

Local and Sectoral Import Spillovers in Sweden

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Abstract

The import side of trade has received in general, relatively less attention in the International Trade literature, and, this tendency carries over to the study of spillovers. The effect of peers located in the same region or operating in the same industry on firms' international trade participation decisions has mainly been studied from the exporter's perspective. This paper instead, studies the relevance of *import spillovers* on a given firm's decision to start importing a specific intermediate good from a specific source market. I therefore contribute to the well established literature on export spillovers by providing evidence on the existence, the importance and the nature of such a mechanism for import activities. This is one of only a handful of papers dealing with import spillovers and the first to do so for an industrialized economy. Having access to an exceptionally detailed dataset I am able to look at a broad set of questions that allow me to go further in the study of informational transactions across firms in the same area. I find that the nature of the import spillovers is specific to the product and the source market from which it is imported. Moreover, I find evidence of spillovers both at the regional but also the sectoral level suggesting that information relevant to the import decision is not locally bounded but also transmitted through intra-sectoral channels. Larger firms seem to benefit more from the presence of other importers in the area and so is true for firms that source intermediates from less accessible markets.

1 Introduction:

A well known finding in the "*new new*" trade literature is that firm characteristics matter for firms' participation in international activities. Both exporting as well as importing involve significant fixed entry costs that only the most productive firms can afford to incur.

A significant part of the costs associated with importing can be thought of as informational transaction costs. These, include costs related to acquiring information about the availability, prices and quality of foreign intermediates, the specific technical characteristics of these goods and their compatibility with the firm's production process and its workers' skills, identifying potential suppliers

and verifying their credentials as well as familiarizing with a different business environment and the conditions of contract enforcement. in a foreign country.

This paper,explores whether the presence of established importers located in the same area and/or operating in the same industry influences the import decision of Swedish manufacturing firms. I build on the idea that the agglomeration of importers in a certain region/industry may generate important information about sourcing inputs from abroad that can be used by other firms, lowering the fixed costs related to importing and hence facilitating their decision to follow suit. The argument is that spatial proximity (or industrial affinity) to established importers enhances a firm's access to import-relevant information and knowledge, thus reducing entry costs. This may occur through both market and non-market interactions. Market interactions refer to the fact that the increased presence of importers in an given region may attract sectors providing auxiliary services, trade intermediaries but also public interventions that improve existing infrastructure facilitating importing activities. Other examples are cost sharing and risk mutualization between importers. On the other hand, non-market interactions refer to the informal diffusion and exchanges of import-specific information and knowledge from more experienced importers towards firms that consider the decision to start sourcing intermediates from abroad.¹

Although in this context, following the literature, I define spillovers as the transfer of knowledge between the importing and non-importing firms occurring through informal channels what I am actually capturing in the estimation process is the net effect of positive market as well as non-market externalities but also competition².

What I contribute, is in fact an extension to the rich literature on export spillovers³. The import side of trade has received in general, relatively less attention in the literature, and, this tendency carries over to the study of spillovers. The effect of peers located in the same region or operating in the same industry on firms' international trade participation decisions has mainly been studied from the exporter's perspective.

There are however reasons to believe that import spillovers are indeed a relevant phenomenon. First of all, trade in intermediate goods has grown to be a salient part of global trade representing more than half of the global volume of trade flows. Moreover, trade in intermediates is known to be a vehicle of knowledge transfers across the borders. Understanding the determinants of the decision to import intermediates is therefore both important and interesting since access to a wider variety of intermediates or to intermediates of higher quality is known to translate into productivity gains for firms as documented

¹As it is common in the export spillover literature as well, I will not be assuming anything about the established importer's intention of transferring information.

²Firms will be competing for the local inputs, crowding out each other on trading facilities but also competing for suppliers etc.

³Aitken et al. (1997), Greenaway and Kneller (2008), Koenig (2009), Koenig et al. (2010), Karpaty and Kneller (2010), Andersson and Weiss (2012), Bernard and Jensen (2004), Barrios et al. (2003) etc. but also Krautheim (2013) and Rauch and Watson (2003) on the theoretical side.

in Halpren et al. (2007) but also Kasahara and Rodrigue (2008), Kasahara and Lapham (2012) etc. Last, as opposed to gathering information related to a firm's exporting activities, public interventions (diffusion of information from the Chambers of Commerce and Export Offices) are rare in the case of importing. As a result informal informational transfers across firms may be the only channel for lowering the cost of acquiring information about foreign intermediates.

This is one of only a handful of papers to provide evidence on the existence, the importance and the nature of such a mechanism for import activities, and the first one to do so using data from an industrialized economy. The only other paper dealing with import spillovers being Lopez and Yadav 2010, using Chilean plant-level data.

The empirical analysis is based on an exceptionally detailed dataset of Swedish firms providing information on imports at the product, firm and country of origin level for the period 1998-2011. I estimate a linear probability model with an exhaustive set of fixed and time effects and present a detailed identification strategy where I control for a variety of observed and unobserved heterogeneity in order to identify import spillovers and further explore their nature.

My results point towards confirming the existence of agglomeration effects on the decision to source intermediates from abroad. In more detail, I find that the nature of the import spillovers is specific to the product and the source market from which it is imported. Moreover, I find evidence of spillovers both at the regional but also the sectoral level suggesting that information relevant to the import decision is not locally bounded but also transmitted through intra-sectoral channels. Larger firms seem to benefit more from the presence of other importers in the area and so is true for firms that source intermediates from less accessible markets.

The remaining of the paper is organized as follows. In the next section I describe the data and the restrictions that lead to my working data set. In Section 3, I detail the empirical strategy, discuss the caveats and the ways to deal with estimation concerns as well as the construction of the spillover variables. Section 4 presents the results. Section 5 concludes.

2 The Data:

This paper uses an exceptionally detailed data set supplied by Statistics Sweden (S.C.B.) covering *all* active firms in the Firms' Registry and spanning the period from 1998-2011. The data set provides information about each firm's unique identification number (as well as the unique identification number of its subunits), its location (at the finest level which is the community -Kommun-) as well as information on various firm characteristics (industry classification, ownership category, legal form, international ownership etc.) and firm performance measures (number of employees, value of output produced, net value added, labour costs, input costs etc.) leaving me with a large pool of available con-

trols and opportunities to perform various robustness checks. The data set also specifies information on firms' international activities featuring details about the traded product codes (at an 8 digit classification) and source/destination markets. Using this rather rich data set, I am able to address a broad set of questions and examine different dimensions of the import decision of individual firms.⁴

2.1 Building the data set:

As already mentioned, data on imports (and exports) provide details about the product code (at the 8-digit level), the source country, the weight and value of each transaction⁵. However, the import-export data, provide the identification number of the importing firm but do not specify the exact establishment to which imports are destined. This is naturally a disadvantage when the research question addressed is the analysis of local spillovers, since the local agglomeration variable is constructed as the number of importing neighbors in the vicinity of the firm pondering the import decision, which clearly poses a problem with multi-establishment firms.

Following the literature in the field⁶ there are two ways to deal with this problem. The first and most straightforward is to drop all multi-establishment firms and restrict the data-set to single-plant firms. The second, is to compute the spillover variable in the neighborhood of the headquarters assuming that all importing decisions are taken at the headquarter-level and that all imports end up in the headquarter. Here the former approach is chosen as the benchmark specification. All multi-establishment firms are dropped when constructing the left hand side variable, they are however taken into account when constructing the spillover measures.⁷ What I will be looking at is therefore how proximity to other importing firms affects the decision of individual, *single-establishment* firms to start importing a specific product-source-market combination.

This choice is motivated by at least two reasons. To start with, given that Sweden is a small open economy, not surprisingly, the great majority of firms are single-plant firms. In fact, around 99% of all firms in the Registry are single-plant firms, hence dropping multi-plant firms doesn't incur a great cost in terms of information lost, neither can it be claimed that it alters the data set. The second reason is that the alternative approach relies on reasonable, albeit strong assumptions about the import activity and the organizational structure of the firm.⁸ An alternative approach would be to assume that the decision for each

⁴Having access to a more comprehensive data set I am able to look at a broader set of questions compared to Lopez and Yadav, 2010 (the only other paper on import spillovers) and provide insights not only on the existence of import spillovers but also on their nature (are they for example product and/or destination specific).

⁵or other measure if applicable

⁶Koenig 2009, Koenig et al., 2010

⁷Note however that in each location I consider plants belonging to the same firm as one single entity. Hence in the construction of the spillover variables different plants or activity units of the same firm are only counted once when computing the number of neighbors.

⁸Why would all imports end up in the headquarters?

plant to start importing is taken at the headquarter level hence spillovers matter in the headquarter’s neighborhood. This however implies a frictionless flow of information among the organizational units of the firm. Last but not least, the single-plant firms are more likely to be smaller firms for which spillovers are expected to be more relevant since these are the firms that face the highest informational barriers and are more constrained by the fixed costs.⁹

The distinction between multi-plant and single-plant firms is based on the notion of the ”local kind-of-activity unit”¹⁰. The concept of the local KAU is not exactly that of the plant¹¹ although according to the S.C.B. for most firms these two different entities in fact coincide.

The data-set provides information for *all* firms in *all* sectors. I am only interested in manufacturing firms.¹²

Firms declaring negative sales, registering negative value added or reporting negative or zero employment levels have been dropped from the data.¹³ I further restrict the sample by dropping firms which change location during the period studied given that we don’t know whether this is due to an error or an actual move of the firm.¹⁴ I do the same for firms/plants that change industry over the time period covered. Moreover I want to be sure that the inclusion of firm-product-country fixed effects employed in my baseline specification will be capturing area as well as industry time-invariant, unobserved characteristics.

3 Empirical Strategy:

The identification strategy is to regress a dummy variable indicating whether a firm starts to import a specific intermediate from a specific source market on the spillover variables while controlling for a variety of observed and unobserved factors. More specifically, following Koenig et al. (2010) I am focusing on first

⁹As a robustness check I will perform (at a later stage) the main regressions also for the whole sample, i.e. not excluding multi establishment firms from the construction of the LHS variable. Moreover I will try to identify whether the effect of peers on an individual firm’s decision to start importing originates mainly from single or multi establishment firms and whether the presence of HQ in the firm’s area is a source of greater informational transfers.

¹⁰The term KAU (kind of activity unit or Verksamhetsenhet, VE) groups all the parts of an enterprise contributing to the performance of an activity at a 4-digit level of NACE and corresponds to one or more operational subdivisions of the enterprise. KAUs are the minimum organizational levels for which information about the production value, intermediate consumption, manpower costs, operating surplus, employment and GFCF are available. The term local KAU, refers to the part of the KAU that corresponds to a local unit. The Swedish term is ”Lokal Verksamhetsenhet” (LVE in abbreviation) and the respective data set is to be found in the LVE database in MONA

¹¹which is better summarized by the variable ”Arbetsstallet”, i.e. worksite

¹²The manufacturing sector comprises of SNI (industry classification codes) 10-33 according to the 2007 classification nomenclature revision.

¹³The reasoning behind this is that these observations may in fact not be corresponding to real operating firms and are possibly shadow firms set up for tax avoidance reasons.

¹⁴As far as single-plant firms are concerned then these firms are completely dropped if there is a change in their location. In the case of multi plant firms I only drop the plants that change location.

time importers as the left hand side variable¹⁵. This allows me to distinguish between starters and continuers without having to resort to the controversial practice of adding the lagged import status as a right hand side variable which raises endogeneity concerns.

3.1 Estimation Issues

3.1.1 Omitted Variables:

When studying the importance of import spillovers for the decision of Swedish firms to start importing, the underlying hypothesis is that the local presence of product and country specific importers (i.e. the presence of other firms in the region that are importing the product-source-market combination in question) positively impacts the product and country specific import decision. This is indeed confirmed in the results as they are summarized in Table 4 featuring the baseline specification. In order to be able to derive a causal interpretation from the observed positive relationship between the agglomeration of importers in the area and the decision to start importing, it is necessary to control for all other variables that may lie behind it.

Firm characteristics: We know that firms that are active in international markets (either through importing or through exporting) are different from purely domestic firms along several dimensions. Importers, just like exporters are more productive, operate at a larger scale, are likely to be bigger in terms of employment and pay higher wages. Not controlling for firm characteristics would therefore overestimate the influence of peers on the firms' import decision. I therefore include as right hand side variables a vector of firm characteristics: the firm's productivity (measured as value added per worker), value of production (output), the average number of employees and unit labour costs (wages).

Firms that form part of business groups (either domestically or foreign owned) are more likely to engage in international activities (either importing or exporting), possibly because they enjoy better reputation, better access to finance, and increased bargaining power¹⁶. Established exporters are also more likely to be sourcing foreign intermediate inputs from abroad. I therefore include in the vector of firm characteristics a binary variable indicating whether a

¹⁵The import history of the firm-product-source-market combination in question for firm "i" can be summarized by a sequence of zeroes and units, where zeroes indicate that the firm in question is not importing this specific intermediate from that specific source market at time t . I am interested in the span of the firm's history up to the point that the first unit appears, i.e. up to the point that the firm starts importing the product-source-market combination for the first time. All subsequent stages in the firm's history are dropped from the construction of the LHS variable. Hence at the moment, I am not examining the agglomeration effects on the probability of continuing to import this given combination, neither the agglomeration effects on the probability of reactivation of the import status. While featuring different lengths, all firm histories will in essence be represented by a series of zeroes followed by a single unit.

¹⁶Affiliates are less likely to be liquidity constrained and hence more able to cover the fixed costs related to exporting and/or importing

given firm belongs to a business group and a binary variable indicating whether the firm registers exporting activity.

The inclusion of firm-product-country fixed effects in the preferred specification, through the firm dimension captures all remaining unobserved time-invariant firm level heterogeneity, reflecting inter alia differences in managerial quality, organizational structure, reputation etc. If unobserved characteristics vary over time then assuming that they are orthogonal to other firms' import decisions would alleviate concerns about them affecting the coefficient of spillovers.

Area Characteristics: Exogenous observed and unobserved characteristics of locations such as natural advantages (proximity to the border or the sea) as well as advantages related to the area's infrastructure (transportation networks, proximity to ports and/or airports, availability of logistic facilities, proximity to government services) turn these areas more attractive to firms. In this context, if the agglomeration of import activity is just a consequence of the agglomeration of economic activity in general in a given area, then failing to account for the area's economic importance and innate characteristics will lead to over interpreting the importance of import spillovers in the data. Indeed, as it can be seen in Fig.1 below the geographical concentration of import activity follows a similar pattern as the concentration of the economic activity across Swedish counties. It is therefore crucial to disentangle these effects.

What is more, agglomerated areas are areas where domestic suppliers of intermediates are more likely to be concentrated. Since it is easier, in terms of informational requirements, and also cheaper to source inputs from domestic suppliers it could be that all else equal, in agglomerated areas firms tend to favor domestic intermediates. Hence the economic size of the area operates as a disincentive to import. At the same time, producers in agglomerated areas face larger congestion effects and increased competition for the domestic inputs which could favor the quest of foreign intermediates, encouraging the decision to source intermediates from abroad. Not taking into account the economic size of the area could introduce a positive or negative bias in the estimation of spillovers depending on which mechanism is stronger.

To deal with this concern I include as a control a measure of economic activity, namely total employment in the area. If concentration of import activity is merely the effect of the concentration of economic activity then accounting for the economic magnitude of the area should remove any significance of the import agglomeration variables.

Intensity of Economic Activity by County, 2011

Intensity of Import Activity by County, 2011

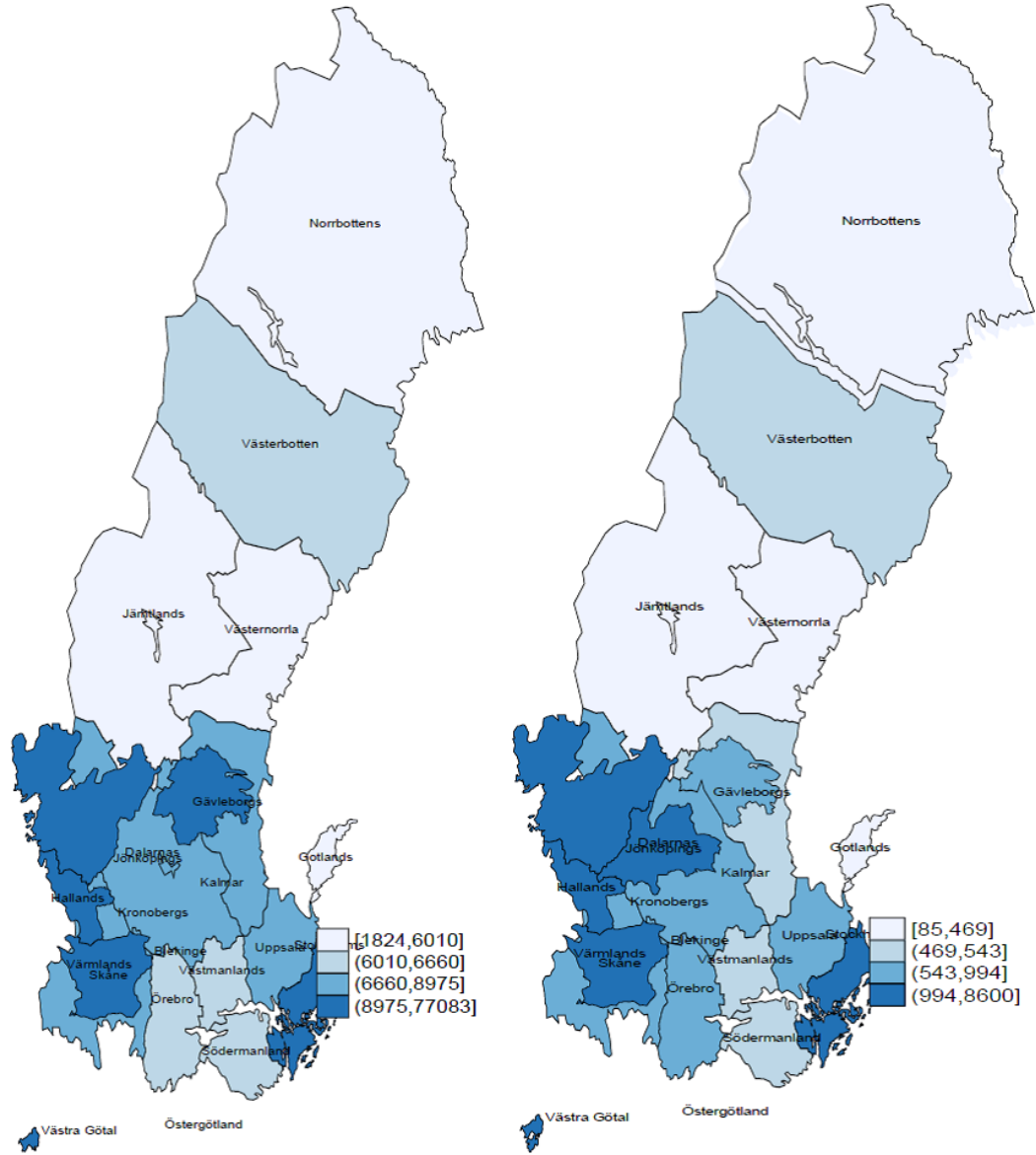


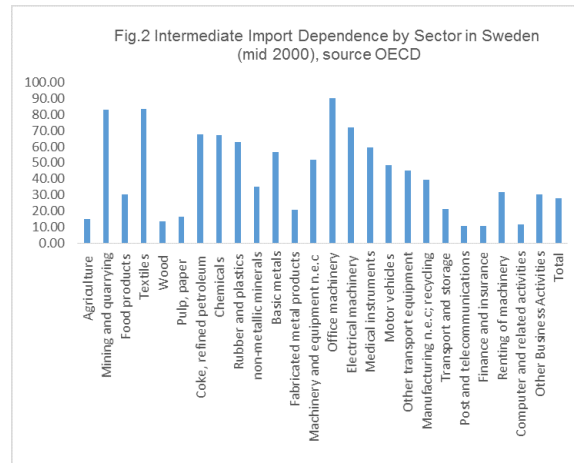
Fig 1. Concentration of economic and import activity in Sweden

Area fixed effects can account for time invariant area characteristics. My preferred specification employs firm-product-country fixed effects. The firm dimension of the triadic fixed effects will also capture all time invariant char-

acteristics of the area in which the firm is located since I have "conveniently" dropped from the sample all firms that have changed location over the period covered.

Respectively, any characteristics that are specific to the area where the firm is seated and the source market, such as lower trade costs reflecting shorter distances, historical and cultural ties etc ¹⁷ are also likely to affect the coefficient of import spillovers. These area-country-specific characteristics will be picked up by the firm-country dimension of the triadic fixed effects.

Industry Characteristics: Similar concerns arise with respect to the industry in which each firm operates. Some industries are more dependent on technologies that rely on the use of foreign intermediates, hence it is both more likely to have a larger pool of established importers operating in these industries but also it is more likely that a firm operating in such industry engages into importing at some point. This is illustrated in Fig.2. below which features the intermediate import dependence (i.e. the share of imported intermediates) by sector, for the Swedish economy.



The firm dimension of the triadic fixed effects should capture time invariant industry attributes as well since firms that report an industry switch during the period covered in the data have also been dropped from the sample.

Moreover, one should also account for the economic importance of the industry in order to make sure that what is being captured is the agglomeration effects and not the country's specialization in a given industry for reasons not related to the agglomeration variables of interest.

Common shocks: Changes in the EU's trade policy, exchange rate movements, supply shocks in the source markets as well as industry specific shocks

¹⁷for example the south of Sweden may have a natural advantage in doing business with Denmark

that vary with time should also be controlled for because they could be confounded with the presence of agglomeration economies. An appreciation of the Swedish krona vis a vis the Euro, would for example boost imports of intermediates from Euro-Area countries and make it possible even for marginal¹⁸ firms to start sourcing intermediates from these countries. This would simply reflect a response to some common shock though and not the result of agglomeration forces. In order to establish whether the observed positive relationship between the presence of other importers in the area and/or industry and the individual firm’s decision to start importing is due to informational externalities I include time effects in order to capture shocks that are common to all industries and regions, a common practice in the literature of spillovers.¹⁹ I also allow for common time effects to have a regional and an industry dimension by adding time dummies that vary for different regions and industries to account for industry-specific and region-specific shocks. In the already rich set of time effects I further include time effects with a product-source market dimension to accommodate shocks related to the specific product-source market combination.²⁰

As a further exercise, following Greenaway and Kneller 2008, in section 4.3 I separate the agglomeration effects of contemporaneous versus established importers.

3.1.2 Endogeneity Concerns

Reverse Causality: We know that the direction of the causality between an individual firm’s decision to start importing and the firm’s productivity is not straightforward. The literature on imports provides evidence both in favor of a selection mechanism (only the most productive firms are able to cover the fixed costs associated with sourcing intermediates from abroad) but is also supportive of the existence of “learning by importing” advocating that by gaining access to a wider range of intermediates firms realize productivity gains (Halpren et al., 2007 etc).

Similar concerns arise with respect to other firm characteristics²¹. Reverse causality could also be an issue with respect to the spillover variables, were the import activity of the other local firms to depend on the import behavior of the firm in question. This is a typical problem faced in the assessment of peer effects.

Simultaneity: Unobserved supply-side or demand shocks could affect both the observed firm characteristics as well as the firm’s decision to import in-

¹⁸i.e. with productivity on the cutoff

¹⁹see Greenaway and Kneller 2008, Karpaty and Kneller 2010, Koenig et al., 2009 add more references papers.

²⁰The Fukushima earthquakes are an example of such a shock that affected imports of automotive parts and components from Japan.

²¹Are bigger, in terms of employment firms more likely to be importers or do firms that engage into importing expand their employment?

intermediates from abroad. A negative demand shock in the firm’s domestic or export markets for example, could lead the firm to reduce its employment but also cut down on sourcing intermediates as a way to downscale its production.

In order to address these endogeneity issues I lag all right-hand-side variables, including spillovers by a year. ²²

3.2 The Spillover Variables:

The import spillover variables are constructed at a detailed regional and sectoral level. The regional disaggregation is the county level ²³ and the manufacturing disaggregation is the 4-digit product nomenclature, which leaves us with 1221 distinct product codes. For each firm i , seated in region r and operating in industry k at time t four different measures of spillovers are defined: The *general spillover* (the number of other importing firms in the county, importing any good from any source market), the *origin-specific spillover* (the number of other firms in the county importing any intermediate from the same source market), the *product-specific spillover* (the number of other importing firms in the county importing the same intermediate from any source market) and the *product-and-origin-specific spillover* (the number of other firms in the county importing the same intermediate from the same source market). Counting the number of firms in a certain region or industry to proxy for agglomeration effects of information spillovers is common practice in the urban economics literature (Lopez and Suedekum, 2009). Each spillover measure is associated with different assumptions regarding the *nature* of informational exchanges between firms that are thought to lower the individual entry costs in the import market facilitating firms’ import decisions.

The general spillover variable treats the information related to the importing decision as homogeneous, i.e. not attached to a specific product or country of origin. Observing other importers in your neighborhood or industry, irrespective of what they import and where they source it from is assumed give rise to information that is relevant for the firm’s product and country specific import decision. The underlying assumption is that the informational barriers that are related to entry in the import markets are of rather general nature. The idea here is that by observing its neighbor that imports screws from Nigeria a given firm gains access to information that is relevant for its decision to import a 3D printer from Norway.

The underlying assumption in the origin-specific spillover is that the import-relevant information concerns specific origin market characteristics (general availability, price level and quality of intermediates, credentials of local suppliers, business climate and contracting environment, bilateral business relations and trade bureaucracies etc) and although it is transferrable across products it is not necessarily transferrable across markets. Therefore, observing other importers

²²This, although being a common practice in the spillovers literature does not fully alleviate endogeneity concerns since there remains the possibility that some firms react with a lag

²³There are 21 counties in Sweden

in the firm’s neighborhood that source intermediates from a particular market affects the individual decision to start importing (any good) from that country.

The product-specific spillover on the other hand, assumes that the import-relevant information is bound to specific product characteristics (technological requirements, energy standards, production compatibility, workforce skill requirements etc.) and is not necessarily transferrable from one product to another. Observing other importers in the firm’s neighborhood or industry that import a particular good affects the individual decision to start importing that good irrespective of the source market.

The product-and-country specific spillover variable makes the strongest assumptions regarding what information is relevant when individual firms consider to start importing a specific intermediate from a specific source market. The relevant information is assumed to concern both product as well as origin market characteristics and is thus obtained by observing only other firms that import the same intermediate from the same country. This information is considered to be attached to a product-origin combination and not transferrable across different product-country pairs.

In the baseline approach I am looking at regional spillovers and assessing the importance of importing neighbors on the firm’s import decisions irrespective of the industry in which they operate. The assumption here is that physical proximity is crucial for the successful transmission of the import-relevant information. The channels through which this information is transmitted are considered to be local in nature. In section 4.2 we further explore whereas the transmission channels are of local or sectoral nature by separating the agglomeration effects of importers that are located in the same county and operate in the same industry from the effect of firms that are located in the same county but operate in different industries.

4 Results

The identification of spillovers on the decision to start importing relies on the estimation of a linear probability model.

$$\text{Prob}(M_{irkgt} = 1) = \alpha X_{it} + \beta_1 \text{empl}_{rt} + \beta_2 \text{GenSpill}_{it} + \beta_3 \text{ProSpill}_{it} + \beta_4 \text{LandSpill}_{it} + \beta_4 \text{ProdLamdSpill}_{it} + \delta_{igj} + \delta_t + \delta_{rt} + \delta_{kt} + \delta_{gjt} + \epsilon_{irkgt}$$

Where M_{irkgt} is equal to one if firm i located in region r and operating in industry k is importing good g from country j at time t . X_{it} represents the vector of firm characteristics discussed previously.

Since the left-hand-side variable is the probability that an individual firm starts to import (for the first time), whereas the spillover variables of interest are aggregated at the regional and sectoral level, errors are clustered at the *intersection of the area level and industry classification* to deal with the possibility of misleadingly small resulting standard errors.²⁴

²⁴Regressing individual variables on aggregate variables is known to introduce a downward

All regressions include *triadic firm-product-country fixed effects*. As detailed in Section 3, the triadic firm-product-country fixed effects allow to control for inter-firm heterogeneity within a given area and industry, as well as for firm-country and firm-product heterogeneity. Area and industry time-invariant characteristics are captured by the firm dimension of the triadic fixed effects since firms that switch location and/or industry have been dropped from the sample. The product-country dimension of the triad allows to control for mean effects in each product line as well as for the market conditions in the source countries. The only remaining variability is in the time dimension within a given firm-product-country triad. What I am estimating is therefore the effect of a change in the agglomeration variables over time with respect to the average level of agglomeration over the entire studied period, on the decision to start importing, at the firm-product-country level.

To deal with the risk of confounding factors (i.e. responses to common shocks), the benchmark specification also includes time effects, time effects with industry and sectoral dimension, but also time effects that are allowed to vary along the product-country pair dimension. All right hand side variables are lagged by one period (year) to deal with endogeneity and simultaneity concerns, whereas all non-binary right hand side variables, except for the spillover variables, are expressed in natural logarithms. Spillover variables are used in levels. In section 4.5.2 I further address this point by investigating whether the effect of spillovers satisfies a linear relationship.

4.1 Identifying spillovers on individual firms decision to start importing:

The main estimation results on the identification of import spillovers on the individual decision to start importing at time t are presented in Table 1. The left hand side variable summarizes the most specific import decision i.e. the decision to start importing a certain input from a certain source market. In columns (1) to (5) regressions are performed employing gradually more specific spillover measures.

In column (5), all four measures of spillovers (general, product specific, country specific, product and country specific) are used simultaneously in the regression. The necessity for this is dictated by the nature of the Linear Probability Model.²⁵ We explore whether the effect of neighbors on the decision to start

bias in the estimation of standard errors leading to erroneous conclusions regarding the significance of coefficients, Moulton (1990)

²⁵The nature of the import decision implies that the unconditional probabilities of more specific decisions depend on the more general spillover variables that affect the unconditional probabilities of more general in nature import decisions. Hence, the unconditional probability of the decision to start importing a particular input from a certain source market faced by an individual firm depends not only on the product and country-specific spillover variable but also on the product-specific and the country-specific spillovers that affect the unconditional probability of the decisions to start importing a particular good and the decision to start importing from a given market respectively, but also from the most general spillover mea-

importing remains when surrounding firms import different product lines from different source markets. This will allow us to draw conclusions on the nature of the informational costs that accompany the decision to start importing.

In columns (6) and (7) I add more controls, namely firm's productivity, measured as value added per worker and a measure of economic activity of the area (total employment). All firm characteristics included in the regressions feature coefficients of the expected sign. Among the spillover variables, only the most specific one (i.e. the product-and-country specific spillover) is of the expected sign and significant at the 1% level. Results suggest that only information acquired by observing firms in the same county that import the same intermediate from the same source market is relevant and facilitates the firm's decision to start importing this product-source market combination. One additional neighbor importing the same intermediate from the same source market increases the probability that a given firm starts importing the same product-country combination at time t by 0.2%. Interestingly, more general measures of spillovers enter significantly at the 1% level, but with negative signs and rather small coefficients. Since what we are in fact capturing here with the term spillover is a *net effect*, negative signs should be interpreted as suggesting that the informational gains are not important enough to counterbalance the competition and congestion effects related with the concentration of other importers in the area. The magnitude and significance of the product-and-country-specific spillover coefficient is not affected by the inclusion of time effects with regional and sectoral dimension (column 8) and product-source-market dimension (column 9) that are thought to capture the incidence of common shocks of different types as discussed above. Column 9 of Table 1 represents my baseline specification.

The explanatory power of a variable also depends on its own variability. In the bottom of Table 1, "betasd" informs us that if the number of neighbors that import a given product-source-market combination increases by one standard deviation with respect to its mean, then the probability that a given firm in a given year starts importing that product-source-market combination increases by 0.48 percentage points.

sure that affects the unconditional probability of the most general in nature import decision. Hence the use of the Linear Probability Model potentially poses issues with the identification. One could look at the conditional probabilities but a linear model for the unconditional probabilities implies a non-linear model for the conditional probability. If we are therefore to use a conditional model we should turn to one whose properties don't change once looking at conditional probabilities like for example the logit or probit. Instead in the baseline specification, summarized by column (4) I stick to the use of the Linear Probability Model but all the spillover variables (from there most general in nature to the most specific, i.e. the product and country specific spillover, are included in the regression.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(employees)	0.002 (0.004)	0.001 (0.004)	0.013** (0.004)	-0.001 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)		
ln(average wage)	(0.015)***	(0.015)***	(0.015)***	(0.015)***	(0.015)***	(0.012**)	(0.012**)	(0.011**)	(0.011**)
export status	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.016** (0.006)	0.016** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)				
ln(productivity)						0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment in the County)							-0.001	-0.006	-0.007
General Spillover	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)
Product-Spillover		-0.000 (0.000)		-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Country-Spillover			-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Product-Country Spillover				0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Observations	876,069	876,069	876,069	876,069	876,069	876,069	876,069	876,069	876,069
# of firm-product-country triads	148,737	148,737	148,737	148,737	148,737	148,737	148,737	148,737	148,737
Adjusted R squared	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
time effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-industry effects	no	no	no	no	no	no	no	yes	yes
year-country effects	no	no	no	no	no	no	no	yes	yes
firm-product-country FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-product -country FE	no	no	no	no	no	no	no	no	yes
clustering	county and sector								
betasd					0.474	0.475	0.475	0.476	0.479
betanorm					0.759	0.761	0.761	0.762	0.768

Table 1: Identifying Import Spillovers.

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The General Spillover refers to the number of *other* importers in the area (across products and source markets). The Product Spillover refers to the number of *other* importers in the area importing the same product (across source markets). The Country Spillover refers to the number of *other* importers in the area importing from the same source market (across products). The Product and Country Spillover refers to the number of *other* importers in the county that import the same product from the same source market. betasd is the coefficient of the Product and Country Spillover adjusted for a standard deviation change. betanorm is the coefficient of the Product and Country Spillover, adjusted for the general ex ante probability of being an importer (27 per cent). betasd and betanorm are expressed in percentages.

4.2 Are spillovers primarily regional or sectoral?

In Table 2, I further explore the existence of import spillovers by investigating whether agglomeration effects operate mainly through physical proximity or industrial affinity. In other words, I am interested in seeing whether the relevant group of peers that contributes to lowering informational barriers and thus promoting a given firm's import decision is that of a firm's neighbors (other firms in the county) or that of other firms in the same industry and hierarchize the importance of intra-industry links over the importance of regional ties. In the first column I repeat again the baseline specification (Column 9 of Table 1) to serve as a benchmark for comparisons.

In column 2, I decompose the regional product and country specific spillover

according to whether neighboring firms also operate in the same industry. Given that information regarding imports of intermediates is highly specialized, one would expect that the gains from observing other firms in the same industry and area are of greater importance in determining the import decision. The coefficients of the number of firms in the same county and industry that import the same product-source market combination and the number of firms in the region but a different industry that import the same product-source market combination suggest that this is not the case however. Only the latter enters significantly. This is likely to reflect increased competition and congestion effects at the intersection of the industry and regional level. Within the industry, bigger firms and firms with higher bargaining power able to negotiate tailor-made or exclusive contracts with suppliers in some markets may be in a position to crowd out smaller firms from these markets. What is more, competition for specialized labour in the region will also drive wages up making it harder for the marginal firms to source intermediates from abroad despite the diffusion of relevant information that lowers barriers to entry. The above reasons may explain why the effect of agglomeration on the import decision seems to be coming from other importers in the same county but different industry.

In the third column, I also add in the regression the number of firms operating in the same industry but located in different counties that import the same product-source market pair. This term is also highly significant although its importance in terms of magnitude appears to be smaller. This result suggests that neighbors are not the only relevant group of peers through which spillovers operate. However physical distance seems to play a role in the diffusion of information with local spillovers prevailing over non local sectoral ones. Indeed, Column 3 provides evidence on the existence of industry-wide Information spillovers.

Column 4, further includes the number of importing firms of a given product-source-market combination that are located in different counties and operate in different industries. This term enters significantly and with a negative sign, the coefficient is though very small.

VARIABLES	(1)	(2)	(3)	(4)
ln(employees)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)
ln(average wage)	(0.011)** (0.005)	(0.011)** (0.005)	(0.011)** (0.005)	(0.011)** (0.005)
(0.005)				
export status	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.017** (0.006)	0.017** (0.006)	0.017*** (0.006)	0.017*** (0.006)
ln(productivity)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment in the County)	-0.006 (0.048)	-0.006 (0.048)	-0.006 (0.048)	-0.006 (0.048)
Product-Country Spillover	0.002*** (0.000)			
Product-Country Spillover (same industry - same county)		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Product-Country Spillover (other industry - same county)		0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Product-Country Spillover (same industry - other county)			0.001*** (0.000)	0.001* (0.000)
Product-Country Spillover (other industry - other county)				-0.000*** (0.000)
Observations	876,069	876,069	876,069	876,069
# of firm-product-country triads	148,737	148,737	148,737	148,737
Adjusted R squared	0.277	0.277	0.277	0.277
time effects	yes	yes	yes	yes
year-industry effects	yes	yes	yes	yes
year-country effects	yes	yes	yes	yes
firm-product-country FE	yes	yes	yes	yes
year-product-country FE	yes	yes	yes	yes
clustering	county-sector	county-sector	county-sector	county-sector
betasd	0.477			
betanorm	0.762			

Table 2: Are spillovers local or industry-wide?.

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The Product and Country Spillover refers to the # of *other* importers in the county that import the same product from the same source market. betasd is the coefficient of the Product and Country Spillover adjusted for a standard deviation change. betanorm is the coefficient of the Product and Country Spillover. adjusted for the general ex ante probability of being an importer (27 %). betasd and betanorm are expressed in percentages.

4.3 Understanding further the nature of product and country specific spillovers:

In our baseline specification, as presented in Table 1, the study of the agglomeration effects on the firm's decision to start importing treats all neighbors as identical. There are however several reasons why agglomeration effects may differ according to the characteristics of the other importers in the area. I in-

investigate this point in Table 3, where the product and country specific spillover variable is decomposed along such differences. The first column, replicates the baseline specification (Table 1 column 9).

In the second column, following Greenaway and Kneller, 2007, I separate the agglomeration of importing firms according to when entry in the import market occurred, i.e. when the other firms in the area started importing the same product-source-market combination. I hence decompose the product-and-country-specific spillover and separate between "old" (established) and "new" (contemporaneous) importers²⁶. There are indeed reasons to believe that agglomeration effects may differ between "old" and "new" importers. If the gains from information spillovers decay over time then the information held by "new" importers will be more relevant for entry in the current period. On the other hand, "old" importers have more experience and their long-standing presence in the markets conveys information about the reliability of their suppliers and the quality credentials of the intermediates. Both "contemporaneous" and "old" importers enter significantly (at the 1% level), established importers however, have a stronger effect on the probability of entry compared to contemporaneous entrants. This exercise yields us important insight regarding how the gains from information spillovers evolve over time, but it also serves in distinguishing to what extent what we observe is the response to some common shock or the result of agglomeration forces on the decision to import.

Old and new importers may have different effects on a given firms' decision to start importing for reasons not related to the non-market informational externalities studied here. More specifically, it is possible that the effect of contemporaneous entrants may in fact reflect confounding factors like the response to exogenous common shocks such as exchange rate movements, policy changes, foreign demand or supply shocks etc., as it has been pointed out in Section 3 where I addressed the main estimation concerns associated with the identification of agglomeration effects on the import decision. If results were mainly driven by contemporaneous entrants then this finding would raise concerns that what is actually being captured is indeed the response to common shocks. Our results, suggesting that most of the effect comes through established importers alleviate such concerns. What is more, the inclusion of an extensive set of period effects further reassures us that our results are indeed driven by information externalities and don't reflect favorable changes that encourage more firms to start importing that particular good from that given source market.

In the third column, I explore whereas agglomeration effects are different depending on whether the neighboring importers of the particular product-country combination are also active on the export markets. Results are robust to the separation between exporting and non-exporting neighbors and both enter as significant determinants of the product-and-country specific import decision at the 1% level. The coefficient for non-exporters is however more than two times

²⁶Note that in the construction of the contemporaneous importers spillover variable, I do not distinguish between first-time importers and firms that reactivate their product-and-country-specific import status

higher compared to the respective coefficient for firms with joint international status. When interpreting this finding, we should remind ourselves that what we actually pick up here is in fact a *net* effect. Firms with joint international status, i.e. firms that both import and export tend to be more productive and larger both in terms of employment size but also in terms of production. Therefore, it might be the case that the net effect stemming from the agglomeration of exporters is of lower magnitude because the competition faced by these firms is more intense. These firms are likely to have increased bargaining power and crowd out smaller firms from the respective markets. Moreover congestion and competition for the local factor of production is also likely to disproportionately arise from the presence of such firms in the area.

The last column, presents the results when the agglomeration of importing firms is separated according to their single-plant status. Only the number of other single plant importers of the same intermediate imported from the same source market appears to affect significantly the decision to start importing that particular product-country combination. This result could also reflect higher competition and congestion coming from multi-plant neighbors.

VARIABLES	(1)	(2)	(3)	(4)
ln(employees)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)
ln(average wage)	(0.011)** (0.005)	(0.011)** (0.005)	(0.011)** (0.005)	(0.011)** (0.005)
(0.005)				
export status	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.017** (0.006)	0.016** (0.006)	0.017*** (0.006)	0.017*** (0.006)
ln(productivity)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment in the County)	-0.006 (0.048)	-0.008 (0.048)	-0.006 (0.048)	-0.006 (0.048)
Product-Country Spillover	0.002*** (0.000)			
Product-Country Spillover (old importers)		0.006*** (0.001)		
Product-Country Spillover (new importers)		0.001*** (0.000)		
Product-Country Spillover (exporters)			0.002***	
Product-Country Spillover (non-exporters)			0.005*** (0.002)	
Product-Country Spillover (single-plant)				0.002***
Product-Country Spillover (multi-plant)			(0.010)	0.007
Observations	876,069	876,069	876,069	876,069
# of firm-product-country triads	148,737	148,737	148,737	148,737
Adjusted R squared	0.277	0.277	0.277	0.277
time effects	yes	yes	yes	yes
year-industry effects	yes	yes	yes	yes
year-country effects	yes	yes	yes	yes
firm-product-country FE	yes	yes	yes	yes
year-product-country FE	yes	yes	yes	yes
clustering	county-sector	county-sector	county-sector	county-sector
beta _{s,d}	0.476			
beta _{n,orm}	0.762			

Table 3: Further unbundling the Product and Country Spillover: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The Product and Country Spillover refers to the #of *other* importers in the county that import the same product from the same source market. betas_d is the coefficient of the Product and Country Spillover adjusted for a standard deviation change. betanorm is the coefficient of the Product and Country Spillover. adjusted for the general ex ante probability of being an importer (27 %). betas_d and betanorm are expressed in percentages.

4.4 Differences in the ways individual firms perceive spillovers

According to the results presented in Columns 2-4 in Table 4, there is evidence of heterogeneity in the effect of the presence of other importers in the neighborhood on the import behavior of Swedish firms for firms of different sizes. Column 1, as usual, replicates the baseline specification. In Column 2, I interact the spillover variable with the firm's size (i.e. the ln) of number of its employees). The

interactive term enters significantly suggesting that agglomeration effects are stronger for firms of higher employment classes. In the next two columns I run separate regressions for firms with less than 25 employees and for firms with more than 25 employees. The employment cutoff of 25 employees used, represents the mean size of Swedish firms. The agglomeration effects are clearly stronger for firms above the mean employment level but the product and origin specific spillover is highly significant in both cases. For firms with less than 25 employees the presence of one additional importer of the same product - source market combination in the area increases the probability that a given firm in the area will start importing the same product - source market pair by 0.1% whereas for firms with more than 25 employees the respective probability increases by 0.2 percentage points. The interpretation of this finding is that the net effect of agglomeration is positive both for bigger and smaller firms but stronger for bigger firms suggesting that either there is something inherent to size, that turns firms of higher size classes more capable of absorbing the informational spillovers or again that bigger firms are less challenged by their peers.

In Column 5, the product and origin spillover variable is interacted with the measure of firm performance (i.e. productivity, defined as the value added per worker) to explore whether there is evidence of heterogeneity in the agglomeration effects on the Swedish firms import decision for firms of different productivity levels. I find no evidence for such claim.

In column 6, I include in the regression, a measure of import diversity at the area level, in other words the number of distinct product codes imported in the region. In column 7, I am interacting the spillover variable with a firm-level measure of import diversity, the number of other source markets from which the product in question is imported. This variable captures accumulated experience and product-related information that may be increasing a given firm's capacity to absorb the information provided by its neighbors as well as scope economies across different source markets. In column 8 instead, I interact the number of other products imported from the same source market, capturing origin-specific information or scope economies across products. These two interaction terms fail to enter significantly. Hence product-related as well as source-market related firm own experience don't seem to have an effect on the way firms are utilizing informational externalities.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			<25 employees	>25 employees					
ln(employees)	0.002 (0.004)	0.001 (0.004)	0.013** (0.004)	-0.001 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	(0.004)	(0.004)
ln(average wage)	(0.015)** (0.004)	(0.015)** (0.004)	(0.015)** (0.004)	(0.015)** (0.004)	(0.015)** (0.004)	(0.012)** (0.005)	(0.012)** (0.005)	(0.011)** (0.005)	(0.011)** (0.005)
export status	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.016** (0.006)	0.016** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.017*** (0.006)	0.016*** (0.006)
ln(productivity)						0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment County)							-0.001 (0.044)	-0.006 (0.048)	-0.007 (0.048)
General Spillover	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)
Product-Spillover		-0.000 (0.000)		-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Country-Spillover			-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
Product-Country Spillover				0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)
Observations	876,069	876,069	876,069	876,069	876,069	876,069	876,069	148,737	148,737
# of firm-product- country triads	148,737	148,737	148,737	148,737	148,737	148,737	148,737	148,737	148,737
Adjusted R squared	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
time effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-industry effects	no	no	no	no	no	no	no	yes	yes
year-country effects	no	no	no	no	no	no	no	yes	yes
firm-product-country FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-product-country FE	no	no	no	no	no	no	no	no	yes
clustering	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector
betasd					0.474	0.475	0.475	0.476	0.479
betanorm					0.759	0.761	0.761	0.762	0.768

Table 4: Identifying Import Spillovers.

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The General Spillover refers to the # of *other* importers in the area (across products and source markets). The Product Spillover refers to the # of *other* importers in the area importing the same product (across source markets). The Country Spillover refers to the # of *other* importers in the area importing from the same source market (across products). The Product and Country Spillover refers to the # of *other* importers in the county that import the same product from the same source market. betasd is the coefficient of the Product and Country Spillover adjusted for a standard deviation change. betanorm is the coefficient of the Product and Country Spillover, adjusted for the general ex ante probability of being an importer (27 per cent). betasd and betanorm are expressed in percentages.

4.5 Robustness Checks:

4.5.1 Different groups of Source Markets

In this section I explore whether the importance of spillovers varies with the origin of imports. In other words, are spillovers more relevant when importing intermediates from some source markets as compared to others? We could argue that in physically or culturally more distant markets spillovers may be particularly relevant since the costs of acquiring information related to the availability and the characteristics of inputs or the credentials of potential suppliers and the

contractual environment are bound to be higher.

In Table 5 countries are sorted in groups applying an imperfect criterion of accessibility. The respective groups are Scandinavian countries (Finland, Norway, Iceland and Denmark), Sweden's closest neighbors but also very similar in terms of business practices, business climate etc., the non-Scandinavian EU-27 countries (including Switzerland but excluding fellow Scandinavian countries i.e. Denmark and Finland), the rest of the OECD (excluding EU members and Nordic members), the BRICS (Brazil, Russia, India China and South Africa), Africa, the Americas, Oceania (excluding its OECD members), the Middle-East and finally the rest of the world.

Results indicate that not surprisingly, spillovers hardly matter for imports from the Nordic neighbors, EU countries or the rest of the OECD, reflecting the high degree of integration between these economies and the uninterrupted flow of trade-relevant information, the similarity of the business and contractual environments as well as the long standing, established trade relations between them. Spillovers appear important for the least accessible groups of countries. This lack of accessibility is over and above the effect of distance which is time invariant and therefore picked up by the firm-country dimension of the triadic fixed effects.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Nordic	EU-27 excl Nordic	OECD (excl EU-27)	BRICS	Africa	Americas	Oceania	Middle East	RoW
ln(employees)	0.013** (0.006)	0.004 (0.007)	-0.014** (0.006)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)
ln(average wage)	(0.018)***	(0.014)	(0.007)	(0.011)**	(0.011)**	(0.011)**	(0.011)**	(0.011)**	(0.011)**
export status	0.019** (0.007)	0.027*** (0.007)	0.016** (0.008)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.018** (0.006)	0.016* (0.010)	0.012 (0.008)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)
ln(productivity)	0.002 (0.006)	0.003 (0.007)	0.006 (0.008)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment Country)	0.028 (0.068)	-0.043 (0.073)	-0.026 (0.078)	-0.007 (0.048)	-0.007 (0.048)	-0.007 (0.048)	-0.007 (0.048)	-0.007 (0.048)	-0.007 (0.048)
Product-Country Spillover	0.003 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002*** (0.000)	0.058* (0.000)	-0.0023 (0.000)	0.005 (0.000)	0.024** (0.000)	0.002** (0.000)
Observations	224,211	304,638	161,938	83,382	3,287	6,155	8,333	17,333	89,026
# of firm-product-country triads	40,399	54,815	26,848	11,012	509	996	1,367	2,500	13,768
Adjusted R squared	0.269	0.268	0.290	0.331	0.304	0.286	0.289	0.305	0.300
time effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-industry effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-country effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
firm-product-country FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
year-product-country FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
clustering	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector	county-sector

Table 5: Spillovers and source market accessibility
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.6 Exploring non-linearities

In Table 6, I investigate the existence of non-linearities in the agglomeration effects on the most specific decision to start importing. The last column replicates the baseline specification for comparison. In the first column I re-run

the baseline regression having restricted the sample to firms having more than three neighbors that import the same product-source market combination. In the second column I use dummies for different levels of the product and country specific spillovers. In the third column, I include a dummy variable indicating whether the firm has at least one neighbor importing the same product-country combination.

Results suggest that having more neighbors that import the same product-source-market pair disproportionately increases the probability that a given firm starts importing that combination, suggesting that the effect of spillovers on the decision to import is not linear. There is not a great difference between having one, two or three neighbors. But having more than 10 neighbors that import the same product and country combination has an effect that is three times stronger compared to having between six and ten neighbors on the probability to start importing the same product-source market pair. This finding suggests that firms located in more agglomerated areas with higher import concentration have much higher chances of starting to import since spillover effects increase with the number of neighboring importers.

VARIABLES	(1)	(2)	(3)	(4)
ln(employees)	0.021*** (0.008)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)
ln(average wage)	0.009 (0.013)	0.011** (0.005)	0.011** (0.005)	0.011** (0.005)
export status	0.020* (0.011)	0.019*** (0.005)	0.019*** (0.005)	0.019*** (0.005)
affiliated firm	0.020** (0.009)	0.017*** (0.006)	0.016*** (0.006)	0.016*** (0.006)
ln(productivity)	0.003 (0.010)	0.006 (0.004)	0.006 (0.004)	0.006 (0.004)
ln(Employment County)	-0.110 (0.233)	-0.008 (0.048)	-0.008 (0.048)	-0.007 (0.048)
Product-Country Spillover	0.002*** (0.001)			0.002*** (0.000)
one neighbor		-0.001 (0.001)		
two neighbors		0.001 (0.002)		
three neighbors		0.006** (0.003)		
five neighbors		0.005 (0.005)		
six-ten neighbors		0.010*** (0.003)		
>neighbors		0.030*** (0.006)		
strictly positive #of neighbors			0.001 (0.001)	
Observations	43,725	876,069	876,069	876,069
# of firm-product-country triads	12,671	148,737	148,737	148,737
Adjusted R squared	0.283	0.277	0.277	0.277
time effects	yes	yes	yes	yes
year-industry effects	yes	yes	yes	yes
year-country effects	yes	yes	yes	yes
firm-product-country FE	yes	yes	yes	yes
year-product-country FE	yes	yes	yes	yes
clustering		county-sector	county-sector	county-sector

Table 6: Non linearities in the spillover effects. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. By neighbors we mean firms that import the same product from the same market.

5 Conclusions

This paper investigates the impact of importers' agglomeration on the import decision of Swedish firms, using a detailed, comprehensive data set on Swedish imports providing information by firm, product, year and source country spanning the period from 1998-2011. I contribute to the rich literature on exporters' spillovers by providing evidence on the existence, relevance and nature of a similar mechanism for import decisions. I find that the number of product and country specific importers in the firm's neighborhood, is associated with a higher probability to start importing the same product-source market pair. Spillovers on the import decision appear to be very specific in nature suggesting that the relevant information is attached to the characteristics of the particular

intermediate and the market from which it is imported. I also find evidence of spillovers at the industry level, but physical distance from other importers seems to be relevant and local spillovers are of greater importance compared to sectoral ones. Spillovers are stronger when generated by "old" importers in the area or when coming from non-exporting or single-plant neighbors. What is more, larger firms are more likely to benefit from the presence of other importing firms in the area and so is true for firms with more than ten neighbors as opposed to firms with only one.

6 References

...to be completed