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Abstract

Are multinational enterprises MNEs more likely than non-MNEs, owing to their footloose character, to close down their plants? The results from using a panel of all Swedish manufacturing plants over the period 1993 and 2002 suggest that MNE plants, and in particular Swedish MNE plants, have higher probability to exit the market than non-MNE plants. The outcome is robust controlling for other variables affecting the survival rates. Among non-MNE plants the probabilities of exit is higher in non-exporting firms than in exporting firms. Moreover, the increased foreign presence in Swedish manufacturing seems, due to intensified competition, to have led to the higher exit rates of plants in non-exporting non-MNEs. Plants of globally engaged indigenous firms, such as plants of Swedish MNEs and exporting non-MNEs, appear, on the other hand, to have been unaffected of the increased foreign presence.

Key words: Survival analysis, multinational enterprises, foreign ownership
JEL classification: C41, F23, J31

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1. Introduction

Multinational enterprises (MNEs) play an important role in Swedish manufacturing.[1] Several studies have by now documented that MNEs differ from non-MNEs in many respects. It has been shown that MNEs are better equipped with some desirable qualifications. They tend to be larger, more capital and skill intensive, and not least to be more productive and pay higher wages than non-MNEs.[2]

Another important characteristic of MNEs is that, as compared to non-MNEs, they can, in response to adverse shocks in one country, relatively easily move production to another country. This footloose character of MNEs means that the survival rate of plants within MNEs, controlling for other factors that affecting plant survival, would be expected to be lower than for plants within non-MNEs.

For a long time, Swedish manufacturing was dominated by Swedish-owned MNEs. Yet in the 1990s, we observe a substantial increase in foreign ownership, mainly owing to some mergers and acquisitions where a number of large Swedish MNEs became foreign-owned. In the Swedish public debate, this gave rise to some concerns. Since foreign MNEs are less rooted in the local economy than Swedish MNEs (and non-MNEs), the former may be more inclined to shift their production to other countries whenever the conditions in Sweden change to their disadvantage. In other words, plant survival rates are lower within foreign MNEs than within Swedish MNEs.

It may well be the other way around, however. An investment in a foreign country involves a large commitment because setting up, and also to some extent taking over a plant abroad, entails substantial sunk costs. This means that given that the conditions in the host country do not deteriorate drastically, it is likely to believe that foreign-owned plants continue to stay on. Domestically owned MNEs which have been established for a long time may, on the other hand, begin to realize that some of their production in the home country is better carried out abroad. Furthermore, recent reductions in transport and information costs have

[1] In 2002, 60 percent of the employees in manufacturing are working in MNEs; 29 percent in Swedish-owned MNEs, 31 percent in foreign-owned firms, whereas the remaining 40 percent are employed in non-MNEs. See Figure 1 below.

[2] See e.g. Doms and Jensen (1998) for the US, Lipsey and Sjöholm (2004) and Bernard and Sjöholm (2003) for Indonesia, and Bandick (2005) for Sweden.

improved the opportunities to exploit the advantages of relocation of production between countries. Therefore, plant survival rates may be lower within domestic (here Swedish) than within foreign MNEs.

Finally, it could be argued that since MNEs are often larger, potentially more diversified, and have better access to sources of capital than non-MNEs, they have larger prospects to withstand negative shocks, such as temporary drops in demand for some of their products. The probability of shutdown would then be less among plants within MNEs than among plants within non-MNEs.

Apparently, it largely seems to be an empirical question to determine whether the survival rates of plants within MNEs are less than the survival rates of plants within non-MNEs and if there are any differences in shutdown probabilities between plants within foreign and domestic MNEs. So far, a few studies, e.g. Görg and Strobl (2003a) for Ireland and Bernard and Sjöholm (2003) for Indonesia, have analyzed differences in survival rates between foreign-owned plants and plants of indigenous firms (domestic MNEs and non-MNEs).[3] Bernard and Jensen (2007) focus on differences in plant survival rates in US manufacturing between plants within domestic (US) MNEs and plants within other firms (foreign MNEs and non-MNEs). The results of these studies indicate that the probability of shutdown is larger for plants within MNEs, at least when controlling for other factors related to plant survival. The only study, to my knowledge, that has been able to analyze the differences in survival rates between MNEs (domestic and foreign-owned) and non-MNEs is the study of Van Beveren (2007). The result shows that domestic and foreign MNE in Belgium are more footloose than national firms in the manufacturing sector during the period 1996-2001.

In the present study, which covers Swedish manufacturing during the period 1993 to 2002, I can divide the plants into Swedish MNE, foreign MNE and Swedish non-MNEs. Unlike some of the former studies, I do not mix mergers and acquisitions with true exits[4] and there are no cut-off limits in plant size in my dataset involving that an exit may be a result of decreased plant size below a cut-off level rather than due to closure[5]. Moreover, in contrast

[3] In contrast to Sweden most MNEs in Ireland and Indonesia are foreign-owned.
[4] Mata and Portugal (2002) and Görg and Strobl (2003a).
[5] Esteve Pérez et.al. (2004), Alvarez and Görg (2005) and Van Beveren (2007).

to previous studies, I can separate non-MNEs' plants into plants of exporters and plants of non-exporters. A negative shock in the domestic market will most likely hit non-exporters harder because they rely more on the domestic product market. In addition, exporters tend be more productive than non-exporters and have other desirable characteristics that mean that they can better resist impaired conditions. Consequently, plant survival rates would be expected to be higher among exporters than among non-exporters.

The increased presence of foreign-owned firms in Swedish manufacturing may have an impact on the survival rate of plants of indigenous firms in two different ways, through technology transfers and through intensified competition. A fundamental idea in many theories of MNEs is that MNEs own firm-specific assets where access to superior technologies is one of the most important. In many countries, utilization of these technologies is a main driving force behind foreign direct investment and a vehicle of technology transfers between countries. Such inflows of superior knowledge due to increased foreign ownership into an economy can be adopted by host country indigenous firms, raise their productivity and reduce their costs, and increase their probability of survival. Görg and Strobl (2003b) find, for instance, that the presence of foreign-owned firms has a life-enhancing effect on indigenous plants in Irish manufacturing high-tech industries.

Intensified competition on product markets, as well as on factor markets, can have negative effects on the survival of plants of indigenous firms. More efficient foreign-owned firms that produce at lower marginal costs than indigenous firms tend to increase their output at the expense of the indigenous firms. If the domestically owned rivals face fixed cost of production, their average cost will increase and reduce the probability of survival of their plants. A larger presence of foreign competitors may also drive up the factor cost, e.g. lead to higher wages, which in turn may entail an increased probability of shutdown among indigenous plants.

The presence of foreign-owned firms may have different impacts on various types of firms, depending on their ability to benefit from technology transfer (their absorptive capacity) and withstand intensified competition. In this paper, I examine how the increased foreign presence in Swedish manufacturing affects the survival prospects of Swedish MNE plants and plants of exporting and non-exporting non-MNEs.

My results show that MNE (Swedish and foreign-owned) plants, in particular Swedish MNE plants, have a higher probability of exiting than non-MNE plants. For plants in larger manufacturing firms, it appears that the survival rate is higher for foreign MNE plants and exporting non-MNE plants than for non-exporting non-MNE plants and Swedish MNE plants. Moreover, the increased foreign presence in Swedish manufacturing seems to have had a negative impact on the survival rate of plants in non-exporting non-MNEs, but not to have affected globally engaged plants, i.e. plants in exporting non-MNEs or plants in Swedish MNEs.

The plan of the paper is as follows. Section 2 briefly describes the dataset I use. Moreover, it shows the changing importance of Swedish MNEs, foreign MNEs and non-MNEs in Swedish manufacturing. Section 3.1 discusses the econometric modeling and section 3.2 presents the results of the analysis. Section 4 summarizes and concludes.

2. Data and description

The dataset used in this paper includes all plants in Swedish manufacturing covering the period 1993 to 2002 and comes from Statistics Sweden (SCB) and Swedish Institute for Growth Policy Studies (ITPS). Each plant is identified by a unique plant code. The appearance of a new identification number indicates that a new plant has entered, the disappearance of a previous number means that this plant has exited, and if a number is the same the plant has survived. For each plant, total employment, the number of employed with post-secondary education and firm and industry codes are reported. Plant age can be derived back to 1986.[6]

The firm code attached to each plant enables me to match e.g. accounting data of the firm to the plant. Accordingly, firm level data, such as labor productivity, can be linked to plants. Furthermore, Swedish manufacturing firms can be divided into Swedish owned MNEs, foreign-owned firms and non-MNE firms. A Swedish MNE is a domestically owned firm,

[6] I have access to plant data from 1986 onwards. For plants entering after 1986 I am able to calculate the exact plant age, while older plants are improperly assigned to enter in 1986.

which is part of an enterprise group with affiliates abroad.[7] In foreign-owned firms (foreign MNEs), foreigners possess more than 50 percent of the voting rights. Non-MNE firms are firms that are neither Swedish MNEs nor foreign MNEs. Using the firm code of plants, I can separate the plants into plants within Swedish MNEs and foreign MNEs and plants within non-MNEs. Swedish manufacturing firms with 50 employees or more reports exports. This means that I can also identify plants in exporting and non-exporting firms with 50 employees or more.

A major advantage as compared to previous studies examining survival rates among plants is the clearer distinction into different types of MNEs and of global engagements of plants that my dataset makes it possible for me to carry out. This distinction is very important since the prospect of surviving may differ between different ownership structures.

Figure 1 Employment shares of foreign-owned firms, Swedish MNEs and non-MNEs in Swedish manufacturing 1993-2002. Percent.

During the 1990s, Swedish manufacturing experienced a substantial increase in foreign ownership. *Figure 1* illustrates how the employment shares have developed for Swedish MNEs, foreign-owned firms and non-MNEs over the decade 1993 and 2002. The increase of the employment in foreign-owned firms seems to have taken place at the expense of employment in Swedish MNEs. The employment share in Swedish MNEs dropped from 47 percent in 1993 to 29 percent in 2002. At the same time, the employment share in foreign-owned firms grew from 15 percent to 31 percent, whereas the employment share in non-MNEs to a large extent remained unchanged. During this period, a number of large Swedish MNEs became foreign owned due to merger and acquisition with foreign MNEs, e.g. Pharmacia and Upjohn 1995 and Volvo Car Company and Ford 1999. The increased importance of foreign ownership is an international phenomenon. In the 1990s, many countries abolished or reduced their restriction for foreigners to buy indigenous firms.[8] Yet,

[7] The first year I can distinguish Swedish MNEs from non-MNEs is 1993 and explains why my analysis begins in 1993.
[8] Golub (2003).

the trend towards more foreign ownership seems to have been more pronounced in Sweden than in other OECD countries.[9]

Table 1 Evolution of plant distribution among Swedish MNEs, foreign MNEs and non-MNEs

The lesser importance of Swedish MNEs can also be seen in *Table 1*, which shows the evolution of the plant distribution among different types of firms in Swedish manufacturing from 1993 to 2002. The share of plants within Swedish MNEs has fallen from 9 percent to 6 percent, whereas the share of plants within foreign MNEs remains constant around 5 percent and has grown for plants within non-MNEs from 86 to 89 percent. The bulk of the plants are thus non-MNE plants but, as can seen in Figure 1, only about 40 percent of manufacturing employment are in non-MNE plants. This implies that non-MNE plants must be significantly smaller than MNE plants. There is a total of 421,390 observations in my dataset, 102,085 of which are unique plants. Of those 43,104 plants that existed from the beginning in 1993 17,917, or 42 percent, remained at the end of the sample period in 2002.

Table 2 Exit and entry rates among plants within Swedish MNEs, foreign MNEs and non-MNEs 1993-2002. Percent.

Table 2 presents exit and entry rates of plants within the various types of firms. The exit rate is, on average, highest among plants within Swedish MNEs and lowest among plants within non-MNEs. Moreover, the entry rate is, on average, highest among plants within Swedish MNEs. Yet the net entry rate is lowest among Swedish MNE plants and highest, and only positive, among foreign MNE plants, which is consistent with the pattern observed in Figure 1 and Table 1. These simple calculations of exit rates suggest that the

[9] Hansson et.al. (2007) chapter 2. Other explanations put forward for the increased foreign ownership in Sweden in the 1990s are that there were more invitation to acquire Swedish firms after the EU membership, Swedish firms were cheap to buy due to the devaluation at the beginning of the 1990s and the Swedish tax system has favored foreign ownership.

probability of plant exit is larger in MNEs, especially in Swedish MNEs, than in non-MNEs.

3. Modeling and estimating plant survival

3.1 The modeling

A non-parametric approach to describe survival rates of plants within Swedish MNEs, foreign MNEs and non-MNEs is to estimate the survivor functions, *S(t)*, i.e. the probability of surviving past time *t*, for each type of plant. The Kaplan-Meier estimate of the survivor function is given by

$$\hat{S}(t) = \prod_{j|t_j \le t} \left(\frac{n_j - d_j}{n_j} \right) \qquad (1)$$

where n_j is the number of plants that have survived to t_j years of age and d_j is the number of plants that die at age t_j. *Figure 2* shows the estimated functions for the different types of plants. Analysis time represents the number of years the plant has been in the sample.

Figure 2 Kaplan-Meier estimates of the survivor function for Swedish MNEs, foreign MNEs and non-MNEs

Figure 2 points out that there are clear differences in the survival probabilities among these three groups of plants. MNE plants are less likely to survive than non-MNE plants. After five years, for instance, 58 percent of the foreign owned plants and 46 percent of the Swedish owned MNE plants have survived, whereas 72 percent of the non-MNE plans are

still in operation.[10] Moreover, a log-rank test allows me to reject the hypothesis that the survivor functions across the three types of plants are equal.[11]

A drawback to comparing Kaplan-Meier survivor functions of MNE and non-MNE plants is that such an analysis does not take other factors affecting plant survival into account. In the previous literature on plant exit plant size and plant age are variables that appear to have an effect on survival rates. A more or less established stylized fact is that smaller and younger plants have lower probabilities of survival than larger and older plants.[12]

Table 3 Plant and firm characteristics of foreign MNEs, Swedish MNEs and non-MNEs in 2002

In *Table 3*, we observe that these and other variables that may have an impact on the survival rates of plants are unequally distributed, in particular across MNEs and non-MNEs. Standard t-tests show that MNE plants are significantly older, larger and more skill intensive than non-MNE plants. Furthermore, MNE firms have a significantly higher productivity and higher export intensity than non-MNE firms.

To disentangle the effect of various plant-, firm- and industry specific factors from multinationality on the survivability of plants, I turn to semi-parametric modeling of plants' hazard rates. Following most of the related empirical literature, I utilize the Cox proportional hazard model. This means that the hazard rate $h(t)$ - the rate at which the plants exit in interval t to $t+1$ conditional upon having survived until period t - is specified as follows

$$h(t) = h_0(t)e^{X\beta} \qquad (2)$$

[10] My results contrast with those of Görg and Strobl (2003a), Bernard and Sjöholm (2003) and Van Beveren (2007). They all find that when comparing unconditional exit rates, foreign MNE plants have lower exit rates than domestic plants.
[11] The results are not presented in the paper but are available upon request.
[12] Geroski (1995).

where h_0 is the baseline hazard function that is given no parameterization. X is a vector of covariates, plant-, firm- and industry characteristics expected to influence the plant's hazard rate.

The covariates include plant size, measured by plant employment at time t, and plant age. Plant skill intensity, i.e. the percentage of the employees with post-secondary education, is added as proxy of human capital at the plant level. The possibility to be at the technological forefront and use advanced technologies is heavily dependent on the level of education of the employees. Plants with a better educated workforce are expected to have higher probabilities of survival.[13]

Unfortunately, data on productivity is not available at the plant level but only at the firm level. This can be a problem in the analysis of multi-plant firms with large variations in productivity across plants. As a measure of productivity, I use relative labor productivity, namely the quotient of value added per worker at the firm and that at the average firm in the industry in the year.[14] The survival rates of plants are expected to be higher within more productive firms.

Moreover, a number of industry controls are included as covariates. In growing industries profits tend to be higher and the probability of exit is likely to be lower. I use employment growth at the industry level as a measure on of sectoral growth. By adding industry export and import intensities, I try to take international competition at the industry level into account. High import intensity (share of import in consumption) indicates that the plants in the industry face tough competition from abroad and consequently, the survival rate of plants is lower. Swedish firm within industries with high export intensity (export share of production) suggests to be competitive on the world market and thus their plants to have high survival rates. In addition, time dummies are included to capture business cycle effects and in some specifications industry dummies are used as an alternative to industry controls.

[13] Mata and Portugal (2002).
[14] A multi-factor productivity measure would have been a more appropriate measure of performance since within industry labor productivity differentials among firms also capture e.g. variations in capital intensity. However, due to the lack of capital stocks, especially among smaller firms, I cannot calculate firm-level total factor productivity for a sufficiently large number of firms.

The key variables in my analysis are the dummy variables showing if a plant is part of a Swedish-owned multinational enterprise $SMNE = 1$ or if it is part of a foreign-owned firm, $FMNE = 1$. The coefficients of these variables indicate whether MNE plants are less likely to survive than non-MNE plants and whether foreign MNEs are more attached to their host market than Swedish MNEs are to their home market.

Exporting firms are less dependent on the domestic product market. Therefore, if the domestic market is hit by a negative shock, plants of exporting firms are better prepared to survive by cushioning the adverse effects through the export market.[15] For firms with 50 employees or more, I am able to identify exporting firms. This means that non-MNE exporting plants can be singled out among such firms $SE = 1$.

In the econometric analysis below, I examine if exit rates are higher among MNE plants than among non-MNE plants and I also distinguish plants within Swedish MNEs from plants within foreign MNEs. Moreover, I investigate if non-MNE plants of exporting firms have higher survival rates than non-MNE plants of non-exporting firms.

3.2 Estimation results

The results of estimating different specifications of the hazard model described in (2) are presented in *Table 4*. In interpreting the results, it should be recalled that hazard ratios (exponentiated coefficients) rather than coefficients themselves are reported, i.e. a coefficient less than one on an independent variable in the table implies that it increases the chances of survival, *ceteris paribus*.

Table 4 Determinants of plant survival in Swedish manufacturing

At first, we observe that the survival rates of MNE plants, in particular of Swedish MNE plants, are less than those of non-MNE plants. This is consistent with the hypothesis that

[15] Alvarez and Görg (2005) ask a different question. They investigate whether Chilean manufacturing plants of exporting (foreign) MNEs are less likely to exit than non-exporting (foreign) MNEs and they find this to be the case in the late 1990s. Exporting firms enjoy better survival prospects in Spanish manufacturing in the 1990s (Esteve Pérez et al. 2004).

MNEs are footloose and can easily relocate plants between different countries. Moreover, it seems that foreign MNEs are more committed to be located in Sweden than Swedish MNEs; the hazard ratio is larger for Swedish MNEs than for foreign MNEs.[16] This may be due to the larger sunk costs a foreign firm has to establish abroad in comparison with what a domestic firm has to set up in the home market.

For larger manufacturing firms (with 50 employees or more), in specifications (iv) and (v), I am able to compare plant survival rates of exporting and non-exporting firms.[17] As expected, plants of exporting firms are less likely to exit, and note that this is the case given that I control for variations in firm labor productivity.[18] As in all other specifications in Table 4, Swedish MNE plants have the lowest survival rate, whereas for these larger firms, foreign MNE plants are more likely to survive than non-MNE plants, in exporting as well as non-exporting firms.

Like in most other studies of plant survival, older and larger plants are less inclined to exit. Generally, the skill intensity of plants appears not to affect the survival rate. However, the estimates in specifications (iv) and (v) suggest that in larger firms, the survival rate is higher in plants with large shares of skilled labor. Furthermore, plants in firms with a low relative labor productivity have a higher probability of exit.

From the coefficients on variables at the industry level, I conclude that plant survival is higher in growing industries and export intensive industries. The result of the impact of import competition on plant survival is inconclusive. On the whole, in specifications (ii) and (iii), more competition from abroad in an industry leads, as expected, to higher plant exit rates. Surprisingly however, according to specifications (iv) and (v), plants in larger firms seem to have higher survival rates in more import intensive industries.

Figure 1 showed that in the 1990s, foreign ownership grew substantially in Swedish manufacturing. The impact of increased foreign presence on the survival rate of plants of

[16] A t-test shows that the difference is significant.
[17] Firm level variables are only available for all manufacturing firms from 1996 onwards. The inclusion of firm level variables entails that I have to shorten the period of study from 1993 to 1996 in (iii). However, firm level variables for larger firms, i.e. firms with 50 employees and more, are available from year 1993.
[18] It has been shown in many studies, e.g. for Swedish manufacturing in Hansson and Lundin (2004), that there is a positive relationship between export and productivity at the firm level. Firms with high productivity tend to be exporters and high productivity firms are also more likely to survive.

indigenous firms appears to be, as I argued in the introduction,[19] ambiguous and depend on the type of indigenous firm. In *Table 5* I present the results from estimating a Cox proportional hazard model in (2) using the same specification as in (iv) Table 4, except adding a new variable capturing foreign presence. As a proxy for foreign presence in an industry, I use the employment share of foreign MNEs in an industry *i* at time *t*. The variable is supposed to capture spillover effects (positive) as well as competition effects (negative) on plant survival. I estimate the model separately for plants within Swedish MNEs, plants of exporting and plants of non-exporting non-MNE firms. The sample consists of Swedish manufacturing plants in firms with 50 employees or more between 1993 and 2002.

Table 5 Effects of foreign MNE presence on the survival of indigenous plants, 1993-2002

The results in *Table 5* indicate that the plant survival of Swedish MNEs and exporting non-MNE firms is unaffected by the increased presence of foreign-owned firms. On the other hand, the impact on survival rates of plants in non-exporting non-MNE firms is negative.[20] An explanation to this pattern may be that plants of non-exporting non-MNE firms do not have enough absorptive capacity to benefit from technology spillovers owing to increased foreign MNE presence. Significantly lower skill intensity (share of employees with some post-secondary education) in plants of non-exporting firms than in plants of exporting firms and plants of Swedish MNEs is one indicator of this.[21] Moreover, plants of non-exporting non-MNE firms are more sensitive to, and thus more severely hit by, intensified competition from increased foreign MNE presence on the product as well as on the factor market. Significantly lower labor productivity in non-exporting firms than in exporting firms and Swedish MNE firms suggest that plants of non-exporting firms are less capable

[19] See also Görg and Strobl (2003b).
[20] For Irish manufacturing, Görg and Strobl (2003b) find that increased foreign presence has a positive impact on domestic plants' survival, through technology spillovers, in the high-tech sector and a negative impact on other foreign-owned plants' survival, through fiercer competition, in the low-tech sector.
[21] In the plants in table 5, the average share of employees with some post-secondary education in 2002 is only 13 percent in non-exporting non-MNE firm plants, whereas it is 19 percent in exporting non-MNE firm plants and 27 percent in Swedish MNE plants.

of withstanding intensified competition due to increased foreign MNE presence.[22] Yet we should be aware of the fact that to some extent, there is a lack of absorptive capacity and the deficient competitiveness of plants in non-exporting non-MNE firms controlled for in the regressions in Table 5 by the inclusion of plant skill intensity and firm relative labor productivity.

4. Conclusions

I have examined whether MNEs (Swedish and foreign), owing to their footloose character, are more likely to close plants than non-MNEs. I find that they are and, in particular, Swedish MNE plants seem to have high exit rates. The latter indicates that an investment abroad entails such large sunk costs that if the conditions deteriorate in a country, foreign MNE plants tend to hang on longer than domestic MNE plants. As a matter of fact in larger Swedish manufacturing firms, foreign MNE plants appear to have even higher survival rates than non-MNE plants.

Comparing exporting and non-exporting non-MNE plants in larger firms shows that plants of non-exporting firms are less likely to survive. A negative shock on the domestic market has a larger effect on non-exporting firms since they are obviously more dependent on their home market and tougher competition on international markets entails that plants of exporting firms become more efficient than plants of non-exporting firms.

Technology transfers and intensified competition are two channels through which the increased presence of foreign-owned firms may influence the survival rates of indigenous firms. Plant survival of globally engaged firms, such as Swedish MNEs and exporting non-MNEs, seems to be unaffected by increased foreign presence, whereas there appears to be a negative impact on the survival rates of non-exporting non-MNE firms.

[22] In the firms in table 5, the average value added per employee (thousand SEK) in 2002 is 353 in non-exporting non-MNE firms, 490 in exporting non-MNE firms and 595 in Swedish MNE firms.

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Figure 1 Employment shares of Swedish MNEs, foreign MNEs and non-MNEs in Swedish manufacturing 1993-2002.

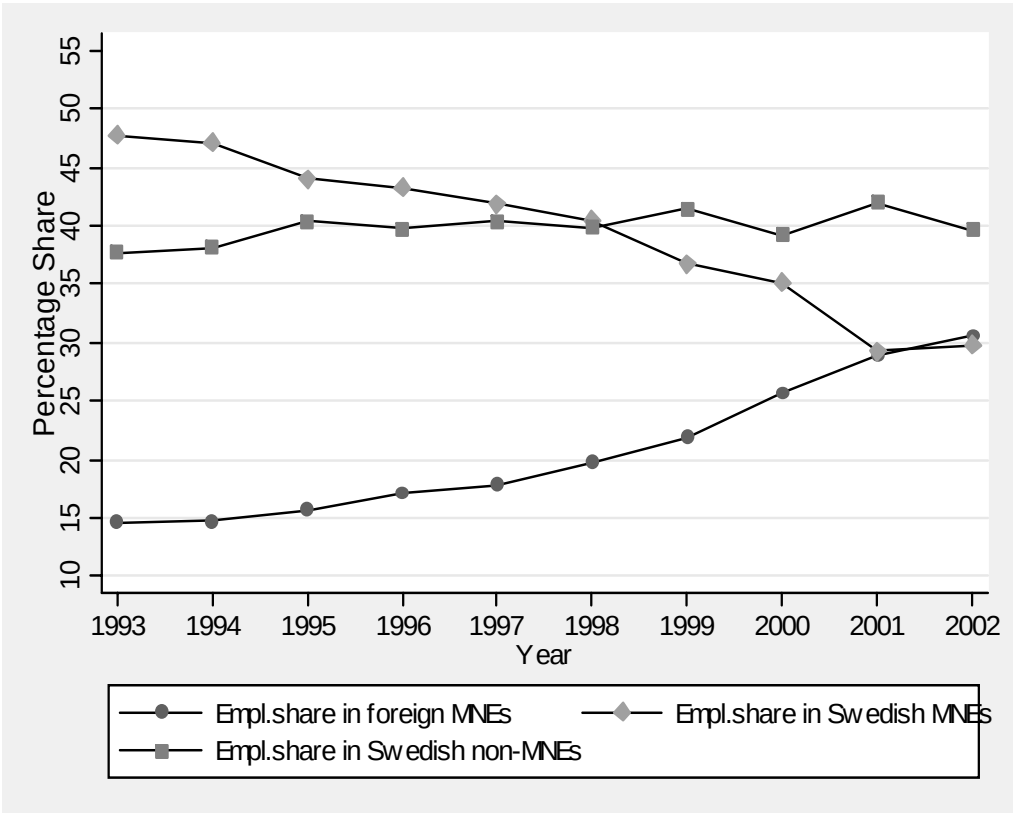

Table 1 Evolution of plant distribution among Swedish MNEs, foreign MNEs and non-MNEs. Number of observations and number of unique plants.

Year	Number of plants						
	All Plants	Foreign MNEs (Percent)		Swedish MNEs (Percent)		Non-MNEs (Percent)	
1993	43,104	2,152	(5.0)	3,884	(9.0)	37,068	(86.0)
1994	43,607	2,190	(5.0)	4,136	(9.5)	37,281	(85.5)
1995	42,934	2,240	(5.2)	3,646	(8.5)	37,048	(86.3)
1996	43,018	2,166	(5.0)	3,348	(7.8)	37,504	(87.2)
1997	42,596	1,972	(4.6)	3,121	(7.3)	37,503	(88.0)
1998	42,468	2,086	(4.9)	2,911	(6.9)	37,471	(88.2)
1999	40,984	2,105	(5.1)	2,392	(5.8)	36,487	(89.0)
2000	41,156	2,170	(5.3)	2,663	(6.5)	36,323	(88.2)
2001	40,867	2,403	(5.9)	2,089	(5.1)	36,375	(89.0)
2002	40,606	2,281	(5.6)	2,261	(5.6)	36,064	(88.8)
	Number of observations						
1993-2002	421,340	21,765	(5.2)	30,451	(7.2)	369,124	(87.6)
	Number of unique plants						
1993-2002	102,085	6,554	(6.4)	10,745	(10.5)	84,786	(83.1)

Table 2 Average exit and entry rates among plants within Swedish MNEs, foreign MNEs and non-MNEs, 1993-2002. Percent.

Plant type	Exit rates	Entry rates	Net entry rates
Swedish MNEs	24.3	19.1	−5.2
Foreign MNEs	17.7	18.0	0.3
Non-MNEs	13.0	12.8	−0.2

Notes: The exit (entry) rate is defined as the number of exiting (entering) plants relative to the total number of plants. An exiting (entering) plant observed in *t* is present (absent) in *t-1* but absent (present) in *t+1*. The net entry rate is entry rate minus exit rate.

Figure 2 Kaplan-Meier estimates of the survivor function for Swedish MNEs, foreign MNEs and non-MNEs

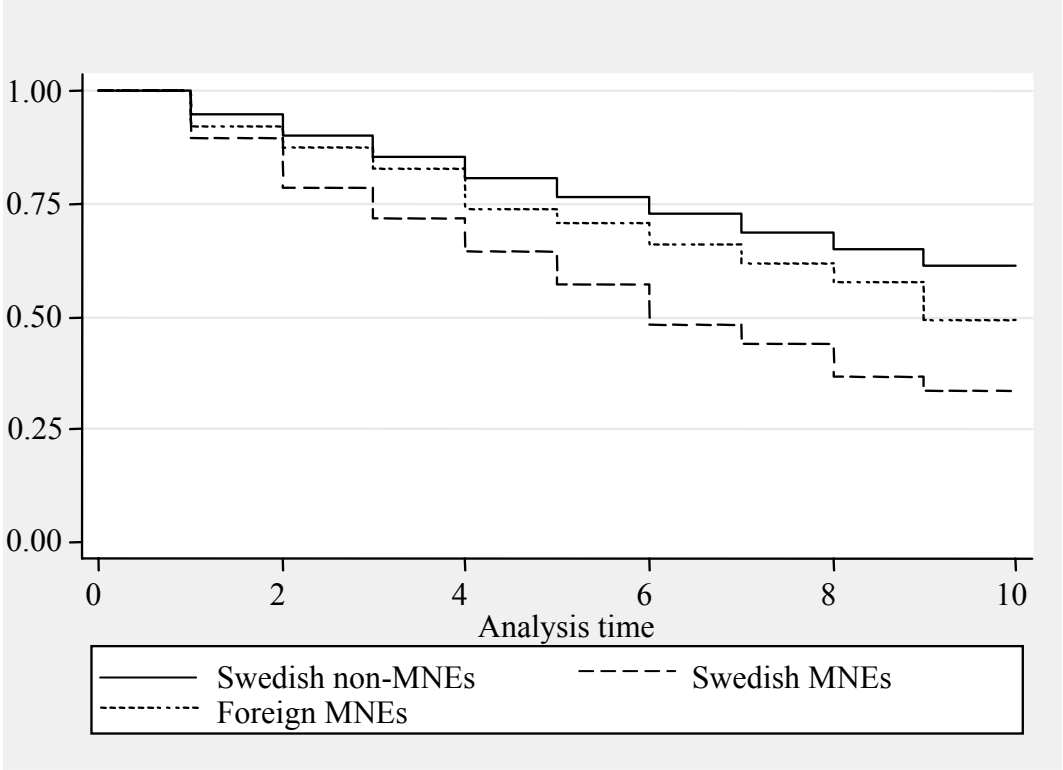

Table 3 Plant and firm characteristics of foreign MNEs, Swedish MNEs and non-MNEs, 2002

Plant variables	Foreign MNEs	Swedish MNEs	Non-MNEs
Age	9.2	9.3	8.7
Size	74	75	8
Skill intensity	22.3	26.7	13.7
Number of plants	2,281	2,261	36,064
Firm variables	Foreign MNEs	Swedish MNE	Non-MNEs
Labor productivity	586	583	427
Export intensity	32.1	28.7	12.3
Number of firms	1,157	1,221	34,139

Notes: Export intensity is export as a share of production in percent and is only available for firms with 50 employees or more. Skill intensity is the percentage of the employees with post-secondary education. Labor productivity, i.e. value added per employee, is in thousand SEK.

Table 4 Determinants of plant survival in Swedish manufacturing

Variables	(i) Hazard ratio (z-statistics) 1993-2002	(ii) Hazard rates (z-statistics) 1993-2002	(iii) Hazard rates (z-statistics) 1996-2002	(iv) Hazard rates (z-statistics) 1993-2002	(v) Hazard rates (z-statistics) 1993-2002
Foreign MNE $FMNE = 1$	1.199 (15.55)***	1.210 (17.85)***	1.318 (18.85)***	0.896 (6.38)***	0.949 (3.63)***
Swedish MNE $SMNE = 1$	1.287 (28.42)***	1.311 (36.46)***	1.463 (29.90)***	1.069 (4.33)***	1.134 (10.35)***
Swedish exporter $SE = 1$				0.899 (5.83)***	
Labor productivity (Firm level)			0.985 (3.28)***	0.977 (3.26)***	0.976 (3.33)***
Age (Plant level)	0.351 (335.99)***	0.349 (352.05)***	0.370 (161.87)***	0.430 (129.85)***	0.430 (129.95)***
Size (Plant level)	0.797 (54.51)***	0.802 (54.34)***	0.744 (40.72)***	0.786 (35.33)***	0.785 (35.42)***
Skill intensity (Plant level)	1.000 (0.19)	1.000 (0.04)	0.997 (1.50)	0.997 (2.03)**	0.997 (1.96)**
Employment growth (Industry level)		0.997 (9.85)***	0.995 (8.84)***	0.997 (4.23)***	0.998 (3.89)***
Import intensity (Industry level)		1.063 (5.24)***	1.065 (2.29)**	0.931 (2.58)***	0.932 (2.57)***
Export intensity (Industry level)		0.887 (7.89)***	0.856 (6.98)***	0.927 (3.17)***	0.910 (4.06)***
Year dummies	yes	yes	yes	yes	yes
Industry dummies	yes	no	no	no	no
Observations	421,340	421,340	188,130	64,521	64,521
Wald Chi Square	164,499***	189,655***	64,975***	33,830***	33,943***

Notes: Industries are defined at the SNI92 3-digit level (99 industries). ***, **, * indicate significance at the 1, 5 and 10 percent levels, respectively. In specifications (i)-(iii) all plants are in the regression, whereas in specifications (iv) and (v) only plants in firms with 50 employees or more are included.

Table 5 Effects of foreign MNE presence on the survival of indigenous plants, 1993-2002

Variables	(i) Swedish MNEs	(ii) Swedish exporter	(iii) Swedish non-exporter
Foreign MNE presence	1.001 (1.35)	0.993 (-0.82)	1.080 (4.50)***
Plant level variables	Yes	yes	Yes
Firm level variables	Yes	yes	Yes
Year dummies	Yes	yes	Yes
Industry dummies	No	no	No
Observations	22,036	13,222	10,929
Wald Chi Square	11,548***	5,469***	5,529***

Notes: Industries are defined at the SNI92 3-digit level (99 industries). Z-statistics are within parentheses. ***, **, * indicate significance at the 1, 5 and 10 percent levels, respectively.