THE INTERNATIONALISATION OF SMES AND THE RELATIONSHIPS BETWEEN IMPORTS AND EXPORTS

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ABSTRACT

We study the relationship between imports and exports for a sample of 588 Canadian SMEs. Specifically, we estimate two logit models explaining respectively the SMEs' import and export status. We show that importers have a greater likelihood to export than non-importers. Second, both international activities are driven by common determinants, thereby justifying the relationship between imports and exports.

Key words: Import, Export, Internationalisation, SME, logistic regression.

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ABSTRACT

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1.   INTRODUCTION

With the growing globalization of the world economy, the internationalisation of firms has drawn much academic interest. In particular, there exist a vast literature investigating the motivations, the effects and the determinants of exports. This predominant focus on exports originates from the fact that outward activities are generally associated with employment, growing market shares, competitiveness and increased firm profits, thereby drawing the attention of scholars, but also policy-makers, consultants and analysts.

However, exports represent only one particular aspect of a firm's internationalisation process. Particularly, import activities represent an equally important dimension that has attracted much less attention (Knudsen & Servais, 2007; Holmlund *et al.*, 2007). In fact, very few studies examine the situation of imports (Korhonen *et al*., 1996; Karlsen *et al*., 2003), and even less so at the SME level (Holmlund *et al*., 2007). But by ignoring the inward dimension, we might largely underestimate the true extent and complexity of the firm's internationalisation involvement. Inward activities involve many specific challenges and risks for SMEs that would be overlooked by concentrating on exports only. As suggested by Fischer & Reuber (2008), for many SMEs, the challenge to internationalise their activities too often exceeds the benefits. Moreover, imports are often the very first occurrence of the firms' internationalisation process, sometimes taking place well before any outward activities (Korhonen *et al*., 1996, Forsman *et al*., 2006; Holmlund *et al*., 2007)[1]. In this situation, a firm's foreign market penetration might appear as being a "case of leapfrogging in its internationalisation process" (Karlsen *et al*., 2003).

Furthermore, imports on their own affect firms in a comprehensive manner, especially in their capacity to subsequently succeed on foreign markets (Korhonen, 1999) and in creating opportunities for international activities (Holmlund *et al.,* 2007). The effects of imports on firms are numerous. First, the purchase of better quality and lower priced inputs, intermediate goods or technologies has a pro-competitive effect on the firm. To be competitive on world markets, a firm must produce at a higher quality, design a differentiated product more tailored to the needs of end-users, and/or set a competitive price according to the markets (Laurin, 2010). This entails using the cheapest or the highest quality components and inputs which may only be supplied from foreign suppliers. Therefore, a greater access to foreign goods and services increases the competitiveness of domestic firms (Amiti & Konings, 2005), which will

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[1] For example, a study by the European Commission (2010), using a sample of 2 300 SMEs that exports and imports, indicates that 39% of firms started to import before exporting, against 18% that exported before importing, and 42% undertaking both activities simultaneously.

subsequently enhance their capacity to penetrate and succeed on foreign markets. We thus get a first relationship between imports and exports.

Similarly, the import of technologies and complex intermediate products may be a vector for the transmission of technological externalities. For instance, the use of new equipment may require technical training sessions given by the supplier, creating knowledge transfers between the supplier and the firm. There is also the "learn-on-imports" effect by which a firm gains technological knowledge by studying how imported goods are designed (reversed engineering). Since more knowledgeable firms are more likely to export, we obtain another relationship between inward activities and the capacity to export.

At the same time, suppliers and other contacts encountered abroad during the development of import activities enrich the firm's network which can then be used to find and exploit future outward opportunities. Moreover, the business experience gained from purchasing abroad may be highly valuable for subsequent export activities in these foreign markets. Therefore, any inward activity is conducive to the initiation and development of outward activities, through foreign contacts and through the international experiences acquired from conducting any business in foreign markets.

In this paper, we thus study the relationship between imports and exports for a sample of 588 SMEs located in the province of Quebec (Canada). More specifically, we estimate two equations explaining respectively the imports status (who imports?) and the export status (who exports?) of SMEs. The first hypothesis is that the existence of import activities should increase the likelihood that a firm will also export. The second hypothesis posits that both international dimensions have common determinants, thereby justifying the relationship between imports and exports.

Few papers have examined this relationship empirically. Welch & Lustarinen (1993) Korhonen *et al*. (1996), Karlsen *et al*. (2003), Holmlund *et al*. (2007), Boutary & St-Pierre (2011) provide interesting studies, relying on study cases or factor analysis. The originality of the present study is firstly that we directly test the relationship between imports and exports using a multivariate logistic regression model. Secondly, we can exploit a large sample of SMEs obtained from a survey specially developed to study the firms' internationalisation process.

We find that the odds of being an exporter are 1.98 higher for a firm that imports than for a firm that does not engage in any inward activities. Second, both international activities are driven by common determinants, verifying our second hypothesis. The combination of these two results confirms the strong relationship between export and import activities.

The paper is organized as follows. We start by reviewing the literature on imports from which we develop a conceptual framework relating imports and exports. In section 3, we describe the data, the econometric model and the determinants of imports and exports. In section 4, the results are presented and discussed. And finally, we conclude with summary results and observations, limitations and directions for future research.

2.   REVIEW OF LITERATURE

A firm's import and export activities are interlinked in various ways. The causation between both aspects of the firm's internationalisation are bidirectional and multidimensional. In particular, we highlight three specific channels:

1. The pro-competitive effect of imports on exports;
2. The network perspective;
3. The incremental perspective.

2.1   The pro-competitive effect of imports on exports

A firm's capacity to enter foreign markets usually builds on some comparative advantage relatively to its competitors. For instance, the firm can be competitive in price. But a lower price signals greater productivity or competitiveness. A firm can directly decrease its production costs by importing cheaper inputs and components abroad. In addition, it can also use more productive foreign technologies and equipment, thereby directly increasing the firm's efficiency. In general, foreign suppliers might be preferred to domestic ones for several motives: shorter or more reliable delivery time, better after-sales services, greater collaboration possibilities, etc., all factors capable of increasing the end-user's competitiveness.

But prices are not the main determinant of imports. Most SMEs that export compete in segmented *niche* markets, building on their flexibility and their adaptive nature. In the models of product differentiation, firms compete not only in price, but also in quality and by the design of their products. Quality involves the utilization of superior components and inputs, while the design of differentiated goods is facilitated by the use of more adapted, efficient, specialized or innovative intermediate goods and services. Moreover, international quality standards or the client's requirements may oblige the use of specific equipment and components that are not necessarily supplied in the domestic market. In these circumstances, firms need to broader their search towards foreign suppliers, considering the lesser quality, adaptability or availability of domestic producers. In the same vein, R&D activities and innovation often necessitate specific technologies, equipment or know-how that may not be supplied domestically. In sum, a greater access to foreign differentiated inputs, equipment or technologies contributes to firm productivity and innovation (Ethier, 1982; Grossman & Helpman, 1991; Amiti & Konings, 2005; Altomonte *et al*., 2008).

There is a further effect of imports on productivity. Imported goods, equipment and technologies bring new knowledge and know-how to the firm, e.g. international knowledge externalities (Grossman & Helpman, 1991). For example, the supplier can provide the firm with specific training sessions related to the use of imported equipment, transmitting valuable information on new foreign technologies and processes. Hence, suppliers are an important vector of innovation and information, beyond the simple provision of physical goods, by participating in the firm's accumulation of knowledge.

New knowledge can also be extracted by inspecting the nature and composition of imported products (learning-on-imports or reversed engineering). International knowledge transfers and learning-on-imports constitute important contributors to the firm's competitiveness, through the assimilation of foreign technologies and knowledge. For example, Braja & Willmore (1991) show that the import of technological products actually increases the likelihood of

undertaking technological activities in Brazilian firms. These authors also find that exports have a positive effect on the import of technological products.

In short, when a firm comes across new intermediate goods or technologies, it opens up all kinds of opportunities for innovation, process improvements, product development and enhanced competitiveness (Boutary & St-Pierre, 2011). This enables the firm to be more competitive on foreign markets, thereby expanding its exports. Indeed, many empirical studies show that firms benefiting from a higher productivity or efficiency level tend to export more (see for instance Clerides *et al.*, 1998; Bernard & Jensen, 1999; Bernard *et al.*, 2003; Melitz, 2003). Therefore, we get an indirect but important link between imports and exports.

The decision to initiate or develop import activities may be reactive in nature, for example when some inputs or specialized equipment are simply not supplied in the local market. In many cases, the decision to import is a matter of involuntary obligation, not choice. For instance, some firms have to comply with international product standards, which may necessitate the import of specific inputs from foreign suppliers. Standard compliance by itself usually leads to greater efficiency or quality. But, voluntary or not, imports in general still generate this pro-competitive effect on the firm's quality or competitiveness.

Therefore, imports should be considered as a proactive strategy by which a firm should always be in search of new, cheaper, more specialized or more innovative suppliers in the world in order to further strengthen its comparative advantage. Indeed, Overby & Servais (2005) find that the primary drivers of Danish SMEs in choosing a foreign supplier are price and quality, rather than the lack of domestic availability. Hence, the ability to coordinate sourcing activities on a global scale becomes a firm-specific advantage that might affect its performance (Birou *et al.*, 1993; Murray, Kotabe & Wildt, 1995; Boutary & St-Pierre, 2011).

2.2 The network perspective

The importance of networks for the development and sustainability of SMEs has been recognized by the literature (e.g. Johanson & Vahlne, 2009). Networks are organized around a web of contacts that can provide formal and informal information and knowledge. With limited internal resources, SMEs can rely on its network to satisfy its informational needs, reduce uncertainties, decode and interpret the mass of information flowing in a complex world, and have access to various other resources. Hence, the extent and the strength of networks constitute a significant competitive advantage for SMEs.

By engaging in outward activities, the firm extends its network to foreign markets. Notably, foreign suppliers can provide valuable information on new technologies and new trends, on local competitors, on specific cultural traits and customs, etc. The design and production of differentiated goods in a segmented market often require a high degree of collaboration between the suppliers of specialized components/services, inputs or technologies, and the purchasing firm. This relationship between suppliers and their clients is conducive to broader types of interactions. In order to improve and develop this relationship, foreign suppliers may find an interest in assisting the purchasing firm to find new clients and in providing various sorts of information. Hence, import activities, through the deepening of foreign networks, can lead to new export opportunities.

Similarly, outward activities can also create some import opportunities. The firm may for instance participate in a trade show where it will meet new suppliers. Foreign clients may

introduce the firm to new suppliers in their own market. As mentioned by Holmlund *et al.* (2007, p. 462), «*it is natural to assume that there exists a link between import and export indicating that resources such as knowledge can be transferred from one activity to another*». Governmental agencies and institutional contacts (chamber of commerce, industry associations, etc.) that provide export assistance may also help in finding suppliers abroad or be knowledgeable about how to conduct business with suppliers in specific foreign markets.

Hence, doing any business in foreign markets brings forth all kind of opportunities: the firm can find new suppliers and potential foreign clients, discover new products and trends, come across new approaches that will enhance productivity, etc.

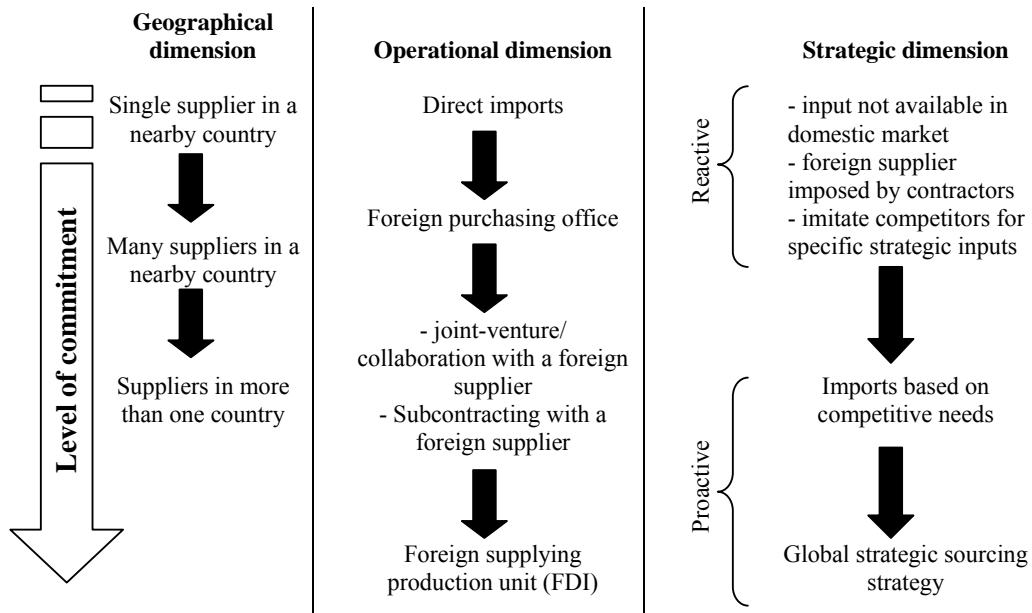## 2.3   The incremental perspective

According to the Uppsala model, firms intensify their international activities following an incremental and linear process, as they gain experience and knowledge on foreign markets (Johanson & Vahlne, 1977) and develop their international networks (Johanson & Vahlne, 2009). This model has been mainly used to explain the level of commitment in undertaking outward activities. At first, the firm starts by exporting to one or a few clients located in a nearby close country. As it becomes more acquainted with doing business abroad, the firm can then commit to more complex outward activities, from expanding its operation in other countries, using the assistance of a foreign agent (indirect exports), setting up foreign sales subsidiaries, and finally establishing a production unit abroad.

Despite its many limitations, the incremental model can equally be useful in explaining the firm's internationalisation process from the inward perspective. Both export and import activities involve some degree of uncertainty, risk and informational gaps. They both imply transaction and searching costs for the firm. The firm's level of commitment towards any international activities still evolves with the level of experience and knowledge acquired on foreign markets. As summarized in Figure 1, the level of commitment toward inward activities can increase incrementally in the geographical dimension (from importing from one nearby country to many countries in different markets) (Overby & Servais, 2005), in the operational dimension (from setting up a simple foreign purchasing office, to entering a joint-venture or a collaboration agreement with a foreign supplier and to establishing a input production unit abroad) or in the strategic dimension (from imports motivated by a reactive strategy, to a competitive proactive strategy and to a strategic global sourcing strategy[2]) (Monczka & Trent, 1991; Korhonen, 1999).

In fact, the development of inward activities constitutes an important platform for subsequent outward activities, and vice-versa (Korhonen *et al*., 1996; Karlsen *et al*., 2003; Holmlund *et al.,* 2007). Visiting foreign markets, participating in trade fairs and missions, learning about foreign cultures and about how to negotiate abroad are actions that can help in finding either potential clients or suppliers, and in deciding on the best operational mode to either sell or purchase abroad. Karlsen *et al.* (2003) describe the internationalisation of a firm "as a dynamic, multidimensional process with accumulation of knowledge and feedback loops". They conclude that the foreign purchasing activities created the conditions, experience and opportunities for expanding a firm's markets abroad.

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[2] According to Birou *et al.* (1993), a strategic global sourcing strategy implies integration and coordination of procurement requirements across world-wide business units, whereas a simple foreign sourcing strategy, even if proactive in nature, only involves purchasing activities from foreign market, without any coordination.

Figure 1: Incremental model applied to imports

Geographical dimension	Operational dimension	Strategic dimension

Geographical dimension

Level of commitment

Single supplier in a nearby country

↓

Many suppliers in a nearby country

↓

Suppliers in more than one country

Operational dimension

Direct imports

↓

Foreign purchasing office

↓

- joint-venture/ collaboration with a foreign supplier
- Subcontracting with a foreign supplier

↓

Foreign supplying production unit (FDI)

Strategic dimension

Reactive
- input not available in domestic market
- foreign supplier imposed by contractors
- imitate competitors for specific strategic inputs

↓

Proactive
Imports based on competitive needs

↓

Global strategic sourcing strategy

2.4 Imports and exports: a mirror image

Thus far, we have shown how import and export activities mutually support each other and may develop concurrently. The internationalisation of the firm is comprehensive in nature and co-affects different aspects of its operations: imports, exports, subcontracting, innovation and R&D, productivity, networking, etc. Figure 2 synthesizes the previous discussion, illustrating all the relationships between imports and exports.

Because of this intimate relationship between imports and exports, it turns out that many models and variables explaining the motivation to and the intensity of exports may be applicable to imports, as a mirror image. Considering two recent reviews of literature on the determinants of exports, a summary classification of export stimuli (Leonidou *et al*., 2007) and a list of the main determinants of export performance (Sousa *et al*., 2008), we notice that most export determinants or stimuli may also explain imports. Hence, we can justify some of our import determinants and their interpretation by borrowing a logic taken from the export literature. We give here three examples taken from Leonidou *et al*. (2007). First, many SMEs initiate exports in response to unsolicited orders from foreign customers, after participating at a trade fair for instance. Likewise, firms may receive unsolicited proposal from foreign suppliers in similar circumstances. Second, the development of foreign networks and the accumulation of knowledge on foreign markets are useful for both export and import activities. Third, a manager's special interest in international business is conducive to both exports and imports.

This line of reasoning justifies our empirical methodology, using similar variables to explain respectively a firm's import and export status. In our empirical model described in the next section, most of our variables are justified either by the previous theoretical discussion or by the reviews of Sousa *et al*. (2008) or Leonidou *et al*. (2007).

Hence, we will test two hypotheses:

H1: The import status increases the likelihood that a firm is also exporting;
H2. Both international dimensions have common determinants.

Figure 2: Internationalization process of SMEs
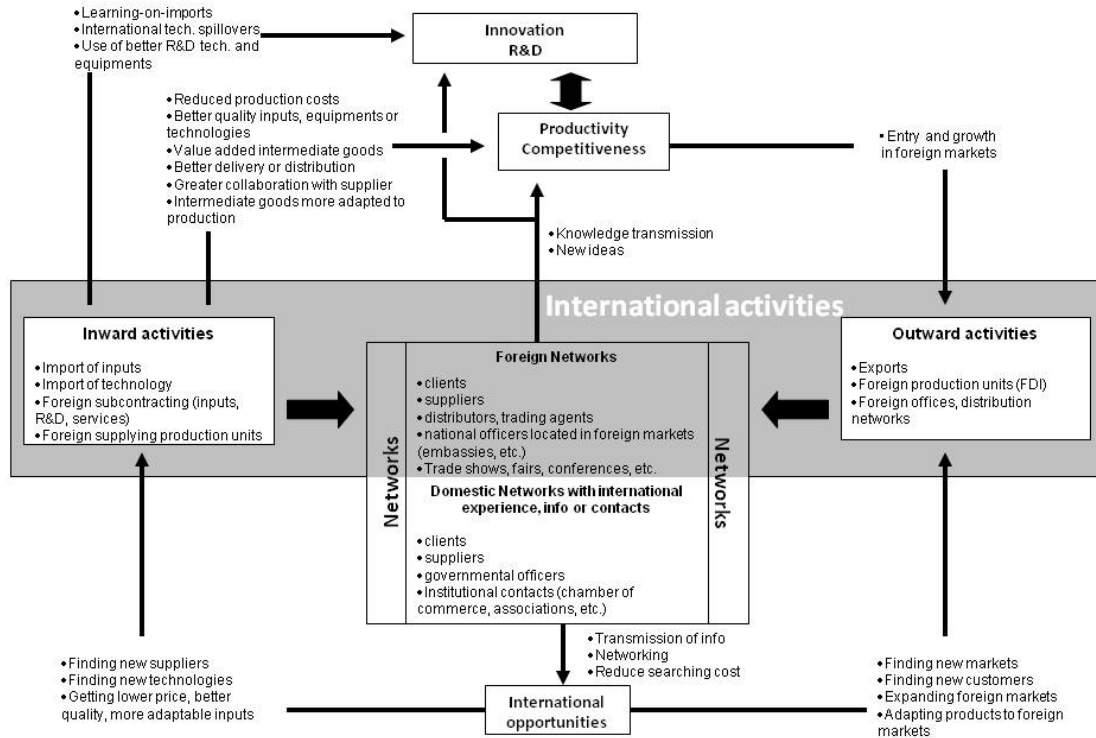
Most studies on the determinants of exports do not take into account the import status and the existence of a relationship between exports and imports. In econometric terms, this leads to a missing variable bias in the results. Hence, based on these results, public authorities have developed policies and programs that have not always contributed successfully in increasing the export rate of SMEs. Our model proposes a more global approach – as illustrated in Figure 2 – that may broaden our understanding of the SMEs' internationalisation process. For many years, this holistic approach has been suggested by many researchers to more accurately reflect the reality of the global economy (Holmslun *et al.,* 2007; Sousa *et al.,* 2008; Perrault & St-Pierre, 2008; Johanson & Vahlne, 2009).

The sample and the empirical methodology are now detailed in the next section.

3. METHODOLOGY AND DESCRIPTION OF THE SAMPLE

3.1 Data collection

We have conducted a survey on a sample of 588 SMEs investigating the different dimensions of internationalisation (imports, exports, subcontracting), their determinants, and their impact on the firms. The survey collects information on the firm's characteristics and organisation (networks, business practices, performance, innovation), and on the manager's profile (education, experiences, control, strategic orientation). The survey's questionnaire was

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developed based on an extensive review of literature on the different modes of SME internationalisation. However, except for exports, this literature is rather thin on many other international strategies or behaviours undertaken by SMEs in a globalized economy, of which the need to relocate operation offshore or to develop international cooperative networks in reaction to some domestic deficiencies. This led us to conduct a series of interviews with SMEs being at different scales of internationalisation. We have also organized focus groups with company directors and representatives from public authorities. The information gathered was then used to build a refined questionnaire. It was also pre-tested on a dozen of selected company's owner-manager.

SMEs were identified from a databank of 3000 manufacturing SMEs from the *Centre de recherche industrielle du Québec* (ICRIQ). They were surveyed by phone by a major survey firm in Canada between May 2010 and February 2011[3]. The survey was conducted specifically with the company's owner-manager and the phone interviews lasted about 20 minutes. The total sample consists of 600 manufacturing SMEs. However, to comply with the European Union's definition of an SME, we have retrieved 12 firms having more than 250 employees. Hence, the size of our final sample reduces to 588 SMEs.

3.2   Sample statistics and description

SMEs in our sample employ an average of 50 workers (going from a minimum of 4 to a maximum of 230 employees). About 52% of surveyed firms are exporters, a figure that is higher than usually found in governmental reports. This result may be explained by the relatively high average size of firms in our sample. MacMillan (2008) reports that only 8% of Canadian SMEs actually exports, but 75% of this population has less than 10 employees.

The leading export market is, as expected, the United States (90%), followed by Europe (28%) and Asia (16%). Physical and cultural proximity with the US market may explain this high rate of exporting firms. At the same time, and despite Mexico's inclusion in the North American Free Trade Agreement (NAFTA) in 1994, only 11% of surveyed firms export to this market, a probable consequence of weak cultural, economic and social ties between Canada and Mexico. For a majority of SMEs, the motivations to export are driven by growth objectives (79%), by the need to respond to a foreign client's specific requests (74%) and, to a lesser extent, by the saturation of the local market (44%).

On the import side, 68% of firms purchase goods abroad, importing inputs (31%), equipment goods (25%) or both (44%). These are again high rates of import compared to past studies. That may again be explained by the US market's attraction. But it may also highlight the influence of globalisation and the ensuing intensification of competitive pressures that force firms to improve their competitiveness by importing. The absence of suppliers on the local market for specific resources is the main motive for purchasing equipment goods (92%) or inputs (73%) abroad. Holmlund *et al.* (2007) obtain similar results for finish SMEs. The import of equipment goods is also motivated by the need to increase production capacity for 88% of firms. Akin to export, the main import market is the United States (86%), followed by Europe (55%) and Asia (35%). Only 4% of firms import from Mexico.

Finally, 42% of surveyed firms simultaneously import and export, of which 68% initiated the import of inputs before any export activities, in accordance with the results of Korhonen *et al.*

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[3] More specifically, the survey was implemented in two waves of three weeks each, one starting in May 2010 and the second one in February 2011.

(1996), Forsman *et al.* (2006), Holmlund *et al.* (2007) about the precedence of inward operations initiated before any export activities.

3.3 Empirical methodology

We will estimate two equations explaining respectively the likelihood that a firm imports and the likelihood that a firm exports, using a logistic (logit) model:

(1) $\text{Prob}[\text{IMPORT}_i=1] = \dfrac{1}{1+e^{-z_i}}$ with $Z_i = \text{CONST} + \beta_1 \text{XM}_i + \eta_i$

(2) $\text{Prob}[\text{EXPORT}_i=1] = \dfrac{1}{1+e^{-v_i}}$ with $V_i = \text{CONST} + \beta_2 \text{IMPORT}_i + \beta_3 \text{XX}_i + e_i$

Where *i* is the SME index, $\text{IMPORT}_i=1$ if the firm imports, and zero otherwise, $\text{EXPORT}_i=1$ if the firm exports and zero otherwise, XM_i is a set of determinants explaining the probability of importing (the import status), XX_i is a set of determinants explaining the probability of exporting (the export status), η_i and e_i are random i.i.d. components.

Notice that, in equation (2) for the export status, the import status IMPORT_i is added as an extra determinant. Following our hypothesis of a relationship between exports and imports, the coefficient β_2 should appear as being positive and significant. Moreover, the set of determinants XM_i and XX_i includes common variables, following our second hypothesis. Hence, we conjecture that most of these common determinants should have a significant effect on the probability of conducting both types of international activities. Table A1 printed in the Appendix lists and defines all the determinants for each equation.

As control variables, both models include personal characteristics about the manager (age, education and business experience) and firm characteristics (employment and sales). The latter two variables are measures of firm size. The pair-wise correlation between both is pretty low (0.1123), indicating that we are in fact measuring two slightly different dimensions related to size: a larger pool of employees (EMPLOYMENT) may approximate the scale of the firm's experience, knowledge and expertise available internally, while the SALES variable reflects the fact that larger firms may have a greater absorption capacity to mitigate errors and risks involved by the internationalisation process, and to internalize searching and transaction costs associated with foreign activities.

Younger generations might be more open-minded towards internationalisation. However, older (AGE) or more experienced managers (EXPERIENCE) might possess greater experience and skills for doing business abroad. Hence, the expected sign for the coefficient of age and business experience is ambiguous. More educated managers (EDUCATION) may also be more sensitive to the importance of internationalisation and have better skills in conducting business abroad (e.g. Leonidou *et al.,* 2007).

We have shown in the previous theoretical review of literature that the relationship between exports and imports arises through three main channels: innovation/competitiveness, international experiences and international networks. For the first channel, we rely on a set of variables measuring the firm's level of innovation, competitiveness and technical sophistication. COMPETITION is a binary variable that equals one if the manager estimates

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that there are many foreign competitors in its market. A more competitive environment forces the firm to be more competitive and efficient, which might trigger the search of cheaper and /or higher quality inputs abroad. At the same time, greater competitiveness enables the firm to conquer foreign markets (e.g. exports).

R&D and innovation activities often require the import of specialized technologies, equipment or services, while it has been shown that more innovative firms tend to export more (Raymond & St-Pierre, 2011). R&D corresponds to the number of employees (full time equivalent) working in R&D activities in the firm (in log). INNO indicates how many innovation activities are implemented in the firm amongst five types of innovation, as listed in the harmonised OECD/Eurostat definition of innovation[4], and taking a value between 0 (did not do any of these activities) to 5 (realized all these activities).

PROD corresponds to the number of production systems used amongst any of the following: process scheduler software, computerized code bar system or Enterprise Resource Planning systems (ERP). PROD gives an indication of the firm's technical sophistication, taking a value between 0 (did not use any of these systems) to 3 (used all of these systems). On the one hand, the implementation or the utilization of production systems may require the import of specialized components. On the other hand, firms that are focused on technical efficiency are more likely to also focus on quality, which may lead to the import of superior components abroad.

Networks are also very useful in conducting business abroad and finding new foreign suppliers and clients. In the survey, firms were asked if they have used foreign sources of information for a) their import decision and b) their export decision, amongst the following sources: foreign clients, foreign suppliers, foreign consultants, fairs/trade shows. Hence, NETWORK_EX and NETWORK_IM correspond to the number of these four sources of information that were used respectively to undertake export and import activities, taking a value between 0 (did not use any of these sources) to 4 (used all of these sources). Notice that only importing firms may have used foreign contacts to import. Therefore, the NETWORK_IM variable cannot discriminate between importers and non-importers; the logit model cannot estimate its effect on the likelihood to import. The logic is similar for the NETWORK_EX variable in the export equation. Hence, we use the sources of information for exporting (NETWORK_EX) in the *import* equation, and vice-versa for the *export* equation. As explained in the last section, conducting outward activities abroad opens up all kinds of business opportunities on the import side. The reasoning is that any information obtained while undertaking export activities may also be subsequently useful for the firm's inward business abroad, and vice-versa (Johanson & Vahlne, 2009).

To assess the firm's experience and capacity to conduct international business, we rely on two variables. INT_EXP is a binary variable that equals one if the manager or a member of the managing committee has studied and/or has lived abroad. The experience acquired by living in a foreign country might be very helpful in doing or facilitating business abroad, in understanding cultural differences and in learning new business practices (Hutchinson *et al.,* 2006; Ojala & Tyräinen, 2007). LANGUAGE indicates if the manager or a member of the managing committee knows more than two languages. Business people in Quebec usually

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[4] 1. R&D activities; 2. Product innovation: new product; 3. Product innovation: significantly improved product; 4. Process innovation (new or significantly improved production or delivery method); 5. Marketing innovation (new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing).

understand French and English, Canada's two official languages. Knowing a foreign language helps in conducting international business. But it may also concern a foreign-born individual (or having foreign-born parents) that might still have relationships in or knowledge of its country of origin (Combes, Lafourcade & Mayer, 2003).

4. Results and discussion

We first present the regression results for the import equation, and then for exports. In the tables of results, we print the estimated odd ratios instead of the logit coefficients, in order to facilitate the variables' interpretation. For instance, we obtain an odd ratio of 1.98 for the import status in the export equation. This means that the odds of being an exporter are 1.98 higher for a firm that imports compared to a non-importer. The *z*-statistic is shown in parenthesis underneath the corresponding odd ratio[5].

4.1 Results for the import equation

Results for the probability of importing are presented in Table 1. Considering the well-known heterogeneity of any sample involving SMEs, and since some variables may have overlapping causal effects, some determinants may not appear as being significant when the full model is overburdened with many variables. Hence, before showing the full model in columns 5-6, we start by presenting the results for reduced sets of determinants, organized by category: personal characteristics (column 1), firm characteristics (column 2), international experiences, knowledge and networks variables (column 3), innovation, R&D and technical sophistication (column 4).

In column 1 of Table 1, we note that the manager's age (AGE) and experience (EXPERIENCE) do not have an influence on the import status. As already mentioned, younger generations of managers might be more open-minded to international activities; however, older – hence more experienced – managers might have greater skills in doing business abroad. However, as expected, the manager's level of education (EDUCATION) increases the probability of conducting inward activities in the firm.

In column 2, the basic firm characteristics all have a significant and positive effect on the import status. The measures of firm size in terms of employment (EMPLOYMENT) and turnover (SALES) are both significant. As we said before, employment indicates the firm's organizational capacity and skills in undertaking international activities, while the turnover assesses the firm financial capacity to absorb the risks and all the extra costs of doing business abroad. The firm's competitive environment (COMPETITION) has a highly significant effect on the import status: competition pushes firms to improve quality and efficiency, motivating the import of superior, more adapted or cheaper components, equipment and inputs.

The manager's international experiences (column 3) have also a positive and significant effect on the import probability: the fact that the manager or some board member has studied/lived abroad (INT_EXP) or speaks more than two languages (LANGUAGE) increases the likelihood of importing. More tellingly, the utilization of foreign contacts and sources of information that were originally exploited for export activities (NETWORK_EX) also increases the likelihood of importing. Hence, the information gained from undertaking

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[5] The *z*-statistic is equivalent to a *t*-statistics in a logit regression. Significance levels are identical.

outward activities abroad may also generate interesting business opportunities and information on the import side.

As expected, innovation and technical sophistication (column 4) are also good predictors of the import status. The intensity of innovation activities, measured by full time employment in R&D (R&D) and by the number of innovation activities performed in the firm (INNO), in addition to the firm's technical sophistication, approximated by the use of production systems (PROD), all have a positive and significant coefficient.

Finally, the last two columns of Table 1 present the results for the full model. However, we have noted some correlation between the number of employees working in R&D and three variables: firm size, the number of innovation activities (INNO) and the use of production systems (PROD). To avoid overburdening the regression, we choose to eliminate R&D from the full model, INNO and PROD having a higher significance level. Similarly, the manager's education level is also related to the knowledge of more than two languages. So, we compare the results with and without the education variable, in respectively column 5 and 6.

The results are very similar to the partial models of columns 1-4, expect that some variables now become statistically insignificant. As already mentioned, this is often the case when many variables interact in a single regression model with an heterogeneous sample. It is the case notably for employment (EMPLOYMENT), the competitive environment (COMPETITION) and the international experience (INT_EXP). However, the other size measure SALES remains significant. LANGUAGE is significant only when education is taken out. Nevertheless, the proxy for international export networks (NETWORK_EX), the innovation indicator (INNO) and the use of production systems (PROD) all keep a positive effect on the import status at the 1% significance level.

The full model pseudo R2 is equal to 0.15 only.

Table 1 : results for the IMPORT equation (odds ratio printed)

Variable	1 Personal chara.	2 Firm chara.	3 International networks & experience	4 Innovation, R&D, techniques	5 Full model	6 without EDUC
AGE	1,0037	-	-	-	0,9986	0,9969
	(0,33)				(-0,11)	(-0,26)
EDUC	1,7368 ***	-	-	-	1,3698 **	-
	(4,57)				(2,34)	
EXPERIENCE	1,0157	-	-	-	1,0129	1,0061
	(1,55)				(1,16)	(0,57)
EMPLOYMENT	-	1,3978 **	-	-	1,1299	1,1216
		(2,16)			(0,73)	(0,69)
SALES	-	1,3427 ***	-	-	1,2658 ***	1,3001 ***
		(3,43)			(2,62)	(2,96)
COMPETITION	-	1,2079 ***	-	-	1,1236 *	1,1076
		(3,06)			(1,69)	(1,50)
INT_EXP	-	-	1,7589 **	-	1,3895	1,4022
			(2,36)		(1,29)	(1,34)
LANGUAGE	-	-	1,6072 *	-	1,4618	1,6039 *
			(1,89)		(1,42)	(1,78)
NETWORK_EX	-	-	1,8401 ***	-	1,4165 ***	1,4435 ***
			(5,39)		(2,81)	(2,97)

	(1)	(2)	(3)	(4)	(5)	(6)
R&D	-	-	-	1,2597 *	-	-
				(1,71)		
INNO	-	-	-	1,2597 ***	1,2603 ***	1,2554 ***
				(2,92)	(3,45)	(3,40)
PRODT	-	-	-	1,6556 ***	1,4340 ***	1,4770 ***
				(4,71)	(3,24)	(3,53)
Log likelihood	-357,002	-345,426	-340,289	-314,755	-309,932	-312,668
Pseudo R2	0,0291	0,0606	0,0746	0,078	0,1572	0,1497
Nb obs.	588	588	588	558	588	588

Notes: Logistic estimation method. Below coefficient: z-statistics, * = significant at 10%; **=significant at 5%; ***= significant at 1%.

4.2 Results for the export equation

Results for the probability of exporting are printed in Table 2. Akin to the import regressions, we first show the results for distinct groups of variables in columns 1 to 4. The last two columns present the full model with and without the inclusion of the import status (IMPORT). Column 6 brings confirmation to our first hypothesis: the existence of inward activities has a positive and very significant effect on exports. The fact of already being an importer increases the likelihood of exporting by a factor of 1.98 compared to non-importers.

Regarding manager characteristics (column 1), AGE and EDUCATION have a significant impact on the decision to export. We could have expected a negative coefficient for age, since younger individual may be more open-minded towards internationalisation. But age also represents a general measure of life experience that seems to increase the likelihood of exporting. Similarly to imports, the owner's experience as a manager is not significant. However, the manager is often supported by a competent staff and an informational network, mitigating the effect of its own experience on the firm's business. Moreover, with a relatively high average firm size, the central role of the manager in an SME might be quite diluted.

In column 2, firm characteristics all have a positive and significant effect on the export status. Akin to imports, both size measures are significant. However, the indicator for the firm's competitive environment (COMPETITON) has a much higher explanatory power in the export equation than for imports. In fact, greater competition has a direct effect on exports, encouraging firms to look for other sources of growth in foreign markets, whereas the relationship between competition and imports is more indirect.

Surprisingly, the experience gained from living or studying abroad does not have a significant effect on export (column 3), but speaking more than two languages still helps in doing international business. In addition, we note that the import network (NETWORK_IM) increases the likelihood of exporting. We thus get the mirror results of the import regressions; hence, developing foreign contacts and sources of information for export purposes also facilitate imports, and vice-versa.

Results on the firm's innovation level and technical sophistication (column 4) are much less conclusive than for imports. The number of people working in R&D is not significant, while the number of innovation activities (INNO) is barely significant at the 10% confidence level. However, the use of production systems (PROD) does significantly increase the probability of exporting, as for imports.

The full model without the import status is shown in column 5. As already explained above, the import network variable (NETWORK_IM) explains 100% of imports. Therefore, this variable cannot be estimated along with the import status. The import network is thus retrieved in the two last columns, fully concentrating on the effect of the import status on the likelihood to export.

As for imports, the full results are very similar to the partial ones, except for the significance of few variables. Only one firm size measure, EMPLOYEMENT, remains significant, as already observed for the import regressions. Adding the import status to the full model (column 6) does not change any of the above results. The explanatory power of the two full export regressions (23% and 26%) is greater than imports (15%).

Table 2: results for the EXPORT equation (odds ratio printed)

Variable	1 Personal chara.	2 Firm chara.	3 International networks & experience	4 Innovation, R&D, techniques	5 Full model	6 with IMPORTS
IMPORTS	-	-	-	-	-	1,9806 ***
						(3,11)
AGE	1,0286***	-	-	-	1,0347***	1,0363 ***
	(2,59)				(2,68)	(2,86)
EDUC	2,0066***	-	-	-	1,7887***	1,7861 ***
	(5,71)				(4,02)	(4,12)
EXPERIENCE	0,9851	-	-	-	0,9724**	0,9747 **
	(-1,56)				(-2,49)	(-2,34)
EMPLOYMENT	-	1,6106***	-	-	1,4118**	1,3449 *
		(3,28)			(2,09)	(1,85)
SALES	-	1,1874**	-	-	1,0394	1,0742
		(2,29)			(0,46)	(0,86)
COMPETITION	-	1,5937***	-	-	1,6082***	1,6384 ***
		(7,53)			(6,7)	(7,12)
INT_EXP	-	-	1,3076	-	1,1396	1,2646
			(1,20)		(0,53)	(0,99)
LANGUAGE	-	-	2,1516***	-	1,7357**	1,7476 **
			(3,36)		(2,16)	(2,25)
NETWORK_IM	-	-	2,5664***	-	2,1731***	-
			(7,78)		(5,78)	
R&D	-	-	-	1,1196	-	-
				(0,95)		
INNO	-	-	-	1,1461*	1,1009	1,1219
				(1,79)	(1,34)	(1,63)
PRODT	-	-	-	1,7464***	1,4364***	1,4840 ***
				(5,97)	(3,42)	(3,82)
Log likelihood	-384,059	-361,629	-353,156	-357,582	-298,715	-313,274
Pseudo R2	0,0561	0,1113	0,1321	0,0724	0,2659	0,2301
Nb obs.	588	588	588	558	588	588

Notes: Logistic estimation method. Below coefficient: z-statistics, * = significant at 10%; **=significant at 5%; ***= significant at 1%.

4.3   Discussion

The results of Table 2 show that imports are the main determinant of the likelihood to export (highest odds ratio), confirming our first hypothesis of a relationship between these two types of international activities. Moreover, most variables that explain the import status predict significantly the probability to export, as assumed by our second hypothesis. These determinants may have similar effects (firm size for instance mitigates risks and transaction costs related to any business abroad, exports or imports), or different interpretations (as for the case of innovation). But the fact of the matter is that the behavior of SMEs towards international activities is governed by a very similar set of determinants, justifying why a firm that export tend to also import, and vice-versa.

We also remark that each channel linking exports and imports – innovation/competitiveness, foreign networks and international business experience/aptitudes – is a significant determinant of both exports and imports. Indeed, at least one variable proxying the influence of each of these channels appears to be significant in both models of international activities.

Finally, looking at the pseudo R2, we note that the model's explanatory power for exports (27%)[6] is greater than for imports (15%). This is hardly surprising. The decision to import is often a matter of necessity, not choice. For instance, some products require the use of particular inputs, technologies or components that are simply not available domestically, prompting the firm to necessarily import. In some industries, it is custom for firms to purchase specific components abroad, from common suppliers. In these circumstances, any firm will import whatever its characteristics or the manager's attitude towards and experience with international activities. On the other hand, the decision to expand markets abroad is always a matter of choice, even if this decision may be strongly imposed upon economic, financial and/or competitive factors or by a client's request.

Conclusion

In this paper, we have investigated the determinants of both the export and import statuses. Our results reveal that SMEs that import are 1.98 times more likely to also export relatively to non-importers. Second, we show that both international activities are driven by common determinants, thereby explaining the relationship between imports and exports.

While the determinants of exports have been extensively studied by scholars and public authorities, the literature on import determinants is rather thin. In order to justify many variables in the import equation, we had to extrapolate a logic drawn from the export literature, but also applicable to imports straightforwardly or as a mirror image. Hence, our results bring forward the need to develop a greater understanding – conceptually as well as empirically – of the import determinants for SMEs.

Policy makers tend to overwhelmingly concentrate on export promotion. This bias towards outward activities eclipses the importance of imports brought forth by this paper's results. In devising assistance programs favouring exports, policy makers ought to take into account the inward dimension as well, since imports might subsequently contribute in increasing SMEs' competitiveness, promote innovation, R&D and efficiency, strengthen their foreign networks,

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[6] We are considering here exports' full model without IMPORTS in Table 2, column 5, in order to be comparable with the full model for imports in Table 1, column 5.

transfer valuable information and encourage directly or indirectly export activities (Korhonen *et al.*, 1996).

Furthermore, the ever-intense world competition favours competiveness strategies focused on quality, and not only on price competition. This induces some firms to extent their purchasing operations abroad in order to ensure an adequate supply of inputs and components necessary for the manufacture of a product that can satisfy the market's requirements. More global public policies, integrating the many dimensions of the firm's international process, might contribute in reducing the unsuccessful attempts at exporting, since, as mentioned by Fisher & Reuber (2008), export performance is not always proportional to the resources allocated to this activity. As mentioned by Ruzzier *et al.* (2006), "more than inward operations, outward operations can in the long term increase the competitive advantage of a company, organization or a country». In effect, we contend that the relationship between both international operations is dynamically multidirectional. Hence, in the absence of any inward operations, exports would generate much less value added for Canada.

The distinction between the import of inputs and of equipment goods is left for future research. Indeed, the purchase abroad of equipment goods may be more strategic in nature and, consequently, governed by different motives and determinants than for inputs. Similarly, the proactive nature of many import activities, in relation with the manager's business orientation and entrepreneurial behaviour, constitutes another interesting research avenue. Many managers do not fully realize the importance of imports as a strategic action capable of generating competitive advantages for the firm. This strategic dimension is also revealed by the choice of importing countries according to the firm's strategic focus on quality, on costs or on capacity. For instance, imports from low-cost countries have a direct effect on competitiveness, but they can also negatively impact quality and performance because of shipping delays, reliability problems, transport costs, etc. (Moatti, 2008). Future research could also investigate the types of markets in which the firms operates, between a segmented *niche* market or a subcontractor's market.

One important limitation to this paper's results is the fact that the entire sample consists of firms located in the province of Quebec. Because of the geographical and cultural proximity with the United States and considering the huge size of its market, exporting and importing rates and behaviours are mainly determined by the influence of the US neighbour. It would be interesting to extent this study to SMEs located in other markets, in order to investigate the degree of international activities and their determinants in a different economic and geographical environment. Finally, with a high average size of 50 employees, our sample is biased in favour of exporting SMEs, as shown by many past studies. The sample is not quite representative of an actual population of SMEs. This limits the scope of our results.

Appendix

Table A1: Determinants of SME imports and exports

Determinants	Import equation		Export equation	
	Interpretation	Exp. sign	Interpretation	Exp. sign
Manager characteristics				
• AGE: age of manager	Younger generations might be more internationally open-minded. However, older managers might possess more experience to conduct business abroad.	+/-	IDEM	+/-
• EDUC: level of education of manager (in years)	More educated managers should be more open-minded towards international activities and show greater abilities for conducting business abroad.	+	IDEM	+
• EXPERIENCE: number of years managing the firm	More experienced managers may have greater abilities for conducting business abroad.	+	IDEM	+
Firm characteristics				
• EMPLOYEMENT: number of employees (in log)	Size effect in terms of employment. A larger pool of employees may reflect the scale of the firm's experience, knowledge and expertise.	+	IDEM	+
• SALES: total value of sales in dollars (in log)	Size effect in monetary terms. Larger firms may have a greater absorption capacity to mitigate errors and risks, and to assume searching and transaction costs related to foreign purchasing.	+	IDEM	+
• COMPETITION=1 if the manager feels that there are many foreign competitors in their market, zero otherwise.	A more competitive environment forces the firm to be more competitive and efficient, which might trigger the search of cheaper, higher quality inputs abroad.	+	A more competitive environment forces the firm to increase its market share outside the domestic market. Also, some firm may strategically enter their competitor's foreign market.	+
International experiences and knowledge				
• INT_EXP = 1 if the manager or a member of the managing committee has studied abroad and/or has lived abroad, zero otherwise	International experiences are more conductive to foreign business.	+	IDEM	+
• LANGUAGE=1 if the manager or a member of the managing committee know more than two languages.	Speaking several languages helps in conducting business abroad.	+	IDEM	+
Networks				
• NETWORK_EX: number of types of foreign contacts/activities used to assist the firm in its export activities amongst: clients, suppliers, consultants or participation to fairs/trade shows.	Indication of the extent of the firm's foreign network and contacts in helping finding new clients abroad. This network may also be used to find new suppliers and conduct import activities abroad.	+	Not estimated.	
• NETWORK_IM: number of types of foreign contacts/activities used to assist the firm in its import activities amongst: clients,	Not estimated.		Indication of the extent of the firm's foreign network and contacts in helping finding suppliers abroad. This network may also be used to find new clients and conduct export activities	+

suppliers, consultants or participation to fairs/trade shows.			abroad.	
R&D, Innovation and technical sophistication				
• R&D: number of employees working (full time equivalent) in R&D activities in the firm (in log).	R&D activities often require the import of specialized technologies, equipment or services.	+	More innovative firms tend to export more.	+
• INNO: number of types of innovation activities (OECD/Eurostat definition of innovation)	Innovation activities often require the import of specialized technologies, equipment or services.	+	More innovative firms tend to export more.	+
• PROD: number of production systems used amongst any of the following: process scheduler software, computerized code bar system, or Enterprise Resource Planning systems (ERP)	Indication of the firm's technical sophistication. On the one hand, the implementation or the use of production systems may require the import of specialized components. On the other hand, firms that are focused on technical efficiency are more likely to also focus on quality, importing superior components abroad.	+	Indication of the firm's technical sophistication. Greater technical efficiency may insure quality and thus be more conducive to export. In general, firms implementing production systems may be more quality oriented.	+

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