

Discussion Paper

Import, Export and Multinationality. Evidence from Swedish Firms

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Abstract

This paper studies the role of imported inputs in explaining firms' export behaviour. Unlike most of the existing literature we are also able to control for the participation of domestic firms to multinational networks. This allows us to test to what extent the recurrent evidence that importing foster exporting activity is instead a figment of the fact that importers are also part of multinational groups. Our evidence, based on Swedish manufacturing firms, suggests that imported inputs, rather than multinationality, are a key determinant of firms' export propensity and product scope. This result is particularly strong for SMEs, and it is driven by imported intermediates and (to a lesser extent) capital goods.

Keywords

importing, exporting, multinational enterprises, Sweden

JEL Classifications

F14, F23, O52

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1 Introduction

Explaining firms' exporting behaviour has been at the forefront of research in applied international trade for the last two decades. The availability of large scale firm (and establishment) level data has allowed researchers to uncover interesting facts about exporters. Earlier studies have focused on explaining why some firms export, and highlighted a number of firm characteristics that make exporting more likely. Among others, firm size, innovation and productivity stood out as the key factors explaining the probability to export.¹ Subsequent works have highlighted that export does not occur in isolation, and firms are often involved in different modes of internationalisation. In particular, importing and exporting activities tend to occur in the same firms, which have been often labelled as two-way traders². More recent studies have investigated the links between importing and exporting activities, showing that imported inputs can be an important determinant of future exporting activities³. Evidence in this direction have been provided for countries as diverse as France (Bas and Strauss-Kahn, 2013), Italy (Lo Turco and Maggioni, 2013), Slovenia (Damijan and Kostevc, 2015), and a sample of firms from 27 Central and Eastern European countries (Aristei et al., 2013).

The relationship between importing and exporting activities has been explained by the fact that importing allows firms to access a larger set of intermediate inputs, which enable them to increase efficiency, upgrade technologies and introduce product innovation (Broda and Weinstein, 2006; Goldberg et al., 2010; Colantone and Crinò, 2014; Halpern, Koren and Szeil, 2015, Lo Turco and Maggioni, 2015), and eventually export (Kugler and Verhoogen, 2009; Bustos, 2011).

Other studies have moved to assess the impact of importing not only on the probability or the volume of exports, but also on the geographic and product scope of exporting activities. The underlying idea of these studies is that by allowing to introduce new and improved products, imported intermediate inputs may boost the degree of innovation in export destinations and exported products. This is consistent with the idea that firms prepare to export, initially by improving products which are destined for the export market (Costantini and Melitz, 2007; Iacovone and Javorcik, 2012). In this line of investigation, there is evidence that importing inputs

¹ See the reviews of empirical evidence offered, for example, in Wagner (2006) and Bernard et al. (2012).

² Among others, see Muuls and Pisu (2009) for Belgium, Castellani, Serti and Tomasi (2010) for Italy, and Vogel and Wagner (2010) for Germany. Wagner (2012 and 2016) offer a comprehensive review of the literature.

³ The evidence on the relationship between exporting and importing activities seems less compelling (Damjian and Kostevc, 2015; Aristei, Castellani and Franco, 2013)

contributes to increase the scope in exported varieties (Bas and Strauss-Khan, 2013; Damijan et al., 2014).⁴

This paper contributes to this fast-growing literature by focussing on the role of imported inputs in explaining the probability of firms' entry into the export market, as well as the scope of their exported products. Unlike most of existing literature we are able to control for the participation of domestic firms to multinational networks. By becoming part of a multinational firm, either by acquisition of foreign or domestic MNE, or by establishing its own network of affiliates abroad, a firm gains access to a variety of sources of imported inputs. So this boils down the question of whether the importance of flows of imported inputs found in previous studies is instead a figment of the fact that importing firms are part of MNEs. If this were the case, multinationality, rather than importing, would be the key factor explaining export performances. By linking foreign transaction level data with business register information on whether companies are independent or rather they are part of a group (controlled by a non-MNE, a domestic MNE or a foreign MNE) we are able to provide a richer interpretation into the role of imported inputs for firms' export performance.

We rely on data from the population of Swedish manufacturing firms with more than 5 employees over the 2001-2012 period. Information from four different sources have been combined. First, transaction-level data on import and export flows at a very disaggregated level (CN8 and country of source/destination) have been used to measure the export and import status of the firms, as well as the number of imported and exported products at the level of the firm, as well as the number of source countries for imports and destination countries for export. Second, for each firm, administrative data on number of employees, value added and physical capital, have been used to compute measures of firm size, labour productivity and investments intensity. Third, each firm could be matched with the register of business groups in Sweden, providing indication of whether the firm is either independent or part of a group, and in this case, whether the group owns affiliates abroad, and whether the ultimate owner is a Swedish or non-Swedish based company. Fourth, we were able to link patents applications filed by inventors employed in our sample firms, thus allowing us to build a proxy for the patenting activity of the firms. Each piece of information is available yearly for the period 2001-2012.

The results of our empirical analysis show that, even after controlling for multinational status, imported inputs (especially intermediate inputs) represent a very important factor able to boost

⁴ Varieties are usually defined as the products sold to (or sourced from) a specific market. The scope of export varieties can increase both by selling a new product to the same (or different) markets, and by selling the same products in different markets.

Swedish firms' export participation and export scope. More specifically we find that it is the actual number of imported inputs and the geographical reach of imports that matters, rather than the simple fact of being an importer. The number and geographical reach of imported inputs is especially effective in increasing the export participation of small and medium enterprises (SMEs). Moreover, importing more products increases the export scope of both SMEs and large firms.

The effect of multinationality is instead less clear cut. Being part of a MNE does not increase firms' export participation, and actually Swedish SMEs which are acquired by a foreign MNE are less likely to enter the export market. Multinationality instead is still a positive factor able to increase firms' export scope, but only for large firms.

The paper is organised as follows. Section 2 lays out the empirical strategy, Section 3 illustrate the sources of data and provide some descriptive statistics, Section 4 discusses the results. Section 5 concludes.

2 The empirical strategy

Our empirical analysis seeks to identify the role of different determinants of the decision to export, as well as the decision to increase the firm portfolio of exported products (i.e. the export scope). Besides the usual determinants that are able to explain export participation, such as productivity, firm size and innovative activity, we are especially interested in the role of imported inputs and multinationality. In particular, we want to clearly distinguish the individual effect of each of these two last factors, as the two are intrinsically interrelated, but both are likely to have an important effect on the ability of firms to sell their products abroad.

2.1 The decision to export

We start by estimating a simple logit model to explain the decision to export of firms:

$$X_{it} = \alpha_0 + \alpha_1 M_{it-1} + \alpha_2 M_{it-1}^p + \alpha_3 M_{it-1}^c + \alpha_4' D_{it-1} + \beta' Z_{it-1} + \lambda_t + u_{it} \quad (1a)$$

$$X_{it} = \alpha_0 + \alpha_1 M_{it-1} + \alpha_2 M_{it-1}^p + \alpha_3 M_{it-1}^c + \alpha_4' D_{it-1} + \beta' Z_{it-1} + \eta_i + \lambda_t + u_{it} \quad (1b)$$

Where X is dummy variable taking value equal to 1 if firm i was an exporter in year t . We lag all the explanatory variables by one year to decrease problems related with simultaneity bias. As explained above, we are interested in the contribution of imported inputs on the decision of firms to export. We explore three mechanisms through which imports might influence export

participation: the simple fact of importing, the overall number of different imported products and the geographical reach of foreign suppliers from which firms source foreign inputs. Accordingly in equation (1a and 1b) M is a dummy variable taking value equal to 1 if firm i was an importer in the year $t-1$, while M_{it-1}^p measures the total number of different products exported by firm i in year $t-1$ and M_{it-1}^c indicates the total number of countries from which firm i sourced its foreign inputs. The other variables of interest are included in the vector of dummy variables defining the ownership structure of each firm, \mathbf{D}_{it-1} . We have four dummy variables that take value 1 if a firm is part of a Swedish group, of a Swedish multinational enterprise, or is a Swedish affiliated to a foreign-owned multinational, respectively. The baseline category is defined by firms that are independent Swedish-owned firms.

The propensity to export is likely to depend also on other firm-specific factors that have to do with its innovative capabilities, as well as its size and relative efficiency. The vector \mathbf{Z} includes such usual set of control variables that are associated with export performance, including innovation activities implemented by each firm, labour productivity, size and investment intensity. The indexes η_i and λ_t denote respectively firm and year fixed effects, while u_{it} indicates the usual idiosyncratic error term.

The inclusion of fixed effects in our specification allows to control for the time-invariant firm heterogeneity that might be correlated both with export participation and with our variables of interest. However, we are interested in estimating the model both with (1b) and without firm fixed effects (1a). This will allow us to investigate both the extent of the cross-sectional correlation, as well as to provide a more causal interpretation. Indeed, the interpretation of the coefficients of our main variables of interest changes when we introduce firms fixed effects. In the pooled cross-section specification we are able to assess whether being an importer (M) is generally associated with a higher propensity to export, while in the fixed effect specification we can check whether starting to import has an impact on the decision to export. At the same time the coefficients of the variables that measure the total number of products imported (M_{it-1}^p) and the total number of foreign markets from which firm source their imports (M_{it-1}^c) have different interpretations according to the inclusion or not of firms' fixed effects. Without fixed effects we will know whether there is a positive correlation between the breadth of import activities (both in terms of product scope and geographical reach) and exporting. In the specification with fixed effects instead we check whether a marginal increase of these two variables has any effect on the probability to start exporting. Finally, also for the multinational status the interpretation differs, while without fixed effects we will just understand whether Swedish or foreign MNEs are more likely to be exporting, with fixed effects we will control

whether becoming a MNE (either by acquisition or by expansion) increases the probability to start exporting.

2.2 The export scope

We are also interested in understanding what drives the broadening of the portfolio of products exported by an individual firm. For this reason, we examine the determinants of the export scope of exporting firms. Our dependent variable is the number of different 8-digits products exported by each firm in a specific year. Since this is a count variable with high over dispersion, we adopt a negative binomial regression method with fixed effects, as this estimator is particularly well suited for over-dispersed dependent variables.⁵ Following the previous specification of equation (1) we estimate the following negative binomial model:

$$E(X_{it}^p | \cdot)_{it} = \exp(\alpha_0 + \alpha_1 M_{it-1} + \alpha_2 M_{it-1}^p + \alpha_3 M_{it-1}^c + \alpha_4' \mathbf{D}_{it-1} + \beta' \mathbf{Z}_{it-1} + \eta_i + \lambda_t + u_{it}) \quad (2)$$

As in the previous specification all the explanatory variables are lagged by one year to alleviate problems associated with simultaneity bias. We adopt the same set of independent variables of equation (1), but in this case our main interest is in understanding whether imports and multinationality have a specific impact on the ability of firms to increase the number of different exported products. Since in this case we control for firm fixed effects η_i , the model allows us to identify whether the increase of the number of different imported products or of the number of import source markets also has an effect on the number of different products exported. Also in this case the interpretation of the coefficients for the MNE indicates whether becoming a MNE increases or decreases the product scope of exported outputs.

3 Data and descriptive statistics

We use data provided by Sweden Statistics (SCB), combining information on international trade activities of Swedish firms, as well as business and ownership structure and balance sheets data. Linking different data sources on the universe of Swedish firms allows us to introduce a major

⁵ We prefer the negative binomial estimator to the Poisson estimator, since the latter suffers from excess zero problems and in our sample, which includes also firms who enter and exit from export, the number of zeros is non negligible. Moreover the Poisson estimator is less suited for variables with high over dispersion (Cameron and Trivedi, 2005).

innovation with respect to existing studies, as it is hardly the case that researchers can have access to such a rich set of information for large samples of firms and over a long period of time.

More specifically, the trade data provides product detailed information at the 8-digit CN8 level, which allows to measure the total number of different products exported or imported by each firm and destination/source country yearly. As recently showed by Van Beveren et al. (2012) the CN8 classification suffers from problems of time-inconsistency because of the frequent waves of product reclassification along the years. A typical outcome of these changes in the classification of each product is that the same specific product might enter a new category from one year to another simply because of a new classification, or two products can be aggregated to a unique category: this can sometimes drastically change the product portfolio of exporters (and importers), by arbitrarily increasing or decreasing the number of products exported according to the CN8 classification. In order to account for this we follow the procedure suggested by Van Beveren et al. (2012), which allows to obtain harmonized CN8 classifications for any specific time period considered, in order to make sure that the increase/decrease of exported products is not an artifact of changing classifications.⁶

Data on ownership structure instead allow us to distinguish firms into independent firms, firms that are part of Swedish groups without foreign subsidiaries, of Swedish Multinational Enterprises (Swedish firms with foreign subsidiaries) and Foreign Multinationals Enterprises (foreign companies with Swedish subsidiaries). We are also able to associate patent information for each firm through the use of a specific dataset created by Jung and Ejeremo (2014) which informs us whether any of the employees of a firm was listed as an inventor in the patents applied for at the European Patent Office in any year of the time period considered.

Finally, linking data from the business register, allows us to include an additional set of controls, which include labour productivity (measured as the log of value added per employee), the (log of the) number of employees and (the log of) total investments in physical capital.

We restrict our analysis to manufacturing firms, in order to focus on firms that are actively engaged in the production of goods and value added, and not only in trading. We want also to exclude micro firms and self-employment cases, so we only include firms with a median of at least 5 employees in the years included in our sample. This leaves us with 14,042 firms and 118,

⁶ The algorithm created by Van Beveren et al. (2012) is such that if in a specific year t the homogeneous category of products x is divided in two different categories y and z , it creates an artificial category x^* which includes all three products (x , y and z) for all the years of the sample. If instead in year t a product j is included inside the category of products k , the algorithm creates a new category k^* which always includes j and k products for all the period considered. A typical outcome of this procedure is the reduction of the overall number of product categories.

096 observations for which we have information on trade activities, multinational status, innovation activities and balance sheet data. Considering that our data covers the period 2001-2012 (12 years) we have an average of almost 10,000 firms per year. According to Eurostat data in the period 2001-2012 in Sweden on average there were 12,000 active enterprises with more than 4 employees. This indicates that the firm data used in our analyses covers more than 80% of the corresponding population of Swedish manufacturing firms with more than 5 employees.

Table (2) shows some of the general features of the firms in our sample: we notice that slightly more than half of the observations include exporting firms, while the average number of different exported products is around 6. Roughly half of the observations involves firms which also import, showing that in the overall sample exporting is slightly more common than importing. The average number of typologies of imported products is 7.9, slightly higher than the number of different exported products. When we distinguish imported inputs on the basis of the Broad Economic Categories classification we find that intermediates are the most common type of imported products, with an average of 5.4 products, while the average for consumption and capital goods is only slightly higher than 1.

Independent firms are the most common type of firms, accounting for 46% of the overall observations, followed by firms belonging to Swedish groups (30%). Respectively 13% and 10% of the observations refer to Swedish and Foreign MNE. In about 2% of the observations firms apply for a patent, suggesting that this is a relatively rare event when one considers the whole of manufacturing sectors.

4 Econometric analysis

Export participation

Table (3) presents the results of the estimation of equation (1a), without firms' fixed effects. The estimator used is a logit, and in all the specifications we include 2-digit industry dummies to account for possible differences in the sectoral propensity to export. In column (1) we introduce the importer dummy (M) to control whether firms imported in time $t-1$, controlling also for multinational status, innovation activity, size, productivity and level of investments. The coefficient of import activity is positive and strongly significant, showing that there is a general positive correlation between being an exporter and being an importer. Also, the coefficients that describe the ownership structure of the firms are positive and significant, showing that with respect to independent ones, firms belonging to a Swedish group, Swedish MNE and Foreign MNE are more likely to export, relatively to Swedish-owned independent firms. Concerning the

other coefficients included in our specification, the positive sign associated with the patent dummy indicates that firms with formalized innovative activities are also more likely to export, in line with most of the results in the existing literature (Roper and Love, 2002; Cassiman and Golovko, 2011). Also export participation is positively associated with higher productivity (Wagner, 2007; Greenaway and Kneller, 2007) as well as firm size and levels of investments. In columns (2) and (3) we further distinguish the import activities by adding a measure of the number of different imported products (M_{it-1}^p) and then introducing also the number of countries from which imports are sourced (M_{it-1}^c). In column (2) we find that the number of different typologies of imported products is positive and significant and its inclusion substantially reduces the size of the import dummy coefficient, showing that, even conditional on size and productivity, the actual number of different imported products has more explanatory power than the simple fact of being an importer. Also, the number of countries from which a firm imports is associated with substantially higher probability to export, and this effect is even stronger in magnitude than the total number of different imported inputs.

In columns (4) and (5) we distinguish between small and medium enterprises (SMEs) with less than 250 employees and large firms. The results show that most of our findings are driven by SMEs. For large firms, only the number of different imported inputs and the number of different geographical sources matter, while multinational status is not relevant, as well as many of the other control variables. This is to say that, among large firms, those that are part of multinational groups are not more likely to be exporters, while this seems to make a big difference for SMEs.

The results of Table (3) show that when we do not control for firms' fixed effects, both importing activities and multinational status positive influence the ability of firms to export. In particular, the total number of different imported inputs and the geographical reach of foreign suppliers increase the probability to export. These results however only hold for small and medium sized firms, while for large firms we find that only the total number of imported inputs and the number of different countries matter.

In Table (4) we estimate equation (1b) with a logit estimator with fixed effects. When we include the firms' fixed effects in the estimation of equation (1b), using a logit estimator, we restrict our sample to the firms that during the period considered changed their export status at least once. This means that we exclude both domestic firms that never exported and persistent exporters who exported in all the years of our data: this leaves us with 4,465 firms and 41,839 observations. The reduction of the number of firms affects especially large firms, since many of these firms are persistent exporters who always export.

In column (1) we find that the import dummy M is still positive and significant, showing that starting to import also has a positive effect on the decision to start exporting (in the following year). On the contrary, the coefficients associated with the ownership structure of the companies are no longer statistically different from zero. In other words, becoming part of a Swedish group or of a Swedish MNE or a foreign MNE does not increase the probability of a firm to start exporting. Interestingly, also patenting activity does not have any impact on the propensity of firms to start exporting, differently from the results of Table (4) and from most of the existing literature on the relationship between innovation and export. This can be partly due to the fact that innovation includes a broad set of activities, of which patents represent only a limited share. However, the results suggests that, when import activities are accounted for, the individual contribution of innovation to export decreases substantially. Combined with previous cross-sectional results this suggests that innovators are generally more likely to be exporters, but innovating at time $t-1$ does not necessarily have an impact on firms' export decision in the following period. Productivity, size and investments are instead still positively associated with the decision to enter foreign markets. In columns (2) and (3) we gradually introduce the other import-related variables: the results show that both the number of different imported products and the number of countries from which the products are imported have a positive impact on the decision to export and the magnitude of their effect is roughly the same. It is worth mentioning that the import dummy turns negative, suggesting that the positive effects of importing on the probability of exporting can be appreciated only above a certain threshold of involvement in importing activities. When we control more in depth for the effect of importing, we also notice that the negative coefficient of Foreign MNE becomes significantly different from zero, showing that when a company is acquired by a foreign MNE its chances of becoming an exporter actually decrease. This suggests that firms that are acquired by foreign MNEs will experience an increase in their importing activity, thanks to the easier access to the MNEs network, which will boost exporting. However the change in ownership per se, is likely to decrease the probability of exporting, or increase the probability of exit from the export market. This result per se is a bit puzzling, but it could signal that foreign MNEs do not buy Swedish firms with the goal to serve the international market. When they acquire a firm that was already exporting, there is a good likelihood that the foreign MNEs will enforce exit from the export market, maybe in an attempt to avoid cannibalization with other products exported by the MNE worldwide.

When we distinguish between SMEs and large firms we find that the positive impact of the two different measures of import scope and geographical reach only have an effect for SMEs, while for larger firms they do not have a significant effect. We also find that the negative effect of

becoming a foreign MNE is only limited to SMEs. Another relevant difference between the two groups of firms is that increases in productivity do not seem to matter for the decision to start exporting among large firms.

Summing up when we control for firms' fixed effects we are able to understand whether a change in our variables of interest have an impact on the export status. When we do that, we find that the number of different imported products and the number of countries from which imports are key determinants of the decision of firms to start exporting, and this is true almost exclusively for SMEs. For these firms, access to imported inputs is crucial for export performance.

Export scope

In Table (5) we estimate equation (2) which focuses on the determinants of export scope, following the same specification of equation (1). It should be noted that since we estimate the model with firm fixed effects we necessarily focus only on firms that had some within-firm variation in the number of exported products. Firms that never export, or keep exporting the same number of products throughout the whole period, are excluded from the estimating sample, due to lack of within-firm variation in the dependent variable.⁷ On the basis of this further restriction we will perform the analysis on 9,644 firms and 88,586 observations. As for the estimation of the probability of exporting, we gradually introduce our import measures in columns (1) to (3). Similarly to our previously reported evidence, the number of different imported products is an important determinant for export performance, and it significantly contributes to increase the export product scope of firms, in line with earlier findings in the literature (Bas and Strauss-Kahn, 2014). Also the number of country sources still has a positive effect on the increase of the export scope. Differently from the probability to export (with fixed effects) we find a positive effect of becoming a Swedish group or a Swedish MNE, while this is not the case for foreign MNE. Therefore, while becoming part of a Swedish group (and MNEs in particular) does not seem to affect the probability to enter the export market, it provides a boost in the number of exported products for established exporters. Also, in line with the results on export participation, we find that innovative activities proxied by the patent dummy are not significantly related to export scope, while the coefficient of productivity is positive and significant.

⁷ In our sample there are no exporters that export exactly the same number of products overtime. There are instead 366 cases in which we observe exporters only for one year (either because the firm runs out of business or because we simply lack information on some relevant variables for the remaining years), also in this few cases the firms are not included in the negative binomial estimations.

When we distinguish between SMEs and large firms we find no substantial differences in the impact of the total number of imported products and the number of country sources: both matter for the increase of export scope. Instead we find that large Swedish firms that either become multinational by establishing subsidiaries abroad, or being acquired by foreign MNE exhibit an increase in the export scope. On the contrary, for SMEs becoming part of a Swedish group or any type of MNE does not have a substantial effect on their export scope.

4.1 Robustness check: importing intermediates, capital goods or final goods

So far we have only distinguished the impact of imports by differentiating between importing per se, the import scope of firms, and the total number of country sources. However, a further important distinction concerns the type of imported products. The impact of importing activities might differ according to whether firms import intermediate goods, capital goods or final goods, since each of these goods impacts differently on the production function of the importers. For these reasons in Table (6) we calculate the number of different imported inputs that pertain to the category of respectively intermediate goods, capital goods and final goods, according to the Classification by Broad Economic Categories (Rev.4).

We report the results obtained using all the three specifications used so far. In columns (1) to (3) we show that the probability to export (without including firms' fixed effects) is positively correlated with intermediate inputs and capital goods with a rather similar magnitude. On the contrary final goods do not show any significant correlation with the probability of being an exporter. When we distinguish between SMEs and large firms we find that capital goods are only important for the former. The same results hold also when we include firms' fixed effects in columns from (4) to (6): the only difference is that now the coefficient of intermediate goods is twice the size of the capital goods.

In columns (7) to (9) we analyze the impact of the different types of imports on the export scope. Also in this case we find that intermediate goods always display the larger coefficient, the main difference being the fact that for large firms also importing consumer goods benefits their ability to increase their export scope.

5 Concluding remarks

This paper contributes to a fast-growing literature focussing on the role of imported inputs in explaining firm's export behaviour. Unlike most of existing literature we are able to control for

the participation of domestic firms to multinational networks. Indeed, firms that become part of a MNE gain access to a variety of sources of imported inputs, so the effect of imported inputs and of multinationality may be confounded in previous studies. By linking foreign transaction level data with business register information on whether companies are independent or rather they are part of a group, controlled by a non-MNE, a domestic MNE or a foreign MNE, we are able to provide a richer interpretation into the role of imported inputs for firms' export behaviour.

We rely on data from the population of Swedish manufacturing firms with more than 5 employees over the 2001-2012 period. The results of our empirical analysis show that, even after controlling for multinational status, imported inputs represent a very important factor able to boost Swedish firms' export participation and export scope. More specifically we find that it is the actual number of imported inputs and the geographical reach of imports that matters, rather than the simple fact of being an importer. The number and geographical reach of imported inputs is especially effective in increasing the export participation of small and medium enterprises (SMEs). Moreover, importing more products increases the export scope of both SMEs and large firms. When we break down import by category, we find that the larger effect is associated with import of intermediates and capital goods, while import of final goods usually does not affect export behavior significantly. The effect of multinationality is instead less clear cut. Being part of a MNE does not increase firms' export participation, and actually Swedish SMEs which are acquired by a foreign MNE are less likely to enter (or more likely to exit) the export market. Instead multinationality is still a positive factor able to increase firms' export scope, but only for large firms.

These findings show that since the early 2000's and up until 2012 the access to imported inputs has boosted the competitiveness of Swedish firms, especially small and medium-sized firms, helping them both to enter foreign markets and to expand their portfolio of exported products. Especially for small and medium-sized firms the access to imported inputs (in particular intermediate inputs) has been much more effective than the acquisition by Swedish or foreign multinationals -a very frequent phenomenon in these years (see Bandick, Görg and Karpaty, 2014)- or the establishment of their own international network. Only for large firms the establishment of an international network of subsidiaries (either Swedish or foreign-owned) has substantially contributed to their export performances, but mainly in terms of increased export scope.

The result of the paper have also clear implications for policy. In particular, they stress that allowing domestic firms an easy access to imported inputs can be as important as supporting their exporting activities. In this perspective, for example, a currency devaluation, while making

exported goods cheaper, will also make imports more expensive, thus undermining one of the potential sources of export performance. At the same time, a word of caution is necessary, since the higher reliance on foreign inputs might also have some downsides for the Swedish economy: it is possible that companies that start to import are also likely to substitute domestic suppliers with foreign ones. From a policy point of view, it should also be important to identify which are the firms and sectors that are most affected by this phenomenon and suggest possible mechanisms to boost their competitiveness.

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Table 1. Variables description

Variable	Description
Dependent variable	
X (dummy)	=1 if the firm is an exporter at time t
χ^p	sum of the different types of products (CN8 8-digits) exported in year t*
Independent variables	
<i>Importing and exporting activities</i>	
M (dummy)	=1 if the firm is an importer at time t
$\ln(M^p)$	log of the sum of the different types of products imported in year t*
$\ln(M^p_intermediates)$	log of the sum of the different types of intermediate goods imported in year t*
$\ln(M^p_consumption)$	log of the sum of the different types of consumption goods imported in year t*
$\ln(M^p_capital)$	log of the sum of the different types of capital goods imported in year t*
$\ln(M^c)$	log of the sum of all the countries from which a firm imports its products in year t*
<i>Ownership type</i>	
Independent firm (dummy)	=1 for a firm not belonging to a group
Swedish group (dummy)	=1 for a firm belonging to a Swedish group
Swedish MNE (dummy)	=1 for a firm belonging to a Swedish group with foreign subsidiaries
foreign MNE (dummy)	=1 for a firm belonging to a foreign group with Swedish subsidiaries
Firm-level controls	
Patents (dummy)	=1 for a firm having at least one employee who patented in year t
$\ln(\text{Productivity})$	log of labor productivity (value added over number of employees)
$\ln(\text{Employment})$	log of the number of employees
$\ln(\text{Investments})$	log of the level of investments in machinery and equipment*

* to avoid the log of zero, we add 1 before taking the ln

Table 2. Descriptive statistics

Variables	Mean	Sd	Min	Max
X	0.567	0.496	0	1
X ^P	5.947	18.465	0	599
M	0.500	0.500	0	1
M ^P	7.915	23.134	0	700
M ^P _intermediates	5.472	16.080	0	479
M ^P _consumption	1.202	5.051	0	194
M ^P _capital	1.233	4.717	0	166
TOT_COUNTRIES	3.142	5.992	0	134
Independent firm	0.465	0.499	0	1
Swedish group	0.304	0.460	0	1
Swedish MNE	0.129	0.335	0	1
Foreign MNE	0.102	0.302	0	1
Patents(dummy)	0.024	0.153	0	1
ln(Productivity)	13.101	0.528	2.639	20.036
ln(Employment)	2.763	1.198	0	10.057
ln(Investments)	13.635	2.934	0	23.658
<i>Observations</i>	118,096			

Table 3. Probability to export - cross-sectional estimates.

VARIABLES	(1) <i>all firms</i>	(2) <i>all firms</i>	(3) <i>all firms</i>	(4) <i>SMEs</i>	(5) <i>large firms</i>
M_{it-1} (dummy)	1.939*** (0.030)	0.604*** (0.048)	0.323*** (0.051)	0.386*** (0.056)	-0.327** (0.160)
$\ln(M^P)_{it-1}$		0.969*** (0.037)	0.530*** (0.051)	0.504*** (0.054)	0.753*** (0.124)
$\ln(M^C)_{it-1}$			0.819*** (0.068)	0.788*** (0.074)	1.082*** (0.159)
<i>Ownership type</i>					
Reference: independ. firms					
Swedish group $_{it-1}$	0.201*** (0.036)	0.197*** (0.036)	0.194*** (0.036)	0.186*** (0.037)	-0.257 (0.216)
Swedish MNE $_{it-1}$	0.676*** (0.061)	0.496*** (0.064)	0.456*** (0.065)	0.440*** (0.071)	0.359 (0.241)
Foreign MNE $_{it-1}$	0.677*** (0.074)	0.294*** (0.080)	0.260*** (0.081)	0.233*** (0.089)	0.243 (0.260)
Patents $_{it-1}$ (dummy)	1.026*** (0.144)	0.819*** (0.154)	0.772*** (0.158)	0.804*** (0.175)	0.596 (0.374)
$\ln(\text{Productivity})_{it-1}$	0.224*** (0.027)	0.165*** (0.028)	0.150*** (0.028)	0.156*** (0.029)	0.067 (0.105)
$\ln(\text{Employment})_{it-1}$	0.489*** (0.022)	0.378*** (0.023)	0.362*** (0.023)	0.461*** (0.026)	-0.150** (0.069)
$\ln(\text{Investments})_{it-1}$	0.086*** (0.007)	0.084*** (0.007)	0.083*** (0.007)	0.079*** (0.007)	0.128*** (0.019)
Constant	-5.448*** (0.417)	-4.323*** (0.420)	-4.063*** (0.419)	-4.300*** (0.441)	-1.419 (1.568)
2-digit industry dummies	yes	yes	yes	yes	yes
year dummies	yes	yes	yes	yes	yes
Observations	118,096	118,096	118,096	100,159	17,723
Log-likelihood	-53838	-52136	-51902	-48933	-2601
Pseudo R-squared	0.334	0.355	0.358	0.295	0.479
Total number of firms	14,042	14,042	14,042	12,052	1,965

The dependent variable is the probability that a firm exports in time t. Logit estimators are implemented in all models. Firm-level clustered standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4. Probability to export – fixed effects estimates.

VARIABLES	(1) <i>all firms</i>	(2) <i>all firms</i>	(3) <i>all firms</i>	(4) <i>SMEs</i>	(5) <i>large firms</i>
M_{it-1} (dummy)	0.468*** (0.035)	-0.014 (0.054)	-0.144** (0.063)	-0.169** (0.067)	-0.072 (0.217)
$\ln(M^P)_{it-1}$		0.479*** (0.041)	0.341*** (0.054)	0.342*** (0.057)	0.287 (0.183)
$\ln(M^C)_{it-1}$			0.323*** (0.082)	0.356*** (0.088)	0.238 (0.246)
<i>Ownership type</i>					
Reference: independ. firms					
Swedish group $_{it-1}$	0.038 (0.053)	0.038 (0.053)	0.038 (0.053)	0.036 (0.054)	-0.125 (0.298)
Swedish MNE $_{it-1}$	-0.046 (0.104)	-0.084 (0.104)	-0.085 (0.105)	-0.045 (0.112)	-0.349 (0.356)
Foreign MNE $_{it-1}$	-0.204 (0.129)	-0.286** (0.131)	-0.270** (0.131)	-0.342** (0.140)	0.130 (0.429)
Patents $_{it-1}$ (dummy)	0.223 (0.193)	0.188 (0.195)	0.179 (0.196)	0.187 (0.215)	0.257 (0.490)
$\ln(\text{Productivity})_{it-1}$	0.273*** (0.034)	0.257*** (0.034)	0.255*** (0.034)	0.249*** (0.035)	0.215 (0.140)
$\ln(\text{Employment})_{it-1}$	0.784*** (0.033)	0.722*** (0.033)	0.711*** (0.034)	0.725*** (0.035)	0.492*** (0.129)
$\ln(\text{Investments})_{it-1}$	0.073*** (0.008)	0.071*** (0.008)	0.070*** (0.008)	0.063*** (0.008)	0.213*** (0.047)
firm fixed effects	yes	yes	yes	yes	yes
year dummies	yes	yes	yes	yes	yes
Observations	41,839	41,839	41,839	39,448	2,391
Log-likelihood	-15647	-15578	-15570	-14767	-779.8
Pseudo R-squared	0.0510	0.0552	0.0557	0.0520	0.144
Total number of firms	4,465	4,465	4,465	4,208	257

The dependent variable is the probability that a firm exports in time t . Logit estimators with fixed effects are implemented in all models. Robust standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5. Export scope

VARIABLES	(1) <i>all firms</i>	(2) <i>all firms</i>	(3) <i>all firms</i>	(4) <i>SME's</i>	(5) <i>large firms</i>
M_{it-1} (dummy)	0.211*** (0.010)	-0.000 (0.012)	-0.033*** (0.012)	-0.003 (0.014)	-0.169*** (0.037)
$\ln(M^P)_{it-1}$		0.186*** (0.005)	0.149*** (0.007)	0.132*** (0.009)	0.197*** (0.011)
$\ln(M^C)_{it-1}$			0.081*** (0.009)	0.054*** (0.012)	0.135*** (0.015)
<i>Ownership type</i>					
Reference: independ. firms					
Swedish group $_{it-1}$	0.031*** (0.011)	0.032*** (0.011)	0.031*** (0.011)	0.007 (0.012)	0.108*** (0.027)
Swedish MNE $_{it-1}$	0.050*** (0.013)	0.036*** (0.013)	0.032** (0.013)	0.020 (0.016)	0.122*** (0.025)
Foreign MNE $_{it-1}$	0.013 (0.014)	-0.017 (0.014)	-0.019 (0.014)	-0.031 (0.020)	0.082*** (0.025)
Patents $_{it-1}$ (dummy)	0.019* (0.010)	0.003 (0.010)	0.003 (0.010)	0.013 (0.021)	0.007 (0.011)
$\ln(\text{Productivity})_{it-1}$	0.083*** (0.006)	0.070*** (0.006)	0.067*** (0.006)	0.082*** (0.008)	0.043*** (0.009)
$\ln(\text{Employment})_{it-1}$	0.248*** (0.006)	0.187*** (0.006)	0.179*** (0.006)	0.314*** (0.009)	0.091*** (0.009)
$\ln(\text{Investments})_{it-1}$	0.025*** (0.002)	0.023*** (0.002)	0.023*** (0.002)	0.018*** (0.002)	0.029*** (0.003)
Constant	- 0.423*** (0.088)	-0.174** (0.085)	-0.134 (0.085)	- 0.451*** (0.113)	0.088 (0.146)
firm fixed effects	yes	yes	yes	yes	yes
year dummies	yes	yes	yes	yes	yes
Observations	88,586	88,586	88,586	71,257	17,329
Log-likelihood	-149492	-148878	-148838	-104477	-44058
Number of firms	9,644	9,644	9,644	7,798	1,846

The dependent variable is the number of different products exported by a firm in time t . Negative binomial estimators with fixed effects are implemented in all models. Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6. Imports by Broad Economic Category

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Probability to export (cross section)			Probability to export (fixed effects)			Export scope (fixed effects)		
	<i>all firms</i>	<i>SMEs</i>	<i>large firms</i>	<i>all firms</i>	<i>SMEs</i>	<i>large firms</i>	<i>all firms</i>	<i>SMEs</i>	<i>large firms</i>
M_{it-1} (dummy)	0.464*** (0.051)	0.515*** (0.056)	-0.113 (0.162)	-0.069 (0.063)	-0.094 (0.067)	-0.009 (0.220)	0.020 (0.012)	0.041*** (0.013)	-0.098*** (0.037)
$\ln(M^P_intermediates)_{it-1}$	0.427*** (0.043)	0.395*** (0.046)	0.652*** (0.110)	0.321*** (0.046)	0.300*** (0.048)	0.533*** (0.162)	0.116*** (0.006)	0.108*** (0.008)	0.153*** (0.011)
$\ln(M^P_consumption)_{it-1}$	-0.001 (0.044)	-0.013 (0.048)	0.226** (0.115)	-0.050 (0.055)	-0.030 (0.059)	-0.141 (0.156)	0.031*** (0.005)	0.010 (0.008)	0.056*** (0.008)
$\ln(M^P_capital)_{it-1}$	0.440*** (0.048)	0.486*** (0.052)	0.083 (0.113)	0.159*** (0.053)	0.169*** (0.056)	0.062 (0.164)	0.040*** (0.005)	0.067*** (0.007)	0.013* (0.008)
$\ln(M^c)_{it-1}$	0.830*** (0.068)	0.801*** (0.075)	1.095*** (0.154)	0.335*** (0.080)	0.379*** (0.086)	0.069 (0.239)	0.082*** (0.009)	0.050*** (0.011)	0.141*** (0.015)
<i>Ownership type (reference: independ. firms)</i>									
Swedish group $_{it-1}$	0.193*** (0.036)	0.185*** (0.037)	-0.277 (0.214)	0.038 (0.053)	0.036 (0.054)	-0.131 (0.299)	0.032*** (0.011)	0.006 (0.012)	0.110*** (0.027)
Swedish MNE $_{it-1}$	0.445*** (0.065)	0.427*** (0.071)	0.363 (0.240)	-0.086 (0.105)	-0.048 (0.112)	-0.332 (0.357)	0.032** (0.013)	0.019 (0.016)	0.121*** (0.025)
Foreign MNE $_{it-1}$	0.250*** (0.081)	0.223** (0.089)	0.241 (0.260)	-0.269** (0.131)	-0.338** (0.140)	0.084 (0.430)	-0.021 (0.014)	-0.038* (0.020)	0.081*** (0.025)
Patents $_{it-1}$ (dummy)	0.745*** (0.161)	0.787*** (0.177)	0.578 (0.368)	0.169 (0.196)	0.180 (0.215)	0.255 (0.498)	0.000 (0.010)	0.012 (0.021)	0.006 (0.011)
$\ln(\text{Productivity})_{it-1}$	0.150*** (0.028)	0.157*** (0.029)	0.073 (0.105)	0.254*** (0.034)	0.248*** (0.035)	0.224 (0.143)	0.066*** (0.006)	0.081*** (0.008)	0.042*** (0.009)
$\ln(\text{Employment})_{it-1}$	0.357*** (0.023)	0.458*** (0.026)	-0.148** (0.069)	0.710*** (0.034)	0.724*** (0.035)	0.490*** (0.129)	0.176*** (0.006)	0.310*** (0.009)	0.089*** (0.009)
$\ln(\text{Investments})_{it-1}$	0.082*** (0.007)	0.078*** (0.007)	0.127*** (0.019)	0.071*** (0.008)	0.063*** (0.008)	0.208*** (0.047)	0.023*** (0.002)	0.018*** (0.002)	0.029*** (0.003)
Constant	-4.052*** (0.418)	-4.303*** (0.441)	-1.497 (1.553)	-	-	-	-0.101 (0.085)	-0.430*** (0.112)	0.136 (0.146)
year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	118,096	100,159	17,723	41,839	39,448	2,391	88,586	71,257	17,329
Log-likelihood	-51792	-48822	-2593	-15559	-14760	-774.5	-148800	-104436	-44042
Pseudo R-squared	0.359	0.297	0.481	0.0564	0.0525	0.150			
Total number of firms	14042	12052	1965	4,465	4,208	257	9,644	7,798	1,846

The dependent variable in columns (1) to (6) is the probability that a firm exports in time t . The dependent variable in columns (7) to (9) is the number of different products exported by a firm in time t . In columns (1) to (6) logit estimators are implemented. In column (7) to (9) negative binomial estimators are implemented. In columns (1) to (3) 2-digit sector dummies are included. In columns (4) to (9) fixed effects at the firm level are included. Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$