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by Jonas Onkelinx and Leo Sleuwaegen

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Internationalization strategy and performance of small and medium sized enterprises

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Abstract

Focusing on the timing and geographical scope of import and export activities of Belgian small and medium sized enterprises (SMEs), the paper analyzes the importance, structural features and performance implications of firms that recently started to export following the geographical configuration of their international trade operations and their year of establishment. The analysis allows us to separate firms that started to export in the period 1998-2005 into four distinct groups: born internationals, i.e. firms which were established less than five years before their first year of exporting and exporting to less than five countries in the same region (regional focus), born globals; young firms but with a more internationally diversified export portfolio, born again globals, i.e. firms similar to born globals but established longer than five years before their first exports and traditional internationalizers, firms established more than five years before their first export operations characterized by a narrow geographical scope of their exports.

We find SME export growth to be driven by a small group of born global firms, accounting for 60 per cent of the total increase in SME exports between 1998 and 2005. Analyzing the structural feature of the different types of firms, we find born globals to be more productive and characterized by a higher R&D spending and intangible asset intensity compared to other types of traders.

We next test if the typology matters for the observed export performance differences across firms over time. We find that born globals grow faster in terms of export sales, have a stronger commitment to export markets and are more likely to continue exporting. Born globals also have the highest failure rate, traditional internationalizers the lowest. These findings suggest strong risk/return tradeoffs among the strategies chosen by the different types of firms.

Performing a dynamic analysis of changes in trade configurations of firms over the observation period, we investigate how these changes have an impact on performance. Specific attention is paid to firms that stop importing/exporting. Especially firms that move from being exporters to become two-way traders, i.e. also starting to import goods from other countries show the most marked increases in turnover and productivity.

The final part of the study analyzes the relationship between export and import activities to particular countries following the sequence in which they occur. We find that the probability to start importing from a country is 4 times higher for firms already exporting to that country than for trading SMEs without prior export experience in that country.

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1. Introduction

There is a striking consistency in the findings about the internationalization of firms across countries: firms involved in international activities are fewer in number, but bigger and more productive than other firms. Only a small number of firms account for the bulk of aggregate exports and foreign direct investment in the investigated countries. For Belgium, it was estimated that the top ten percent of all exporters account for 84% of all exports of products in 2003 (Mayer and Ottaviano, 2007; Muûls and Pisu, 2007). The reason for this strong concentration is ascribed to international competition which triggers a selection process where more productive firms replace less productive firms, and which enables successful firms to grow strongly across borders.

Despite this strong concentration, Mayer and Ottaviano (2007) show that the number of exporting firms, the so-called extensive margin, is more important than the increase in the exports sales per firm, the so-called intensive margin for explaining increases in the aggregate value of exports for a set of countries. Moreover, given the superior performance of firms participating in international markets, a larger number of those firms would also raise productivity, GDP and wages of the countries more than proportionally. Hence, their plea for policies geared towards increasing the number of exporting firms, instead of promoting established exporters.

Following this perspective, we focus on the internationalization of small and medium sized enterprises (SMEs) and investigate their contribution to export growth, job creation and value added creation. Recent developments show an increasingly active role played by SMEs in international markets (e.g. OECD, 2000, 2007). Because of declining government barriers and advances in technology, this trend is expected to gain further momentum (Lu and Beamish, 2001).

However, in spite of the positive evolution, the internationalization of SMEs is often limited, both in geographical scope and in terms of the share of international versus domestic activities (Westhead et al., 2004).

Export and import are also more common among older and larger SMEs. Despite the increasing prevalence of international new ventures, i.e. recently established firms that start exporting soon after inception, most SMEs venturing abroad often still do so using a cautious, stepwise approach after several years of domestic growth. While high tech firms may choose rapid internationalization and follow the international new venture approach (Oviatt and McDougall, 1994), the stage theory (Johanson and Vahlne, 1977) may still be the most appropriate one for firms in mature industries. The timing and risks involved in these approaches are different, and firms need to evaluate whether they want to reduce the risk and follow a conservative pattern, or need to rapidly capture market share before their technology becomes obsolete.

The question also arises whether or not international trade participation matters for the performance of SMEs. Several studies have indicated that internationalization is often accompanied by improved firm performance, growth and competitiveness (e.g. De Loecker, 2007). The impact of export on sales growth is straightforward. In addition, the subsequent larger sales volumes enable firms to achieve economies of scale and increase labor productivity and management efficiency. The associated cost savings should have a direct impact on firm profitability. A growing body of empirical research has also demonstrated the superior characteristics of exporting firms relative to domestic ones. Exporters are larger, more productive, more capital intensive, more technology intensive, and pay higher wages (e.g. Bernard and Jensen, 1999). The central issue is the direction of the causality between export and firm performance. There is convincing evidence that strong, efficient firms become exporters: exporters are larger, more productive and have higher employment growth before their first exporting activities. Bernard and Jensen (1999) suggest, however, that while export

does not lead to faster productivity growth at the firm level, employment growth is higher and exporting firms are more likely to survive than non-exporters with similar characteristics (see for Belgium, Coucke and Sleuwaegen, 2008).

Based on a review of 45 studies on the impact of export on productivity, Wagner (2005) concludes there is convincing evidence that the more productive firms self-select into export markets, while exporting does not necessarily improve productivity. Nevertheless, some researchers (e.g. De Loecker, 2007) find that export entrants become more productive, and that the productivity gap between exporters and domestic firms further increases over time. Studying the same question in a different direction, Girma, Greenaway and Kneller (2002) find firms exiting from exporting to suffer a mild decrease in total factor productivity, but sizeable losses in output and employment. Unfortunately, since research on the effects of export on firm performance has lacked a focus on small firms, it remains unclear to what extent SMEs are subject to the same effects. Moreover, as we show in the next section, such effects may differ following the different internationalization strategies adopted by SMEs.

2. SME internationalization strategies

SMEs need to carefully consider the entry mode, timing, scope and pace at which they deploy their international activities. Several behavioral process models have been developed in this regard. The best known model is the so-called "Uppsala model" which sees firms growing internationally in a staged approach first entering and committing resources in psychically close markets before moving on very gradually to more distant markets (Johanson and Vahlne, 1977). This approach has been challenged by models of new ventures that from the outset are driven to be present in many foreign markets at the same time, not only because of the wide scope of the relevant market on which they need to compete, but also to develop and leverage critical resources in those centers of the world where the best supporting conditions are available. Especially for R&D intensive activities this seems to be most relevant (Oviatt and McDougall, 1994). More recently, with the spreading of supply chains and the organization of supporting networks across countries, an increasing number of firms have to follow their lead customers and accordingly have to adapt their scope and timing of internationalization to not become left behind. This might explain the rapid and wide scope internationalization of smaller firms in more traditional industries (Onkelinx and Sleuwaegen, 2008).

In view of these different developments, there has been a need to develop more general models relating the environmental and market specificities to firms' choice of internationalization strategies (e.g. Zahra and George, 2002). While from a conceptual approach this may look obvious, the building of formal theoretical models leading to a clear cause and effects logic has been less developed. Perhaps, one of the most useful exceptions to this observation, and one that is highly useful for this study, is the innovation diffusion model based on a dynamic competitive game theory framework introduced by Kalish, Mahajan and Muller (1995). Using this framework, they investigate how firms will introduce new products in foreign countries.

On the one hand, firms can choose for a so called sprinkler strategy, targeting multiple countries at once. Another option is a waterfall strategy, slowly cascading from one country to the next. Taking account of the high (sunk) cost of committing resources, few firms can internationalize simultaneously in all regions. Especially for starting SMEs, a global approach is often not an option. SMEs are more likely to gradually move from a successful domestic launch towards entering more advanced countries and in a later stage to less developed economies. Using a sprinkler strategy, firms can maximize revenues by exploiting economies of scale in R&D and manufacturing. Moreover, a sprinkler strategy may pre-empt competitive moves in some countries, thus maximizing sales and market share. Entering markets before competitors do may result in substantial first mover

advantages. From the interpretation of the comparative statics and dynamics of the model, Kalish et al. (1995) found the following market conditions to favor waterfall strategies:

- Very long life cycle of the product
- Small foreign markets
- Slow growth in the foreign markets
- Low innovativeness in the foreign market
- High fixed cost of entry into the foreign market
- Weak or no competitors in the foreign markets
- Co-operative behavior among competitors

From an empirical point of view, Mascarenhas (1997) found that being the first to enter the market did indeed result in higher long-term international market share and survival. However, launching a new product requires substantial investment in manufacturing, inventory, advertising, distribution, human resources. Using a waterfall strategy, firms can limit these investments, as the new product is introduced in a limited number of countries. If the product is unsuccessful in these countries, the firm can refrain from making investments in other countries. Being successful, income from the first market can be used to invest in a subsequent market. Consequently, a waterfall strategy can lower the pressure on cash flow. A waterfall strategy is thus less risky than a sprinkler strategy.

Moreover, possible benefits of delayed internationalization are improved learning by doing resulting in higher productivity and a stronger competitive position. There is substantial evidence that only the more productive firms export and survive in export markets, i.e. those firms that have reached a certain productivity level necessary to compete in international markets (e.g. Bernard, Jensen and Schott, 2006a).

From the considerations above it follows that choosing a sprinkler or a waterfall strategy involves a strong tradeoff between sales maximization and risk minimization. Although a sprinkler strategy may be more appropriate in many cases, managers might favor a waterfall strategy as a way to limit the risk of failure. This trade-off between revenues and risk in choosing between a sprinkler versus waterfall strategy is central to the development of several of the hypotheses that will be tested in this paper.

The remainder of the paper is organized as follows. Classifying firms according to the observed differences in international scope configurations and timing of internationalization, the relative contributions of each group to overall Belgian export growth is analyzed. Next, the relationship between geographic scope at the start of the internationalization of SMEs is analyzed in relation to structural features of these firms. Moving from a static to a dynamic analysis, the study continues by relating changes in trade configurations over time to changes in performance. Specific attention is paid to firms that stop exporting. The final part of the study analyzes if there are learning spillovers between export and import activities in developing trade with foreign countries.

3. Newly internationalizing SMEs in Belgium over the period 1998-2005

3.1 The significance of international SMEs for the Belgian economy

In collaboration with the National Bank of Belgium (NBB), we have constructed a comprehensive dataset linking firm level trade data to annual account data of firms collected by the Central Balance Sheet Office of the Bank. All non-financial firms in Belgium with at least 10 FTE employees (at least one year between 1998 and 2005) were included in the dataset. SMEs were selected using the employment criterion of the Eurostat definition: firms with fewer than 250 FTE employees. We distinguish between small firms (<50 FTE), medium sized firms (50-249 FTE) and large firms (≥ 250 FTE). The final dataset contains 35,240 SMEs and 1,009 large firms, across all industries. The period covered is 1998-2005, as the thresholds for the Intrastat inquiry remained the same in this period. Firm-level data on trade of goods are available per product (4-digit CN4) and country. The dataset contains trade data for 1,279 products and 249 countries. Export dummies for the 1993-1997 period were added indicating if firms had export activities before 1998.

This unique dataset is extremely well suited to reduce certain gaps in extant research on the internationalization of SMEs. Arguably the most striking ones are the lack of empirical studies on the evolution of internationalized SMEs over time (Zahra, 2005) and the limited number of studies comprising multiple industries. As Coviello and Jones (2004) pointed out: *“International entrepreneurship research is characterized by static cross-sectional studies and a lack of service sector and/or comparative research within and across sectors.”* Not only will longitudinal data be used in the proposed research design, it will also provide a complete picture of SME internationalization across all sectors, including low tech manufacturing industries and services industries. The lack of attention being paid to services is all the more surprising, given that evidence shows that exports by services SMEs are increasing and only 28% of SME exporters in the U.S. are manufacturers (U.S. Department of Commerce, 2005).

Although export remains concentrated among a small number of firms (in 2005, the top 1% and top 10% exporters accounted for respectively 52% and 85% of trade – excluding micro firms), a large number of SMEs in Belgium is exporting. SMEs account for 56% of total export in wholesale and retail, and 32% of total manufacturing export. Overall, the share of SMEs in total export is stable at 39% in both 1998 and 2005. Whereas manufacturing accounts for 76% of export by large firms, manufacturing only represents 56% of SME export. Wholesale and retail on the other hand, are much more important for SME export (35% of total export by SMEs) than for large firms (17%). Other services account for 6% of SME export and just 0.3% of export by large firms.

Table 1: Distribution of total export by large firms and SMEs across sectors (2005)

	total export by industry			% of all exporters		% SMEs in total export
	all firms	Large firms	SMEs	Large firms	SMEs	
Agriculture, fishing, mining	0.5%	0.1%	1%	0.4%	2%	85%
Manufacturing	68%	76%	56%	48%	49%	32%
Utilities & construction	4%	7%	1%	8%	11%	8%
Wholesale & retail	24%	17%	35%	18%	29%	56%
Other services	3%	0.3%	7%	26%	9%	94%
	100%	100%	100%	100%	100%	39%

Total export from Belgium increased by 35% between 1998 and 2005, from €101 billion to €136 billion. SMEs accounted for 30% of this increase, large firms for 70%. Firms are classified as SME or large firms at the start of the period, in 1998¹.

SMEs continuing to export from 1998 to 2005 accounted for about 36 per cent of total export growth over the period. 27% of total export growth is accounted for by SMEs that started exporting between 1998 and 2005. However, this growth is smaller than the decrease in export by SMEs that stopped exporting. All in all, SMEs thus accounted for 30% of the increase in total exports. Not surprisingly, SMEs accounted for 70% of the increase by firms that started exporting between 1998 and 2005.

Table 2: Export growth SMEs and large firms, 1998-2005 (€ million)

Export growth	total Δ	Δ large	Δ SME	% SMEs
continue export	37,915	25,411	12,504	33%
stop export	-16,753	-5,331	-11,422	
start export	13,378	3,952	9,427	70%
total	34,540	24,031	10,509	30%

Table 3 shows the divergent evolution of total export between 1998 and 2005 across sectors. Manufacturing still accounts for about half of the total increase in exports, although especially for large firms this growth is limited in relative terms. SMEs accounted for 37% of the total increase in manufacturing export.

Table 3: Export growth by industry, 1998-2005 (€ million)

Export growth	total Δ	Δ large	Δ SME	% SMEs
Agriculture, fishing, mining	212	13	199	94%
Manufacturing	17,840	11,214	6,626	37%
Utilities & construction	5,449	5,385	64	1%
Wholesale & retail	10,210	7,864	2,346	23%
Other services	830	-445	1,274	154%
total	34,540	24,031	10,509	30%

Equally interesting, In terms of job creation, SMEs that started to export also made a significant contribution to net employment growth in Belgium. Overall, SMEs have created 120,204 jobs between 1998 and 2005, whereas job destruction in large firms was 27,523. Total job creation of large firms and SMEs was 92,681. Although overall employment growth in large firms is negative, domestic large firms and a small group of large firms that started exporting had a positive contribution to total employment. In contrast, both firms that stopped exporting and those that continued, showed a substantial decline in employment. Among SMEs, only those that stopped exporting had a negative contribution, while all others showed positive employment growth.

¹ In Table 1, SMEs and large firms are classified according to their size in 2005.

Table 4: Employment growth SMEs and large firms, 1998-2005 (FTE)

Employment growth	total Δ	Large		SME		% SMEs in total
		Δ	Δ (%)	Δ	Δ (%)	
no export	115,191	37,351	27%	77,839	21%	68%
continue export	-3,217	-38,817	-8%	35,600	14%	
stop export	-116,185	-49,498	-70%	-66,688	-59%	
start export	96,893	23,440	162%	73,453	169%	76%
total	92,681	-27,523	-4%	120,204	15%	130%

Table 5: Employment growth by industry, 1998-2005 (FTE)

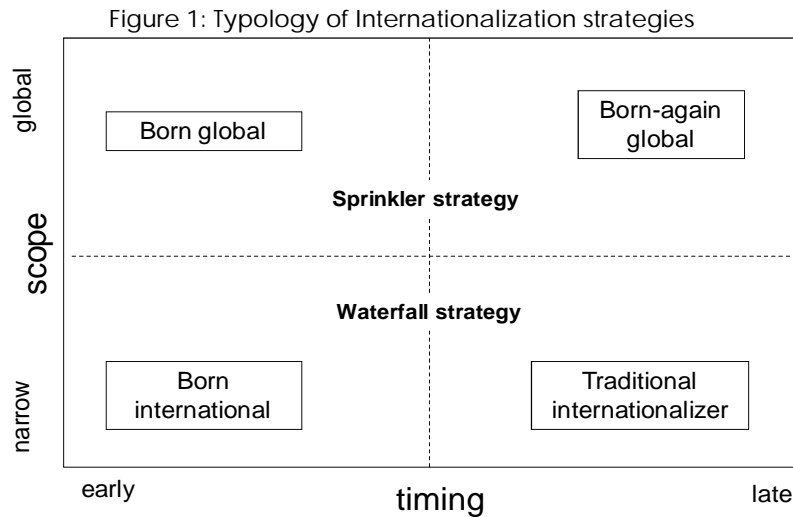
Employment growth	Δ total	Large		SME		% SMEs in total
		Δ	Δ (%)	Δ	Δ (%)	
Agriculture, fishing, mining	842	11	1%	832	9%	99%
Manufacturing	-62,280	-48,210	-16%	-14,070	-6%	5205%
Utilities & construction	158	-8,040	-17%	8,198	8%	
Wholesale & retail	42,149	11,830	15%	30,319	16%	
Other services	111,812	16,886	6%	94,926	42%	85%
total	92,681	-27,523	-4%	120,204	15%	130%

Across broad sectors, only manufacturing declined in terms of employment. Wholesale, retail and other services had high growth rates, especially among SMEs. SMEs had positive employment growth in all sectors except manufacturing. At a finer level, for all NACE 2-digit industries, the industry employment growth rate of international SMEs averaged across industries was significantly larger than the average industry employment growth rate of large international firms over the period 1998-2005 (SME growth rate = 0.47; growth rate of large firms = 0.07; industry paired t-test = 2.734 for difference in growth rate).

3.2 Strategic types of newly internationalizing SMEs

Following different process models of internationalization, we next analyze the different strategies of newly internationalizing Belgian SMEs over the period 1998-2005, and the implementation of these strategies. Focusing on timing and the scope of export and import activities of Belgian SMEs, we analyze the importance and performance implications of firms characterized by different international trade configurations. The analysis allows us to separate firms with a narrow export scope (regional focus) from the more internationally diversified firms (global).

SMEs can also opt for early or late internationalization in their life cycle and use a waterfall or sprinkler strategy. As a result, four types of internationalization strategies can be identified: new firms that start exporting soon after inception (international new ventures) and incumbent firms that start exporting after a substantial number of years of purely domestic growth (late internationalizers), both opting for either simultaneous entry in multiple markets (sprinkler strategy) or entering a single market and consecutively spreading activities over different markets in time (waterfall strategy). Combining scope and timing of internationalization, we propose the typology of internationalization strategies presented in Figure 1.



To clearly distinguish these strategic choices, we focus on newly internationalizing SME, those firms that start exporting in the period covered in the dataset, i.e. 1998-2005. The sample includes recently established firms (1993 or later) and firms that reported their first export activity in the 1998-2005 period, but were established before 1993. To control if firms had no prior export activities, we checked if any exports were reported between 1993 and 1997. This leaves us with 5,933 SMEs that started exporting between 1998 and 2005. Focusing on timing and scope, we can distinguish between firms that start exporting early or late, using a narrow or a global scope.

Some small firms are able to internationalize shortly after inception -within five years. If they start on a global scale, i.e. export to at least 5 countries, one of which outside Europe, they are labeled born-globals (BG). Firms that start early but export to a smaller set of countries (less than five countries) are born international firms (BI). SMEs that wait more than 5 years and start with a narrow country scope (less than five countries) are called traditional internationalizers (TI). Finally, Bell et al. (2001) found that some firms start their internationalization late, but follow an approach similar to born globals, once they decide to internationalize. Those firms are labeled born-again global² (BAG). These thresholds of five years and five countries correspond to similar thresholds used in prior literature (see appendix 1). Moreover, in checking for robustness, we did not find the results to be very sensitive to the chosen thresholds.

Figure 2: Classification of SMEs according to timing and scope of export

		timing	
		early	late
scope	global	Born Global 1,226 21%	Born-again Global 77 1%
	narrow	Born International 1,775 30%	Traditional Internationalizer 2,799 47%

² A small number of newly established SMEs (56 firms) that started exporting between 1998 and 2005 do not fit these categories. These firms started exporting to more than five countries (six on average) within five years, but their geographical scope was limited to the EU.

The four types of internationalizing SMEs (5,877 firms) that started exporting between 1998 and 2005 accounted for 25% of total export growth and created 68,634 new jobs. Born globals were the main drivers of SME export growth, accounting for 60 per cent of the total increase in SME exports between 1998 and 2005. SMEs that started internationalizing between 1998 and 2005 were also important drivers of job creation. Early internationalizers had the largest contribution to employment growth: born globals created 21,440 jobs (+76% relative to base year employment) and born internationals 25,560 jobs (+121%). Traditional internationalizers created 19,481 jobs (+33%) and a small group of born-again globals created 2153 jobs (+151%) between 1998 and 2005.

3.3 Globalized industries

Whereas born globals are almost equally distributed between manufacturing and services, the other types of internationalizing SMEs are relatively more present in services. In a recent study on the industry determinants of born globals, following an in depth review of the literature on this topic, it was deduced that born globals would occur more frequently in high technology industries and globalized industries³ (Fernhaber, McDougall and Oviatt, 2007). Our dataset provides a direct possibility to test this proposition. Classifying industries according to the R&D intensity⁴ and the openness to international trade, we constructed contingency tables (Table 6 and

³ To analyze which of these strategy types are more common in globalized industries, we constructed an industry globalization dummy. This dummy is based on the share of total industry trade (import and export) in total industry sales, and the share of industry extra-EU trade in total industry trade. Industries with a share of trade greater than 45% and a share of extra-EU trade greater than 17% were classified as globalized, all other industries were local. We thus found 16 globalized industries in 2005 (nacebel 2 digit), or 29% of all industries.

⁴ Manufacturing industries were classified into four categories according to the industry's technology intensity, following the OECD classification. Based on three digit nacebel codes, industries were thus classified as high tech (HT), medium-high tech (MH), medium-low tech (ML) and low tech (LT).

Table 7) for the year 2005. The chi square test suggests a strong contingency for both dimensions with born globals occurring more frequently in high tech and globalized industries than expected from a non-contingency. Traditional internationalizers, on the other hand, are found more frequently in low tech and local industries than expected.

Table 6: Distribution of strategic types of newly internationalizing SMEs across industries according to industry technology intensity and globalization

2005	HT-MH		LT-ML		other industries		
	local	global	local	global	local	global	
BG	33	195	246	152	252	324	1,202
BI	36	102	288	102	901	346	1,775
TI	19	60	378	99	1,945	297	2,798
BAG	2	5	19	4	38	9	77
	90	362	931	357	3,136	976	5,852

Table 7: Expected distribution of strategic types of newly internationalizing SMEs across industries according to industry technology intensity and globalization

expected	HT-MH		LT-ML		other industries	
	local	global	local	global	local	global
BG	19	74	191	73	644	200
BI	27	110	282	108	951	296
TI	43	173	445	171	1,499	467
BAG	1	5	12	5	41	13

chi-square = 964

degrees of freedom = 15

p < 0.000

3.4 Distinguishing characteristics among the international SME-types

Born globals are the largest of the four types, not only in terms of the scope of their trade, but also in employment, value added and sales. Although traditional internationalizers are older, they are on average much smaller than these born globals. The difference between born globals and born again globals was relatively small in terms of the different characteristics, except for the relative number that are importers and the size in terms of value added and turnover in 1998. In 2005, these differences between born globals and born-again globals had become even smaller.

Table 8: Descriptives (means) of strategic types of newly internationalizing SMEs (FTE, € million)

	BG		BAG		BI		TI	
	1998	2005	1998	2005	1998	2005	1998	2005
employment	37.90	50.57	30.97	57.71	20.59	33.85	22.72	31.97
value added	2.31	4.55	0.97	3.79	1.07	2.51	1.46	2.34
turnover	21.50	40.00	6.04	43.10	8.16	23.60	5.51	13.40
export	6.81	11.51	5.43	8.37	1.01	1.79	0.24	1.11
export countries	13.15	16.81	12.00	14.02	1.91	3.26	1.37	2.78
export products	10.92	12.55	7.89	12.40	4.43	6.01	2.66	4.82
% importers	81%	89%	22%	84%	44%	54%	18%	30%
import countries	7.33	9.49	5.20	8.61	3.58	4.63	2.34	3.89
import products	19.84	24.54	15.90	21.54	13.15	17.55	8.93	14.94
N	1,226		77		1,775		2,799	

Almost 9 out of 10 born globals were also international sourcers, i.e. importers in 2005. On average, born globals imported 25 different products from 9 different countries. In contrast, only 30% of traditional internationalizers were importers. On average, these firms sourced 15 products from 4 countries. The share of importers among born internationals was higher (54%) compared to traditional internationalizers. Nevertheless, the number of countries (5) remained limited compared to born globals.

Despite the very small number of born-again globals, the data on import reveal that these firms have a sourcing strategy that is very distinct from other late internationalizers, similar to the one of (early internationalizing) born globals.

For the firms that started exporting in 1998 and still exported in 2005, we also examined the evolution of some important individual characteristics of these firms. We did this by performing several analyses of variance using regression analysis for a set of important indicators in relation to the different categories of traders. We also included industry dummies to account for specific

industry effects. The coefficients of the category variables represent differences in averages for the different categories with respect to the reference group (SMEs that were non-traders both in 1998 and 2005). Given the logarithmic specification the coefficients can be interpreted as percentage differences with respect to the original average of the variable (if differences are relatively small).

Table 9 and Table 10 distinguish between the types of traders that started exporting between 1998 and 2005 (i.e. born globals, born internationals and traditional internationalizers⁵) and all other traders (i.e. those that started exporting before 1998 or firms that only imported) and non-traders.

⁵ Controlling for industry effects, and given the very limited number of observations for born-again globals, we had to exclude this group from the analysis in table 9 and table 10.

Table 9: Differences between types of SME traders in 1998

	log employment	log value added	log VA per employee	log fixed assets	log fixed assets per employee	log intangible assets	log intangible assets per employee	log R&D	log R&D per employee
	ln_FTE98	ln_VA98	ln_prod_98	ln_FA98	ln_FA_FTE98	ln_IA98	ln_IA_FTE98	ln_RD98	ln_RD_FTE98
intercept (no trade)	2.538*** (0.01)	12.990*** (0.01)	10.532*** (0.01)	11.938*** (0.02)	9.447*** (0.01)	9.612*** (0.05)	7.012*** (0.05)	11.363*** (0.19)	7.899*** (0.19)
Born global	0.411*** (0.04)	0.796*** (0.05)	0.327*** (0.02)	1.103*** (0.06)	0.655*** (0.06)	1.516*** (0.13)	0.958*** (0.13)	0.864*** (0.30)	0.329 (0.31)
Born international	-0.070** (0.03)	0.045 (0.04)	0.078*** (0.02)	0.479*** (0.05)	0.535*** (0.05)	0.703*** (0.12)	0.679*** (0.12)	0.109 (0.32)	0.288 (0.33)
Traditional internationalizer	0.112*** (0.02)	0.327*** (0.03)	0.230*** (0.01)	0.547*** (0.03)	0.431*** (0.03)	0.138 (0.10)	-0.037 (0.10)	-0.032 (0.30)	-0.233 (0.31)
other_trader	0.537*** (0.01)	0.912*** (0.02)	0.312*** (0.01)	1.041*** (0.02)	0.467*** (0.02)	0.435*** (0.06)	-0.250*** (0.06)	0.444** (0.21)	0.033 (0.21)
number of observations	29,455	29,675	29,111	29,559	28,988	7,916	7,837	1,169	1,165
R ²	0.11	0.16	0.18	0.17	0.14	0.09	0.10	0.15	0.14

* p<0.10, ** p<0.05, *** p<0.01

Regressions with 58 industry dummies (nacebel2).

In Table 9, all types of traders⁶ are larger than non-traders in terms of value added. Born globals have the largest premia in terms of labor productivity, measured here as value added divided by the number of employees, and are followed by other traders, traditional internationalizers and born internationals. Born globals appear to be the most capital intensive, as measured by fixed assets per employee. Although very few SMEs report R&D spending, born globals seem to have significantly higher R&D spending. Broader than R&D, intangible assets may provide a better indication of the intellectual property of these firms. In terms of intangible assets per employee, early internationalizers (born globals and born internationals) show the largest intangible assets intensity, whereas other traders have a lower ratio than non-traders.

⁶ SMEs that started exporting between 1998 and 2005 are included in one of the three categories of export starters (born global, born international, traditional internationalizer), whereas traders that already exported before 1998 are in the group of other traders.

Table 10: Differences between types of continuing SME traders in 2005

	log employment	log value added	log VA per employee	log fixed assets	log fixed assets per employee	log intangible assets	log intangible assets per employee	log R&D	log R&D per employee
	FTE05	VA05	prod05	FA05	FA_em05	IA05	IA_em05	RD05	RD_em05
intercept (no_trade)	2.712***	13.339***	10.701***	12.135***	9.425***	9.734***	6.872***	11.126***	7.884***
	(0.010)	(0.010)	(0.010)	(0.020)	(0.020)	(0.050)	(0.040)	(0.200)	(0.210)
Born global	0.722***	1.326***	0.532***	1.237***	0.518***	1.035***	0.256	1.783***	1.065***
	(0.040)	(0.050)	(0.030)	(0.080)	(0.080)	(0.160)	(0.160)	(0.330)	(0.340)
Born international	0.401***	0.897***	0.419***	1.047***	0.614***	0.33	0.023	0.557	0.138
	(0.060)	(0.070)	(0.040)	(0.110)	(0.100)	(0.230)	(0.220)	(0.540)	(0.540)
Traditional internationalizer	0.411***	0.776***	0.301***	1.119***	0.700***	0.591*	0.199	0.847	-0.083
	(0.070)	(0.090)	(0.050)	(0.140)	(0.130)	(0.310)	(0.300)	(0.850)	(0.850)
other_trader	0.754***	1.252***	0.428***	1.348***	0.587***	0.779***	-0.096	0.908***	0.138
	(0.020)	(0.030)	(0.010)	(0.040)	(0.040)	(0.090)	(0.080)	(0.250)	(0.250)
number of observations	18,188	18,479	17,997	18,136	17,674	5,974	5,932	775	771
R ²	0.14	0.25	0.21	0.20	0.16	0.09	0.08	0.18	0.15

* p<0.10, ** p<0.05, *** p<0.01

Regressions with 58 industry dummies (nacebel2).

Table 10 shows the same characteristics for those firms that survived and continued exporting (export in 1998 and 2005) and surviving SMEs that did not trade in 1998 and 2005. All types of continuing exporters were still larger in terms of value added and employment compared to non-traders; and the gap had increased between 1998 and 2005. Born globals still had the greatest value added and productivity advantage and the highest R&D intensity in 2005. Continuing born internationals were able to considerably reduce the gap in productivity.

4. The process of internationalization: Some testable hypotheses

The extensive and unique data make it possible to develop and test some specific hypotheses about the internationalization process of SMEs. First, the recent international trade literature has shown how increased openness of countries selects the most efficient firms into exporting and increases the failure rate of less efficient firms (Melitz, 2003; Bernard et al., 2003; Costantini and Melitz, 2007; Melitz and Ottaviano, 2008). In a recent paper Eaton et al. (2004) develop a selection model in the context of differentiated country markets and test it against a large sample of French firms. A basic result of the model is that a more efficient firm will typically both enter more markets and sell more widely in any given market. Moreover, this translates into higher profitability of the firm.

This results of efficiency getting translated in higher sales growth is also the basic idea in stochastic growth models of firms, following up on the original ideas developed in Jovanovic's (1982) "Bayesian" learning model of firm growth (see Coad, 2009 for a recent overview). Following this logic, firms enter the industry with different relative (fixed) efficiency levels. Once established in the industry, firms learn about their efficiency, especially in their first years, with the least efficient ones being forced to exit, while more efficient firms expand. The higher and erratic growth rates of smaller firms are also related to the small size at which firms enter vis-à-vis the minimum efficient scale (MES), dictated by the technological conditions of the industry. Confronted with this scale cost-disadvantage, surviving small firms will grow rapidly to reach the MES. Above the MES, growth may become completely random (see e.g. Caves, 1998). In the empirical work testing for these ideas, it is indeed found that smaller and younger firms grow faster than larger, older ones; but the volatility in their growth rates is also higher as are their hazard rates (e.g., Evans 1987; Variyam and Kraybill 1992; Dunne and Hughes 1994; Yasuda 2005; Calvo, 2006).

Thus far these insights from the stochastic evolution models seem not to have been tested in the context of expanding abroad and entering diverse international markets. This international expansion forces firms to discover their relative efficiency in the specific market context of the different countries to which they decide to export. Obviously, the selection process triggered by trade liberalization will favor efficient firms in the domestic market and stimulate them to internationalize. This self-selection should milder the learning process in foreign markets. However, many unobserved factors in foreign markets may still lead to a similar growth process. We expect this learning effect to be stronger for born globals and born internationals that as young firms and early internationalizers need to expand in several countries at the same time. For traditional internationalizers and/or established exporters, export growth will be more controlled and less sensitive to a parallel discovery process.

Hypothesis 1: Born globals and born internationals will grow faster in export sales than traditional internationalizers and established exporters.

An increasing number of studies both in the international business literature as well as in the international trade literature link the entry into foreign markets through exports to a commitment of resources coupled with substantial sunk costs that firms have to incur to enter these markets (Bernard and Jensen, 2001). For narrow scope and traditional (i.e. staged) internationalizers, this process will be gradual with a limited commitment of resources (Johanson and Vahlne, 1977). For born globals on the other hand, the instant and simultaneous entry into several markets will involve substantial investment that needs to be matched with substantial export volumes to overcome these costs. We therefore hypothesize that the levels of commitment in terms of initial export intensity will be much more substantial for the born global firms. Hence,

Hypothesis 2: Among the newly internationalizing SMEs, born globals will have the strongest initial commitment to export markets.

The larger commitment of born globals should be associated with less flexibility in withdrawing from foreign markets. This commitment is also likely to go together with a strategic intent to stay significantly present in world markets. Moreover, as most of these firms operate in high technology industries and globalized industries, as shown in section 3.3 of the paper, the relevant market on which they have to compete (i.e. the market where the competitive interaction among firms is high), is also typically comprising several countries. This is very different from traditional internationalizers, which occur more often in local traditional industries. Hence, we expect

Hypothesis 3: Among the newly internationalizing SMEs, born globals will show the highest probability to continue exporting over time.

Conform the logic of the passive learning model, being a new firm and being exposed to many different foreign markets also increases the risk of failure; i.e. bankruptcy of the firm. However, there is also substantial evidence that prior to expanding abroad, firms self select and only the most efficient ones will expand abroad (Bernard and Jensen, 1999) reducing excess risk. Some researchers have found that despite the risks involved in internationalization, both import (e.g. Coucke and Sleuwaegen, 2008) and export (e.g. Bernard and Jensen, 1999; Muûls and Pisu, 2007) positively impact chances of firm survival. Moreover, some authors find that learning by exporting gives rise to substantial productivity gains, increasing the chances of firm survival (e.g. De Loecker, 2007). If, however, internationalization ultimately increases long term chances of firm survival, the costs and risks involved in the process may reduce short term chances of survival (Sapienza et al., 2006).

Empirical research comparing the exit rates of different types of internationalizing SMEs to those of domestic new ventures is limited. Zahra (2005) found that SME proceeding cautiously and incrementally into international markets are likely to face fewer risks and pitfalls compared to rapidly and globally internationalizing SMEs, and may therefore have higher chances of survival. Mudambi and Zahra (2007) found lower survival rates for new ventures entering markets simultaneously compared to sequential foreign market entry. However, these differences disappear when competitive strategies are taken into account. Most of the past studies were based on small samples, and did not always correct for industry influences. With the data at hand, we are able to do a more complete analysis, and test if the failure rates of the different types of SMEs differ systematically across industries. Following our typology, we can test for both born globals and born internationals if next to the risk of being a new firm and trader there is an extra risk of entering multiple foreign markets at the same time. More specifically, we hypothesize

Hypothesis 4: Among the newly internationalizing SMEs, born globals will show the highest failure rate, traditional internationalizers the lowest.

Acquiring foreign market knowledge prior to expanding into a foreign market can reduce the risk of entering foreign markets. Such prior knowledge will also facilitate the international development path of small firms. So far, we have assumed that firms only expand in one direction by exporting to foreign countries. However, recently there has been growing evidence that foreign sourcing, i.e. importing intermediate goods and services from foreign countries, has been growing strongly over time (Muûls and Pisu, 2007; Coucke and Sleuwaegen, 2008). From a learning perspective, those contacts with foreign partners are likely to generate privileged knowledge about these countries, and may be instrumental in reducing the risk and cost of entering by export those same foreign markets. This learning process could equally well apply in the other direction. Exporting to a particular country may also help to acquire better knowledge of possible foreign partners in that

same country and lead to sourcing products from those foreign partners. With the extensive data available in this study, we can investigate if these learning arguments hold and test the following two hypotheses.

Hypothesis 5: SME that import from (export to) a foreign market will have a greater propensity to start exporting to (importing from) that market compared to firms with no prior experience in that particular market and vice versa.

If the learning process is driving these hypothesized results, we should find this learning effect to be more important for those countries for which we assume firms lack substantial prior knowledge, or countries for which geographical distances and cultural and institutional differences make it difficult to obtain and interpret relevant information and make it useful for practical purposes. Hence, we expect

Hypothesis 6: The propensity to start importing from (exporting to) foreign countries following earlier export to (import from) the same countries will be relatively higher for (psychically and institutionally) distant countries.

5. Statistical evidence

5.1 Growth, selection and commitment

In testing the first hypothesis we set up a simple regression model relating annual export growth (export measured in value) over the period 1998-2005 to the (log of=ln) value of exports at the starting year 1998. We also included (log of) intensity of the firm's import per employee in 1998, (M98/FTE) as an explanatory variable in the growth regression, as firms' exports could to a large extent consist of imported goods that are processed for exports or simply resold to foreign customers. This two way trade is strongly stimulated by the ongoing spreading of value chains across borders by a strongly increasing number of firms. Controlling for scale and import effects and testing for the hypothesis that the recently created internationalizing firms will grow faster than established ones, we included a dummy variable for each of our different groups of newly internationalizing firms in 1998. Unfortunately, given the small number of born-again globals, absent in many of the industries for which we control, we had to exclude them from the analysis. The OLS regression is presented in Table 11. Following these results, export growth remains very erratic among all firms, as implied by the large unexplained variation by the model. Interestingly, controlling, for the initial export sales and imports intensity, the results suggest a substantially larger expected growth for newly internationalizing firms. The effect is most marked for born globals who, together with the born internationals, are not only newly internationalizing firms but are also recently created new firms.

Table 11: Growth regression OLS

	export growth b/se	
ln_export1998	-0.0552*** (0.000)	Number of obs. = 4986
ln_M98/FTE	0.0160*** (0.000)	F(5, 4930) = 220.17
Born global	0.0720*** (0.000)	Prob. > F = 0.0000
Born international	.0444** (0.033)	R-squared = 0.1915
Traditional internationalizer	0.0415 (0.219)	Adj. R-squared = 0.1825
industry dummies included	yes	Root MSE = .25357

* p<0.1, ** p<0.05, *** p<0.01

While these results would provide evidence in support of our first hypothesis, in testing the model we should be concerned with possible selection bias by selecting only the continuing exporters into our sample. As many firms will discontinue exporting in the period, common unobservable factors in the decision to continue exporting and in the growth of continuing exporters may cause serious bias in the estimated effects. To deal with this selectivity bias, we performed a Heckman two stage estimation of the model. In the first stage we run a probit model to establish the probability that firms will continue to export until 2005. Using this information in the second stage of the model, we estimate the expectation of firms' export growth conditional on being a continuing exporter in the period 1998-2005. Following the logic of the selection model, in the probit model of continuing to

export or not, we added the logarithm of the initial relative productivity (total factor productivity⁷, \ln_TFP98) of the firm in 1998 as an explanatory variable. Among the export discontinuing firms, 29 % were firms that dropped out completely and exited from the industry. The results of the Heckman estimation are presented in Table 12.

Table 12: Heckman two-stage estimation

	avg_ \ln_X05 - \ln_X98 yearly growth		select probit export
$\ln_export1998$	-0.0452*** (0.000)	$\ln_export1998$	0.0876*** (0.000)
\ln_M98/FTE	0.0184*** (0.000)	\ln_M98/FTE	0.0296*** (0.002)
Born global	0.0550*** (0.000)	Born global	-0.1149*** (0.055)
Born international	0.0028*** (0.000)	Born international	-0.3607 (0.000)
Traditional internationalizer	-0.0262 (0.600)	Traditional internationalizer	-0.5672*** (0.000)
		\ln_TFP98	0.1503*** (0.000)
Inverse Mills	0.1923* (0.059)		
industry dummies included	yes	industry dummies included	yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Number of obs.	=	7,118
Censored obs.	=	2,166
Uncensored obs.	=	4,952
Wald chi2(55)	=	524.28
Prob > chi2	=	0.0000

Controlling for export and import at the start year 1998, which favors the decision to continue export over the time period; we still observe significant differences in the probability to stop exporting among the groups of new exporters. While it is reasonable to expect from the passive learning model that all new internationalizing firms face a higher propensity to stop exporting, the large marginal effect for traditional internationalizers is striking. Following Table 13, the probability of continuing to export drops by 21 per cent for traditional internationalizers. This result suggests a totally different strategic intent concerning internationalization and a different scope of the relevant geographical market on which these firms compete. Apparently, regressing back to the domestic market appears to be a lot easier and common among the traditional internationalizers. For born globals the drop-out effect is small, only minus 4 percent, which supports their strong commitment and strategic intent to operate on global markets. This evidence strongly supports our third hypothesis.

⁷ TFP is measured as value added divided by capital and labor weighted by their relative cost shares.

Table 13: Marginal effects probability to continue exporting 1998-2005

variable	dy/dx	Std. Err.	z
ln_export1998	0.03014	0.002	12.3
ln_M98/FTE	0.01019	0.003	3.1
Born global	-0.04050	0.022	-1.87
Born international	-0.13326	0.029	-4.54
Traditional internationalizer	-0.21528	0.043	-5.02
TFP	0.05172	0.011	4.82
industry dummies included			

Turning to the outcome equation, and the implied marginal effects in Table 14, we may observe that the marginal effects are not too different from the OLS results, except for a small positive bias. The result is driven by unobserved factors which correlate positively for the decision to continue exporting and the growth performance. It is also interesting to compare the results for the unconditional and conditional marginal effects. The values suggest that the average growth among all traditional internationalizers, continuing and non-continuing exporters taken together is equal to zero, where for the continuing exporters 3 percent extra growth is expected.

Table 14: Marginal effects

variable	Heckman conditional marginal effect	Heckman unconditional marginal effect	OLS Marginal effect
ln_export1998	-0.05374	-0.03641	-0.0552
ln_M98/FTE	0.01556	0.01153	0.0160
Born global	0.06639	0.04255	0.0720
Born international	0.04061	0.01679	0.0444
Traditional internationalizer	0.03608	0.00683	0.0415
industry dummies included			

When interpreting these results, one should not overlook the fact that born globals grow faster than other internationalizing firms notwithstanding the stronger initial exports sales of born globals at the start. Born globals show a strong initial commitment to international markets by having relatively more foreign sales per product and country than any other firm. In other words, this commitment is not only due to the larger geographical scope of these firms and/or the product scope, nor to the imports from abroad, but reflects a truly international strategic intent and orientation of their activities.

This strong initial commitment to export markets can be illustrated following a simple decomposition of the export to sales ratio of exporting firms, where exports to sales can be expressed as follows:

$$X/S = (\bar{X}/S) * N_p * N_c$$

Taking logs:

$$\ln(X/S) = \ln(\bar{X}/S) + \ln N_p + \ln N_c$$

Where X = total exports, S= total sales of the firm, \bar{X} = average exports per product and country, N_p = number of export products, N_c = number of export countries.

Taking logarithms of both sides we can linearly decompose the log of export to sales into the various contributing factors. Following the logic of this decomposition, we ran a regression analysis including the number of products and number of countries by exporting firm as regressors and including industry dummies that allow for specific industry estimates of the average sales per exported product and country. Again, as many firms source from abroad and minimally process and/or resell those products to foreign markets, we should also allow for extra export sales that are transiting and do not really involve a real commitment. Consequently, we added (the log of) imports to sales as an extra covariate in the regression ($\ln_import/sales98$), allowing for possible substitution of own production by imported goods and services.

The results shown in Table 15 support the stronger commitment to international markets (hypothesis 2) of born globals, notwithstanding the larger country and product scope of these firms and scale of foreign sourcing. In terms of share of average export sales per product and country in total sales, born globals show a commitment that is about 25% stronger than the average trading firm. Traditional internationalizers show a minor commitment when they start internationalizing, as suggested by the large negative coefficient (more than 40% lower than the average firm). The small coefficient for the number of products suggests a strong inequality of sales among exported products, and should therefore better be interpreted as a number equivalent correction (number of products with equal export sales).

Interestingly, when the same variance analysis is done at the end of the period in 2005 for those firms that still export, the difference between the two groups of firms has narrowed, but continues to be significant. Traditional internationalizers are no longer different from long time established exporters. This evidence suggests a gradually rising commitment process for traditional internationalizers, in contrast to the strong initial international commitment of born globals.

Table 15: Regression export to sales ratio

	export_1998 b/se		export_2005 b/se
$\ln_import/sales98$	0.224*** (0.000)	$\ln_import/sales05$	0.280*** (0.000)
\ln_Np_98	0.235*** (0.000)	\ln_Np_05	0.226*** (0.000)
\ln_Nc_98	1.029*** (0.000)	\ln_Nc_05	1.046*** (0.000)
Born global	0.256*** (0.001)	Born global	0.253*** (0.000)
Born international	0.180 (0.121)	Born international	0.119 (0.207)
Traditional internationalizer	-0.438*** (0.004)	Traditional internationalizer	-0.028 (0.801)
industry dummies included	yes	industry dummies included	yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Number of obs	= 5,537
F(7, 5478)	= 670.68
Prob > F	= 0.0000
R-squared	= 0.5460
Adj R-squared	= 0.5412
Root MSE	= 1.5707

Number of obs	= 5,006
F(7, 4950)	= 682.15
Prob > F	= 0.0000
R-squared	= 0.5600
Adj R-squared	= 0.5551
Root MSE	= 1.6031

5.2 Exit of newly internationalizing SME

The foregoing analysis pointed out important differences in the withdrawal of newly internationalizing firms from export markets. In an important number of cases this withdrawal went together with a complete exit of the firm from the industry. Although recent evidence on the relationship between export and firm survival (e.g. Bernard and Jensen, 1999; Muûls and Pisu, 2007) has suggested that exporting may increase the chances of firm survival, little was known about survival of the various types of exporting SMEs. Conventional wisdom on small firm internationalization follows the traditional stage models (e.g. Johanson and Vahlne, 1977), which suggest that firms proceeding cautiously and incrementally into international markets face fewer risks and compared to rapidly and globally internationalizing SMEs, and may therefore have higher chances of survival. This implies that late internationalizers would have higher survival rates compared to early internationalizers, as suggested by Autio (2005).

The results above suggest the strong commitment to international markets of born globals with only a small percentage really withdrawing from export. However, the sprinkler strategy that these firms develop assumes significant resources and competencies to deal with the complexities of expanding into several countries (Kalish et al., 1995). Needless to say that such a drastic expansion may involve higher risks. In fact, among the born globals that stopped exporting, 22% stopped as a result of complete exit from the industry, compared to 15% for born internationals and only 7% of traditional internationalizers. Only cessation of activities was considered as exit. An equal percentage of SMEs that stopped exporting and appear to have exited, have in fact merged with another firm or have been taken over.

Taking account of possible industry influences (see section 3.3), we calculated exit rates⁸ per group of new exporters per industry (nacebel 2 digit) and performed a paired t-test for differences in exit rates among the groups. The results for average exit rates across industries and differences among the different groups are shown in Table 16.

⁸ Exit was defined as firms that had ceased to exist according to the crossroads bank and no longer reported employment in 2005. Even if the actual date these firms stopped was later than 2005 (i.e. between 2006 and 2009), the firm was classified as having exited in 2005 if it no longer reported employment in 2005. In the full dataset, we find an average exit rate of 9.7%, across all firms and industries. However, these exit rates vary greatly across industries. In three industries, we do not observe firm exit (forestry; fishing; and insurance and pension funds), whereas in four other industries exit rates exceeded 20% (mining; textile manufacturing; manufacturing of radio, television and communication apparatus; and water purification and distribution).

Table 16: Differences in exit rates between different types of traders and non-traders

	exit rate	Δ old traders	Δ old non-traders	Δ young non-traders	Δ BG	Δ BI	Δ TI
old traders (SE) t	0.10030 .0086991		-0.07649 0.023 -3.3794***	-0.10836 0.031 -3.4986***	-0.09120 0.046 -1.9819*	-0.06535 0.028 -2.3020**	0.01882 0.019 0.966
old non-traders (SE) t	0.17367 0.023	0.07649 0.023 3.3794***		-0.01757 0.018 -0.995	-0.00762 0.050 -0.1525	0.00127 0.028 0.0458	0.08223 0.026 3.1706**
young non-traders (SE) t	0.20855 0.033	0.10836 0.031 3.4986***	0.01757 0.018 0.995		0.02690 0.052 0.5128	0.03018 0.036 0.8268	0.11746 0.034 3.4920***
BG (SE) t	0.19775 0.044	0.09120 0.046 1.9819*	0.00762 0.050 0.1525	-0.02690 0.052 -0.5128		0.03265 0.058 0.5676	0.10660 0.041 2.5688**
BI (SE) t	0.16017 0.028	0.06535 0.028 2.3020**	-0.00127 0.028 -0.0458	-0.03018 0.036 -0.8268	-0.03265 0.058 -0.5676		0.06109 0.025 2.3971**
TI (SE) t	0.08643 0.014	-0.01882 0.019 -0.966	-0.08223 0.026 -3.1706	-0.11746 0.034 -3.492	-0.10660 0.041 -2.5688**	-0.06109 0.025 -2.3971**	

Paired t test of average industry exit rates of different types of SMEs.

***p<.01; **p<.05; *p<.1

When interpreting the data presented in table 16, one should consider the following definitions:

- "Old traders" refers to SMEs established before 1993 that imported and/or exported at least once in the period observed (1998-2005).
- "Old non-traders" are all SMEs established before 1993 that never imported, nor exported in this period.
- "Young non-traders" refers to all SMEs established in 1993 or later, that never imported, nor exported in this period.
- BG, BI and TI refer to born global, born international and traditional internationalizer as defined in appendix 1.

Overall, traders have lower exit rates compared to non-traders in the same industry, confirming the findings of Bernard and Jensen (1999) and Muûls and Pisu (2007). Analyzing differences between old and young traders (i.e. firms that started to trade in the period 1998-2005) and non-traders, we find that young non-trader firms have the highest exit rate. The exit rate of old traders is substantially below the one observed for old non-trader firms.

Following our typology of firms that started exporting between 1998 and 2005, we tested if the initial timing and scope of internationalization affects the chances of firm survival in the observation period. As expected, we find that born globals have the highest exit rates among these three types⁹ and traditional internationalizers the lowest, supporting hypothesis 4. The exit of traditional internationalizers was significantly lower than those of born globals and born internationals.

Interestingly, the export scope does not appear to have a significant impact on firm survival. A born global strategy appears not more risky than early internationalization with a more narrow scope (born globals versus born internationals). Furthermore, when comparing these latter two groups of early internationalizers with non-traders established in the same period, we find no differences in survival rates. This may suggest that early internationalization does not negatively impact the chances of survival when compared to no internationalization, a result that is at odds with the findings by Sapienza et al. (2006), who find that the costs and risks involved in the process may reduce short term chances of survival. However, the self selection of only those firms with a relatively high efficiency level into born globals may obscure this additional risk effect in our analysis and explain why the exit outcome for born globals is not too different from the exit rate of young non-trading firms.

5.3 Dynamics of trade involvement by SMEs:

Many firms are unsuccessful in their internationalization endeavors and stop exporting after one or more years, as we discussed in section 5.1. In this section we examine further changes in the trade configuration of firms over the time period 1998-2005. The following table summarizes how the trading status of all SMEs active in 1998 changed over time.

Table 17: Evolution of trading status SMEs active in 1998

trade status 1998	# SMEs active in 1998	2005				
		exit	no trade	import only	export only	two way trade
no trade	17,003	12%	76%	5%	4%	3%
import only	3,146	11%	26%	39%	3%	21%
export only	2,100	10%	38%	6%	30%	17%
two way trade	7,208	11%	13%	8%	4%	65%
total	29,457	11%	52%	10%	6%	21%

The vast majority (76%) of SMEs that did not trade in 1998, did not trade in 2005 either. Some of these firms (16%), however, had traded one or more years between 1998 and 2005. Only a small fraction of non-traders in 1998 became traders and continued trading until 2005. Three per cent of non-traders evolved to two way trade, four per cent only exported and five per cent only imported.

⁹ The group of born-again globals was too small to compare exit across industries. Their average exit rate was 10.4%.

SMEs that only exported in 1998 are the least persistent: less than one third were still only exporters in 2005, 17% had become two way traders and 38% stopped trading. Among firms that only imported, more firms evolved towards two way trade (21%) and fewer firms stopped trading (26%).

Two way traders are the most consistent in their trading status: 65% of firms that were two way traders in 1998 were still two way traders in 2005. Very few two way traders stopped trading; and many more one way traders evolved to two way trade. The fact that this category is large and that many firms move in the direction of becoming a two-way trader suggests that there must be substantial gains in making this transition.

5.4 The importance of becoming a two-way trader

Tables 18 and 19 relate the change from moving from a one way trader to become a two way trader to the change in performance of those firms in terms of value added and labor productivity, measured as value added per worker. For comparison reason the tables also show the change in performance for those firms who did not change status, moved in the other direction of trade, or stopped trading internationally.

Table 18: Evolution of trading status of SMEs that only imported in 1998

	Import only 1998			
	M+X 2005	Import only 2005	Export only 2005	No trade 2005
Δ employment	60%	26%	26%	3%
Δ value added	117%	53%	16%	34%
Δ labor productivity	35%	22%	-8%	29%
Δ turnover	93%	59%	12%	10%
Δ import products	39%	12%		
Δ import countries	46%	17%		
N	644	1,234	95	590
%	25%	48%	4%	23%

In 1998, 3,146 SMEs only imported. Half of those that were still active in 2005 still only imported, 25% had become two-way traders and 23% stopped trading. A small number of firms switched from import to export. The firms that became two-way traders had, on average, superior growth rates in employment, value added, sales and labor productivity.

Table 19: Evolution of trading status of SMEs that only exported in 1998

	Export only 1998			
	M+X 2005	Export only 2005	Import only 2005	No trade 2005
Δ employment	46%	21%	39%	10%
Δ value added	116%	62%	63%	12%
Δ labor productivity	48%	34%	17%	2%
Δ turnover	139%	74%	103%	46%
Δ export products	85%	23%		
Δ export countries	54%	9%		
N	355	621	120	599
%	21%	37%	7%	35%

In 1998, 2,100 SMEs only exported. Of those that were still active in 2005, 21% had become two-way traders, 37% still only exported and 35% had stopped trading. Those firms that became two-way traders had, on average, superior growth rates in employment, value added, sales and labor productivity. Interestingly, these two-way traders also had a faster increase in the number of export products and destinations compared to firms that strictly focused on exporting. They increased the number of products from 4.6 to 7.1 and the number of countries from 4.5 to 8.3. For SMEs that only exported in 1998 and 2005 there was a modest increase in products from 3.1 to 3.8 and in destinations from 3.2 to 3.5. For firms that stopped trading, there was a remarkable difference in terms of productivity growth between firms that were only importers and those that only exported in 1998.

5.5 Making the transition to two-way trade by country: Acquiring market knowledge through import and export

SMEs deciding to enter foreign markets face a number of challenges posed by these new markets; including differences in language, lifestyles, cultural standards, consumer preferences, purchasing power and institutional context (e.g. Lu and Beamish 2001; Sousa and Bradley 2005). Literature on SME internationalization has identified psychic distance and institutional differences as a key explanatory variable regarding expansion into foreign markets (e.g. Johanson and Vahlne, 1990; Dollar and Kraay, 2002; Francois and Manchin, 2006). Internationalizing SMEs would thus first enter psychically and institutionally close markets, before entering more distant markets. The learning from each export market would contribute to the firm's international experience, knowledge and capabilities and thus enable them to overcome the difficulties in dealing with these more distant markets. However, as we and others before us have demonstrated, a large number of internationalizing SMEs do not follow this traditional approach of internationalization in incremental stages. Consequently, many other factors seem to be at work explaining the various expansion paths of SMEs.

A number of factors facilitating rapid internationalization have been proposed. Besides the need to be globally active (cf. section 2) a key element for rapid internationalization is the international orientation and prior export experience of the owner/manager (e.g. Zou and Stan, 1998; Manolova and Manev, 2004). Likewise, hiring managers with prior export experience or knowledge about specific markets can accelerate the internationalization of SMEs. Another source of market knowledge can be found in the SME's network. Domestic buyers and suppliers may have international operations and can provide valuable information about certain markets. Analogously, SMEs can benefit from learning from their international customers or suppliers. In this respect, sourcing from a certain market may enable small firms to rapidly acquire knowledge about this market and assess the export potential of this market. Similarly, interactions with customers in foreign markets may help firms in identifying possible suppliers in these markets.

Whereas the stage theory proposed that SMEs learn from prior export experience before moving to more distant markets (Johanson and Vahlne, 1977), acquiring knowledge about that specific market through import may be even more important and thus enable SMEs to speed up their internationalization and enter psychically and institutionally distant markets without much prior export experience.

Table 24 and Table 25 in appendix show the evolution of trade of SMEs with Belgium's 10 main trading partners and 10 important but more distant trading partners, for firms active in 1998. For non-traders and firms that only imported from a certain country in 1998, we analyzed how many of these firms have started exporting to each of these markets by 2005. Overall, we find that for geographically and institutionally nearby markets in the EU, more firms make this transition than for more distant markets. In line with our hypothesis, we find a much larger share of importers that started exporting to a particular market than non traders making the same evolution. The propensity to start exporting conditional on importing from the same country is also significantly larger than the same propensity for firms that have trade experience but no imports from the particular country. This observation underscores the importance of having country specific knowledge about a potential export market.

Similarly, moving to the other trade direction, we find that exporters to a particular country make this transition to also import from that country more frequently than firms with no experience in this market.

For more distant markets we observe less transitions but the relative frequency of starting to export (import) by importing (exporting) firms from (to) the same country versus non-experience firms is more marked, suggesting the greater importance of acquiring knowledge and experience in dealing with these countries. We find that prior import or export experience substantially increases the likelihood of subsequent export or import to or from that market. The share of firms making the transition is smaller than for nearby markets. However, the importance of prior market experience is greater for those more distant markets. For the most popular EU trading partners, importers (exporters) are 5 times more likely to start exporting (importing) to (from) the same country than non-traders. For countries outside the EU, importers are 8 times more likely to start exporting than non-traders; and exporters are 9 times more likely to start importing from the same market than non-traders, providing support for hypothesis 6.

One remarkable result is the share of firms only exporting to China in 1998 that had started importing from this country by 2005 (Table 25 in appendix). More than one out of four SMEs that only exported to China in 1998 started importing before 2005, suggesting that the export experience in this market enabled these firms to discover opportunities for sourcing from China.

Table 20: Transition from import to export

	import to export	other country trade to export	Δ other country trade to export	no trade to export	Δ no trade to export
main EU trading partners (SE) t	0.1713 (.010)	0.0950 (.009)	0.0763 (.004) 21.40***	0.0345 (.003)	0.1368 (.007) 19.01***
non-EU trading partners (SE) t	0.124 (.014)	0.041 (.006)	0.083 (.009) 9.3784***	0.018 (.002)	0.106 (.012) 9.192***

paired t test; *** $p < .01$

Table 21: Transition from export to import

	export to import	other country trade to export	Δ other country trade to export	no trade to import	Δ no trade to import
main EU trading partners (SE) t	0.265 (.012)	0.123 (.012)	0.143 (.006) 23.68***	0.051 (.005)	0.215 (.008) 26.48***
non-EU trading partners (SE) t	0.132 (.020)	0.039 (.007)	0.094 (.013) 7.43***	0.018 (.003)	0.115 (.016) 7.01***

*paired t test; *** $p < .01$*

In sum, knowledge about a particular market turns out to be an important factor in the decision to start trading, whether it is through import or export.

Discussion and conclusion

Even though international trade remains strongly concentrated among a small number of large firms, the evidence in this paper pointed at the importance and dynamics of SMEs in international trade. First, SMEs dominate trade in services, a sector that is increasingly contributing to international trade. Second, newly internationalizing SMEs contributed to a very significant part of new exports in the period 1998-2005. International SMEs were also found as contributing positively to employment creation, in contrast with the international large firms, which saw employment decrease by 15% over the analyzed time period 1998 to 2005. This evidence corroborates earlier findings of Mayer and Ottaviano (2007), who found the extensive margin, i.e. new exporting firms, to be important in the creation of new trade for several countries in Europe.

More importantly, the evidence presented in this paper suggests that there are significant differences among SMEs in the strategic orientation towards international expansion and the emanating internationalization process. Taking timing and initial scope of export operations as distinguishing features of the internationalization strategies of SMEs, we found marked differences among those SMEs that go for a rapid and global internationalization, the so called born globals versus the more traditional internationalizers, which start later and only move gradually from expanding to one country after the other. The born globals are not a marginal phenomenon. They accounted for about 21% of all firms that started exporting between 1998 and 2005. Their share in the total extra trade that was created between 1998 and 2005, our observation period, was equal to 27% of all export growth.

If we include the born internationals which also start to internationalize soon after their creation, but with a smaller geographical scope, the shares of rapid internationalizers goes up to 51% of all firms that start to export in the period and 30% of all extra export that was created in that period. In relating the type of internationalizing SME to industry environment, we observed born globals, followed by born internationals to occur significantly more in global and high technology industries than traditional internationalizers.

We also find strong evidence of differences in initial commitment and export growth performance among the different types of internationalizing SMEs. Consistent with passive learning models, we find surviving born globals to grow faster than traditional internationalizers. We also find a substantial difference in the initial commitment of both types of firms. While born globals at the outset show a significantly higher commitment as illustrated by the much higher average export per product and per country than the one observed for traditional internationalizers, the lower commitment of traditional internationalizers goes together with a lower strategic intent to expand into international markets. We found interesting evidence that, controlling for initial commitment, the probability of traditional internationalizers to stop exporting is substantially higher than the one observed for born globals. This evidence suggests that born globals see the relevant market on which they need to compete and operate much larger than the traditional internationalizers, which more easily revert to the domestic market. Born globals are also characterized by a substantially higher R&D intensity and intangible asset intensity in the industries in which they are active, suggesting that born globals are focused niche players in high value segments of the industry.

Interestingly, born global firms are also typically characterized by a high import intensity, implying that they are not only selling their products to a wide set of markets, but are also substantially sourcing products and services from abroad. This evidence suggests that born global firms are often key actors in global supply chains, and develop their competitive advantage in the interaction in global networks. Supporting evidence in this regard is the marked increase in productivity following their increased participation in international markets after a couple of years of existence.

The importance of becoming better inserted in global supply chains became also evident when we analyzed how the transition from exporting into sourcing abroad helps firms to significantly improve their productivity and chance of survival, corroborating earlier evidence on the survival of Belgian firms in industries exposed to strong international competition (Coucke and Sleuwaegen, 2008).

In examining the dynamics of trade among SMEs we found that the probability to start importing from a country if the firm was already exporting to the country was about 4 to 8 times higher than the same propensity for trading SMEs without prior export experience in that country. The difference was most marked for institutionally and geographically distant countries. Also in the other direction SMEs that were sourcing from a particular country were much more likely to export to the same country in the short time interval 1998-2005.

Overall, we believe that our results contribute to a better understanding of the relation between firm heterogeneity and trade performance and provide original insights in the different types of internationalizing SMEs. Such findings add to a recently developing body of international business research, looking at the implications of increasing global competition on firm strategy (Coucke and Sleuwaegen, 2008; Bowen and Wiersema, 2008; Hutzschenreuter and Gröne, 2009).

We also believe that the body of evidence we present in this paper has strong implications for public policies and trade promoting agencies. First, SMEs should receive more attention in policies and instruments aiming to develop trade with foreign countries, especially SMEs that never considered trade to these countries before. Second, in view of the different strategic types of internationalizing SMEs, policies and instruments should be differentiated following the different needs of those distinguished SMEs. A born global firm will need more assistance in mitigating the liability of foreignness in the different countries where it simultaneously penetrates. Given that many of those countries are institutionally very different from home and that those firms typically operate in industries characterized by important intellectual property and regulatory issues, economic diplomacy will be key to support those firms. For traditional internationalizers, the support should be directed towards building increasing strategic thrust and commitment through providing assistance and information in preparing firms to start exporting to a particular country. These SMEs would also benefit from assistance in the development of the necessary competencies to expand abroad.

Third, globalization of industries and development of global supply chains provides many opportunities for SMEs to quickly internationalize and benefit from being linked to productive networks organized across borders. Instead of trying to freeze activities locally, policies should be directed towards facilitating the offshoring of activities and the sourcing of goods and services by SMEs from international partners. This approach will not only improve productivity and growth potential of the firm; it will also help firms to expand internationally.

Finally, it is fair to mention some limitations of this study. First, this study focused on quantitative measurements and completely ignored the qualitative dimensions related to management and organization of internationalizing firms. We therefore recommend in depth case studies to shed additional light on the development process itself. Second, our study was limited to the Belgian case. Belgium, together with Singapore and Ireland, is one of the most open economies in the world. Many SMEs have been exposed to this reality for a longer time than firms in other countries, implying that some of our findings about the significance and incidence of born global firms may not fully carry over to other countries. An extension of our analysis to a broad set of countries is recommended to provide further evidence.

APPENDIX

1. Data and definitions

SME

In collaboration with the National Bank of Belgium (NBB), we constructed a comprehensive dataset linking firm level trade data to annual accounts data. All non-financial firms incorporated in Belgium with at least 10 FTE employees (at least one year between 1998 and 2005) were included in the dataset. SMEs were selected using the employment criterion of the Eurostat definition: firms with fewer than 250 FTE employees. However, we did not impose any restrictions in terms of Turnover or Balance sheet total. We distinguished between small firms (<50 FTE), medium sized firms (50-249 FTE) and large firms (≥ 250 FTE). The final dataset contains 35,240 SMEs and 1,009 large firms, across all industries.

Trade

Throughout the paper, trade, import and export refer to trade of goods only. Firm-level data on trade of goods are available per product (4-digit CN4) and country. The dataset contains trade data from 1998 until 2005 for 1,279 products and 249 countries. Export dummies for the 1993-1997 period were added indicating if firms had export activities before 1998.

For firms importing or exporting outside the EU (Extrastat), customs data are collected for all transactions whose value is higher than 1,000 euro or whose weight is bigger than 1,000 Kg. Coverage of extra-EU trade in the dataset is more comprehensive than that of intra-EU trade, which has higher thresholds. For intra-EU trade, firms have to participate in the Intrastat inquiry if their import or export exceeds 250,000 euro a year. This threshold remained unchanged between 1998 and 2005. Between 1995 and 1997, the threshold was 104,115 euro a year. This lower threshold for intra-EU trade, combined with the low threshold for extra-EU trade, implies that the export dummies for 1993-1997 are a good proxy to check if firms had any export before 1998.

As a result of the 2004 EU enlargement, trade to the eight new member states was no longer subject to the Extrastat declaration. Consequently, a number of SMEs exporting to or importing from these countries did no longer had to report this trade as of 2005, if it did not exceed the threshold of 250,000 euro.

Typology of internationalization strategies

We classify firms according to the timing and scope of their initial export. To analyze when firms start exporting, and to how many markets, we focus on those firms that started exporting in the period covered in the dataset, i.e. 1998-2005. This sample includes recently established firms (1993 or later) and firms that reported their first export activity in the 1998-2005 period, but were established before 1993. To control if firms had no prior export activities, we checked if any exports were reported between 1993 and 1997.

Literature on international new ventures or born globals lacks a consensus on how to define these firms. Several definitions have been proposed, but no single definition is generally accepted. Some authors (e.g. McDougall, Oviatt and Schrader, 2003) allow up to six years after inception for firms to record their first international sales, whereas others (e.g. Madsen, Rasmussen and Servais, 2000) restrict this to three years. According to Fernhaber, Gilbert and McDougall (2008, p. 272) "the operational definition of a new venture within the entrepreneurship literature is up to 6 or 8 years of age." Export scope is often measured as a percentage of export in total sales, or in terms of number of export destinations. Some authors use a combined measure of export share and number of destinations. Taking the extant literature and the idiosyncrasies of the Belgian context into account,

we define early internationalization as export within five years after inception, and a global scope as export to at least 5 countries, one of which outside the European Union. Consequently, late internationalization refers to starting to export after more than five years, and a narrow scope is export to less than five countries. A sensitivity analysis revealed that changing the cut-off in terms of export markets has only a limited impact, as long as the extra-EU criterion is imposed. Changing the cut-off for firm age to three or six years did not substantially change the distribution of SMEs across these different types.

Hence, born globals (BG) are SMEs that started exporting within five years, to at least five countries, including one outside the EU.

Born internationals (BI) are SMEs that started exporting within five years, to fewer than five countries.

Traditional internationalizers (TI) are SMEs that started exporting after more than five years, to less than five countries.

Born-again globals (BAG) are SMEs that started exporting after more than five years, to at least five countries, including one outside the EU.

Nevertheless, these definitions entail some limitations. A small number of newly established SMEs (56 firms) that started exporting between 1998 and 2005 do not fit these categories. These firms started exporting to at least five countries (six on average) within five years, but their geographical scope was limited to the EU. Given the data at hand, we cannot ascertain that firms established before 1993, that started to export between 1998 and 2005 (i.e. traditional internationalizers and born-again globals) never exported before 1993. However, since they did not export between 1993 and 1997, one could assume the subsequent decision to start exporting in 1998 or later is a strategic decision unrelated to any export that may have taken place before 1993.

Data

Table 22: Descriptive statistics of variables

Variable	Description	Obs	Mean	Std. Dev.
In_FTE98	Log FTE employees 1998	29,455	2.795624	0.9908205
In_FTE05	Log FTE employees 2005	28,686	2.95564	0.949165
In_VA98	Log Value added 1998	29,675	13.44359	1.274292
In_VA05	Log Value added 2005	29,214	13.78925	1.246625
In_prod_98	Log Value added/FTE1998	29,111	10.7022	0.6414989
In_prod_05	Log Value added/FTE2005	28,334	10.89655	0.6438599
In_FA98	Log Fixed assets 1998	29,559	12.49588	1.736948
In_FA05	Log Fixed assets 2005	28,793	12.67776	1.825042
In_FA_FTE98	Log Fixed assets/FTE 1998	28,988	9.731069	1.512899
In_FA_FTE05	Log Fixed assets/FTE 2005	27,931	9.722847	1.623016
In_IA98	Log Intangible assets 1998	7,916	9.933387	2.189313
In_IA05	Log Intangible assets 2005	9,681	10.09066	2.300117
In_IA_FTE98	Log Intangible assets/FTE 1998	7,837	6.962135	2.167422
In_IA_FTE05	Log Intangible assets/FTE 2005	9,608	6.872226	2.190229
In_RD98	Log R&D 1998	1,169	11.74191	1.953963
In_RD05	Log R&D 2005	1,235	11.80546	2.135745
In_RD_FTE98	Log R&D/FTE 1998	1,165	7.943239	1.965647
In_RD_FTE05	Log R&D/FTE 2005	1,226	8.044165	2.1055
In_M_FTE98	Log Import/FTE 1998	10,354	10.23584	2.34652

In_X98	Log export 1998	9,373	12.88446	2.892446
In_X05	Log export 2005	8,974	13.13262	2.927103
TFP98	Log Total Factor productivity 1998	28,670	9.064988	0.5877397
avg_In_X05-In_X98	Log Average export growth 1998-2005	5,999	0.0470398	0.29339
In_M_TO98	Log Import / turnover 1998	7,432	-2.102499	2.117547
In_M_TO05	Log Import / turnover 2005	6,782	-2.185875	2.211695
In_Np98	Log Number of export products 1998	9,373	1.404672	1.179461
In_Np05	Log Number of export products 2005	8,974	1.493868	1.231677
In_Nc98	Log Number of export countries 1998	9,373	1.474791	1.118719
In_Nc05	Log Number of export countries 2005	8,974	1.588056	1.165463

Table 23: Change in number of export markets (1998-2005)

# SMEs		# export markets 2005											
		0	1	2	3	4	5	6-10	11-25	26-50	>50	total	
# export markets 1998	1	5,533	1,033	365	182	127	82	190	99	9	2	7,622	
	2	1,659	424	289	166	117	84	132	74	13	1	2,959	
	3	937	182	160	162	110	84	141	53	7	1	1,837	
	4	646	124	101	124	130	93	206	63	9	0	1,496	
	5	448	47	67	70	85	86	212	73	5	0	1,093	
	6-10	983	123	121	93	154	174	755	519	32	0	1,971	
	11-25	579	44	39	26	40	29	268	894	250	8	2,177	
	26-50	126	7	5	4	1	3	11	75	240	72	544	
	>50	31	2	0	0	0	0	0	3	13	47	96	
	total	9,959	1,986	1,147	827	764	635	1,915	1,853	578	131	19,795	

# SMEs	# export markets 2005											
# export markets 1998	0	1	2	3	4	5	6-10	11-25	26-50	>50	total	
	73%	14%	5%	2%	2%	1%	2%	1%	0%	0%	100%	
	56%	14%	10%	6%	4%	3%	4%	3%	0%	0%	100%	
	51%	10%	9%	9%	6%	5%	8%	3%	0%	0%	100%	
	43%	8%	7%	8%	9%	6%	14%	4%	1%	0%	100%	
	41%	4%	6%	6%	8%	8%	19%	7%	0%	0%	100%	
	50%	6%	6%	5%	8%	9%	38%	26%	2%	0%	100%	
	27%	2%	2%	1%	2%	1%	12%	41%	11%	0%	100%	
	23%	1%	1%	1%	0%	1%	2%	14%	44%	13%	100%	
	32%	2%	0%	0%	0%	0%	0%	3%	14%	49%	100%	
	50%	10%	6%	4%	4%	3%	10%	9%	3%	1%	100%	

Table 24: Evolution from import to export and vice versa (10 main trading partners)

	no trade, active in 1998		sourcing from	exporting to
	export 2005	import 2005	[country] in 1998 export 2005	[country] in 1998 import 2005
NL	4.0%	6.9%	19.0%	29.7%
DE	3.4%	6.4%	17.5%	27.9%
FR	4.1%	6.2%	18.8%	29.4%
LU	5.0%	4.1%	21.2%	22.5%
GB	3.0%	4.6%	17.1%	29.0%
IT	2.6%	5.1%	16.0%	28.4%
US	2.2%	3.2%	13.7%	18.9%
ES	3.4%	4.2%	15.7%	23.9%
CH	2.9%	2.3%	17.6%	13.7%
DK	2.2%	2.9%	11.7%	21.5%

Table 25: Evolution from import to export and vice versa (10 non-EU trading partners)

	no trade, active in 1998		sourcing from	exporting to
	export 2005	import 2005	[country] in 1998 export 2005	[country] in 1998 import 2005
US	2.2%	3.2%	13.7%	18.9%
CN	1.7%	4.3%	11.7%	27.7%
PL	3.1%	2.3%	21.1%	18.0%
JP	1.4%	1.1%	11.3%	9.7%
TW	0.8%	1.2%	8.7%	8.2%
CA	1.5%	1.2%	9.1%	8.8%
IN	1.2%	1.3%	10.0%	12.7%
RU	2.1%	0.4%	17.4%	4.6%
BR	0.8%	0.6%	6.8%	8.1%
TR	1.7%	1.6%	8.9%	15.2%

References

- Aaby, N.-E., Slater, S.F. (1989), Management Influences on Export Performance: A Review of the Empirical Literature 1978-88, *International Marketing Review*, 6 (4), 7-26.
- Acs, Z.J., Morck, R., Shaver, J.M. and Yeung, B. (1997), The Internationalization of Small and Medium-Sized Enterprises: A Policy Perspective, *Small Business Economics*, 9(1), 7-20.
- Autio, E. (2005), Creative tension: the significance of Ben Oviatt's and Patricia McDougall's article 'toward a theory of international new ventures', *Journal of International Business Studies*, 36, 9-19.
- Bell, J., McNaughton, R., Young, S. (2001), 'Born-again global' firms. An extension to the 'born global' phenomenon, *Journal of International Management*, 7, 173-189.
- Bernard, A.B., Jensen, J.B. (1999), Exceptional exporter performance: cause, effect, or both?, *Journal of International Economics*, 47, 1-25.
- Bernard, A.B., Jensen, J.B. (2001), Why some firms export, *NBER Working Paper No. W8349*, Washington, US.
- Bernard, A.B., Eaton, J., Jensen, J.B., Kortum, S.S., (2003), Plants and Productivity in International Trade, *American Economic Review* 93 (4), 1268-1290.
- Bernard, A.B., Jensen, J.B., Schott, P. K., (2006a), Trade costs, Firms and Productivity. *Journal of Monetary Economics* 53 (5), 917-937.
- Bernard, A. B., Jensen, J. B., Redding, S. J., Schott, P. K. (2007). Firms in international trade. *Journal of Economic Perspectives*, 21(3):105-130.
- Bowen, H. P., Wiersema, M. (2008), Corporate diversification: the impact of foreign competition, industry globalization, and product diversification, *Strategic Management Journal*, 29 (2), 115 – 132.
- Calvo, J., (2006), Testing Gibrat's Law for Small, Young and Innovating Firms, *Small Business Economics*, 26, 117-123.
- Caves, R., (1998), Industrial organisation and new findings on the turnover and mobility of firms, *Journal of Economic Literature*, 36, 1947-1982.
- Coad, A., (2009), The Growth of Firms: a Survey of Theories and Empirical Evidence, Edward Elgar, Cheltenham, UK and Northampton, MA, USA.
- Constantini, J.A., Melitz, M.J. (2007) The Dynamics of Firm-Level Adjustment to Trade Liberalization, mimeo.
- Coucke, K., Sleuwaegen, L. (2008), Offshoring as a survival strategy: evidence from manufacturing firms in Belgium, *Journal of International Business Studies*, 39 (8), 1261-1277.
- Coviello, N.E., Jones, M.V. (2004), Methodological Issues in International Entrepreneurship Research, *Journal of Business Venturing*, 19 (4), 485-508.
- De Loecker, J. (2007), Do Exports Generate Higher Productivity? Evidence from Slovenia, *Journal of International Economics*, 73 (1), 69-98.
- Dollar, D., Kraay, A. (2002), Institutions, Trade, and Growth, *Journal of Monetary Economics*. 50: 133-162.
- Dunne, P., Hughes, A., (1994), Age, size, growth and survival: UK companies in the 1980s, *The Journal of Industrial Economics*, 42, 115-140.
- Eaton, J., Kortum, S., Kramarz, F. (2004), Dissecting trade: firms, industries, and export destinations, *American Economic Review Papers and Proceedings*, 94, 150-154.

- Evans, D. E., (1987), The relationship between firm growth, size and age: estimates for 100 manufacturing industries, *The Journal of Industrial Economics*, 35, 567-582.
- Francois, J, Manchin, M. (2006), Institutional Quality, Infrastructure, and the Propensity to Export, *CEPR*, London.
- Fernhaber, S.A., McDougall, P.P., Oviatt, B.M. (2007), Exploring the Role of Industry Structure in New Venture Internationalization, *Entrepreneurship Theory and Practice*, 517-542.
- Heckman, J. (1979), Sample Selection Bias as a Specification error, *Econometrica*, 47: 153-161.
- Hutzschenreuter, T., Gröne, F. (2009), Product and geographic scope changes of multinational enterprises in response to international competition, *Journal of International Business Studies*, 40 (7), 1149-1170.
- Johanson, J., Vahlne, J.E. (1977), The internationalization process of the firm: A model of knowledge development and increasing foreign market commitments, *Journal of International Business Studies*, 8, 23-32.
- Jovanovic, B., (1982), Selection and the Evolution of Industry, *Econometrica*, 50(3), 649-670.
- Kalish, S., Mahajan, V., Muller, E. (1995), Waterfall and sprinkler new-product strategies in competitive global markets. *International Journal of Research in Marketing*, 12 (2), 105-119.
- Lu, J.W., Beamish, P.W. (2001), The Internationalization and Performance of SMEs, *Strategic Management Journal*, 22 (6/7), 565-586.
- Lu, J.W., Beamish, P.W. (2006), SME internationalization and performance: Growth vs. profitability, *Journal of International Entrepreneurship*, 4, 27-48.
- Madsen, T.K., Rasmussen, E., Servais, P. (2000), Differences and similarities between born globals and other types of exporters, in *Globalization, the Multinational Firm, and Emerging Economies*, pages 247-265, JAI Press: Amsterdam.
- Manolova, T.S., Manev, I. M. (2004) Internationalization and the performance of the small firm: A review of the empirical literature 1996-2000, in *Emerging Paradigms in International Entrepreneurship*, pages 37-63, Edward Elgar, Cheltenham, UK.
- Mascarenhas, B. (1997), The order and size of entry into international markets, *Journal of Business Venturing*, 12 (4), 287-299.
- Mayer, T., Ottaviano, G.I.P. (2007), The Happy Few: The internationalisation of European firms New facts based on firm-level evidence, *Bruegel Blueprint Series*, Brussels, 95pp.
- McDougall, P.P., Oviatt, B.M., Shrader, R.C. (2003), A comparison of international and domestic new ventures, *Journal of International Entrepreneurship* 1 (1), 59-82.
- Melitz, M.J. (2003), The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica*, 71 (6), 1695-1725.
- Melitz, M., Ottaviano, G. (2008) Market Size, Trade, and Productivity, *Review of Economic Studies*.
- Mudambi, R., Zahra, S.A. (2007), The survival of international new ventures, *Journal of International Business Studies*, 38, 333-352.
- Muûls, M., Pisu, M. (2007), Imports and Exports at the Level of the Firm: Evidence from Belgium, Working Paper, *National Bank of Belgium*, Brussels, 57pp.
- OECD (2000), Small and Medium Sized Enterprises: Local Strength, Global Reach, *Organisation for Economic Co-operation and Development*, 8pp.
- OECD (2007), Working Party on SMEs and Entrepreneurship – Internationalisation of SMEs: Preliminary Project Plan, *Organisation for Economic Co-operation and Development*, 10 pp.

Onkelinx, J., Sleuwaegen, L. (2008), Internationalization of SMEs, *Flanders DC and Vlerick Leuven Gent Management School*, 87pp.

Oviatt, B.M., McDougall, P.P. (1994), Toward a Theory of International New Ventures, *Journal of International Business Studies*, 25(1) 45-62.

Sapienza, H.J., Autio, E., George, G., Zahra, S.A. (2006), A capabilities Perspective on the Effects of Early Internationalization on Firm Survival and Growth, *Academy of Management Review*, 31 (4), 914-933.

Sousa, C.M.P., Bradley, F. (2005), Global Markets: Does Psychic Distance Matter?, *Journal of Strategic Marketing*, 13 (1), 43-59.

U.S. Department of Commerce (2005), Small and Medium-Sized Exporting Companies: A Statistical Handbook, *Office of Trade and Industry Information, International Trade Administration, U.S. Department of Commerce*, 67pp.

Variyam, J.N., Kraybill, D.S., (1992), Empirical evidence on determinants of firm growth, *Economics Letters*, 38, 31-36.

Wagner, J. (2005), Exports and Productivity: A Survey of the Evidence from Firm Level Data, *University of Lüneburg Working Paper Series in Economics*, 30pp.

Yasuda, T. (2005), Firm growth, size, age and behavior in Japanese manufacturing, *Small Business Economics*, 24, 1-15.

Zahra, S.A., George, G. (2002), International entrepreneurship: The current status of the field and future research agenda. In M.A. Hitt, R.D. Ireland, S.M. Camp, & D.L. Sexton (Eds), *Strategic entrepreneurship: Creating a new mindset* (pp. 255-288). Oxford, UK: Blackwell Publishers.

Zahra, S. (2005), A theory of international new ventures: a decade of research, *Journal of International Business Studies*, 36, 20-28.

Zou, S., Stan. S. (1998), The determinants of export performance: A review of the empirical literature between 1987 and 1997, *International Marketing Review*, 15 (5):333-356.

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