ANALYSIS

Multinational firms and productivity

Does country of origin matter?

2025

Executive summary

The purpose of this report is to understand if and how productivity increases after a foreign acquisition has taken place, and whether the productivity effect differs depending on the country of origin of a foreign investor. Additionally, we analyse what characteristics of firms make a foreign acquisition more likely, and how these characteristics vary with the origin of the acquiring multinational enterprise (MNE). In order to achieve this, we use a rich panel of Swedish firm-level data from 1997 to 2020.

Total factor productivity (TFP), a large share of employees with a higher education, and larger firm size are factors that increase the likelihood of a foreign acquisition. This suggests that foreign firms tend to acquire Swedish firms that are already relatively productive, rather than firms that are not as productive today, but have the potential to be so in the future. Furthermore, we find that most of the time, neither profitability nor export intensity increase the likelihood of foreign acquisitions.

Our main results show that when Swedish firms are acquired by firms from the European Economic Area (EEA), the Nordics, the UK, the US and Canada, or Japan, productivity increases. These regions and countries have a skilled workforce and a high level of technology with which Sweden has relatively well-established bilateral relations, in the sense that there appears to be interdependence and economic exchange between Sweden and these markets. Furthermore, the EEA and the Nordics are geographically close, which further facilitates trade and investment.

However, we find no significant effect on productivity following Chinese or Indian acquisitions of Swedish firms. For example, investments made by firms from Europe, Japan, and North America seem to be efficiency-seeking to a greater extent, such that the motive for an investment is to improve operational efficiency. On the other hand, investments from, for example, Chinese or Indian firms tend to be market-seeking or strategic asset-seeking, meaning that these firms often invest in Sweden to gain access to a new market or to acquire firm-specific technologies.

This report underscores the role of foreign direct investment (FDI) in boosting productivity, a key driver of economic growth. With the EU experiencing slow productivity growth, prioritising European productivity is essential. In this context, FDI is important for productivity as it not only constitutes an inflow of capital but also of technology, managerial expertise and global market integration. *Therefore, creating an environment that attracts and retains FDI should be a strategic priority.*

Table of contents

List of figures

List of tables

Authors Patrik Karpaty, Ebba Lundqvist and Mikael Kihlberg, Policy Advisers at National Board of Trade Sweden

Valuable comments and suggestions have been gratefully recieved from Jonas Hallberg, Patrik Tingvall and Erik Merkus.

1 Introduction

After decades of global investment liberalisation, the 2007–2008 financial crisis marked a change of direction, leading to a slowdown in global foreign direct investment (FDI). This development has also been identified in Sweden as the foreign share of the economy has stagnated in recent years (Swedish Agency for Growth Policy Analysis, 2021; Sjöholm, 2022). The slowdown in FDI has been described as a contributing factor to the observed sluggish productivity growth across Europe. Furthermore, a transatlantic divergence has emerged, with Europe's per capita income levels falling behind those of the US, and the International Monetary Fund (2024) forecasts that this gap will only widen over the next decade.

In economic research, FDI is widely recognized as a key driver of economic and productivity growth, achieved by boosting wages, optimizing capital allocation, and fostering technological advancement and innovation. Also, the presence of foreign multinational enterprises (MNEs) also brings benefits to other firms on the domestic market through technological spillovers, know-how, and increased competition (see, for example, Blomström & Kokko, 1998; Dunning & Lundan, 2008; Keller, 2021). Furthermore, MNEs are in general larger, more productive, and more profitable than firms that only operate in the domestic market (Antras & Yeaple, 2014; Bernard et al., 2018). Given that productivity is a critical driver of GDP growth, the slowdown of FDI has been linked to the stagnating economic growth witnessed in both Europe and Sweden (Swedish Productivity Commission, 2024).

The purpose of this report is to understand if and how a firm's productivity changes after a foreign acquisition has taken place, and whether this differs depending on the country of origin of a foreign investor. In our analysis we use Swedish firm level panel data for the years 1997–2020 and an event study approach as our main method.

To deepen our understanding of the behaviour of foreign investors, we investigate the characteristics of Swedish firms that such investors typically own, using theory and descriptive statistics. We also aim to analyse what characteristics of Swedish firms increase the likelihood of being acquired by a foreign MNE. To discern the characteristics of Swedish firms prioritised by foreign investors and how these characteristics vary with the origin of the acquiring MNE, we use a probit model. This model enables us to understand whether MNEs from different countries have different objectives when acquiring a Swedish firm.

The slowdown of productivity growth in Europe has drawn significant attention, making the exploration of its potential drivers particularly relevant, as highlighted by Draghi (2024). As outlined above, FDI is a vital mechanism given its intrinsic added value for productivity as it not only constitutes an inflow of capital but also of technology, managerial expertise and global market integration. In accelerating Swedish and European productivity growth, gaining a greater understanding of the motives behind foreign acquisitions and their effect on productivity is of utmost importance.

The structure of the report is as follows: Section 2 provides an overview of the theoretical framework surrounding FDI and a review of the key findings from prior research concerning the relationship between FDI and productivity. Section 3 presents a descriptive analysis of foreign-owned firms operating in Sweden, using the dataset employed in the subsequent empirical investigations. Section 3 also outlines the results of the probit regression analysis. Section 4 introduces the event study method. The principal findings of our research are discussed in Section 5, and concluding remarks are provided in Section 6. Supplementary materials, including additional tables, figures and relevant information, are available in the Appendix.

2 Drivers of foreign direct investment

2.1 Rationale for cross-border investments

In what follows, two well-known frameworks of why firms invest abroad and the decisions leading up to the investment are presented. The first framework describes the prerequisites behind a firm's internationalisation strategy. The second framework stipulates the motives behind a firm's desire to invest abroad. Both frameworks were developed by Dunning (1977; 1993).

2.1.1 The OLI Model

Industrial economics theory suggests that firms encounter challenges in foreign markets, such as language barriers and insufficient local knowledge. The eclectic paradigm – better known as the OLI Model (whereby the acronym means *ownership, localisation and internalisation*) – stipulates why a firm engages in cross-border investments despite the obvious disadvantages. First, firms must have an *ownership* advantage, such as strong brands, patents or leadership, to compete in a foreign market. Second, the host country should offer *localisation* advantages, such as favourable taxes, political stability, natural resources, or cheap labour. Finally, *internalisation* advantages arise when a firm increases its efficiency by keeping production in-house rather than outsourcing (Dunning, 1977).

2.1.2 Four motives for foreign investments

The motive for an investor to undertake a cross-border investment can roughly be divided into four categories: resource-seeking, market-seeking, efficiency-seeking and strategic-asset-seeking (Dunning & Lundan, 2008). Each motive is linked to specific benefits that firms seek to obtain through international investments.

A resource-seeking investment is undertaken when a firm wants to acquire specific resources that are not available in its home country. This overlaps well with the localisation advantage of the host country mentioned in the previous section. Second, a market-seeking investment involves entering new markets, adapting to local preferences and overcoming trade barriers. It could also involve accessing nearby markets, so-called export platform FDI (see Ekholm et al., 2007; Yeaple, 2003). Third, efficiency-seeking investments seek to improve operational efficiency by reducing costs through cheaper labour or inputs, or to benefit from economies of scale by centralising production for multiple markets and optimising the global value chain. The efficiency motive overlaps with the internalisation advantage from the previous section. Lastly, the strategic-asset-seeking investment aims to acquire assets that can increase a firm's competitiveness, such as technology, R&D capabilities and managerial expertise.

In most cases, foreign investments may be a combination of these. Taking Sweden as an example, previous studies (Swedish Agency for Growth Policy Analysis, 2017) have shown that Swedish industry has comparative advantages in high-tech production, i.e. production that is intensive in the use of real capital and human capital. Sweden is

also highly placed in the rankings regarding research expenditure per capita and is also a high-income country with an admittedly small market; however, it is also geographically connected to and integrated with other larger markets. Typically, when firms invest in a small innovative economy like Sweden, they seek strategic assets such as R&D, technology, or access to the EU's Single Market.

2.2 Expected effects on productivity

2.2.1 Direct effects

There are compelling reasons to take a positive attitude towards inward FDI. For example, several studies show that FDI contributes to economic growth in host countries (see, for example, the review by Otieno & Aduda, 2022; Alfaro et al., 2010; Blomström et al., 1994).[1] One channel for economic growth is increased productivity. MNEs display elevated levels of investments in R&D as well as higher capital intensity, which generally translates into higher productivity. Another channel of economic growth is that foreign acquisitions can offer the acquired firms access to a larger market and increased sales. Given the same number of inputs, this also leads to an increase in the productivity of the subsidiaries. A critical factor is the connection with local firms, as foreign firms are expected to identify and collaborate with productive subcontractors and retailers (De Backer, Miroudot, and Rigo, 2019; Driffield, Lavoratori, and Temouri, 2021). Parent firms can also assist their foreign subsidiaries with financial and, to some extent, real capital.

When MNEs transfer managerial and technological knowledge to their foreign subsidiaries, this can have direct effects on the productivity of the subsidiaries. Several studies have found significant productivity gains through foreign acquisition of Swedish firms. Foreign acquisitions are associated with increased R&D intensity, likely due to the transfer of technology and management practices from the foreign parent firm (Hejazi and Safarian, 1999; Bandick, Görg, & Karpaty, 2014). Furthermore, foreign-owned manufacturing firms in Sweden show higher levels of productivity compared to domestic firms, which is particularly pronounced in high-tech industries (Karpaty, 2007).[2] However, some studies have shown that the productivity gains following a foreign acquisition are not due to the foreign ownership, per se, but rather to the fact that the acquisitions take place in sectors that are already relatively productive (Heyman & Norbäck, 2013; Swedish Agency for Growth Policy Analysis, 2020; Schiffbauer, 2017). For example, Heyman and Norbäck (2013) investigated the productivity effects of foreign acquisitions on Swedish firms and found that firms from France and Finland generated the largest productivity effects on Swedish firms.[3]

---

1 For a review of the theoretical perspectives on the relationship between FDI and productivity growth, measured as total factor productivity (TFP) growth, see Ferret (2004).

2 Bandick (2011) finds positive effects from vertical FDI, but not horizontal FDI.

3 Interestingly, they found no significant effects when the acquiring firm was from Japan, the United Kingdom, Norway, Denmark, Netherlands, Luxembourg or Switzerland.

2.2.2 Indirect effects

Inward FDI is also expected to contribute to indirect effects, i.e. effects on other firms in the recipient country. Apart from spillovers into R&D and technology within the acquired firm, there can also be spillovers that affect the surrounding environment and other competing firms. An acquisition of a firm that leads to productivity increases and technological advancements will most likely lead to increasing competition within that industry, which would either increase the productivity within the industry (Alfaro and Chen, 2018; Haskel, Pereira, and Slaughter, 2007) or cause firms to disappear from the market (Melitz, 2003; Aitken and Harrison, 1999). On the one hand, knowledge can be spread from foreign-owned firms to other firms in the same industry or region, so-called knowledge spillovers. On the other hand, an incoming FDI can force other firms to make their production more efficient; then the foreign investment will also contribute to better competition in the market (Helpman, Melitz, and Yeaple, 2004).

3 Foreign-owned firms in Sweden

Key take-aways

Swedish firms owned by European or North American manufacturing firms have increased their total factor productivity (TFP) over time, whereas manufacturing firms from Russia and the Asian economies have little to no growth in TFP.

Geographical distance and bilateral relations are important factors for foreign acquirers, as evidenced by the most common foreign owners of firms in Sweden.

Acquisitions from China, India, Japan and the UK are typically horizontal investments, seeking market access, whilst acquisitions from the EEA, the Nordics, the US and Canada are relatively vertically oriented, implying that the operations in Sweden are integrated in an global value chain.

Foreign-owned manufacturing firms are on average larger than foreign-owned service firms, and Chinese manufacturing firms in particular stand out due to their acquisition of Volvo Cars.

Foreign firms generally acquire Swedish firms that have highly educated employees. Firms from the EEA show the largest share of employees with post-secondary education for both the manufacturing and the service sector.

The EEA and the Nordics have a relatively high real capital per employee, whereas the levels for the US and Canada, Japan and the UK are lower.

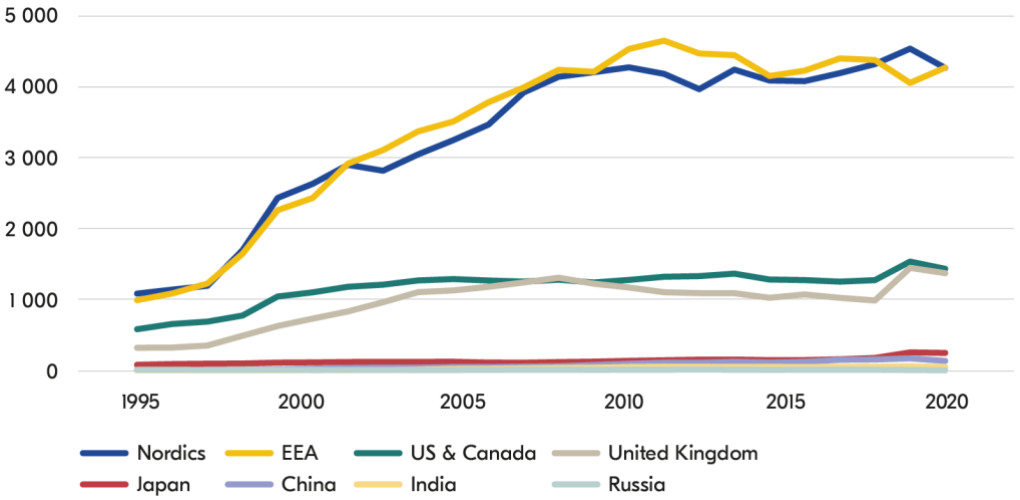
3.1 Where do foreign multinationals in the Swedish economy originate from?

3.1.1 Foreign presence in Sweden

The most common owners of foreign firms in Sweden are the Nordics and the EEA, each representing over 4000 firms in 2020 (Figure 1).[4] The sharpest increase occurred in the early 2000s until 2010. Since this time, the number of foreign-owned firms in Sweden has been increasing at a much slower pace. For example, firms from the United Kingdom as well as US and Canadian firms have been stagnating, with the exception of a spike in 2019. However, firms from these regions comprise around 97 per cent of the foreign business landscape in Sweden (Figure 2), suggesting that geographical distance and bilateral relations are important factors when acquiring foreign entities.

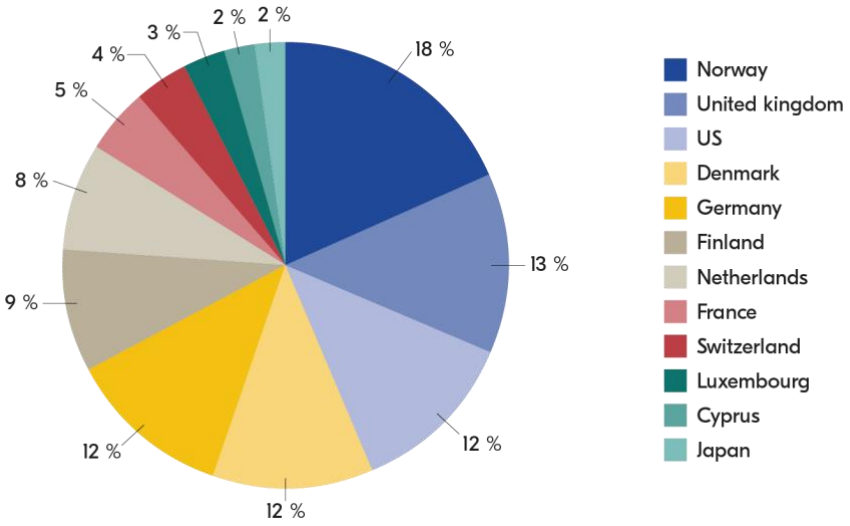
[4] The geographical classification is the Nordics, the European Economic Area (EEA) (excluding the Nordics), the United Kingdom, US and Canada, China and Hong Kong, India, Japan and Russia. These regions are chosen for geographical and geopolitical considerations, as well as with regards to data constraints. Note that Russia contains limited observations throughout the analysis and will therefore not be discussed in detail.

Figure 1. Number of foreign firms in Sweden from 1997–2020



Note: Authors' calculations based on data from Statistics Sweden

Figure 2. Presence of foreign MNEs in Sweden in 2020, 12 most frequent countries of origin



Note: The data has been retrieved from the Swedish Agency for Growth Policy Analysis

3.1.2 Sectoral analysis of foreign-owned firms in Sweden

Foreign-owned firms are divided based on their ownership and main activities, as reported by their industry code (SNI).[5] Their presence in the different sectors is shown in Figure 4. Most foreign acquisitions occur in the service sector (Figure 3). This corresponds with the overall business landscape in Sweden.[6] Within the service sector, foreign ownership is heavily concentrated on a few sectors: wholesale and retail trade, financial and real estate activities, professional and administrative activities, manufacturing, and information and communication (Figure 4). This aligns with a report from the Swedish Agency for Growth Policy Analysis (2022), stating that 78 per cent of foreign-owned enterprises in Sweden in 2020 belonged to the service sector, compared to nine per cent for the manufacturing sector.[7]

EEA and the Nordics are especially prominent in the manufacturing sector compared to other regions. For example, firms from the UK, US, and Canada appear to have a stronger presence in various service sectors. In the US and Canada, wholesale and retail dominate, while in the UK, professional and scientific activities are the largest sector. Additionally, Japanese and Chinese firms also maintain a notable presence in these areas.

China has publicly emphasized the importance of firms investing abroad, and the objective is to connect to global value chains, acquire advanced technology and necessary know-how, and gain access to attractive brands. Thus, there is a strong strategic state-led intent behind many Chinese acquisitions, not least regarding the technology areas listed in the industrial plan *Made in China 2025* (Swedish Defence Research Agency, 2019; 2023).

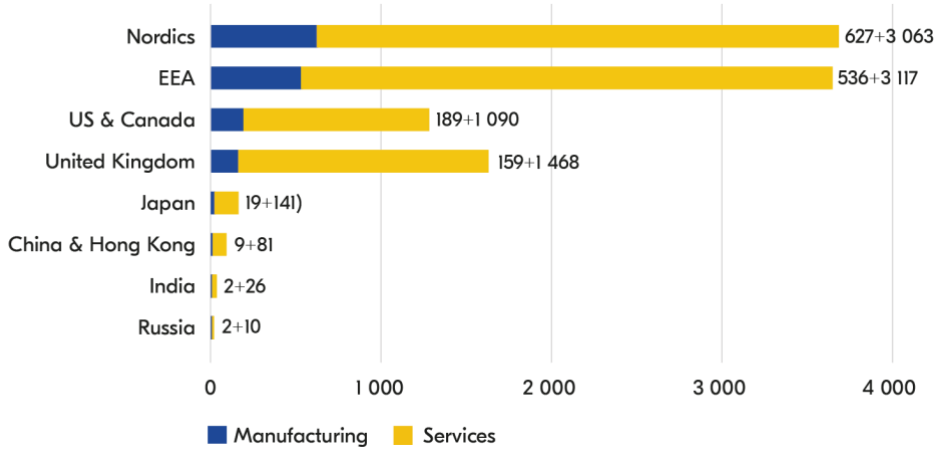
---

5 The Swedish Tax Authority is responsible for collecting firms' industry codes reported by the firms themselves. Firms can commit to several activities other than their reported activity. A complete list of the sectors covered can be found in the Appendix.

6 Foreign acquisitions in the agriculture sector are not included in this figure as they only amount to 51 acquisitions in the period studied.

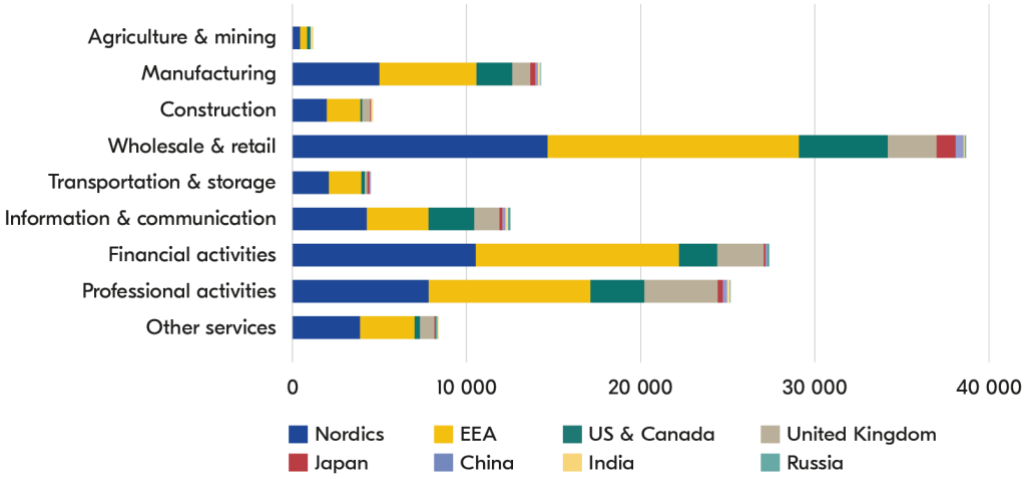
7 The rest consists of agriculture, mining, fishing and forestry.

Figure 3. Number of acquisitions in manufacturing and services from 1997–2020



Note: Authors' calculations based on data from Statistics Sweden

Figure 4. Number of foreign-owned firms (mean) divided by sector, from 2008–2020



Note: Author's calculations based on data from Statistics Sweden

3.2 Characteristics of foreign-owned firms in Sweden

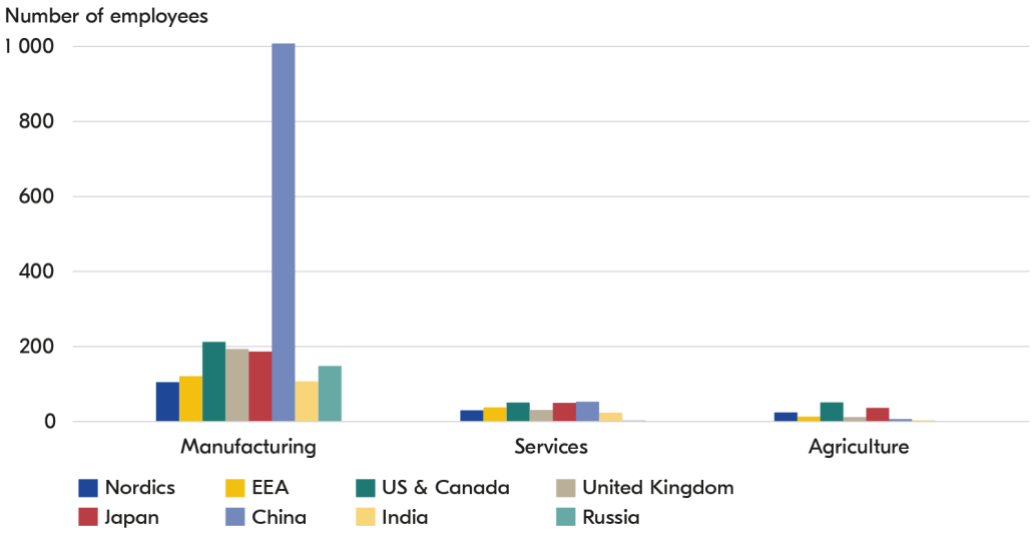
In this section we will analyse firm size, share of employees with post-secondary education, real capital per employee, share of exports to home country, and total factor productivity. The purpose of presenting these statistics is to gain an understanding of how, in aggregate, foreign firms differ from one another depending on their country of origin, and whether there are certain implications that can possibly be linked to productivity effects following an acquisition.

For each region, statistics for the entire period (1997–2020) are presented. Note that these statistics are merely averages, and therefore do not take account of key characteristics behind individual data points.

3.2.1 Firm size

Manufacturing firms are on average larger than service firms (Figure 5). China and Hong Kong stand out with a very large average firm size in manufacturing, largely driven by Geely Holding's acquisition of Volvo Cars in 2010.[8] Other than this, manufacturing firms from the United Kingdom, Japan and the US and Canada are also relatively large.

Figure 5. Average firm size



Note: Author's calculations based on data from Statistics Sweden

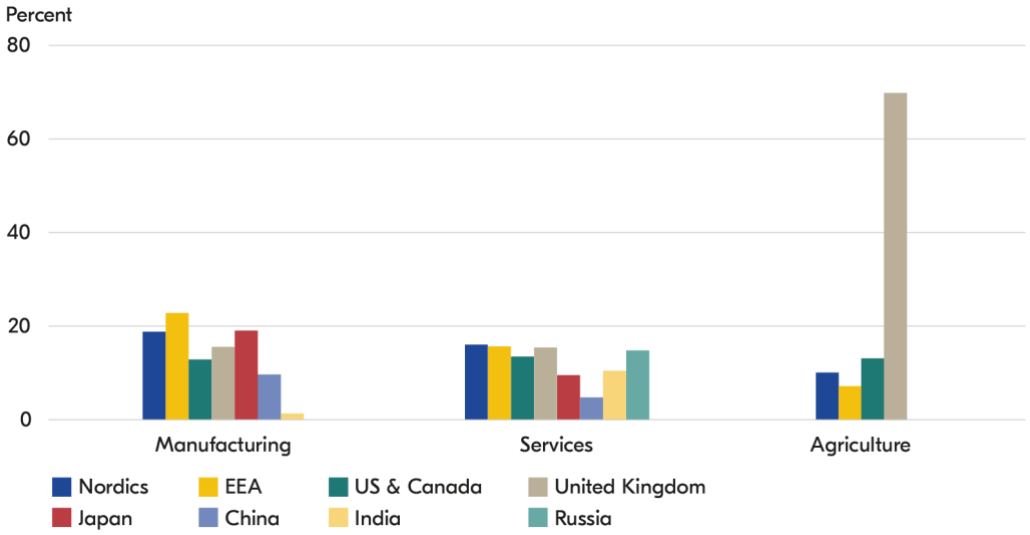
3.2.2 Educational level

Figure 6 illustrates the proportion of employees with post-secondary education in foreign-owned firms in Sweden, categorized by ownership. This metric reflects the operational quality of firms from various countries active in Sweden. Overall, foreign firms often acquire businesses with a high percentage of educated employees. Firstly, firms from the EEA have the largest share of employees with post-secondary school education in the manufacturing sector. Nordic and Japanese manufacturing firms also have a large share of highly educated employees, followed by American firms.

Chinese firms in the manufacturing sector also have a high proportion of highly educated employees, likely influenced by Geely Holding's acquisition of Volvo Cars in 2010, as Volvo Cars employs numerous engineers for its R&D activities. When it comes to services, Chinese enterprises in Sweden are heavily engaged in research and development (R&D) activities as 22 per cent of R&D expenditure from foreign-owned firms in 2021 in Sweden came from Chinese firms (Swedish Agency for Growth Policy Analysis, 2021).

[8] Geely Holding is also a large shareholder in Volvo Trucks, but Volvo Trucks is a Swedish MNE in this regard.

Figure 6. Share of employees with post-secondary school education



Note: Author's calculations based on data from Statistics Sweden

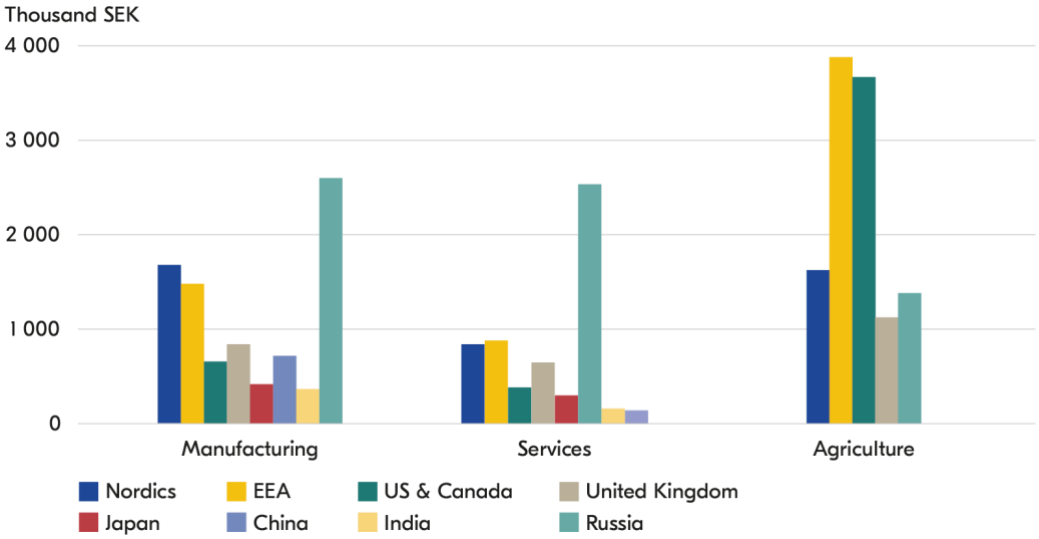
3.2.3 Real capital per employee

Real capital refers to physical, tangible assets that contribute directly to production within a firm, such as machinery, buildings or land. The real capital per employee can be seen as a measure of capital intensity. A low real capital per employee signals that such firms often operate in the service sector, where labour is used as an input to a larger extent. A combination of high real capital and a large share of highly educated employees indicates that firms operate within high-tech production.

The EEA and the Nordics have a relatively high real capital per employee (see Figure 7). Nordic and European firms have on average a smaller share of highly educated employees and fewer employees compared to the average, while there are a significant amount of firms from these regions operating in Sweden. Thus, firms from the EEA and the Nordics seem to be predominant in the manufacturing sector, performing less advanced operations. Also, fewer employees in firms will generate larger values when calculating real capital per employee.

The US and Canada, Japan and the UK show a lower real capital per employee in both the services and the manufacturing sector. China and Hong Kong have relatively lower real capital per employee in the manufacturing sector. This could be because the average Chinese firm size in manufacturing is much larger than the other regions, which negatively impacts the value of real capital per employee. China and Hong Kong also show a significant share of highly educated employees, an indication that firms from these regions typically engage in high-tech production.

Figure 7. Real capital per employee (Thousand SEK)



Note: Author's calculations based on data from Statistics Sweden
Note: Real capital is the book value of buildings, machinery and equipment and is measured in thousands of SEK

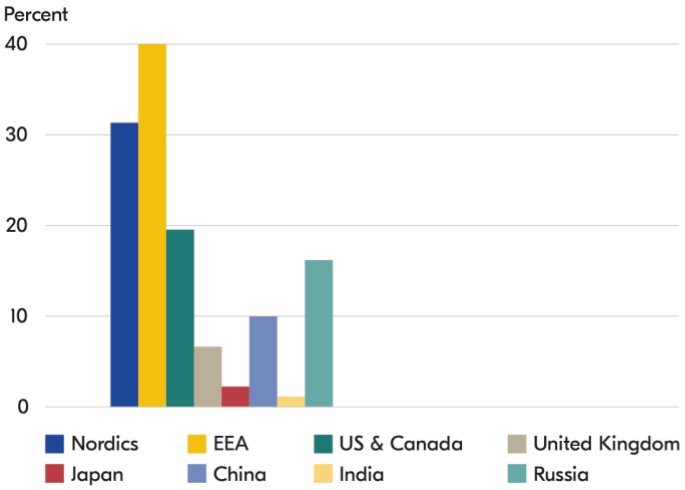
3.2.4 Share of exports to home country

The share of home exports (Figure 8) indicates whether there is a large share of vertical investments, to the extent that operations in Sweden are part of a value chain. Conversely, a relative lower share of exports to its region of origin would imply that the investments are horizontal. It is assumed that exports from Sweden will be larger to regions that are geographically close to Sweden. This reduces the possibility of interpreting the effect of vertical or horizontal investments for investors that are based close to Sweden, as is the case with the EEA and the Nordic regions. However, it is worth noting that foreign-owned firms from the EEA and the Nordic countries are also large aggregate exporters from Sweden (Figure 9).

Chinese firms are an example of a below-average share of exports to their home territory. 10 per cent of total exports from Sweden go back to China or Hong Kong (Figure 8). The total value of exports from Chinese firms in Sweden in 2020 was approximately the same as American and Canadian firms, about SEK 100 billion (Figure 9). This is quite exceptional considering how many more American firms there are in Sweden compared to Chinese firms. Thus, Chinese investments are horizontal to a larger extent.

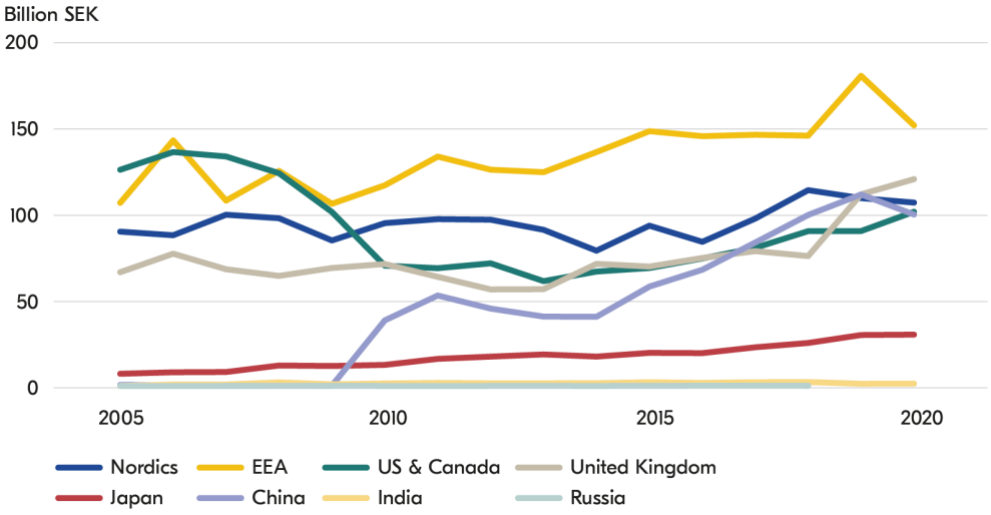
UK firms only export 7 per cent of their exports back to the United Kingdom, even if they are the second largest exporter after EEA-owned firms. Thus, much like firms from China and Hong Kong, British firms in Sweden are relatively export oriented and tend to export a large share to other markets than to their domestic market. In comparison, the US and Canada on average have a similar number of firms in Sweden as the United Kingdom (Figure 1), their respective total exports from Sweden are similar, but investments from the US and Canada are seemingly more vertically oriented, whilst investments from the United Kingdom are rather horizontally integrated.

Figure 8. Share of exports to home country from foreign-owned firms in Sweden



Note: Author's calculations based on data from Statistics Sweden

Figure 9. Total exports from foreign-owned firms in Sweden (Billion SEK)



Note: Author's calculations based on data from Statistics Sweden

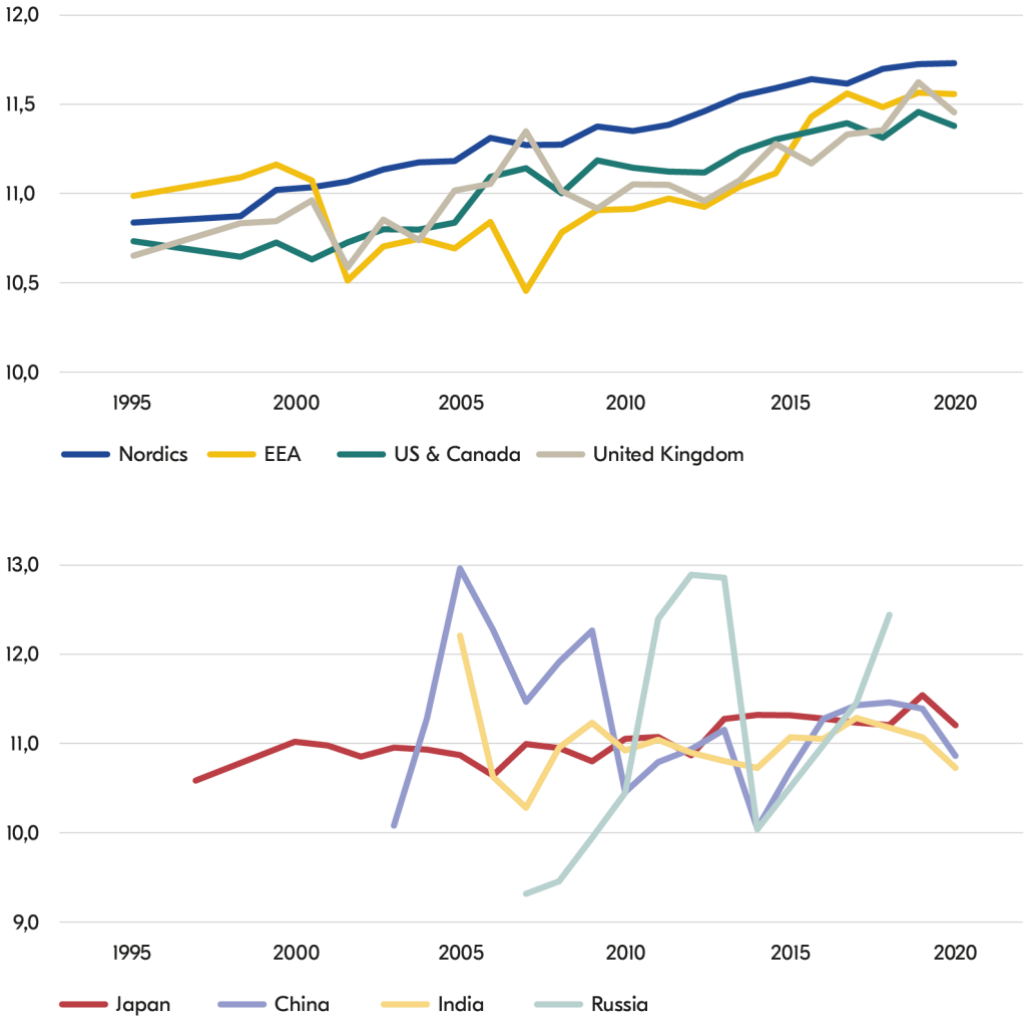
3.2.5 Total factor productivity

Total factor productivity (TFP) reflects how effectively inputs are combined to achieve a certain level of output, and captures effects such as technological advancement, changes in management practices, and other factors that affect overall efficiency. For example, if a firm introduces a new technology that allows for more production while using the same amount of labour and capital, this will lead to an increase in TFP, but not necessarily an increase in labour productivity.

Figure 10 below shows TFP in the manufacturing sector. Firstly, TFP has grown considerably for firms from the Nordics, the EEA, the US and Canada, and the UK (Panel A). In 2020, manufacturing firms from these regions were generally more

productive than manufacturing firms from the countries in Panel B. For the firms from Japan, China, India, and Russia (Panel B) there has been less growth in TFP. The reason for this is hard to determine, but it could be that firms from these countries generally have other motives when acquiring firms abroad, such as market-seeking rather than technology- or strategic asset-seeking (See 2.1.2).

Figure 10. TFP in the manufacturing sector, 1997–2020

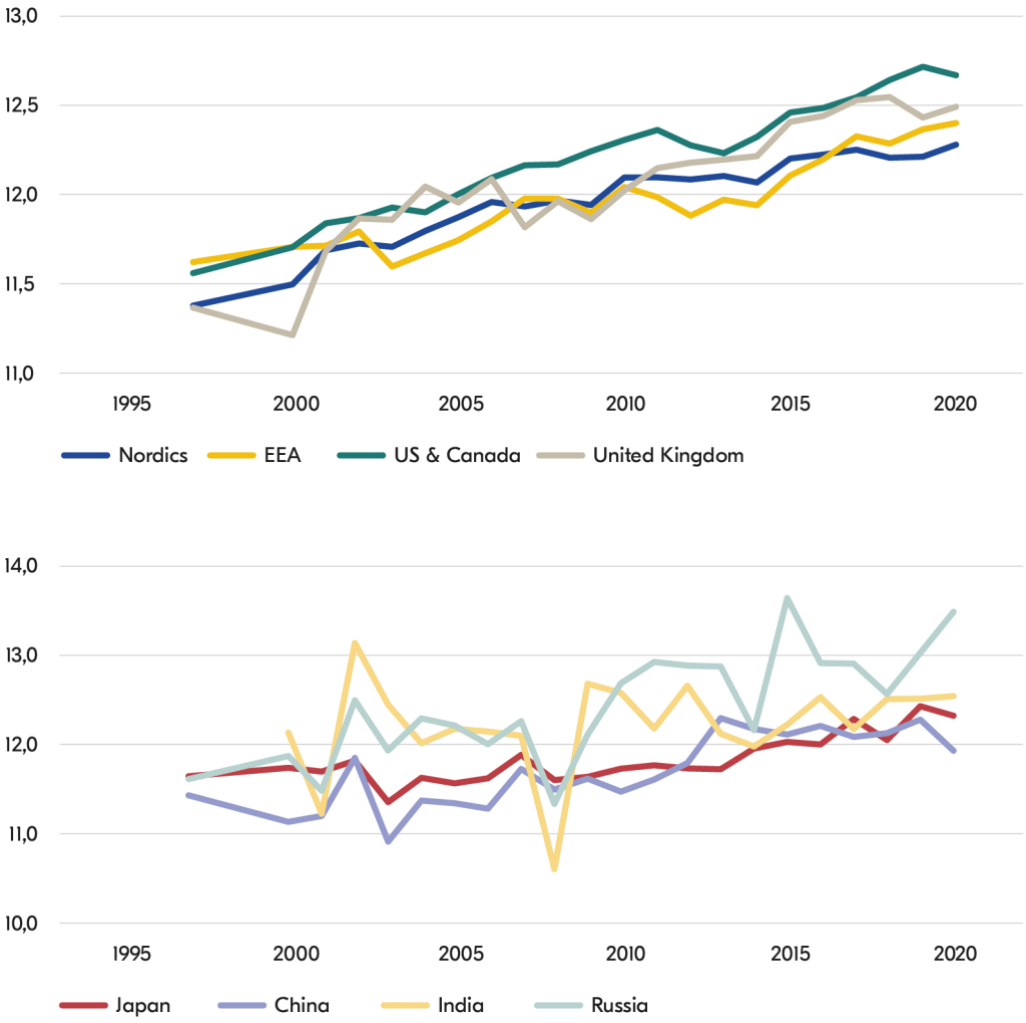


Note: Author's calculations based on data from Statistics Sweden

In the service sector (Figure 11), a less pronounced pattern is found. Foreign-owned firms in the Swedish service sector seem to be more equally productive over time compared to foreign-owned manufacturing firms.

Foreign-owned firms are expected to be more productive than Swedish firms since theory (see 2.1.1) would suggest that firms that seek to expand their business abroad must be efficient enough to adapt to new markets and business cultures, as well as to cover the costs of new facilities. Figures 10 and 11 suggest that the origin of a foreign firm matters for the level of TFP, as well as the growth of TFP.

Figure 11. TFP in the service sector from 1997–2020



Note: Author's calculations based on data from Statistics Sweden

3.3 Which firms are the targets of foreign acquisitions?

Quick take-aways

Factors that increase the likelihood of foreign acquisition

- Share of employees with post-secondary school education
- Total factor productivity
- Firm size (exception: the Nordics and India

Factors that do not affect the likelihood of foreign acquisition

- Profit ratio (exception: China and Hong Kong)
- Export intensity (exception: Russia)

This section will build on the previously presented descriptive analysis of the characteristics of foreign-owned firms in Sweden, and further explore whether firms, depending on their origin, acquire firms with certain characteristics. For this purpose, a probit model is used to analyse which factors and to what extent such factors affect the likelihood of a Swedish firm being acquired by a foreign MNE. In the model, the dependent variable takes the value 1 if a firm is acquired in that year, and 0 if a firm is domestic. Table A2 in the Appendix presents the results of the estimates on firm-level data, including acquisitions between 2000 and 2020. Note, however, that this is not the main method of this paper; it is merely an analysis to further investigate what characteristics of Swedish firms are the most attractive to foreign MNEs. The main results are presented in Section 5.

The coefficient estimates for TFP are positive and significant for all regions. This indicates that Swedish firms that are relatively productive will have a higher likelihood of being acquired by an MNE. This argument coincides with the cherry-picking theory, that foreign firms acquire the most efficient domestic firms, something that several studies have identified (Alfaro and Chen, 2018; Swedish Agency for Growth Policy Analysis, 2020).

Profit ratio is insignificant for most regions, but for China and Hong Kong the results are negative and significant. This indicates that higher profitability of a Swedish firm reduces the likelihood of it being acquired by a Chinese firm. There are some potential explanations for this. Firstly, a highly profitable domestic firm with a strong market position or competitive advantage might be perceived as having little potential for further growth, making foreign firms less inclined to acquire it. It could also be that a domestic firm with large profits may be expensive to acquire, making it less attractive to foreign firms if the asking price is too high relative to the potential benefits of the acquisition. As previously mentioned in Section 3.2.3, Chinese MNEs often target financially struggling Western firms that have a well-developed knowledge base as part of their industrial strategy *Made in China 2025*. This was the case when Zheijang Geely acquired Volvo Cars (Budryk, 2024).

Export intensity has no significant impact on the probability of acquisition, implying that exports are not of essential relevance to the acquiring firm. This is true for all regions, except Russia. However, this does not rule out the fact that the acquirer does

not have any objectives of internationalisation after the acquisition. It might be that foreign ownership increases the opportunity of expanding abroad.

The coefficient estimates for the share of skilled labour are positive and significant for all regions, suggesting that an increase in the share of skilled labour in Swedish firms increases the probability of these firms being acquired by foreign firms. MNEs may view the acquisition of such firms as an opportunity to access knowledge and technology, which could enhance their own competitiveness in the market. The share of skilled labour in Swedish firms seems to be particularly important to firms from China and Hong Kong, the United Kingdom, and the US and Canada.

Finally, firm size is positive and significant across all regions, except Nordic and Indian MNEs, indicating that larger firms are more likely to be acquired by foreign firms. Larger firms may have greater resources, capabilities and market presence, potentially making them more attractive to foreign investors. Furthermore, larger firms may have economies of scale and strong consumer bases, which further increase the interest from foreign firms. This suggests that a key motive for foreign ownership in Sweden is market-seeking.

To sum up, the most attractive characteristics of Swedish firms for foreign MNEs seems to be the share of skilled labour. Foreign firms often seek business opportunities in high-income countries where the technology level is high and the access to skilled labour is favourable. From an international perspective, Sweden is one of the EU countries that invests the most in R&D (Swedish Agency for Growth Policy Analysis, 2021). Thus, one of the main factors that makes Sweden an attractive country to invest in is the highly qualified and skilled workforce that can work in R&D.

Probit results in relation to the theory on FDI

When foreign firms buy large firms in Sweden that have high productivity, profitability and a large share of highly educated, three of Dunning's four motives for FDI may be relevant:

Strategic-asset-seeking: Since foreign firms are interested in accessing advanced technology, expertise and knowledge of Swedish firms, its highly educated labour force and productivity make these firms attractive as strategic assets.

Efficiency-seeking: The productivity and profitability of Swedish firms indicate that foreign firms seek to improve their efficiency and competitiveness by integrating these high-performing operations into their global structure.

Market-seeking: If Swedish firms also have a strong market position in Sweden or in the Nordics, the acquisition may also be motivated by a desire to access these markets. This would allow foreign firms to strengthen their presence in the region and better serve the local customer base.

4 Method

This chapter introduces the empirical strategy of our report and the motivation behind choosing the strategy in question. Readers mainly interested in the results of the analysis can skip this section without missing any important information. For a more comprehensive and detailed discussion of the method, see Section 7.4 of the Appendix.

4.1 Event study analysis

An event study is often used to analyse the impact of a specific event or policy change. For this report, the acquisition of a Swedish firm by a foreign-owned enterprise is the event in focus. The event is also known as a *treatment*; thus, the treatment effect in this paper is the impact that a foreign acquisition has on a Swedish firm's productivity.

To estimate the treatment effect in standard event studies, units (Swedish firms) are divided into two groups: the first group contains units that have received treatment (been acquired by a foreign enterprise), and the second group contains units (firms) that have not been treated (remained Swedish-owned) during the entire period of study. Since the second group was never treated, it will function as our control group, meaning the productivity of firms can be compared between the two groups to distinguish and isolate any effects stemming from an acquisition.

However, this standard version of an event study does not account for any potential heterogeneity in treatment effects over time. In standard event studies, the treatment is often assumed to be constant over time and across firms. When treatment effects vary over time, this could result in incorrectly estimated treatment effects.[9] The estimated treatment effects may vary for different treatment years, where acquisitions that took place during the financial crisis in 2008 may be fundamentally different from those acquisitions that took place in 2017, for example.

Thus, using a standard event study approach might result in misleading estimates, as it does not account for heterogeneous treatment effects. The event study proposed by Sun and Abraham (2021) has therefore been chosen for the purpose of this paper. By introducing a dynamic model that captures both time and individual-specific effects, Sun and Abraham's (2021) approach capture the heterogeneity in treatment responses that standard methods overlook. Furthermore, their two-step estimation procedure, involving individual-level treatment effect estimation followed by aggregation, ensures robust and efficient inference.[10]

---

[9] See Roth et al. (2023) for a discussion of the potential issues with the standard version of an event study.

[10] See Appendix section 7.4 for a detailed description of the model.

4.2 Data

The data we use has been retrieved from a comprehensive database provided by Statistics Sweden. The database contains detailed data on firms and individuals, all of which are connected through unique serial numbers. Specifically, we use a dataset on structural business statistics, trade statistics, and a dataset with information about the educational level of firms' employees. By combining this firm-level data with data on foreign ownership of firms provided by the Swedish Agency for Growth Policy Analysis, we are able to construct a detailed and extensive dataset for this analysis.

Structural business statistics (FEK) contain information about characteristics such as a business' profitability, growth, development, finance and production. It includes all active firms that are actively operating in Sweden, regardless of their legal form. A firm is considered active if it has paid taxes for employed staff, paid VAT or F-tax.[11]

Labour statistics based on administrative sources (RAMS) describe employment in the form of paid work. The statistics provide a comprehensive picture of the labour market status of the population aged 16 to 74 years. The statistics are based on a register from the Swedish Tax Authority that contains background information on the persons, their workplace, and their educational level.

The statistics of Sweden's foreign trade in goods is broken down by country, firm and type of goods classification. The combined nomenclature (CN) provides the most detailed level. The statistics provide information on net weight and the value of goods.

Statistics on the foreign ownership of firms in Sweden are from the Swedish Agency of Growth Policy Analysis, as mentioned above. The statistics contain information about foreign firms operating in Sweden, and their nationality. The nationality is decided based on the residence of the ultimate owner. A firm is foreign owned if more than 50 per cent of voting rights belong to one or more foreign owners.

[11] Since 2003, inactive firms holding real estate in the amount of at least SEK one million in assessed value are included as real estate firms. Inactive firms with at least one operating subsidiary are included as holding firms.

5 Results

Quick take-aways

When Swedish firms are acquired by firms from the European Economic Area (EEA), the Nordics, the UK, the US and Canada, or Japan, productivity increases. However, there are **no** significant effect on productivity following Chinese or Indian acquisitions of Swedish firms.

This chapter presents the results of the event study analysis. The first section discusses productivity effects on Swedish firms acquired by firms from the EEA, the Nordics, the UK, and the US and Canada. Henceforth, we will refer to these regions as Europe and North America. The second section presents the productivity effects on Swedish firms acquired by firms from Japan, India, and China and Hong Kong. These countries will henceforth be referred to as the Asian economies. Russia has been excluded from this part of the analysis due to there being too few acquisitions. The plotted point estimates from the event studies are reported in Figures 13–14.[12] More specifically, the figures show a year-on-year comparison of productivity between acquired and non-acquired firms before (t-) and after (t+) the acquisition.

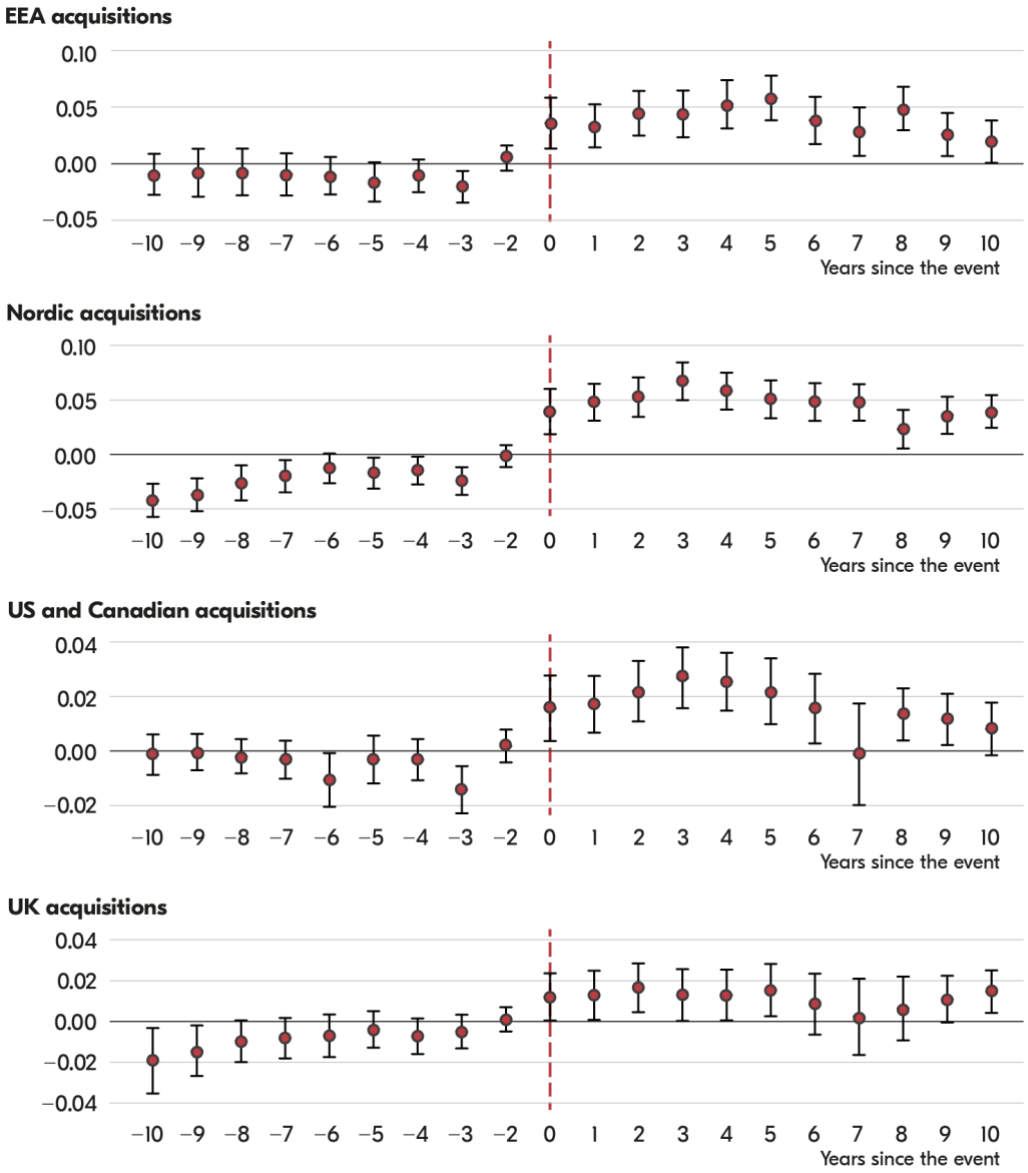
5.1 Europe and North America

Figure 12 below is the event for (1) EEA, (2) the Nordics, (3) the UK and (4) the US and Canada. For all regions, we see an increase of productivity in the acquired firms. This in line with both the theory of multinational firms and the extensive empirical research in this area (Chapter 2).[13] The immediate effect on productivity on the acquired Swedish firms may possibly be explained by an immediate transfer of knowledge, management, or patents from the acquirer to the acquired firm in combination with direct access to new markets and foreign subcontractors.

[12] When the vertical bars, representing the confidence intervals, cross the horizontal zero line, the parallel trends assumption is met.

[13] An important caveat is that we only analyse the effects on firms that survive at least three years after an acquisition. There is thus a risk that we may overestimate the impact of acquisitions.

Figure 12. Event study results, Europe and North America



Note: Shown coefficients are leads and lags (treatment occurs at '0'). Response variable is Total Factor Productivity. Control group: never-treated.

Another result from Figure 12 is that the magnitude, i.e. how much productivity is increased by the acquisitions, differs greatly depending on the source of the FDI. Based on the country breakdown in our report, we find that FDI from the EEA leads to the largest productivity gains and that the effect remains significant and positive. However, these results need to be interpreted with some caution due to the significant trends before the acquisition. There might be external factors or concurrent events that only affect the treated group that are not captured in this analysis that cause significant

pre-trends.[14] For the other regions, we see mostly significant pre-trends, which means that there is no significant difference in productivity between the firms that are subsequently acquired and the firms that are never acquired.[15]

In summary, the results of the event analysis and the probit (in Chapter 3) indicate that FDI flows from European and North American economies are largely driven by efficiency gains and strategic-asset acquisitions.[16] These motives underline the importance of FDI as a tool for firms in advanced economies to remain competitive in the global market. If the reason for these direct effects is the transfer of knowledge from a foreign owner to an acquired firm, there may also be indirect effects of the foreign acquisitions in Sweden that generate positive spillovers.

5.2 The Asian economies

As there are too few Russian acquisitions, we chose to exclude them from this analysis. For the Asian economies' acquisitions, we only find positive significant effects for Japan (Figure 13). The absence of positive effects for China-Hong Kong and India may be due to the fact that the number of acquisitions from these countries is very low and that our methodology requires a sufficiently large sample to estimate the exact effects.

However, it is also likely that firms from countries further away from the European market tend to prioritize market-seeking acquisitions to a greater extent. Furthermore, the results suggest that the ownership-specific advantages are lower in firms from these countries and that acquisitions are focused on exploiting the acquired firm's ownership advantages instead, i.e. that strategic asset-seeking is also a likely motive. This would be in line with what is suggested by Nicolas and Tomsen (2008), that Chinese investment in Europe or North America is more likely to be market or strategic asset-seeking. This is similar to the findings of Karolyi and Liao (2017), who examine government-controlled acquisitions and find that such investments are more motivated by acquiring strategic assets such as advanced technology or entering new markets. The Swedish Defence Research Agency (2019) also suggests that the motive behind Chinese investment in Sweden is often to acquire expertise within high-tech industries and services, so-called technology-seeking FDI.

Finally, the Japanese investments in our data differ from those in the other Asian countries. Productivity is certainly higher after the acquisitions, although the magnitude is rather weak. We would have expected Japanese investment to lead to effects on a par with those from Europe and North America because Japan has a high

---

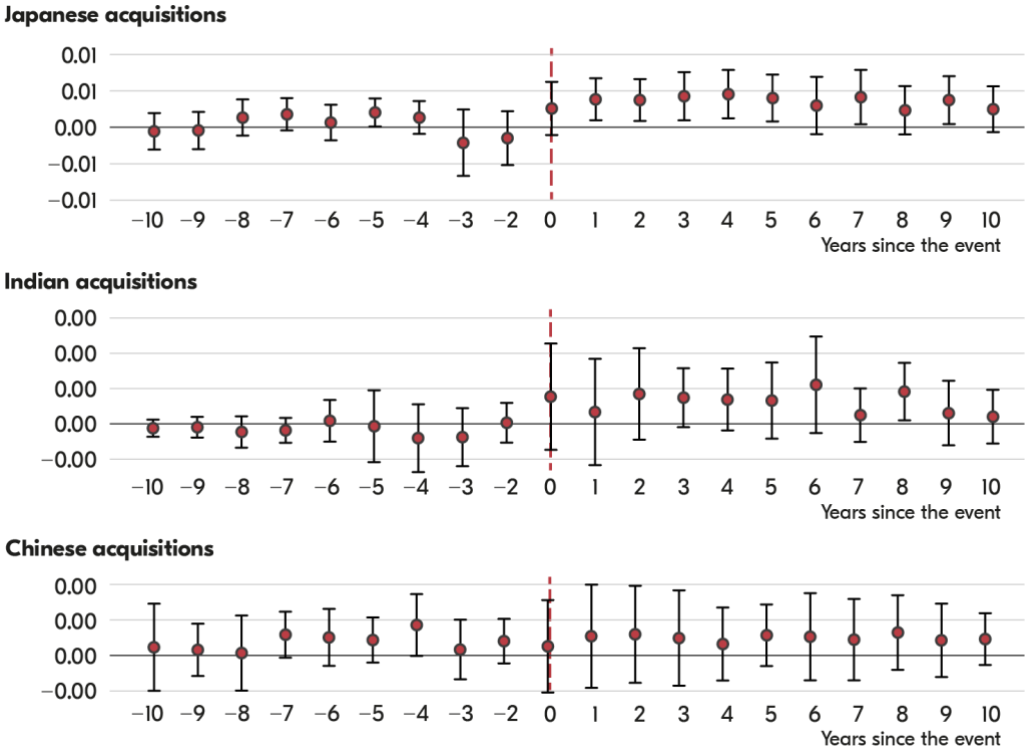
[14] Model misspecification or insufficient control variables can also lead to unexpected pre-event estimates.

[15] An important criterion for drawing any conclusions about the relationship between foreign acquisitions and increased productivity is that the firms that become foreign owned had roughly the same productivity as non-acquired firms before the acquisition, i.e. parallel trends. Problems may arise if the acquisitions have influenced the outcome before it occurs (so-called pre-trends). If we find such pre-trends before the event, this is taken as evidence against the strict exogeneity of the event and it becomes difficult to argue that productivity rose because of the foreign acquisition.

[16] The strategic asset motive that we found in Chapter 3 is sometimes also called "technology sourcing", i.e. the motive for the acquisition is to gain access to new knowledge and technology.

proportion of highly educated people and has great advantages in high-tech industries. At the same time, we cannot exclude that the low magnitude can be partly explained by our chosen methodology which seems sensitive to the number of firms in the treatment group.[17]

Figure 13. Event study results for the Asian economies



Note: Shown coefficients are leads and lags (treatment occurs at '0'). Response variable is Total Factor Productivity. Control group: never-treated.

[17] This has proven to be consistent in our analysis. The fewer firms in the treatment group, the lower the magnitude.

6 Conclusion

Foreign direct investment generally leads to positive effects on the acquired firms, but we find that the results vary depending on the origin of the parent firm. Acquirers are often large multinational corporations employing a significant number of people, which substantially contributes to the Swedish economy.

In accordance with theory of industrial economics, the results of the event study analysis indicate that productivity in Swedish firms increases when they are acquired by firms originating in the European and North American economies. These positive effects can be explained by the transfer of advanced technical knowledge, managerial skills and the international presence of the foreign parent. Conversely, no significant productivity effects have been identified for acquisitions originating in India or China. In contrast, we find weak but persistent productivity effects for investments from Japan. Motives and the degree of technology may be explanatory factors behind these results.

These findings are further substantiated by the descriptive analysis of TFP (see Section Total factor productivity 3.2.5) which showed a marked increase in productivity in European and North American firms, especially across the manufacturing sector. In contrast, firms from Russia and the Asian economies showed little, if any, productivity growth over the analysed period, highlighting a pronounced divergence in performance trajectories between these two groups. This suggests that the origin of a foreign firm matters for both the level and the growth of TFP.

The probit results suggest that although foreign firms, irrespective of their origin, tend to acquire Swedish firms that are relatively productive, there is a deviation in productivity that emerges over time following the acquisition. The discrepancy between Russia and the Asian economies on the one hand, and the European and North American economies on the other, suggests that firms, depending on their country of origin, may have different motives for acquisitions and different impacts on the acquired firm, or both. Firms from the Nordic and European economies, being geographically and economically closer to Sweden and the broader European market, may pursue investments that are relatively more vertically oriented and efficiency-seeking. In contrast, firms from the Asian economies, being more distant from the European market, are likely to prioritise investments that are market-seeking or aimed at acquiring strategic assets, which may not result in productivity gains for the acquired firm to the same extent. *Made in China 2025* is an example of such an investment strategy.

As highlighted in *The Future of European Competitiveness* by Mario Draghi (2024), Europe is grappling with a pronounced deceleration in productivity growth, a trend that poses significant challenges to long-term economic resilience. As the EU enters an era in which growth is not expected to be supported by rising populations, productivity becomes an increasingly critical determinant of sustainable growth. Concurrently, the EU faces a series of new investment needs, such as the digital transformation and the green transition, necessitating financing through high growth rates. As outlined above, FDI is a vital mechanism in this context given its intrinsic added value for productivity as it not only constitutes an inflow of capital but also of

technology, managerial expertise and global market integration. Therefore, creating an environment that attracts and retains FDI should be a strategic priority.

To conclude, as foreign-owned firms tend to be more productive and often aim to increase their operational efficiency in domestic firms, this report underscores the crucial role of FDI in boosting productivity, a key driver of economic growth.

References

Ackerberg, D. A., K. Caves, and G. Frazer (2015). Identification properties of recent production function estimators. *Econometrica*, 83, 2411–2451.

Aitken, Brian J. & Ann E. Harrison (1999). Do domestic firms benefit from foreign direct investment? Evidence from Venezuela. *American Economic Review*, 89 (3), 605–618.

Alfaro, Laura & Maggie X. Chen (2018). Selection and Market Reallocation: Productivity Gains from Multinational Production. *American Economic Journal: Economic Policy*, 10 (2), 1–38.

Alfaro, Laura, Areendam Chanda, Sebnem Kalemli-Ozcan & Selin Sayek (2010). Does Foreign Direct Investment Promote Growth? Exploring the Role of Financial Markets on Linkages. *Journal of Development Economics*, 91(2), 242–256.

Antràs, Pol, and Stephen R. Yeaple. Multinational firms and the structure of international trade. *Handbook of international economics* 4 (2014): 55–130.

Bandick, Roger, Holger Görg & Patrik Karpaty (2014). Foreign Acquisitions, Domestic Multinationals, and R&D. *Scandinavian Journal of Economics* 116, (4), 1091–1115.

Bandick, Roger (2011). Foreign acquisition, wages and productivity. *The World Economy*, *34*(6), 931-951.

Bernard, A. B., Jensen, J. B., Redding, S. J. and Schott, P. K. (2018). Global Firms. *Journal of Economic Literature*, 56(2), 565–619.

Blomström, Magnus and Ari Kokko (1998). Multinational Corporations and Spillovers. *Journal of Economic Surveys*, 12(3), 247–277.

Blomström, Magnus, Robert E. Lipsey, and Mario Zejan (1994). What Explains the Growth of Developing Countries? In W. J. Baumol, R. R. Nelson, & E. N. Wolf (Eds.), *Convergence Productivity: Cross-National Studies and Historical Evidence*, pp. 243–259. Oxford University Press.

Budryk, Michal (2024). From the World's Factory to the Middle Kingdom China's Changing Geopolitical and Geoeconomic Role. In Christopher Weidacher Hsiung, Cecilia During, Oscar Almén, Ivar Ekman, Peter Stenumgaard, and Annica Waleij (Eds.), *Strategic Outlook 10 – China as a Global Power*, pp. 39–43. Swedish Defence Research Agency.

De Backer, Koen, Sébastien Miroudot & Davide Rigo (2019). Multinational enterprises in the global economy: Heavily discussed, hardly measured. Available at: https://cepr.org/voxeu/columns/multinational-enterprises-global-economy-heavily-discussed-hardly-measured [Retrieved April 2024].

Draghi, Mario (2024). The Future of European Competitiveness – A competitiveness strategy for Europe. *European Commission*, September 2024.

Driffield, Nigel, Katiuscia Lavoratori, & Yama Temouri (2021). Inward investment and UK productivity. Working Paper No. 14, UK Productivity Institute.

Dunning, John H., and Sarianna M. Lundan, (2008). *Multinational enterprises and the global economy*, 2nd edition, Edward Elgar Publishing.

Dunning, John. H. (1977). Trade, Location of Economic Activity and the MNE: A Search for an Eclectic Approach. In: Ohlin, B., Hesselborn, P.O. and Wijkman, P.M., Eds., *The International Allocation of Economic Activity*, 395–418. MacMillan, London.

Ekholm, Karolina, Rickard Forslid, & James R. Markusen (2007). Export-platform foreign direct investment. *Journal of the European Economic Association*, 5(4), 776–795.

Goodman-Bacon, Andrew (2021). Difference-in-differences with variation in treatment timing, *Journal of Econometrics*, 225 (2), 254-277.

Grossman, G.M. Helpman, E. (2003). Outsourcing Versus FDI in Industry Equilibrium, Journal of the European Economic Association, 1 (2-3), 317–327, https://doi.org/10.1162/154247603322390955

Haskel, Jonathan, Sonia C. Pereira & Matthew J. Slaughter, 2007. Does inward foreign direct investment boost the productivity of domestic firms? *The Review of Economics and Statistics*, MIT Press, 89 (3), 482–496.

Hejazi, Walid & A. Edward Safarian (1999). Trade, foreign direct investment, and R&D spillovers. *Journal of International Business Studies*, 30, 491–511.

Heyman, Fredrik & Pehr-Johan Norbäck (2013). Utlandsägande och utländska uppköp: Vilken betydelse har huvudägarens hemvist? *IFN Policy Paper nr 61*.

Helpman, Elhanan, Marc T. Melitz & Stephen Yeaple (2004). Export versus FDI with heterogeneous firms. *American Economic Review*, 94 (1), 300–316.

International Monetary Fund (2024). *World Economic Outlook— Steady but Slow: Resilience amid Divergence.* Washington, DC. April.Keller, Wolfgang (2021). Knowledge Spillovers, Trade and FDI. NBER Working Paper 28739.

Karolyi, G. Andrew & Rose C. Liao (2017). State capitalism's global reach: Evidence from foreign acquisitions by state-owned companies, *Journal of Corporate Finance*, vol. 42, 367–391.

Levinsohn, James & Amil Petrin (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies*, 70 (2), 317–341.

Melitz, Marc T. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica*, 71 (6), 1695–1725.

National Board of Trade (2022). Perspectives on the Economic Effects of FDI and Investment Screening. Analysis Report by Jonas Hallberg and Patrik Tingvall.

National Board of Trade (2023). Productivity Effects of Foreign Acquisitions in Sweden: A sectoral analysis. Analysis Report by Patrik Karpaty.

Nicolas, Francois & Stephen Thomsen (2008). The rise of Chinese firms in Europe: Motives, strategies and implications. Paper presented at the Asia Pacific Economic Association Conference in Beijing 2008.

Olley, G Steven & Ariel Pakes (1996). The dynamics of productivity in the telecommunications equipment industry, *Econometrica*, Economic Society, 64 (6), 1263–1297.

Otieno, William & Josiah Aduda (2022). Foreign direct investments and economic growth: a critical literature review. *International Journal of Finance*, 7(3), 34–60.

Roth, Jonathan, Pedro H.C. Sant'Anna, Alyssa Bilinski & John Poe (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*, 235(2), 2218–2244.

Rovigatti, Gabriele & Vincenzo Mollisi (2018). Theory and Practice of Total-Factor Productivity Estimation: The Control Function Approach using Stata. *The Stata Journal*, 18(3), 618–662.

Schiffbauer, Marc, Julia Siedschlag & Frances Ruane (2017). Do foreign mergers and acquisitions boost firm productivity? *International Business Review*, 26 (6), 1124–1140.

Sjöholm, Fredrik (2022). Industrial Policy and Foreign Direct Investment. In Andersson, M., Deiaco, E., and Eklund, J.E. (Eds.), *Swedish Perspectives on Industrial Policy*. Swedish Entrepreneurship Forum, 131–152.

Sun, Liyang & Sarah Abraham (2021). Estimating Dynamic Treatment Effects in Event Studies with Heterogeneous Treatment Effects, *Journal of Econometrics*, 2021, 225 (2), 175–199.

Swedish Agency for Growth Policy Analysis (2022). Foreign controlled enterprises 2020. Statistik 2022:03.

Swedish Agency for Growth Policy Analysis (2021). Research and development in international enterprises. 2023:06.

Swedish Agency for Growth Policy Analysis (2020). Foreign Acquisitions – a shortcut to higher productivity and expansion in smaller firms? PM 2020:06.

Swedish Agency for Growth Policy Analysis (2017). Foreign acquisitions in the Swedish business sector – threat or opportunity? PM 2017:12.

Swedish Defence Research Agency (2023). Chinese investments in Sweden: a survey. Report by Oscar Almén.

Swedish Defence Research Agency (2019). Kinesiska bolagsförvärv i Sverige: en kartläggning. FOI Memo by Jerker Hellström, Oscar Almén and Johan Englund.

Swedish Military Intelligence and Security Service (MUST) (2024). MUST Årsöversikt 2023.

Swedish Productivity Commission (2024). ”Goda möjligheter till ökat välstånd”, SOU 2024:29 Delbetänkande av Produktivitetskommissionen s. 17–18.

Swedish Security Service (2023). Lägesbild 2023–2024.

Yeaple, Stephen R. (2003). The complex integration strategies of multinationals and cross-country dependencies in the structure of foreign direct investment. *Journal of International Economics*, 60(2), 293–314.

7 Appendix

7.1 Foreign ownership

Table A1. Number of foreign-owned firms and Swedish MNEs in Sweden from 1997–2020

	China & Hong Kong	EEA	United Kingdom	India	Japan	The Nordics	Russia	US & Canada
1997	5	1,102	363	1	85	1,119	8	611
1998	5	1,222	365	2	95	1,189	9	698
1999	4	1,366	401	2	102	1,284	6	723
2000	10	1,796	550	2	105	1,783	7	810
2001	16	2,463	700	2	119	2,558	8	1,106
2002	24	2,660	821	6	123	2,790	5	1,171
2003	38	3,214	965	5	124	3,152	6	1,299
2004	41	3,283	1,052	6	122	2,959	6	1,278
2005	41	3,536	1,193	10	124	3,176	5	1,319
2006	48	3,708	1,218	22	124	3,401	5	1,339
2007	49	4,061	1,304	23	116	3,660	7	1,341
2008	56	4,330	1,373	29	110	4,172	8	1,325
2009	62	4,598	1,419	35	120	4,381	9	1,358
2010	84	4,597	1,339	39	125	4,531	8	1,338
2011	103	4,926	1,295	48	136	4,547	9	1,375
2012	117	5,032	1,218	54	147	4,451	11	1,420
2013	114	4,818	1,217	51	154	4,196	13	1,430
2014	128	4,810	1,224	49	157	4,484	11	1,477
2015	122	4,747	1,221	52	154	4,505	8	1,516
2016	136	4,798	1,248	51	154	4,461	9	1,503
2017	166	4,955	1,211	54	169	4,574	10	1,477
2018	172	4,955	1,157	55	188	4,723	10	1,517
2019	226	5,015	1,858	65	290	5,676	2	1,913
2020	172	5,355	1,746	51	279	5,279	3	1,777
Average	**81**	**3,806**	**1,102**	**30**	**143**	**3,627**	**8**	**1,297**

Note: Data is from Statistics Sweden and consists of Business Statistics and Foreign Ownership Statistics

List of covered sectors based on SNI07

01–03: Agriculture, forestry and fishing

05–09: Mining and quarrying

10–33: Manufacturing

35: Electricity, gas, steam and air conditioning supply

36–39: Water supply; sewerage, waste management and remediation activities

41–43: Construction

49–53: Transportation and storage

55–56: Accommodation and food service activities

58–63: Information and communication

64–66: Financial and insurance activities

68: Real estate activities

69–75: Professional, scientific, and technical activities

77–82: Administrative and support service activities

84: Public administration and defence; compulsory social security

85: Education

86–88: Human health and social work activities

90–93: Arts, entertainment, and recreation

94–96: Other service activities

7.2 Method for calculating total factor productivity

TFP is measured as the value added in relation to an index that weighs together the inputs of different resources, in this case, labour, real capital and inputs in production. A firm's choice of inputs is assumed to be endogenous as the firm's optimisation decision depends on factors that are only observed within the firm. Thus, an ordinary least squares (OLS) estimation that do not account for such endogeneity will present inconsistent estimates. This means that if we were to repeat the estimation with an increasing number of observations, we would not arrive at the 'true' value. To handle endogeneity, a control function approach will be used, which is a two-step procedure developed by Ackerberg et al. (2015). This procedure is based on Olley and Pakes (1996) and Levinsohn and Petrin (2003). For a comparison of the different approaches, see Manjón (2016). In our calculations, we use value added as output, and labour and real capital as inputs. The proxy variable used is intermediate goods. We assume a Cobb-Douglas production function:

$$y_{jt} = \beta_0 + \sum_k \beta_k x_{jt}^k + \omega_{jt} + \eta_{jt}$$

y_{jt} is the log of firm value added, x_{jt}^k is a vector of inputs (log of capital, log of labour, log of intermediate goods), ω_{jt} is the log of unobserved productivity, and η_{jt} is the residual. Unlike Olley and Pakes (1996) and Levinsohn and Petrin (2003), who assume that firms can adjust certain inputs immediately and without any costs, this approach by Ackerberg et al. (2015) assumes that the correlation between labour and productivity produces biased and inconsistent estimators and therefore needs to be estimated separately. For a more detailed description, see Rovigatti and Mollisi (2018).

7.3 Probit results

Table A2. Probit analysis. Estimated probability of foreign acquisitions from 2000–2020 in Sweden

	The Nordics	EEA	US & Canada	United Kingdom	China & Hong Kong	India	Japan	Russia
TFP	0.1371***	0.1969***	0.2256***	0.1502***	0.1004**	0.0855*	0.1194*	0.2448***
	(0.0142)	(0.0121)	(0.0215)	(0.0183)	(0.0454)	(0.0480)	(0.0651)	(0.0356)
Profit ratio	5.36e-09	-2.65e-08	-2.45e-08	1.63e-09	-7.42e-08***	-1.33e-09	2.95e-09	-1.37e-08
	(9.78e-09)	(2.70e-08)	(1.49e-08)	(5.87e-09)	(1.65e-08)	(2.86e-09)	(3.84e-09)	(1.03e-08)
Export intensity	3.34e-07	8.54e-07	-9.95e-08	6.10e-07	-1.30e-06	3.34e-07	8.95e-07	0.0001**
	(7.24e-07)	(7.92e-07)	(4.49e-07)	(5.54e-07)	(9.87e-07)	(4.67e-07)	(1.61e-06)	(0.0000)
Share of skilled labour	0.1882***	0.2937***	0.4877***	0.5046***	0.6521***	0.2733***	0.2850***	0.3205*
	(0.0192)	(0.0183)	(0.0312)	(0.0283)	(0.0894)	(0.0755)	(0.0867)	(0.1743)
Firm size	1.20e-09	2.52e-09***	1.26e-09**	8.29e-10***	9.13e-10***	3.36e-10	1.02e-09**	6.49e-10*
	(8.01e-10)	(6.08e-10)	(4.39e-10)	(2.71e-10)	(2.31e-10)	(2.23e-10)	(4.36e-10)	(3.51e-10)
Year dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Log pseudo-likelihood	-36,695.95	-33,675.66	-10,662.23	-10,957.24	-1,051.27	-395.72	-925.56	-76.52
Observations	7,732,774	7,731,264	7,723,548	7,723,269	7,472,645	4,277,495	6,549,237	1,666,748
Groups	1,306,356	1,305,754	1,302,313	1,302,190	1,246,725	1,100,368	1,263,357	853,930

Note: Dependent variable is foreign acquisition and is zero when a firm is domestic and one if it becomes foreign owned (the acquisition year). * Significant at 10%, ** significant at 5%, *** significant at 1%

Table A3. Correlation matrix foreign-owned firms

	TFP	Export intensity	Firm size	Share of skilled labour	Profit ratio
TFP	1.0000				
Export intensity	0.0000	1.0000			
Firm size	0.1108	0.0000	1.0000		
Share of skilled labour	0.0128	-0.0001	-0.0035	1.0000	
Profit ratio	-0.0006	0.0058	-0.0000	0.0004	1.0000

7.4 Method: Event study analysis

The following section will present the method of the paper in more detail. First, a traditional version of the method will be discussed, followed by a presentation of the event study approach by Sun and Abraham (2021) which is used for the analysis of this paper. A section dedicated to motivating the choice of method will conclude this section.

7.4.1 Standard event study analysis

An event study is used to analyse the impact of a specific event or policy change. Data ex-ante and ex-post is used to see how an outcome develops over time. For the present report, the acquisition of a Swedish firm by a foreign-owned firm is the event in focus. The event is also known as *treatment*, and thus the treatment effect in this paper is the impact that a foreign acquisition has on the acquired firm's productivity.

To identify a treatment effect in traditional event studies, units are divided into two groups: the first group contains units (Swedish firms) that have received treatment (been acquired by a foreign enterprise), and the second group contains units (firms) that have not been treated (remained Swedish-owned) during the entire period of study. Since the second group never receives treatment, it therefore functions as our control group. This allows us to compare the productivity of firms between the two groups to identify and isolate any effects stemming from the acquisition.

To analyse the treatment effect, the *parallel trends assumption* needs to be satisfied. This assumption is commonly attributed to the difference-in-differences estimation method (DiD). The parallel trends assumption implies that without treatment, the control unit and the treated unit would exhibit the same outcome evolution. Thus, in the context of this paper, it means that if the acquired firms never had been acquired by a foreign firm, they would have experienced a similar evolution as the firms that remain Swedish-owned.

However, there might be heterogeneity in treatment effects over time that this standard version does not account for as the treatment is presumed to be constant over time and across firms. When treatment effects vary over time, this could result in incorrectly estimated treatment effects.[18] Estimated treatment effects may vary for different treatment years, where acquisitions that took place during the financial crisis in 2008 may be fundamentally different from those acquisitions that took place in 2017, for example.

Thus, using a standard event study approach might result in misleading estimates, as it does not account for heterogeneous treatment effects. The event study proposed by Sun and Abraham (2021) has therefore been chosen for the purpose of this paper. By introducing a dynamic model that captures both time and individual-specific effects, Sun and Abraham's (2021) approach captures the heterogeneity in treatment responses that standard methods overlook. Furthermore, their two-step estimation procedure, involving individual-level treatment effect estimation followed by aggregation, ensures robust and efficient inference.

---

[18] See Roth et al. (2023) for a discussion of the potential issues with the standard version of an event study.

7.4.2 Event study analysis by Sun and Abraham

Sun and Abraham (2021) address the shortcomings of the standard event study analysis in two primary ways:

Firstly, by allowing for varying treatment effects as it is no longer assumed that the treatment effect is constant over time. Instead, they estimate separate treatment effects for different time periods to track how the effect evolves over time after the treatment. As acquisitions take place in different years, it is desirable to track them irrespective of when each individual acquisition occurred. For this purpose, time indicators are created that track time relative to when the treatment occurred. Thus, the year before treatment will become *year -1*, the year of treatment will be *year 0*, the year after treatment is *year 1*, and so on, thereby enabling the tracking of how productivity in acquired firms evolves during the years after the acquisition took place.

Secondly, it allows for heterogeneous treatment effects across individuals by the creation of an interaction-weighted estimator between the treatment indicator and the relative time indicators. This implies that the productivity effects after an acquisition can vary across firms. The interaction-weighted estimator is leveraged to estimate a weighted average of the group average treatment effect on the treated (ATT). The firms that are acquired by a foreign-owned firm from a specific region or country constitute one group. The ATT is estimated using a linear two-way fixed effects specification, and the weights are estimated with sample shares of each firm within the period of investigation. The weights sum to one and are non-negative. Thereafter, the interaction-weighted estimator is created by combining the weighted averages of ATT with the estimated weights. The interaction-weighted estimators assign different weights to different units based on the timing of the treatment and the specific characteristics of individual firms. These are then used to calculate the average treatment effect (ATE). This effect is the difference between the average change in outcomes for a given group in the periods prior to the treatment, and the average changes for the groups that had not been treated. The never-treated units, firms that remain Swedish during the entire time period, function as the control group. Furthermore, the parallel trends assumption needs to be satisfied.

The main specification of Sun and Abraham (2021) takes the following dynamic form:

$$Y_{it} = \alpha_i + \lambda_t + \sum_{\ell=-K}^{-2} \beta_\ell \cdot D_{i,t} + \sum_{\ell=0}^{L} \beta_\ell \cdot D_{i,t} + \epsilon_{it}$$

Y_{it} being the outcome variable for unit *i* at time *t.* For the context of this paper, implying total factor productivity of a specific firm at a specific point in time.

α_i representing firm fixed effects. These can vary over time, but not across firms.

λ_t representing time fixed effects. These can vary across firms, but not over time.

$D_{i,t}$ being the indicator for being treated. It is equal to 1 if firm *i* is treated in period *t* and 0 otherwise.

β_ℓ capturing the ATE ℓ periods after the event.

ℓ being the relative time period for the treatment.

K and *L* being the number of leads and lags, which is 10 in our analysis. The productivity of a firm is analysed 10 years before and 10 years after the acquisition.

To avoid multi-collinearity, one period needs to be excluded. In practice, it is most common to exclude relative periods close to the initial treatment.

7.4.3 Motivation for choosing the empirical strategy

A standard event study is often based on the difference-in-differences (DID) method with two-way fixed effects (TWFE). The DID approach compares changes in outcomes over time between a treated group and a control group. The fixed effects are included to control for characteristics that are constant over time and across individuals. This approach thus assumes that treatments are constant over time and across firms.

TWFE estimators have been considered equivalent to the canonical DID estimators, but recent developments have revealed that the estimators differ significantly. A DID estimator relies on the parallel trends assumption, which implies that without treatment, the control unit and the treated unit would exhibit the same outcome evolution. The assumption further signifies that the DID estimator is unbiased. However, the TWFE estimator requires an additional assumption for unbiasedness to hold: the treatment effect should be constant between groups and across time. Goodman-Bacon (2021) showed that the TWFE estimator is a weighted average of all possible standard DID estimators, with weights based on the variance in treatment and size of the control groups. As already treated units can act as controls in the set-up of staggered treatment timing, changes in their treatment effects over time will be subtracted from the DID estimate. If the treatment does not vary over time, the TWFE approach provides a variance-weighted average of cross-group treatment effects where all weights are positive. Nevertheless, when the treatment effects vary over time, negative weights may arise that create downwardly biased estimators (Goodman-Bacon, 2021). Although this may not imply a failure of the model itself, it signals caution against the use of TWFE and a single coefficient to summarise time-varying effects (Goodman-Bacon, 2021).

Our model is based on staggered treatment timing, to the extent that the treatment happens at different points in time for different firms, the treatment being a domestic firm acquired by a foreign firm at a specific point in time. To avoid any issues that the TWFE estimator may create, our analysis is based on Sun and Abraham (2021). By introducing a dynamic model that captures both time and individual-specific effects, Sun and Abraham's (2021) approach capture the heterogeneity in treatment responses that standard methods overlook. Furthermore, their two-step estimation procedure, involving individual-level treatment effect estimation followed by aggregation, ensures robust and efficient inference.

Sammanfattning på svenska

Summary in Swedish

Syftet med denna rapport är att förstå om och hur produktivitet i svenska företag ökar efter ett utländskt förvärv och om produktivitetseffekten skiljer sig åt beroende på den utländska investerarens ursprung. Dessutom analyserar vi vilken typ av företagsegenskaper som gör ett utländskt förvärv mer sannolikt, och hur dessa egenskaper varierar med det förvärvande företagets ursprung. För att göra detta använder vi data på företagsnivå under perioden 1997–2020.

Total faktorproduktivitet, en stor andel anställda med högre utbildning och företagsstorlek är faktorer som ökar sannolikheten för ett utländskt förvärv. Detta indikerar att utländska företag tenderar att förvärva svenska företag som redan är relativt produktiva, snarare än företag som kanske inte är särskilt produktiva idag men som har potential att bli det i framtiden.

Våra huvudresultat visar att produktiviteten ökar när svenska företag köps upp av företag från Europa, Nordamerika och Japan. Detta är regioner och länder som Sverige har relativt väletablerade bilaterala relationer med, i den meningen att det verkar finnas ett ömsesidigt beroende och ekonomiskt utbyte mellan Sverige och dessa marknader. Dessutom ligger Europa och Norden geografiskt nära varandra, vilket underlättar handel och investeringar ytterligare.

Vi finner dock ingen signifikant effekt på produktiviteten i svenska företag när de köps upp av företag från Indien eller Kina. Denna avvikelse kan bero på att det finns olika motiv bakom utländska förvärv, och att dessa motiv också skiljer sig åt mellan olika ursprung. Exempelvis verkar investeringar som görs av företag från Europa eller Nordamerika i större utsträckning vara effektivitetssökande, det vill säga att motivet bakom investeringen är att förbättra den operativa effektiviteten. Å andra sidan tenderar investeringar från indiska eller kinesiska företag att vara marknadssökande eller strategiska tillgångssökande, vilket innebär att dessa företag ofta investerar i Sverige för att få tillgång till en ny marknad eller för att förvärva företagsspecifika teknologier.

Denna rapport understryker den roll som utländska direktinvesteringar spelar för att öka produktiviteten, en viktig drivkraft för ekonomisk tillväxt. Eftersom EU har en långsam produktivitetstillväxt är det viktigt att prioritera produktiviteten i Europa. Utländska direktinvesteringar är i detta sammanhang viktiga för produktiviteten eftersom de inte bara utgör ett inflöde av kapital utan också av teknik och marknadstillträden. Att skapa en miljö där utländska direktinvesteringar attraheras och behålls bör därför vara en strategisk prioritering.

The National Board of Trade Sweden is the government agency for international trade, the EU internal market and trade policy. Our mission is to facilitate free and open trade with transparent rules as well as free movement in the EU internal market.

Our goal is a well-functioning internal market, an external EU trade policy based on free trade and an open and strong multilateral trading system.

We provide the Swedish Government with analyses, reports and policy recommendations. We also participate in international meetings and negotiations.

The National Board of Trade, via SOLVIT, helps businesses and citizens encountering obstacles to free movement. We also host several networks with business organisations and authorities which aim to facilitate trade.

As an expert agency in trade policy issues, we also provide assistance to developing countries through trade-related development cooperation. One example is Open Trade Gate Sweden, a one-stop information centre assisting exporters from developing countries in their trade with Sweden and the EU.

Our analyses and reports aim to increase the knowledge on the importance of trade for the international economy and for the global sustainable development. Publications issued by the National Board of Trade only reflect the views of the Board.

The National Board of Trade Sweden, February 2025, ISBN: 978-91-89742-54-3

Kommerskollegium
National Board of Trade Sweden

Box 6803, S-113 86 Stockholm, Sweden
Phone +46 8 690 48 00
E-mail registrator@kommerskollegium.se
www.kommerskollegium.se