crucial for our analysis, particularly of domestic employment. For manufacturing firms, the coefficient for the size of firm is negative and statistically significant in equations for domestic employment while it is positive and mostly statistically significant in equations for domestic establishments and domestic affiliates. It indicates that Japanese manufacturing firms with larger employment size at home are more likely to diminish domestic operations in terms of domestic employment, though they tend to expand domestic operations in terms of domestic establishments and domestic affiliates.

== Table 6 ==

== Table 7 ==

[16] As mentioned in Section 1, see Hijzen, Inui, and Todo (2007) for the analysis of the effect of becoming a multinational or establishing the first foreign affiliate during the sample period between 1995 and 2002, on home performance, using propensity matching techniques.

[17] Blomstrom, Fors, and Lipsey (1997) and Yamashita and Fukao (2010), for instance, focus on MNEs.

[18] Table A.1 shows the results of regression analysis, with a definition of the following expanding operations: firms with expanding operations are those who have at least one affiliate at the beginning of the sample period and increase in the number at the end of the period. Discussion in this sub-section is applicable for the analysis with this definition in most cases.

== Table 8 ==

The coefficient for capita-labor ratio is statistically significant with a positive value in the analysis in most cases. In addition, the coefficient tends to be larger for machinery firms than for non-machinery firms. These results suggest that Japanese manufacturing firms with capital-intensive technology, particularly machinery firms with capital-intensive technology, tend to expand domestic operations and strengthen transactions with East Asia. Machinery firm are active investors in East Asia as well as one of important players in developing international production/distribution networks in the region.

Moreover, the coefficient for in-house R&D ratio is positive with statistical significance mostly for domestic employment, regardless of whether the binary variable or the growth rate, and export activities with East Asia. It implies that R&D intensive manufacturing firms are more likely to expand domestic operations in terms of employment at home and relatively intensify export activities with East Asia, probably because they succeed in reorganize competitive activities and strengthen their competitiveness.

Furthermore, the coefficient for advertisement expenditure is positive with statistical significance for domestic affiliates in both periods for machinery and non-machinery firms and also for domestic establishments for both periods for machinery firms while only in the latter period for non-machinery firms. It suggests that manufacturing firms, particularly machinery firms, with intangible assets and technological competitiveness are more likely to expand domestic operations in terms of domestic affiliates and domestic establishments.

Given the size of firm and other controls, our results provide several interesting insights. First, the expansion of operations in East Asia is positively associated with an increase in domestic employment and their growth rates with statistical significance for manufacturing firms once the size of firm is controlled. Such a tendency is stronger for machinery firms than non-machinery manufacturing firms in more recent period (Tables 7(1) and 8(1)). These suggest that manufacturing firms expanding operations in East Asia, particularly machinery firms, are likely to increase their domestic employment, compared with those not, according to the further development of production networks. Moreover, their growth rates of domestic

employment for manufacturing firms expanding operations are likely to be higher than those for other manufacturing firms by as much as 4.5 percent to 6.7 percent during the four years (Table 6 (2)).

Table 9 shows the results of the analysis, combined with the globalizing behavior in the previous period. The coefficients for expanding operations in the latter period, regardless of whether firms have expanding operations in the former period or not, are positive and statistically significant, while the coefficient for not-expanding operations in the latter period but expanding operations in the former period is insignificant in most analyses for domestic operations. In addition, the coefficient tends to be larger for expanding operations in both periods than for expanding operations only in the latter period. Moreover, all the analyses except the growth of domestic employment present the positive coefficients that are higher for machinery firms than non-machinery firms. These suggest that even if we control time-invariant firm-specific elements at least partially, the above-mentioned results regarding domestic employment are robust.

== Table 9 ==

Although the total domestic employment in manufacturing sectors declines at the aggregate level from the end of the 1990s to the beginning of the 2000s, globalizing corporate manufacturing activities, particularly by machinery firms, tend to partially offset job destruction and sometimes even contribute to net job creation in the domestic market at the firm level. A rise in domestic employment by Japanese manufacturing firms, in particular machinery firms in the latter period, expanding operations in East Asia would partially reflect a need to expand domestic production of key parts and components to be exported to East Asia, to strengthen R&D activities for new products, or to intensify a specialization in headquarter services at home, as a result of active and effective fragmentation of production and specialization. The fragmentation with successful cost reduction would allow firms to expand employment engaged in production or services of these PBs though it may indeed decrease in employment at home in other PBs, which results in an expansion of employment at home in total. Another possible explanation for a relative rise in domestic employment by globalizing manufacturing firms would be that they succeed in differentiating products to be

produced in the domestic market from those to be produced in East Asia.

Second, there is a positive statistically significant relationship between the expansion of manufacturing operations in East Asia and an increase in the number of domestic establishments for manufacturing firms as a whole and machinery firms in the latter period and the number of domestic affiliates for all equations (Tables 6 (3), 6 (4), 7 (3), 7 (4), 8 (3), and 8 (4)). These suggest that manufacturing firms, particularly machinery firms, tend to expand domestic corporate operations in terms of the number of domestic establishments and domestic affiliates when they expand operations in the region.

Third, export/import activities with East Asia are relatively intensified by globalizing firms in East Asia, and such a tendency is likely to be stronger for machinery firms. The relationship between the expansion of manufacturing operations in East Asia and the relative intensification of transactions with East Asia is positively associated with statistical significance, with a larger coefficient for machinery firms in most cases than for non-manufacturing firms (Tables 6 (5), 6 (6), 7 (5), 7 (6), 8 (5), and 8 (6)). It suggests that firms expanding operations in East Asia intensify their transactions with East Asia compared to other manufacturing firms, which is particularly true in the case of machinery firms. This is another supporting evidence for expanding fragmentation of production by Japanese firms mainly in machinery industries and their involvement in further development of production/distribution networks in East Asia where trade and FDI are in a sense complementary.

Fourth, the effect of becoming MNE is likely to be positive, which is stronger for machinery firms recently. The results of analysis comparing firms that establish the first affiliate in East Asia in concerned period with those remain domestic show that the coefficients for becoming MNE is positive and statistically significant in most cases (Tables 10 and 11). Therefore, the firm that newly enters the East Asian market tends to expand domestic operations and relatively intensify transactions with East Asia, compared with those remain domestic.

== Table 10 ==

== Table 11 ==

Fifth, analyses focusing only on parent firms, which compare MNEs expanding operations in East Asia with MNEs not expanding operations, present the similar results discussed above (Tables 12 and 13). If the results in Tables 12 and 13 are compared with the results in Tables 6 to 8, however, the coefficients tend to be slightly smaller. It indicates that if we focus only on MNEs, the positive impacts on domestic adjustments become slightly smaller.

== Table 12 ==

== Table 13 ==

4. Conclusion

Japanese firms have recently accelerated their investment in East Asia, mainly in manufacturing sectors, and have contributed to the development of international production/distribution networks in machinery sectors as the major players. Our study attempted to investigate patterns of globalizing activities of Japanese firms, with a particular emphasis on firms investing in East Asia, and their domestic impacts by using comprehensive firm-level data including both firms with and without foreign operations two periods, 1998-2002 and 2002-2006. In addition to changes in domestic (parent) employment, domestic establishments, and domestic affiliates, changes in transactions with East Asia are also examined. For the analysis in the latter period, we also incorporate the information on the globalizing behavior in the former period to control time-invariant firm-specific elements at least partially. Besides these benchmark analyses, we conduct analyses to compare changes of firms becoming a MNE with those of firms remaining domestic and also to compare MNEs expanding operations with those of MNEs not expanding operations.

Our logit/OLS estimation analyses with a distinction among manufacturing, machinery, and non-machinery manufacturing firms demonstrates that given the size of firm and other controls, globalizing manufacturing firms are likely to increase their domestic employment and rather tend to increase in the number by five to seven during the four years, compared with other manufacturing firms. We also find that Japanese manufacturing firms expanding operations in East Asia are more likely to increase the

number of domestic affiliates and establishments in addition to domestic employment. Such a tendency is more vividly observed in the latter period, when the international division of labor in the region is more active. Furthermore, manufacturing firms, particularly machinery firms with expanding operations in East Asia tend to intensify export/import activities with the region, suggesting the existence of complementary operations. At the individual firm level, the fragmentation of production by Japanese manufacturing firms seems to generate additional jobs and operations at home by effectively utilizing the mechanics of production process-wise division of labor in East Asia

Our dataset does not unfortunately allow us to directly analyze changes in the skill structure of employed labor. However, we at least clearly observe that Japanese manufacturing firms intensifying operations in Eat Asia tend to expand domestic operations more successfully than other firms more recently. Particularly in the case of SMEs globalizing their activities, domestic operations are even expanded. Further investigation on the Japanese case would provide a crucial key to fight against the unwarranted anti-globalism sentiment.

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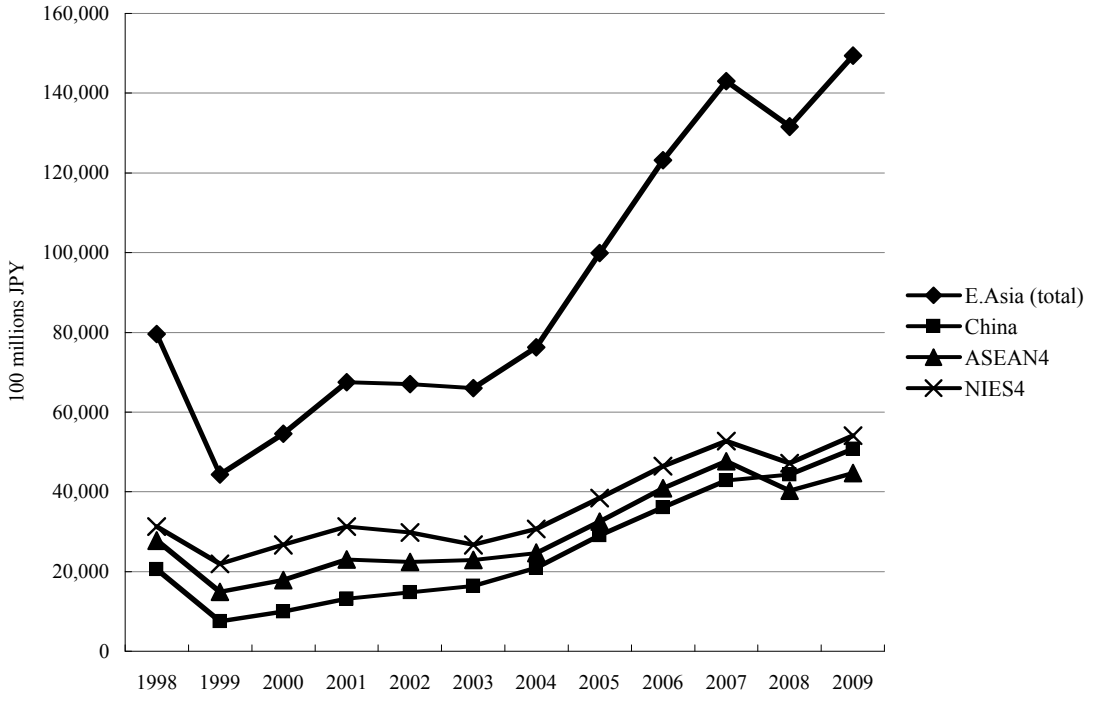
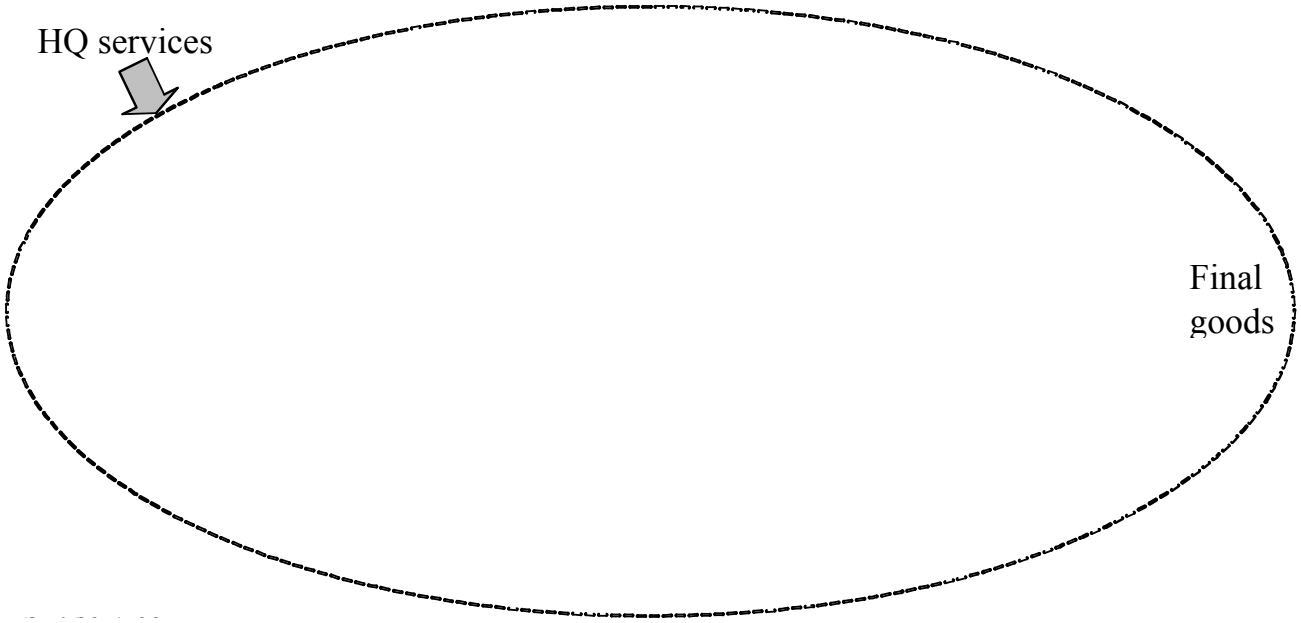
Figure 1 Direct investment position of Japan in East Asia



Data source: authors' calculation, based on balance of payments statistics available from the website of the Bank of Japan.

Figure 2 Complementary operations with fragmentation: an illustration



Source: Ando and Kimura (2010).

Table 1 Sectoral patterns of Japanese parent firms and their affiliates in East Asia, North America, and Europe for 2006

Industry of parent firm	Number of parent firms: all sized	(%)	Number of affiliates by the industry of parent firms	(%)	Share by the industry of affiliate: Manufacturing	(machinery)	Non-manufacturing	(wholesales)	Number of parent firms: SMEs	(%)	Number of affiliates by the industry of parent firms	(%)	Share by the industry of affiliate: Manufacturing	(machinery)	Non-manufacturing	(wholesales)
					(a-1) East Asia								(a-2) East Asia			
Manufacuturing	2,679	67%	11,308	67%	72%	(37%)	28%	(18%)	1,304	65%	2,292	61%	84%	(37%)	16%	(12%)
-Machinery	1,380	35%	6,232	37%	67%	(62%)	33%	(21%)	632	32%	1,089	29%	83%	(73%)	17%	(13%)
Non-manufacturing	1,299	33%	5,671	33%	35%	(12%)	65%	(38%)	700	35%	1,487	39%	36%	(10%)	64%	(47%)
-Wholesales	814	20%	4,456	26%	41%	(14%)	59%	(48%)	537	27%	1,236	33%	40%	(8%)	60%	(55%)
Total	3,978	100%	16,979	100%	59%	(29%)	41%	(25%)	2,004	100%	3,779	100%	65%	(26%)	35%	(25%)
					(b-1) North America								(b-2) North America			
Manufacuturing	1,200	69%	3,630	65%	46%	(27%)	54%	(22%)	336	61%	367	56%	49%	(25%)	51%	(40%)
-Machinery	712	41%	2,452	44%	40%	(38%)	60%	(23%)	204	37%	218	33%	45%	(39%)	55%	(46%)
Non-manufacturing	536	31%	1,941	35%	17%	(4%)	83%	(36%)	213	39%	289	44%	17%	(4%)	83%	(47%)
-Wholesales	312	18%	1,437	26%	23%	(6%)	77%	(46%)	150	27%	199	30%	24%	(5%)	76%	(65%)
Total	1,736	100%	5,571	100%	36%	(19%)	64%	(27%)	549	100%	656	100%	35%	(15%)	65%	(43%)
					(c-1) Europe								(c-2) Europe			
Manufacuturing	692	70%	3,681	71%	41%	(23%)	59%	(36%)	118	56%	148	46%	43%	(20%)	57%	(51%)
-Machinery	429	44%	2,551	49%	33%	(32%)	67%	(40%)	71	33%	90	28%	36%	(29%)	64%	(59%)
Non-manufacturing	294	30%	1,540	29%	22%	(6%)	78%	(41%)	94	44%	175	54%	19%	(6%)	81%	(43%)
-Wholesales	181	18%	1,242	24%	27%	(7%)	73%	(49%)	75	35%	133	41%	24%	(8%)	76%	(57%)
Total	986	100%	5,221	100%	36%	(18%)	64%	(37%)	212	100%	323	100%	30%	(12%)	70%	(47%)

Data source: authors' calculation, based on METI database.

Notes: The figures for (a-1, b-1, c-1) are those of all sized parent firms and figures for (a-2, b-2, c-2) are of parernt SMEs. The figures for "share" for manufacuring, machinery, non-manufacturing, and wholesales expresse the shares of manufacturing affiliates, machinery affiliates, non-manufacturing affiliates, and wholesales affiliates in total number of affiliates of all sized/SMEs firms in each sectoral category.

Table 2 Globalizing patterns of firms in the period 1998-2002 and 2002-2006

	Two-year-balanced panel				Three-year-balanced panel			
	1998-2002		2002-2006		1998-2002		2002-2006	
The type of firms	# of firms	Share	# of firms	Share	# of firms	Share	# of firms	Share
(a) All firms								
No entry in East Asia	16,314	85%	17,631	83%	12,961	84%	12,538	81%
Expansion in East Asia (i+ii)	1,375	7%	1,921	9%	1,155	7%	1,567	10%
- (i) Expansion in East Asia	709	4%	1,066	5%	616	4%	938	6%
- (ii) Expansion in East Asia (with 1st FDI in the region)	666	3%	855	4%	539	3%	629	4%
Steady in East Asia	1,063	6%	1,157	5%	914	6%	957	6%
Shrinkage in East Asia	282	1%	247	1%	236	2%	200	1%
Shrinkage in East Asia (withdrawal from the region)	259	1%	259	1%	206	1%	210	1%
Total	19,293	100%	21,215	100%	15,472	100%	15,472	100%
(b) Manufacturing firms								
No entry in East Asia	8,619	80%	8,017	77%	7,057	73%	6,596	76%
Expansion in East Asia (i+ii)	1,003	9%	1,314	13%	853	9%	1,151	13%
- (i) Expansion in East Asia	539	5%	773	7%	468	5%	703	8%
- (ii) Expansion in East Asia (with 1st FDI in the region)	464	4%	541	5%	385	4%	448	5%
Steady in East Asia	764	7%	822	8%	666	7%	711	8%
Shrinkage in East Asia	177	2%	156	1%	153	2%	137	2%
Shrinkage in East Asia (withdrawal from the region)	149	1%	157	2%	117	1%	136	2%
Total	10,712	100%	10,466	100%	9,699	100%	8,731	100%
(c) SMEs								
No entry in East Asia	12,859	91%	13,982	89%	10,085	90%	9,923	88%
Expansion in East Asia (i+ii)	614	4%	848	5%	484	4%	649	6%
- (i) Expansion in East Asia	189	1%	325	2%	151	1%	276	2%
- (ii) Expansion in East Asia (with 1st FDI in the region)	425	3%	523	3%	333	3%	373	3%
Steady in East Asia	539	4%	694	4%	447	4%	579	5%
Shrinkage in East Asia	58	0%	89	1%	45	0%	66	1%
Shrinkage in East Asia (withdrawal from the region)	136	1%	147	1%	98	1%	113	1%
Total	14,206	100%	15,760	100%	11,159	100%	11,330	100%
(d) Manufacturing SMEs								
No entry in East Asia	7,007	89%	6,777	85%	5,652	89%	5,526	85%
Expansion in East Asia (i+ii)	420	5%	544	7%	337	5%	449	7%
- (i) Expansion in East Asia	125	2%	208	3%	101	2%	183	3%
- (ii) Expansion in East Asia (with 1st FDI in the region)	295	4%	336	4%	236	4%	266	4%
Steady in East Asia	373	5%	489	6%	308	5%	417	6%
Shrinkage in East Asia	29	0%	50	1%	23	0%	38	1%
Shrinkage in East Asia (withdrawal from the region)	80	1%	96	1%	58	1%	78	1%
Total	7,909	100%	7,956	100%	6,378	100%	6,508	100%

Source: authors' calculation, based on METI database.

Table 3 Changes in domestic operations in the period 1998-2002 and 2002-2006 by the type of firms, based on the two-year-balanced panel data

	1998-2002			2002-2006			1998-2002		2002-2006		1998-2002		2002-2006	
	Domestic employment						Domestic establishments				Domestic affiliates			
The type of firms	Share of firms increasing	Average growth rates at the firm level	Aggregate change	Share of firms increasing	Average growth rates at the firm level	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change
(a) All firms														
No entry in East Asia	36%	0.012	112,856	51%	0.076	404,992	27%	15,252	28%	18,421	13%	-1,059	11%	-571
Expansion in East Asia (i+ii)	34%	-0.015	-143,798	63%	0.139	218,375	27%	1,962	34%	3,676	30%	-32	33%	3,651
- (i) Expansion in East Asia	31%	-0.069	-151,711	60%	0.099	159,242	27%	96	33%	-491	30%	-776	35%	2,927
- (ii) Expansion in East Asia (with 1st FDI in the region)	37%	0.042	7,913	66%	0.188	59,133	27%	1,866	36%	4,167	30%	744	30%	724
Steady in East Asia	29%	-0.061	-68,906	54%	0.050	18,717	28%	1,511	27%	1,469	21%	-472	17%	-195
Shrinkage in East Asia	21%	-0.097	-108,767	49%	0.048	-28,310	28%	-316	28%	-260	20%	-3,223	18%	-760
Shrinkage in East Asia (withdrawal from the region)	32%	-0.076	-11,577	49%	0.059	-33,153	30%	314	28%	-432	17%	-268	16%	-322
Total	35%	0.003	-220,192	52%	0.079	580,621	27%	18,723	29%	22,874	15%	-5,054	13%	1,803
(b) Manufacturing firms														
No entry in East Asia	32%	-0.037	-128,527	51%	0.052	60,913	19%	393	20%	299	11%	-664	8%	-235
Expansion in East Asia (i+ii)	33%	-0.042	-160,084	64%	0.126	116,235	26%	-620	33%	108	27%	-240	28%	1,443
- (i) Expansion in East Asia	29%	-0.081	-142,988	62%	0.101	99,970	25%	-728	34%	73	29%	-685	32%	1,347
- (ii) Expansion in East Asia (with 1st FDI in the region)	38%	0.002	-17,096	67%	0.161	16,265	28%	108	33%	35	26%	445	23%	96
Steady in East Asia	25%	-0.093	-69,561	54%	0.045	13,861	25%	-283	25%	-117	19%	-389	16%	-193
Shrinkage in East Asia	23%	-0.102	-104,182	48%	0.022	-35,154	28%	-282	24%	-7	23%	-1,392	16%	-369
Shrinkage in East Asia (withdrawal from the region)	29%	-0.097	-9,708	52%	0.007	-5,561	26%	137	23%	-152	15%	-107	16%	-144
Total	32%	-0.043	-472,062	53%	0.060	150,294	21%	-655	22%	131	13%	-2,792	12%	502
(c) SMEs														
No entry in East Asia	36%	0.013	5,284	51%	0.078	129,293	24%	3,461	25%	4,736	11%	-693	9%	-527
Expansion in East Asia (i+ii)	42%	0.023	867	67%	0.178	21,992	25%	164	30%	387	25%	66	23%	189
- (i) Expansion in East Asia	43%	0.000	-226	63%	0.114	6,186	25%	0	28%	37	25%	-20	20%	3
- (ii) Expansion in East Asia (with 1st FDI in the region)	42%	0.033	1,093	69%	0.217	15,806	25%	164	31%	350	25%	86	24%	186
Steady in East Asia	33%	-0.029	-4,840	56%	0.053	3,667	23%	-35	24%	5	17%	-16	15%	-46
Shrinkage in East Asia	24%	-0.008	-500	54%	0.129	1,445	31%	-2	22%	-10	21%	-16	13%	-35
Shrinkage in East Asia (withdrawal from the region)	35%	-0.044	-1,271	52%	0.110	1,291	29%	69	22%	-23	17%	6	9%	-72
Total	36%	0.011	-460	52%	0.083	157,688	24%	3,657	25%	5,095	12%	-653	10%	-491
(d) Manufacturing SMEs														
No entry in East Asia	33%	-0.027	-38,565	52%	0.060	40,767	17%	103	19%	433	9%	-599	7%	-153
Expansion in East Asia (i+ii)	45%	0.021	344	67%	0.169	12,769	25%	97	26%	56	20%	35	19%	32
- (i) Expansion in East Asia	46%	0.005	-92	63%	0.125	4,461	22%	-21	27%	1	21%	-10	19%	5
- (ii) Expansion in East Asia (with 1st FDI in the region)	44%	0.027	436	70%	0.196	8,308	27%	118	26%	55	20%	45	19%	27
Steady in East Asia	30%	-0.072	-5,588	58%	0.058	3,060	21%	-66	23%	-4	14%	-22	15%	-22
Shrinkage in East Asia	28%	-0.109	-665	56%	0.136	899	41%	-21	18%	-9	34%	5	14%	-15
Shrinkage in East Asia (withdrawal from the region)	34%	-0.057	-847	54%	0.009	-79	23%	10	18%	-17	16%	4	7%	-38
Total	34%	-0.026	-44,586	54%	0.067	57,416	18%	123	20%	459	10%	-577	8%	-196

Source: authors' calculation, based on METI database.

Table 4 Changes in domestic operations in the period 1998-2002 and 2002-2006 by the type of firms, based on the three-year-balanced panel data

	1998-2002			2002-2006			1998-2002		2002-2006		1998-2002		2002-2006	
	Domestic employment						Domestic establishments				Domestic affiliates			
The type of firms	Share of firms increasing	Average growth rates at the firm level	Aggregate change	Share of firms increasing	Average growth rates at the firm level	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change	Share of firms increasing	Aggregate change
(a) All firms														
No entry in East Asia	37%	0.022	142,340	50%	0.055	214,974	27%	11,588	27%	12,487	13%	-673	11%	-641
Expansion in East Asia (i+ii)	34%	-0.015	-141,450	62%	0.105	179,842	27%	1,579	34%	781	29%	1	32%	2,854
- (i) Expansion in East Asia	32%	-0.065	-138,747	60%	0.094	148,285	27%	228	33%	-533	30%	-656	35%	2,473
- (ii) Expansion in East Asia (with 1st FDI in the region)	37%	0.042	-2,703	64%	0.122	31,557	27%	1,351	34%	1,314	28%	657	28%	381
Steady in East Asia	29%	-0.055	-49,024	52%	0.035	9,079	27%	-11	25%	624	22%	-353	17%	-179
Shrinkage in East Asia	23%	-0.084	-94,741	50%	0.055	-28,393	29%	-170	27%	220	19%	-2,729	16%	-824
Shrinkage in East Asia (withdrawal from the region)	32%	-0.068	-8,176	48%	0.064	-23,316	31%	462	29%	-372	17%	-318	15%	-306
Total	36%	0.012	-151,051	51%	0.059	352,186	27%	13,448	28%	13,740	15%	-4,072	13%	904
(b) Manufacturing firms														
No entry in East Asia	33%	-0.029	-95,926	50%	0.042	50,118	20%	549	20%	167	11%	-372	8%	-221
Expansion in East Asia (i+ii)	33%	-0.043	-147,745	63%	0.105	108,934	26%	-650	33%	18	27%	-130	29%	1,435
- (i) Expansion in East Asia	30%	-0.079	-131,364	62%	0.098	98,037	25%	-626	34%	66	29%	-543	32%	1,341
- (ii) Expansion in East Asia (with 1st FDI in the region)	37%	0.001	-16,381	66%	0.115	10,897	28%	-24	31%	-48	25%	413	23%	94
Steady in East Asia	26%	-0.086	-61,145	52%	0.034	11,184	25%	-309	24%	-137	21%	-269	16%	-158
Shrinkage in East Asia	24%	-0.086	-93,209	50%	0.031	-34,594	30%	-206	24%	0	24%	-1,248	15%	-371
Shrinkage in East Asia (withdrawal from the region)	26%	-0.110	-7,638	49%	-0.002	-5,692	26%	167	24%	-154	14%	-147	16%	-146
Total	32%	-0.037	-405,663	52%	0.048	129,950	21%	-449	22%	-106	13%	-2,166	12%	539
(c) SMEs														
No entry in East Asia	38%	0.023	15,433	50%	0.058	68,122	24%	3,033	24%	2,932	11%	-342	9%	-422
Expansion in East Asia (i+ii)	44%	0.028	1,126	65%	0.117	11,747	24%	107	27%	99	24%	28	21%	0
- (i) Expansion in East Asia	46%	-0.002	-124	62%	0.102	5,057	23%	16	27%	14	25%	-19	18%	-59
- (ii) Expansion in East Asia (with 1st FDI in the region)	43%	0.042	1,250	67%	0.128	6,690	25%	91	26%	85	24%	47	23%	59
Steady in East Asia	34%	-0.012	-2,818	55%	0.040	2,244	24%	-34	22%	-33	18%	-1	15%	-44
Shrinkage in East Asia	24%	0.011	-302	58%	0.157	1,368	29%	-7	20%	-13	22%	-16	12%	-47
Shrinkage in East Asia (withdrawal from the region)	33%	-0.044	-1,007	50%	0.106	766	29%	57	23%	-19	16%	-51	6%	-68
Total	38%	0.021	12,432	51%	0.061	84,247	24%	3,156	24%	2,966	12%	-382	10%	-581
(d) Manufacturing SMEs														
No entry in East Asia	35%	-0.017	-25,842	51%	0.047	27,487	18%	160	18%	153	9%	-286	7%	-144
Expansion in East Asia (i+ii)	45%	0.015	238	65%	0.122	8,800	25%	46	25%	16	20%	15	19%	-34
- (i) Expansion in East Asia	48%	-0.008	-155	62%	0.118	3,923	19%	-7	27%	-5	21%	-7	18%	-53
- (ii) Expansion in East Asia (with 1st FDI in the region)	44%	0.025	393	67%	0.125	4,877	28%	53	24%	21	19%	22	19%	19
Steady in East Asia	32%	-0.058	-3,754	57%	0.046	2,206	21%	-62	21%	-8	16%	-9	15%	-10
Shrinkage in East Asia	26%	0.090	184	61%	0.175	906	39%	-25	16%	-8	39%	5	13%	-17
Shrinkage in East Asia (withdrawal from the region)	29%	-0.091	-1,003	50%	-0.007	-157	21%	-8	19%	-18	16%	-35	8%	-36
Total	35%	-0.018	-30,177	52%	0.052	39,242	18%	111	19%	135	10%	-310	8%	-241

Source: authors' calculation, based on METI database.

Figure 3 Typical sequence in globalizing corporate activities

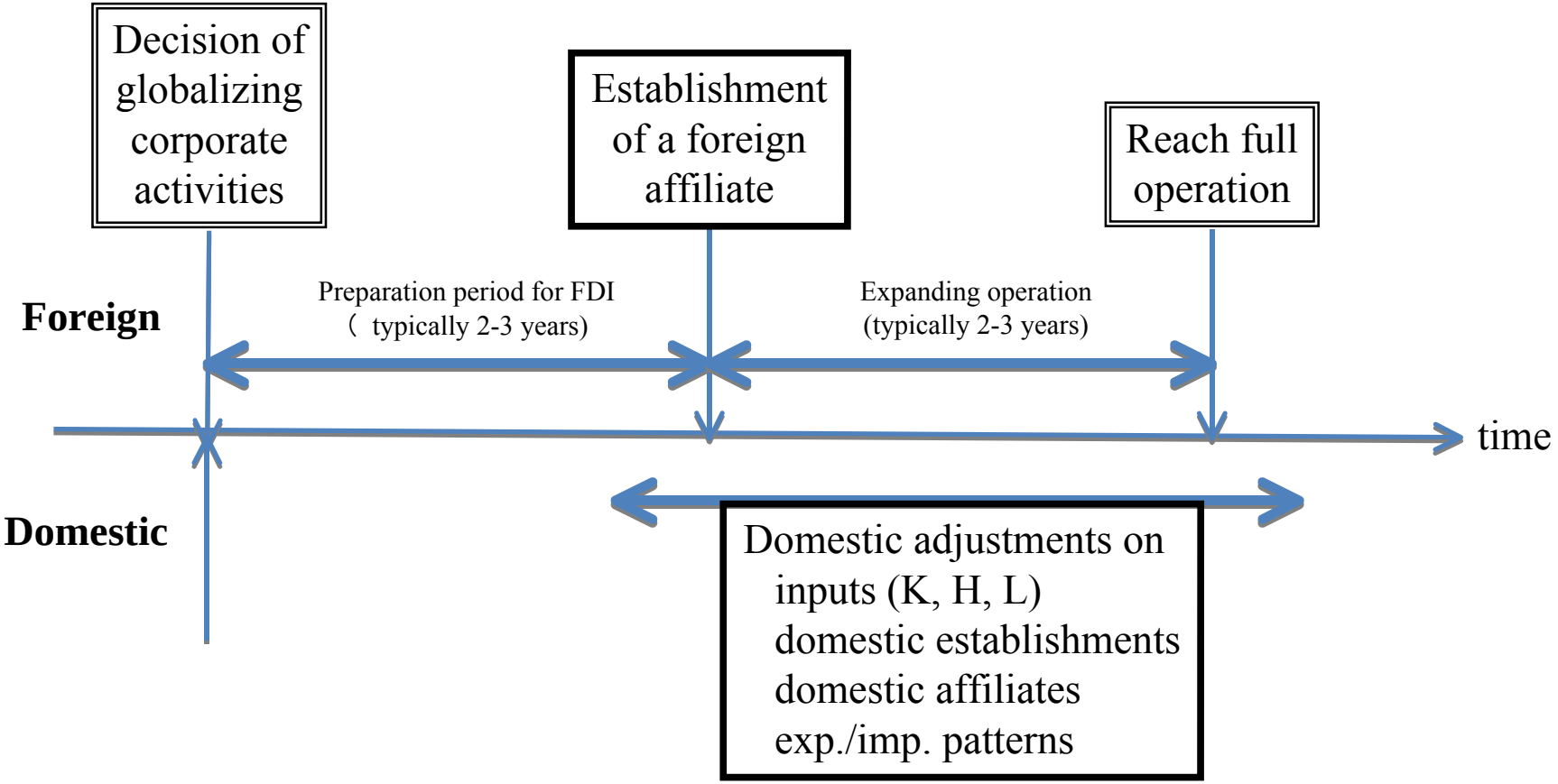


Table 5 The globalizing patterns of firms from 1998 to 2006

The type of firms	Manufacturing	Machinery	Non-machinery manufacturing
The number of firms			
1 (expansion1-expansion2)	389	202	187
2 (nonexpansion1-expansion2)	762	385	377
3 (expansion1-nonexpansion2)	470	257	213
0 (nonexpansion1-nonexpansion2)	7,110	2,552	4,558
Total	8,731	3,396	5,335
Share of firms increasing domestic employment during 2002 to 2006			
1 (expansion1-expansion2)	63%	64%	62%
2 (nonexpansion1-expansion2)	63%	68%	59%
3 (expansion1-nonexpansion2)	57%	59%	55%
0 (nonexpansion1-nonexpansion2)	50%	56%	46%
Average growth rates at the firm level during 2002 to 2006			
1 (expansion1-expansion2)	12%	11%	14%
2 (nonexpansion1-expansion2)	9%	11%	8%
3 (expansion1-nonexpansion2)	4%	4%	3%
0 (nonexpansion1-nonexpansion2)	4%	8%	2%
Share of firms increasing domestic establishments during 2002 to 2006			
1 (expansion1-expansion2)	33%	34%	31%
2 (nonexpansion1-expansion2)	33%	36%	30%
3 (expansion1-nonexpansion2)	24%	21%	29%
0 (nonexpansion1-nonexpansion2)	20%	18%	21%
Share of firms increasing domestic affiliates during 2002 to 2006			
1 (expansion1-expansion2)	36%	36%	35%
2 (nonexpansion1-expansion2)	25%	22%	29%
3 (expansion1-nonexpansion2)	15%	11%	21%
0 (nonexpansion1-nonexpansion2)	9%	7%	10%

Source: authors' calculation, based on METI database.

Note: expansion1 (2) and nonexpansion1 (2) indicate the firm expanding operations in East Asia in the period 1998-2002 (2002-2006) and the firm not expanding operations in the 1998-2002 (2002-2006), respectively. For instance, expansion1-expansion2 means that the firm expands operations in East Asia in the period 1998-2002 as well as in the period 2002-2006. The figures are calculated, using three-year-balanced panel data.

Table 6 Production networking in East Asia and domestic operations for 1998-2002 and 2002-2006: manufacturing firms

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Period: 1998-2002						
Constant	0.890 ***	0.201 ***	-2.962 ***	-4.023 ***	0.004	0.016 *
	(0.213)	(0.029)	(0.235)	(0.267)	(0.004)	(0.009)
Expansion in East Asia	0.356 ***	0.045 ***	0.033	0.642 ***	0.020 ***	0.026 ***
(incl. 1st FDI)	(0.084)	(0.012)	(0.091)	(0.095)	(0.002)	(0.003)
Firm size	-0.362 ***	-0.050 ***	0.254 ***	0.356 ***	0.000	0.000
	(0.028)	(0.004)	(0.028)	(0.033)	(0.001)	(0.001)
Capital-labor ratio	0.116 ***	0.009 ***	0.094 ***	0.142 ***	0.0000	0.000
	(0.026)	(0.003)	(0.030)	(0.038)	(0.001)	(0.001)
Foreign sales ratio	0.057	-0.045	-0.190	-0.087	0.047 ***	0.050 ***
	(0.229)	(0.031)	(0.255)	(0.293)	(0.005)	(0.009)
In-house R&D ratio	2.316 **	0.267	2.683 **	2.299	0.051 **	0.014
	(1.179)	(0.164)	(1.259)	(1.508)	(0.026)	(0.050)
Advertisement ratio	-0.219	0.226 ***	2.320	4.964 ***	-0.046	-0.004
	(1.486)	(0.207)	(1.510)	(1.640)	(0.032)	(0.062)
Foreign capital ratio	0.00040	0.00009 **	-0.00005	-0.00081 *	0.00001 **	0.00001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-5399		-4439	-3286		
Adj R2		0.034			0.050	0.019
Number of observations	8834	8834	8834	8834	8526	8154
b) Period: 2002-2006						
Constant	0.531 ***	0.119 ***	-2.638 ***	-4.861 ***	-0.004	0.030 ***
	(0.173)	(0.026)	(0.201)	(0.094)	(0.004)	(0.008)
Expansion in East Asia	0.554 ***	0.067 **	0.412 ***	0.796 ***	0.015 ***	0.033 ***
(incl. 1st FDI)	(0.078)	(0.011)	(0.082)	(0.094)	(0.002)	(0.004)
Firm size	-0.203 ***	-0.029 ***	0.230 ***	0.418 ***	0.001 *	-0.006 ***
	(0.028)	(0.004)	(0.031)	(0.038)	(0.001)	(0.001)
Capital-labor ratio	0.075 ***	0.019 ***	0.028	0.288 ***	0.000	0.002
	(0.028)	(0.004)	(0.033)	(0.047)	(0.001)	(0.001)
Foreign sales ratio	0.171	-0.033	-0.635 **	-0.100	-0.049 ***	0.002
	(0.239)	(0.035)	(0.282)	(0.326)	(0.006)	(0.011)
In-house R&D ratio	2.864 **	0.633 ***	1.181	2.302	0.115 ***	-0.007
	(1.262)	(0.183)	(1.392)	(1.655)	(0.032)	(0.060)
Advertisement ratio	-0.529	0.000	4.152 ***	4.160 **	-0.057	-0.016
	(1.479)	(0.221)	(1.553)	(1.725)	(0.040)	(0.070)
Foreign capital ratio	0.00355	-0.00002	-0.00438	-0.005	0.00017 ***	0.00049 ***
	(0.002)	(0.000)	(0.003)	(0.004)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-4857		-3875	-2549		
Adj R2		0.030			0.020	0.024
Number of observations	7281	7281	7281	7263	7003	6731

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 7 Production networking in East Asia and domestic operations for 1998-2002 and 2002-2006: machinery firms

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Period: 1998-2002						
Constant	0.488 **	0.154 ***	-3.022 ***	-4.238 ***	0.001	0.007
	(0.224)	(0.028)	(0.240)	(0.285)	(0.006)	(0.010)
Expansion in East Asia	0.222 *	0.026 *	0.065	0.726 ***	0.023 ***	0.022 ***
(incl. 1st FDI)	(0.118)	(0.016)	(0.130)	(0.135)	(0.003)	(0.006)
Firm size	-0.316 ***	-0.042 ***	0.230 ***	0.314 ***	0.001	0.000
	(0.043)	(0.005)	(0.044)	(0.051)	(0.001)	(0.002)
Capital-labor ratio	0.205 **	0.015 ***	0.108 **	0.160 **	0.0007	0.000
	(0.043)	(0.005)	(0.052)	(0.067)	(0.001)	(0.002)
Foreign sales ratio	-0.187	-0.074 **	0.012 **	0.080	0.057 ***	0.064 ***
	(0.276)	(0.036)	(0.304)	(0.347)	(0.008)	(0.013)
In-house R&D ratio	2.499	0.114	2.454	3.457 *	0.053	-0.009
	(1.532)	(0.208)	(1.676)	(1.921)	(0.045)	(0.074)
Advertisement ratio	0.886	0.503	24.838 ***	17.850 **	-0.095	0.374
	(6.451)	(0.878)	(6.935)	(7.389)	(0.186)	(0.322)
Foreign capital ratio	0.00057	0.00006	-0.00001	-0.00065	0.00001	0.00000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Log likelihood	-2063		-1614	-1199		
Adj R2		0.022			0.046	0.018
Number of observations	3382	3382	3382	3382	3237	3106
b) Period: 2002-2006						
Constant	1.307 ***	0.168 ***	-2.338 ***	-4.821 ***	-0.007	0.042 ***
	(0.221)	(0.031)	(0.252)	(0.337)	(0.007)	(0.012)
Expansion in East Asia	0.627 ***	0.051 ***	0.663 ***	0.960 ***	0.018 ***	0.051 ***
(incl. 1st FDI)	(0.114)	(0.015)	(0.117)	(0.142)	(0.004)	(0.006)
Firm size	-0.245 ***	-0.026 ***	0.149 ***	0.332 ***	0.002	-0.008
	(0.042)	(0.006)	(0.047)	(0.059)	(0.001)	(0.002)
Capital-labor ratio	0.150 ***	0.025 ***	0.063	0.232 ***	0.002	0.002
	(0.044)	(0.006)	(0.055)	(0.085)	(0.001)	(0.002)
Foreign sales ratio	-0.038	-0.026	-0.522	0.186	-0.065 ***	0.003
	(0.275)	(0.039)	(0.324)	(0.377)	(0.010)	(0.016)
In-house R&D ratio	0.298	0.188	0.696	4.396 **	0.134 **	-0.004
	(1.602)	(0.228)	(1.791)	(2.116)	(0.055)	(0.092)
Advertisement ratio	-1.708	-1.440	24.309 ***	18.730 **	0.086	0.157
	(7.019)	(1.002)	(7.376)	(9.166)	(0.236)	(0.398)
Foreign capital ratio	-0.00299	-0.00064	-0.00349	-0.00709 **	0.00023 *	0.00094 ***
	(0.004)	(0.001)	(0.005)	(0.007)	(0.000)	(0.000)
Log likelihood	-1870		-1469	-898		
Adj R2		0.012			0.025	0.033
Number of observations	2807	2807	2807	2807	2673	2574

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 8 Production networking in East Asia and domestic operations for 1998-2002 and 2002-2006: non-machinery manufacturing firm

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Period: 1998-2002						
Constant	0.962 ***	0.214 ***	-2.766 ***	-4.282 ***	0.007 ***	0.011
	(0.187)	(0.025)	(0.192)	(0.228)	(0.003)	(0.007)
Expansion in East Asia	0.421 ***	0.055 ***	-0.020	0.531 ***	0.018 ***	0.031 ***
(incl. 1st FDI)	(0.118)	(0.017)	(0.128)	(0.134)	(0.002)	(0.004)
Firm size	-0.348 ***	-0.050 ***	0.256 ***	0.385 ***	-0.0009 *	-0.0004
	(0.036)	(0.005)	(0.036)	(0.041)	(0.001)	(0.001)
Capital-labor ratio	0.047	0.004	0.058 *	0.142 ***	-0.0002	-0.0018
	(0.029)	(0.004)	(0.033)	(0.042)	(0.000)	(0.001)
Foreign sales ratio	-0.027	-0.050	-0.786	-0.691	0.026 ***	0.0212
	(0.415)	(0.059)	(0.499)	(0.595)	(0.006)	(0.015)
In-house R&D ratio	0.938	0.269	3.202 *	-0.523	0.080 ***	-0.004
	(1.655)	(0.236)	(1.705)	(2.147)	(0.026)	(0.065)
Advertisement ratio	1.712	0.445 **	2.315	4.882 ***	-0.049 **	-0.041
	(1.691)	(0.212)	(1.500)	(1.611)	(0.023)	(0.055)
Foreign capital ratio	0.00026	0.00011 **	-0.00003	-0.00093	0.00002 ***	0.00001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Log likelihood	-3412		-2847	-2092		
Adj R2		0.019			0.033	0.011
Number of observations	5452	5452	5452	5452	5289	5048
b) Period: 2002-2006						
Constant	0.370 *	0.109 ***	-2.662 ***	-5.197 ***	0.000	0.031 ***
	(0.189)	(0.029)	(0.214)	(0.267)	(0.003)	(0.007)
Expansion in East Asia	0.529 ***	0.087 ***	0.156	0.661 ***	0.010 ***	0.019 ***
(incl. 1st FDI)	(0.104)	(0.016)	(0.115)	(0.124)	(0.002)	(0.004)
Firm size	-0.157 ***	-0.028 ***	0.294 ***	0.467 ***	0.0004	-0.0050 ***
	(0.036)	(0.005)	(0.040)	(0.047)	(0.001)	(0.001)
Capital-labor ratio	0.111 ***	0.023 ***	-0.035 **	0.312 ***	-0.0004	0.0001
	(0.033)	(0.005)	(0.037)	(0.051)	(0.001)	(0.001)
Foreign sales ratio	1.036 **	-0.039	-1.436 **	-0.896	-0.003	-0.029
	(0.491)	(0.073)	(0.624)	(0.704)	(0.009)	(0.019)
In-house R&D ratio	4.749 ***	0.832 ***	1.334	-0.898	0.097 ***	0.057
	(1.770)	(0.267)	(1.954)	(2.319)	(0.032)	(0.074)
Advertisement ratio	-1.994	-0.065	3.429 **	3.683 **	-0.049 *	-0.007
	(1.504)	(0.226)	(1.545)	(1.712)	(0.028)	(0.059)
Foreign capital ratio	0.00872	0.00037	-0.00620	-0.00324	0.00012 **	0.00017
	(0.003)	(0.000)	(0.004)	(0.005)	(0.000)	(0.000)
Log likelihood	-3055		-2414	-1652		
Adj R2		0.016			0.014	0.005
Number of observations	4474	4474	4474	4474	4330	4157

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 9 Production networking in East Asia and domestic operations for 2002-2006

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Constant	0.594 ***	0.126 ***	-2.643 ***	-4.792 ***	0.000	0.033 ***
	(0.175)	(0.026)	(0.203)	(0.254)	(0.004)	(0.008)
Exp1-exp2	0.670 ***	0.097 **	0.313 **	0.953 ***	0.025 ***	0.036 ***
	(0.125)	(0.018)	(0.131)	(0.140)	(0.003)	(0.006)
Nonexp1-exp2	0.569 ***	0.056 **	0.491 ***	0.789 ***	0.014 ***	0.035 ***
	(0.089)	(0.013)	(0.093)	(0.109)	(0.002)	(0.004)
Exp1-nonexp2	0.306 ***	0.008	0.164	0.275 *	0.019 ***	0.013 ***
	(0.106)	(0.016)	(0.120)	(0.150)	(0.003)	(0.005)
Firm size	-0.218 ***	-0.030 ***	0.228 ***	0.402 ***	0.000	-0.007 ***
	(0.029)	(0.004)	(0.032)	(0.038)	(0.001)	(0.001)
Capital-labor ratio	0.073 ***	0.019 ***	0.028	0.286 ***	0.000	0.002
	(0.028)	(0.004)	(0.033)	(0.047)	(0.001)	(0.001)
Foreign sales ratio	0.078	-0.041	-0.640 **	-0.192	-0.056 ***	-0.002
	(0.241)	(0.035)	(0.284)	(0.331)	(0.006)	(0.011)
In-house R&D ratio	2.761 **	0.621 ***	1.180	2.216	0.107 ***	-0.013
	(1.262)	(0.183)	(1.391)	(1.659)	(0.032)	(0.060)
Advertisement ratio	-0.509	-0.004	4.190 ***	4.179 **	-0.056	-0.014
	(1.480)	(0.221)	(1.554)	(1.729)	(0.040)	(0.070)
Foreign capital ratio	0.00378	-0.00002	-0.00422	-0.00453 ***	0.00019 ***	0.00012 ***
	(0.002)	(0.000)	(0.003)	(0.004)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-4853		-3873	-2547		
Adj R2		0.030			0.029	0.025
Number of observations	7281	7281	7281	7263	7003	6731
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Exp1-exp2	0.711 ***	0.072 ***	0.515 ***	1.202 ***	0.027 ***	0.059 ***
	(0.179)	(0.025)	(0.185)	(0.203)	(0.006)	(0.010)
Nonexp1-exp2	0.650 ***	0.038 **	0.744 ***	0.862 ***	0.021 ***	0.052 ***
	(0.131)	(0.018)	(0.132)	(0.167)	(0.004)	(0.007)
Exp1-nonexp2	0.226	-0.014	0.078	0.097	0.026 ***	0.018 **
	(0.145)	(0.021)	(0.171)	(0.234)	(0.005)	(0.008)
Log likelihood	-1869		-1468	-897		
Adj R2		0.012			0.035	0.034
Number of observations	2807	2807	2807	2807	2673	2574
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Exp1-exp2	0.634 ***	0.119 ***	0.104	0.710 ***	0.023 ***	0.019 ***
	(0.172)	(0.026)	(0.186)	(0.193)	(0.003)	(0.007)
Nonexp1-exp2	0.553 ***	0.078 ***	0.227 *	0.724 ***	0.007 ***	0.020 ***
	(0.120)	(0.018)	(0.131)	(0.142)	(0.002)	(0.005)
Exp1-nonexp2	0.420 ***	0.032	0.270	0.430 **	0.012 ***	0.012 **
	(0.153)	(0.023)	(0.168)	(0.196)	(0.003)	(0.006)
Log likelihood	-3051		-2413	-1650		
Adj R2		0.017			0.023	0.006
Number of observations	4474	4474	4474	4474	4330	4157

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 10 Production networking in East Asia and domestic operations for 1998-2002: domestic v.s. becoming MNEs

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Constant	0.878 ***	0.214 ***	-3.296 ***	-4.941 ***	0.002	0.012
	(0.247)	(0.034)	(0.275)	(0.352)	(0.004)	(0.008)
Expansion in East Asia	0.361 ***	0.061 ***	0.354 ***	0.833 ***	0.020 ***	0.034 ***
	(0.113)	(0.016)	(0.123)	(0.132)	(0.002)	(0.004)
Firm size	-0.360 ***	-0.052 ***	0.346 ***	0.462 ***	0.001	0.000
	(0.035)	(0.005)	(0.036)	(0.044)	(0.001)	(0.001)
Capital-labor ratio	0.117 ***	0.007 *	0.103 ***	0.172 ***	0.000	-0.001
	(0.027)	(0.004)	(0.032)	(0.042)	(0.000)	(0.001)
Foreign sales ratio	-0.170	-0.074 *	-0.996 **	0.016	0.054 ***	0.010
	(0.303)	(0.042)	(0.400)	(0.423)	(0.006)	(0.010)
In-house R&D ratio	2.231 ***	0.190 *	4.318 ***	4.063 **	0.058 **	0.018
	(1.362)	(0.196)	(1.461)	(1.767)	(0.025)	(0.049)
Advertisement ratio	-2.667	0.159	1.093	3.901 **	-0.035	-0.056
	(1.713)	(0.230)	(1.692)	(1.868)	(0.029)	(0.056)
Foreign capital ratio	0.00028	0.00008 **	-0.00001	-0.00092 *	0.00002 ***	0.00002 **
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-4600		-3630	-2508		
Adj R2		0.030			0.048	0.015
Number of observations	7430	7430	7430	7430	7150	6830
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.223	0.038 *	0.269	0.741 ***	0.018 ***	0.034 ***
	(0.159)	(0.021)	(0.179)	(0.195)	(0.004)	(0.006)
Log likelihood	-1655		-1214	-822		
Adj R2		0.019			0.056	0.016
Number of observations	2684	2684	2684	2684	2555	2443
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.436 ***	0.077 ***	0.395 **	0.848 **	0.022 ***	0.033 ***
	(0.157)	(0.024)	(0.168)	(0.178)	(0.002)	(0.005)
Log likelihood	-3018		-2437	-1696		
Adj R2		0.014			0.032	0.010
Number of observations	4746	4746	4746	4746	4595	4387

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 11 Production networking in East Asia and domestic operations for 2002-2006: domestic v.s. becoming MNEs

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Constant	0.497 **	0.101 ***	-2.978 ***	-5.290 ***	0.005	0.020 ***
	(0.215)	(0.031)	(0.253)	(0.343)	(0.004)	(0.007)
Expansion in East Asia	0.571 ***	0.063 ***	0.440 **	0.970 ***	0.013 ***	0.035 ***
	(0.113)	(0.016)	(0.118)	(0.136)	(0.002)	(0.004)
Firm size	-0.189 ***	-0.026 ***	0.303 ***	0.474 ***	-0.001	-0.004 ***
	(0.037)	(0.005)	(0.041)	(0.054)	(0.001)	(0.001)
Capital-labor ratio	0.057 *	0.014 ***	0.035 **	0.301 ***	0.000	0.001
	(0.030)	(0.004)	(0.036)	(0.054)	(0.001)	(0.001)
Foreign sales ratio	0.502	0.020	-1.188 **	-0.539	-0.046 ***	-0.009
	(0.368)	(0.050)	(0.496)	(0.626)	(0.007)	(0.012)
In-house R&D ratio	3.859 **	0.083	2.090	2.868	0.074 **	0.030
	(1.625)	(0.230)	(1.852)	(2.414)	(0.029)	(0.056)
Advertisement ratio	-1.783	-0.233 *	4.137 **	2.349	-0.011	-0.011
	(1.659)	(0.236)	(1.718)	(2.145)	(0.032)	(0.055)
Foreign capital ratio	0.00582 **	0.00025	-0.00353	-0.00584	0.00020 ***	0.00052 ***
	(0.003)	(0.000)	(0.004)	(0.005)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-3809		-2940	-1748		
Adj R2		0.030			0.016	0.038
Number of observations	5707	5707	5707	5695	5469	5253
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.685 ***	0.044 *	0.780 ***	1.121 ***	0.021 ***	0.047 ***
	(0.169)	(0.022)	(0.167)	(0.207)	(0.004)	(0.007)
Log likelihood	-1339		-985	-531		
Adj R2		0.010			0.024	0.041
Number of observations	2013	2013	2013	2013	1904	1826
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.519 ***	0.084 ***	0.134	0.853 ***	0.006 ***	0.026 ***
	(0.150)	(0.022)	(0.165)	(0.178)	(0.002)	(0.004)
Log likelihood	-2525		-1954	-1215		
Adj R2		0.011			0.007	0.011
Number of observations	3694	3694	3694	3694	3565	3427

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 12 Production networking in East Asia and domestic operations for 1998-2002: expanding MENs v.s. non-expanding MNEs

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Constant	0.693	0.120 **	-2.891 ***	-1.755 ***	0.009	0.066 **
	(0.518)	(0.060)	(0.586)	(0.500)	(0.016)	(0.032)
Expansion in East Asia	0.387 ***	0.029 *	-0.231	0.402 ***	0.018 ***	0.011
	(0.138)	(0.016)	(0.140)	(0.140)	(0.004)	(0.009)
Firm size	-0.400 ***	-0.045 ***	0.095	0.168 ***	-0.002	-0.006
	(0.063)	(0.007)	(0.059)	(0.061)	(0.002)	(0.004)
Capital-labor ratio	0.113 ***	0.035 ***	0.077	-0.018	0.000	-0.001
	(0.092)	(0.011)	(0.094)	(0.097)	(0.003)	(0.006)
Foreign sales ratio	0.381	-0.022	0.837 **	-0.468	0.036 ***	0.076 ***
	(0.391)	(0.046)	(0.381)	(0.428)	(0.013)	(0.025)
In-house R&D ratio	2.564	0.400	0.134	-0.529	0.052	-0.045
	(2.456)	(0.293)	(2.492)	(2.653)	(0.081)	(0.159)
Advertisement ratio	13.273 ***	0.673	9.558 **	7.042 *	-0.090	0.241
	(3.950)	(0.483)	(3.957)	(3.881)	(0.132)	(0.262)
Foreign capital ratio	0.00133 *	0.00012	0.00021	0.00025	-0.00005 **	-0.00003
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-777		-775	-736		
Adj R2		0.030			0.022	0.010
Number of observations	1404	1404	1402	1402	1376	1324
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.202	0.009	-0.144	0.547 ***	0.027 ***	0.002
	(0.185)	(0.025)	(0.190)	(0.189)	(0.007)	(0.012)
Log likelihood	-402		-391	-369		
Adj R2		0.041			0.021	0.017
Number of observations	698	698	698	698	682	663
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.626 ***	0.045 **	-0.329	0.258	0.010 **	0.020 *
	(0.205)	(0.019)	(0.207)	(0.206)	(0.005)	(0.012)
Log likelihood	-383		-393	-373		
Adj R2		0.055			0.036	-0.005
Number of observations	706	706	706	706	694	661

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table 13 Production networking in East Asia and domestic operations for 2002-2006: expanding MENs v.s. non-expanding MNEs

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Constant	0.379	0.142 **	-2.075 ***	-3.796 ***	-0.001	0.061 **
	(0.377)	(0.060)	(0.424)	(0.448)	(0.015)	(0.028)
Expansion in East Asia	0.530 ***	0.071 ***	0.424 ***	0.532 ***	0.011 **	0.030 ***
	(0.117)	(0.018)	(0.124)	(0.135)	(0.005)	(0.009)
Firm size	-0.247 ***	-0.040 ***	0.114 **	0.300 ***	0.003	-0.012 ***
	(0.052)	(0.008)	(0.055)	(0.058)	(0.002)	(0.004)
Capital-labor ratio	0.211 ***	0.054 ***	0.001	0.252 ***	-0.001	0.003
	(0.078)	(0.012)	(0.086)	(0.097)	(0.003)	(0.006)
Foreign sales ratio	0.016	-0.088	-0.451	-0.048	-0.075 ***	-0.013
	(0.348)	(0.055)	(0.379)	(0.410)	(0.014)	(0.026)
In-house R&D ratio	2.067	1.618 ***	0.489	1.630	0.140 *	-0.027
	(2.058)	(0.322)	(2.154)	(2.286)	(0.084)	(0.155)
Advertisement ratio	5.507	0.847	4.141	10.466 ***	-0.235	-0.038
	(3.820)	(0.583)	(3.777)	(3.963)	(0.150)	(0.278)
Foreign capital ratio	-0.00448	-0.00138	-0.00303	0.00215	0.00004	0.00056
	(0.005)	(0.001)	(0.006)	(0.006)	(0.000)	(0.000)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-1033		-914	-785		
Adj R2		0.044			0.015	0.017
Number of observations	1574	1574	1558	1568	1534	1478
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.576 ***	0.055 **	0.486 ***	0.750 ***	0.010	0.052 ***
	(0.165)	(0.022)	(0.171)	(0.202)	(0.008)	(0.013)
Log likelihood	-526		-478	-364		
Adj R2		0.032			0.024	0.018
Number of observations	794	794	794	794	769	748
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Expansion in East Asia	0.496 ***	0.089 ***	0.298 *	0.364 **	0.010 *	0.007
	(0.161)	(0.029)	(0.175)	(0.180)	(0.006)	(0.011)
Log likelihood	-525		-454	-423		
Adj R2		0.042			0.004	0.007
Number of observations	780	780	780	780	765	730

Data source: Authors' calculation, based on METI database.

Notes: figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases

Table A.1 Production networking in East Asia and domestic operations: different definition of expanding operations

	Dependent variable					
	(1)	(2)	(3)	(4)	(5)	(6)
	d. .employment	d. employment	d. establishment	d. affiliates	exports to E.Asia	imports from E.Asia
Independent variables	[logit]	[OLS]	[logit]	[logit]	[OLS]	[OLS]
a) Manufacturing firms						
Period: 1998-2002						
Expansion in East Asia	0.322 ***	0.028 *	-0.304 **	0.402 ***	0.018 ***	0.020 ***
(excl. 1st FDI)	(0.116)	(0.016)	(0.125)	(0.125)	(0.002)	(0.005)
Period: 2002-2006						
Expansion in East Asia	0.468 ***	0.087 ***	0.321 ***	0.595 ***	0.016 ***	0.029 ***
(excl. 1st FDI)	(0.097)	(0.021)	(0.102)	(0.113)	(0.002)	(0.004)
b) Machinery firms						
Period: 1998-2002						
Expansion in East Asia	0.249	0.019	-0.133	0.668 ***	0.022 ***	0.012
(excl. 1st FDI)	(0.161)	(0.017)	(0.172)	(0.170)	(0.004)	(0.007)
Period: 2002-2006						
Expansion in East Asia	0.505 ***	0.050 ***	0.544 ***	0.754 ***	0.017 ***	0.051 ***
(excl. 1st FDI)	(0.140)	(0.020)	(0.146)	(0.167)	(0.005)	(0.008)
c) Non-machinery manufacturing firms						
Period: 1998-2002						
Expansion in East Asia	0.319 *	0.027	-0.507 ***	0.101	0.013 ***	0.030 ***
(excl. 1st FDI)	(0.165)	(0.017)	(0.181)	(0.184)	(0.002)	(0.006)
Period: 2002-2006						
Expansion in East Asia	0.481 ***	0.080 ***	0.092	0.461 ***	0.014 ***	0.010 **
(excl. 1st FDI)	(0.132)	(0.020)	(0.144)	(0.154)	(0.002)	(0.005)
a) Manufacturing firms						
Period: 2002-2006						
Exp1-exp2	0.599 ***	0.097 **	0.312 **	0.619 ***	0.025 ***	0.023 ***
	(0.148)	(0.018)	(0.153)	(0.164)	(0.004)	(0.007)
Nonexp1-exp2	0.438 ***	0.056 **	0.354 ***	0.576 ***	0.014 ***	0.035 ***
	(0.114)	(0.013)	(0.119)	(0.133)	(0.003)	(0.005)
Exp1-nonexp2	0.233 ***	0.008	0.151	-0.028	0.015 ***	0.017 **
	(0.154)	(0.016)	(0.170)	(0.208)	(0.004)	(0.007)
b) Machinery firms (excerpted, coefficients for dummies of globalizing patterns only)						
Period: 2002-2006						
Exp1-exp2	0.891 ***	0.104 ***	0.605 ***	0.784 ***	0.025 ***	0.050 ***
	(0.217)	(0.029)	(0.214)	(0.234)	(0.007)	(0.011)
Nonexp1-exp2	0.343 **	0.020	0.539 ***	0.653 ***	0.019 ***	0.058 ***
	(0.162)	(0.023)	(0.169)	(0.196)	(0.005)	(0.009)
Exp1-nonexp2	0.165	-0.004	0.128	-0.381	0.027 ***	0.030 ***
	(0.207)	(0.030)	(0.235)	(0.335)	(0.007)	(0.012)
c) Non-machinery manufacturing firms (excerpted, coefficients for dummies of globalizing patterns only)						
Period: 2002-2006						
Exp1-exp2	0.364 *	0.069 **	-0.011	0.472 **	0.026 ***	0.002
	(0.203)	(0.031)	(0.221)	(0.226)	(0.004)	(0.008)
Nonexp1-exp2	0.585 ***	0.092 ***	0.178	0.508 ***	0.008 ***	0.016 ***
	(0.158)	(0.024)	(0.169)	(0.181)	(0.003)	(0.006)
Exp1-nonexp2	0.322	0.050	0.206	0.328	0.001	0.006
	(0.228)	(0.035)	(0.246)	(0.273)	(0.004)	(0.009)

Data source: Authors' calculation, based on METI database.

Notes: a definition of the expanding operations for analysis in this table: firms with expanding operations are those who have at least one affiliate at the beginning of the sample period and increase in the number at the end of the period. Only the results of expanding operations are excerpted for each regression. Figures in parenthesis are standard deviation. *** indicates that the results are statistically significant at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Regressions are as follows:

(1) dependent variable: 1 if a firm does not reduce the number of domestic employments and 0 otherwise

(2) dependent variable: growth rate of the number of domestic employment

(3) dependent variable: 1 if a firm does not reduce the number of domestic establishments and 0 otherwise

(4) dependent variable: 1 if a firm does not reduce the number of domestic affiliates and 0 otherwise

(5) dependent variable: a change in the ratio of expoprts to East Asia in total sales

(6) dependent variable: a change in the ratio of imports from East Asia in total purchases