

LEARNING BY EXPORTING: SHORT-TERM VS. LONGER TERM EFFECTS OF EXPORT DURATION ON PRODUCT INNOVATIONS. DO BORN GLOBALS LEARN DIFFERENTLY?

INTRODUCTION

Internationalization is an important constituent for economic growth and allows firms to enhance their performance by spotting market opportunities and by transferring valuable firm resources to multiple destinations in order to reap competitive advantages (Helpman & Krugman, 1985; Filatotchev & Piesse, 2009). SMEs, mainly internationalizing via exports (Young, Wheeler, & Davies, 1989), have been shown to profit from enhanced international operations in a multitude of studies (Golovko & Valentini, 2011; Zahra, Ireland & Hitt, 2000), emphasizing mechanisms like a larger customer base, the potential of risk diversification, scale economies and, more recently, learning by exporting (Salomon & Jin, 2008; Salomon & Shaver, 2005) as reasons for higher profitability and firm growth. While we have considerable knowledge about the determinants and performance implications of SMEs' exports, we only have limited understanding about the learning effects that may be triggered by exporting (Garcia, Avella & Fernandez, 2012; Salomon & Jin, 2008).

Recent studies point towards a learning by exporting effect, meaning that it is not only productive firms that enter international markets at an enhanced rate, but also that exporting increases the level of firm productivity, or put more specifically, the innovation capabilities of firms (Love & Ganotakis, 2013). Arguing from a learning perspective, firms are exposed to richer information by operating in foreign environments than by only operating in a single domestic market. Sources of information may be customer opinions, cooperation partners or competitors. These information inputs provide the basis for increased organizational learning and may lead to improved innovativeness. Previous studies on large, multinational enterprises (MNEs) provided some evidence for learning by exporting effects (Salomon & Shaver, 2005).

However, the empirical findings in the literature are rather mixed. While some studies find a positive effect from exporting on productivity (e.g. Aw, Roberts, & Winston, 2007; Baldwin & Gu, 2004; Love & Mansury, 2009; Van Biesebroeck, 2005), others did not find support for such effects (Arnold & Hussinger, 2005; Bernard & Jensen, 1995, 1999, 2004; Castellani, 2002; Greenaway, Kneller & Gullstrand, 2006). Moreover, most studies on the learning by exporting effects focused on MNEs rather than SMEs. Therefore if and when SMEs have an enhanced innovativeness resulting from export activities remains an open question.

The research stream on born globals (Oviatt & McDougall, 1994) argues that firms that push early and at a significant scope into foreign environment perform better in terms of their ability to adapt to the international environment and realize “learning advantages of newness” (Autio, Sapienza & Almeida, 2000). On the other hand it is possible that born globals only learn faster from exporting in the short term, since born globals also face higher liabilities of foreignness and international complexity through serving multiple and, in part, culturally and institutionally divergent markets. These enhanced hurdles require managerial attention and resources which might otherwise be distributed toward the invention of new products (Roper & Love, 2002). Accordingly, a born global internationalization strategy may be an important contingency for the effectiveness of learning by exporting.

This study makes two important contributions to the understanding of learning by exporting in SMEs. First, we show that SMEs have an accelerated phase of learning in the period directly after starting export activities. However, this “innovation-boom” diminishes after some time, resulting in an inverted-u-shaped relation between export duration and new product innovations. This finding propels the learning by exporting literature and shows the need for a dynamic and long-term perspective on learning effects triggered by exporting. Second, we show that the curvilinear relation between export duration and new product innovations is more distinct for born globals than for gradual internationalizers. In this regard, we also account for the endogenous nature of internationalization strategies (Mudambi &

Zahra, 2007; Reeb, Sakakibara, & Mahmood, 2012), showing that born globals are not more innovative than gradual exporters on average, but that their learning pattern is a different one. We indeed find evidence for a “learning advantages of newness” (Autio, Sapienza & Almeida, 2000) effect, by the steeper slope of the short term relation between export duration and new product innovations for born globals. However, these learning advantages of newness level out after some time, leaving born globals and gradual internationalizers on the same innovativeness stage on the longer run.

Empirically, we contribute to the international business literature by drawing on data covering all exports from Canadian SMEs from 1997 to 2005. By integrating multiple sources of data from Statistics Canada, we are able to create a unique dataset that allows us to unravel the short term and the longer term effects of learning by exporting for a SME population, and to differentiate between born global firms (i.e. SMEs that export to multiple destinations realizing at least 25% of total revenues abroad within 2 years after inception) and gradual internationalizers.

THEORY AND HYPOTHESES

Learning by exporting: short term and longer term effects

Learning by exporting literature argues that firms have productivity gains when they export their products and services into foreign markets (Salomon & Jin, 2008) because they are able to learn from international customers, partners and competitors and thus become more innovative (Love & Ganotakis, 2013). Learning by exporting has mainly been regarded in the international trade literature, largely focusing on the macro level data for observing learning by exporting effects. Given the availability problems of export data for individual firms, analyses covering the firm level, however, are still scant (Salomon & Jin, 2008). Since international trade (i.e. exports and imports) mostly occurs between firms and not necessarily between institutions or countries, the firm level analysis has been forwarded in recent years (e.g. Salomon & Shaver, 2005). While some studies have focused on learning by exporting

effects among MNEs, the learning by exporting by SMEs is still understudied. Only few studies were able to observe if and under which conditions SMEs have learning effects through exporting (Love & Ganotakis, 2013). Yet, particularly SMEs need to learn from their export activities. SMEs are more vulnerable to failure than resource-abounding MNEs and given the costs of entering an export market, SMEs, often short on resources, require for learning and efficiency effects from their international operations in order to secure their viability (Lee, Kelley, Lee & Lee, 2012). We thus try to address this research deficit by observing the short- and long term learning by exporting effects of SMEs.

Learning by exporting on the firm level can be explained by organizational learning theories. Through this theoretical lens, international exchange can be seen as a process of knowledge accumulation and enhanced learning within firms (Barkema & Vermeulen, 1998). International markets provide more information than the domestic market. Exporting firms have access to knowledge resources which are not available in their domestic market, and can exploit these knowledge resources to create innovations (Golovko & Valentini, 2011). By absorbing the more diverse and richer information base from international markets, firms are able to perform double-loop or higher levels of learning allowing them to enhance so called within-paradigm improvements as well as across-paradigm improvements (Yeoh, 2004). Within-paradigm improvements refer to innovations by improving existing products, while across-paradigm improvements refer to radical innovations (e.g. completely new product developments; Love & Ganotakis, 2013).

Previous research has highlighted several reasons why the information base in foreign markets is a richer one than in domestic markets. A major constituent of the learning potential in foreign markets is provided by multiple stakeholder exposure. In foreign markets a firm gets into contact with new customers, new potential cooperation partners and new potential competitors. Foreign customers may have differing tastes or demand other product features than customers in the domestic market. A firm entering a foreign market thus may need to

adapt its products to these differing customer preferences in order to prevail in the foreign market (Clerides, Lach, & Tybout, 1998). A larger amount of potential cooperation partners is hosted in international markets as well. Potential international partners are a strong source of market and technological learning (Huber, 1991) and a larger international network may facilitate new opportunity recognition and innovativeness (Baum, Schwens & Kabst, 2013; Hansen, 1999). Moreover, firms are confronted with new competitors. These competitors may be a source of learning regarding the adaption of best-practices in a specific foreign market and provide competitive pressure (Girma, Kneller, & Pisu, 2005; Greenaway & Kneller, 2007; Helpman, Melitz, & Yeaple, 2004). This pressure is elevated, if competitors are not, or not as strongly affected by liabilities of foreignness. This particularly pertains to innate foreign competitors. Indigenous competitors do not have to overcome liabilities of foreignness and thus have a competitive advantage over new market entrants from abroad (Cuervo-Cazurra, Maloney & Manrakhan, 2007). Foreign firms thus need to address these comparative disadvantages. One possible avenue for overcoming these liabilities of foreignness is to offer innovative products and services (Bloodgood, Sapienza & Almeida, 1996). Accordingly, if a firm is exposed to international markets, its technological and marketing capabilities are strengthened (Salomon & Shaver, 2005) and consequently its propensity to develop new products and services is propelled.

Given these arguments, we assume that SMEs will have a positive learning by exporting effect in the short run. SMEs' entering into foreign markets are exposed to increased competitive pressure, formal and informal institutional dissimilarities between home and host market and have to adapt to new customers abroad. All these mechanisms lead an exporting SME to increase its innovativeness and thus have an enhanced likelihood to create new products and services after the foreign market entry (Salomon & Jin, 2008). We therefore propose the following:

Hypothesis 1: In the short-term, the relationship between export duration and new product innovations will be positive for SMEs.

The above mechanisms cause an increased level of innovativeness in the short-term after the beginning of export activities. The increased innovativeness is, however, not likely to endure in the long-term at the same level but is going to diminish over time. The higher levels of information availability and the greater competitive pressure in export markets force a firm to adapt its products and services and causes strain to the internationalizing SME (Sapienza, Autio, George & Zahra, 2006). Adapting towards new market situations and to the more dynamic international environments, causes strain to SMEs particularly in the short term after internationalization. In the first months after foreign market entry, new routines have to be created and the SMEs' management team has to administer the greater complexity of the foreign environment (Hoskisson, 1987). The strain causes learning and product innovations as a reaction towards the changing environment. This "innovative strain" however is not a linear function (Hutzschenreuter & Guenther, 2009) and learning by exporting is not going to be at the same level as it is in the first months after market entry. According to the 'big step hypothesis' (Pedersen & Shaver, 2011) internationalization and learning from international operations is not linear, but a discontinuous one. The authors propose that after a first big step into foreign environments, firms pursue a more constant internationalization. The first internationalization is a disproportionately more demanding step than any further international investment. Particularly at the first international exposure firms have to learn excessively and can leverage this realized learning in later stages of the internationalization process (Johanson & Vahlne, 2009).

Another process that accounts for the diminishing innovation-impact of export duration is the exploitation of market opportunities (Zettinig and Benson-Rea, 2008). Once firms have adapted to the external environment and have created the necessary product

innovations to efficiently penetrate the export market, they will reduce the “innovative-rush” and try to reap the benefits of the innovative products and services. Thus, in the next period, firms are more likely to invest into market development rather than new product innovations in order to exploit the opportunities which have been created by the innovations and thus try to realize the return on the initial investments. We do not propose that innovation is going to stop entirely, however the pace of innovation is going to diminish as innovations are resource demanding (Shaver, 2011). Since SMEs are usually scarce on resources, particularly financial ones, they are more likely to reduce their innovative attempts when they have overcome the first market entry barriers. SMEs will therefore not continuously innovate after export initiation, but have strong learning (i.e. innovation) processes in the short time after market entry and weaker processes in the longer-run. Thus, we come to the following hypothesis:

Hypothesis 2: In the longer-term, the relationship between export duration and new product innovations will be diminishing for SMEs, forming an inverted u-shaped curve.

Learning differences between born globals and gradual internationalizers

While we argue that learning by exporting will be high at the early stages after market entry and diminishing in subsequent phases for all SMEs, we also propose that these effects will be more distinct for born globals than for gradual internationalizers.

Born globals are firms that internationalize at a high pace after their inception and enter multiple foreign markets, realizing a significant share of revenues from international activities (Knight & Cavusgil, 2004). This proactive internationalization strategy has positive and negative consequences for the level of learning of born globals. In the short term, this early internationalization strategy enhances the speed of learning since firms come into contact with multiple markets and cultures (Goshal, 1987; Zahra et al., 2000). Autio and colleagues (2000) refer in this context to the “learning advantages of newness”. Accordingly,

young firms have learning advantages in foreign markets because they have not yet built highly structured processes, routines and mental models (Bruneel, Yli-Renko, & Clarysse, 2010). Older firms usually have built such routines, which however are adapted to the domestic market and may prove ineffective in the newly entered international environment. Such older firms thus first have to “unlearn” (i.e. forget) their established routines and mental models when they enter foreign markets in order to efficiently adapt to the different formal and informal institutional differences abroad (Santangelo & Meyer, 2011). Thus, “the age at which a venture realizes its first foreign sales might have an impact on its ability and willingness to recognize and use the new knowledge available to it in the new countries it enters” (De Clercq, Sapienza, Yavuz & Zhou, 2012: 152). There are some empirical studies corroborating this reasoning. Sapienza and colleagues (2005) provide empirical support for the argument of enhanced international learning efforts of early internationalizers. They show that early internationalizers indeed put more emphasis into learning the international environment than older firms. Thus, early internationalizers are likely to have greater learning effects after internationalization. Blomstermo and colleagues (2004) draw a consistent picture. By studying 206 Swedish firms they demonstrate that early internationalizers accumulate significantly more foreign internationalizing knowledge than if internationalization takes place at an older age.

Thus, the learning by exporting is likely to be more pronounced for born global firms in a positive way on the short run, meaning that born globals have a greater learning effect in the early phase after foreign market entry than gradual internationalizers.

However, we also argue that the negative relationship between export duration and new product innovations in later phases of internationalization is aggravated for born global firms. While the early exposure to international markets accelerates learning, the continued international expansion can reinforce information overload due to increased cultural diversity and enhances transaction costs (Zahra et al., 2000). Such information overload attenuates the

speed of technological learning (Hitt, Hoskisson & Kim, 1997). Born globals, having entered multiple foreign markets shortly after their inception, need to process and internalize more, and more diverse, information after internationalization. While in the short term their innovative capabilities will be spurred, in subsequent times they have to focus on information consolidation and market development activities. The huge amount of available information tests the managerial skills of born globals and results in a lower innovation rate in latter stages after internationalization. Since SME managers have to spend more of their financial and cognitive resources for handling the information flow from multiple foreign environments (Hutzschenreuter & Guenther, 2009) they have fewer resources available for future innovation projects, which reduces the speed of innovation. Thus, even though the initial innovation rate after commencing exports will be higher for born globals than for gradual internationalizers, the consolidation phase afterwards will also be aggravated.

Conversely, gradual internationalizers pursue an internationalization strategy which is largely in line with the internationalization process model (Johanson & Vahlne, 1977). These SMEs enter more cautiously into foreign markets and therefore have a leveled adaptation process to foreign particularities compared to the more aggressively internationalizing born globals. Their learning by exporting will be flattened as well in the short turn. However they will also have lower information overload and consolidation requirements in latter stages. Thus, their innovation rate will not decline that strongly as it does for born globals in the longer term.

The above arguments have received some empirical support. Zhang and colleagues (2009) argue in their study that different internationalization capabilities and innovativeness are built through early internationalization. However, observing differences between born globals and gradual internationalizers, their findings did not fully corroborate their initial assumption since the two firm groups did not differ significantly in terms of innovativeness. This suggests that the effect of early internationalization on learning is not that straight

forward and that counteracting mechanisms might be effective: some facilitating innovativeness, some hampering it. Zahra et al. (2000) show that international diversification of young firms incorporates both strengthening and weakening mechanisms for technological learning. We argue that the strengthening mechanisms result in short term learning by exporting advantages of born globals compared to gradual internationalizers. However, in the longer term the impeding innovation mechanisms pertinent to the born global strategy will result a stronger decline in the innovation rate in latter stages of exports.

Summing our theoretical arguments up, we come to the following conclusion.

Hypothesis 3: The effect of export duration on new product innovations is moderated by SMEs internationalization strategy (born global vs. gradual internationalization). In the short term, born globals have a higher positive learning by exporting effect than gradual internationalizers. However, in the longer term, the innovation rate of born globals will diminish more strongly than the innovation rate of gradual internationalizers.

METHOD

Empirical Data

Since we are interested in observing the effects of exporting behavior on short term and longer term learning, we have to draw on longitudinal data. Longitudinal data also allows us to address common method bias or causality problems and thus overcomes the limitations that have been a source of critique to most existing studies on SME internationalization. We merge our data from different longitudinal data sources covering different Canadian firm registers: the Exporter Register (ER), the Business Register (BR), and the Longitudinal Employment Analysis Program (LEAP). All these databases are produced and maintained by Statistics Canada. Our main data source, the Exporter Register (ER), is a large-scale administrative database of all merchandise trade transactions by Canadian firms from 1993 to

2005. The data was obtained from two sources: the U.S. Customs documents and Canada Revenue Agency (CRA) documents. This data set allows us to track the first year in which a firm starts to export, its value of exports, the destinations and the products it exports in each year between 1993 and 2005. The second data source, the Business Register (BR), is a main frame that includes all businesses operating within Canada as well as foreign businesses that have links with Canadian companies from 1987 to 2006. We use the BR database as supplements for the ER database to obtain information on firms' annual revenue and ownership. The third data source, the Longitudinal Employment Analysis Program (LEAP), contains employment information for each employer business between 1997 and 2004 in Canada.

In order to adhere to common definitions of young SMEs, we selected manufacturing firms established between 1997 and 2004 with 500 or fewer employees (e.g. Lu et al., 2010) commencing exports in the same period of time. Thus, we have comparatively young exporting firms and can differentiate between different internationalization strategies. To ensure export is an important part of a firm's business activity, we eliminated firms whose annual value of exports is \$2,000 Canadian dollars or less. This gives us the analysis sample of 1,689 SME comprising 7257 firm-year records over the whole observation period (1997-2005).

Dependent variable

Since we aim at measuring the extent of learning by exporting among SMEs, our dependent variable is innovative productivity. We specify innovative productivity by the new product innovations that a firm launched in a given year. Our secondary data covers new product innovation, meaning products with another identification code than other products formerly provided by the firm. Our dependent variable, new product innovations, thus is measured by the number of new products a firm introduced to the export market in year t .

This measurement of learning by exporting is a well-established indicator of the innovative productivity of a firm (Smith et al., 2005).

Independent and moderator variables

Export duration

According to Grossman and Helpman (1991: 518) exporting “tangible commodities facilitates the exchange of intangible ideas.” Thus, measuring if a firm exported or not in a given year, reflects a firm’s actual access to the “intangible ideas” generated from export markets (Salomon & Jin, 2008). In line with previous studies on learning by exporting (Salomon & Jin, 2008; Salomon & Shaver, 2005) we use the export status of a firm in a given year as independent variable. This variable takes the value “1” if the firm exported in a given period and “0” otherwise. Since we are interested in the short term and longer term learning by exporting effects, we use the time-spell-length in the export market as measurement of export duration.

Internationalization strategy

Following Kuivalainen, Sundqvist, and Servais (2007), we use three criteria to classify the observed Canadian SMEs as born global firms and firms that gradually internationalize. The first criterion, internationalization timing, is the age of the firm when it commenced exports. The second criterion, the internationalization scale, is the percentage of a firm’s revenue that comes from exporting; this criterion takes into account the intensity of the firm’s commitment to foreign sales. The third criterion, internationalization scope, is the number of countries a firm exports to. Consistent with existing born global studies (e.g., Knight & Cavusgil, 1996), a firm is specified as born global if it exported within two years of its inception, has an export intensity of 25% or higher and exported to multiple (at least two) destinations. The rest of the firms in the sample are classified as having internationalized

gradually. According to this classification, the numbers of firms classified as born globals and gradual internationalizers are 116 and 1,573, respectively.

Control variables

As controls we included firm size, productivity and product diversification as proxies for firm's resource endowment. Firms resources have been demonstrated to have an important effect on the innovativeness of firms since innovation is resource intensive (Bayona, Garcia-Marc & Huerta, 2001). A firm's size is measured by the number of employees it hires in a given year. To avoid problems of non-normal distribution we used the natural logarithm of this variable. A firm's productivity is measured by its revenue to employee ratio in a given year, where revenue is in thousands of Canadian dollars, deflated by industry price index. The variable "products" is measured by the variety of products a firm exports in a given year.

We also include environmental variables and time dummies in order to control for innovativeness differences that might be triggered by industry, location or export region effects. Including year dummies helps us to alleviate any further spurious effects and changes in the environment over time. Year dummies also help us to account for unobserved between firm heterogeneity and censoring and thus makes our findings more robust. Environmental variables like the industry also have a potential effect on innovations, since some industries are more innovative than others (Zahra et al., 2000). Specifically, the industries that the firms belong to include food and beverage, textile and clothing, leather, wood, paper and printing, petroleum, chemical, plastic and rubber, non-metallic mineral, metal, machinery, computer and electronics, transportation, equipment, furniture and miscellaneous. We control for a firm's province of location. Location dummy variables include Newfoundland, Nova Scotia, New Brunswick, Ontario, Quebec, Manitoba, Saskatchewan, Alberta and British Columbia. We furthermore control for a firm's major export region in a given year. Export region dummy variables include North American, Europe, Asia, and the rest of the world.

The descriptive statistics of the main variables are shown in Table 1.

Insert Table 1 about here.

Estimation procedure

Estimation of the effect of born global internationalization on product innovations needs to take into account the possibility that firms do not choose their internationalization strategy randomly, but may be affected by the same characteristics that affect their innovation capabilities. Therefore, a two-stage estimation method is used to control for the endogeneity of a firm's strategic choices (Masten, 1993), where the first stage estimates a firm's choice between born global and gradual internationalization, and the second stage estimates the determinants of a firm's product innovations. To address the endogeneity issue, the inverse mills ratio (IMR) is generated from first stage as additional regressor in second stage.

A logit model is used in the first stage to study each firm's strategic choice in relation to its characteristics in a cross-sectional setting. The first stage model has the following structure:

$$BG_i = \alpha_1 Y_i + \alpha_2 C_i + v_i \quad (1)$$

where the dependent variable BG is a dummy variable that equals to one if a firm chose the born global internationalization and 0 otherwise. Y_i is a vector of the independent variables (such as size and productivity) for firm i that may affect its choice of export strategy. C_i is a vector of control variables (such as industry, location, year or export region). α_1 and α_2 represent coefficient estimates. v_i is assumed to be normally distributed with zero means and unit variance. Furthermore, v_i represents additional unobserved effects that might affect a firm's export decisions. Based on the estimated coefficients, the inverse mills ration, the ratio of the probability density function to the cumulative distribution function, is calculated.

In the second stage, we employ panel analysis by negative binomial regression for random effects. This method is suggested by Salomon and Jin (2012) in their study on the patents of firms. The specification the second stage model can be presented as follows:

$$Innovations_{it} = \delta' X_{it} + \eta_1 BG_i + \eta_2 Duration_{it} + \eta_3 Duration_{it}^2 + \eta_4 IMR_i + \varepsilon_{it} \quad (2)$$

where $Innovations_{it}$ is measured by the number of new products of firm i exported at time t . X_{it} is a vector of the independent variables that may affect a firm's innovative capabilities (such as initial size and initial product varieties). BG_i is a dummy variable that equals to one if firm i chose the born global strategy and zero otherwise. $Duration_{it}$ is the export duration of firm i in year t . IMR_i is the inverse mills ration that was generated from the first stage strategic choice model. ε_{it} is an error term which is assumed to have standard gamma distribution.

ANALYSES AND RESULTS

Accounting for the endogeneity of strategic choice

We differentiate between learning effects of born globals and gradual internationalizers. However, the choice for one above the other strategy is an endogenous one as previous IB research has demonstrated (e.g. Golovko & Valentini, 2011; Hashai, 2011; Shaver, 2011). Not addressing the endogenous nature of internationalization strategy could lead to false predictions regarding the innovativeness differences among born globals and gradual internationalizers, since more productive firms have been shown to enter foreign markets more easily (Mudambi & Zahra, 2007). In such, we would identify that born globals are more productive, but we would find that result because of self-selection effects and not because of stronger learning by exporting. We therefore use account for the endogenous nature of strategic choice and calculate a strategy model with a logistic regression (Table 2). We used several firm internal variables like size, labor productivity, and product diversification in the year which a firm start to export as well as variables reflecting the

respective environment (location, industry, year and export region dummies) in order to predict the likelihood of pursuing a born globals as opposed to a gradual internationalization strategy. The estimated probability is used as input variable in our main analysis for testing our predictions. This two-step approach has been used recently to predict survival changes by born global firms (Mudambi & Zahra, 2007) and provides robust results.

Insert table 2 about here.

Hypotheses testing

After we have accounted for endogeneity problems in the strategy variable, we proceed with our analyses to predict the learning by exporting effects of SMEs. Table 3 shows the results of the negative-binomial regression with product innovations as dependent variable.

Insert Table 3 about here.

Our analysis has multiple steps. The first two steps are for showing estimation differences for the born global variable if endogeneity is not considered (model 1) and if endogeneity is considered (model 2). In model 2, we enter the duration and squared duration variables for testing hypotheses 1 and 2 in addition to the endogenized strategy variable and multiple control variables. As model 1 compared to model 2 shows, it is important to account for the endogenous nature of internationalization strategy. Not accounting for it, would mislead us to think that born globals have more product innovations than gradual internationalizers. After accounting for self-selection, we find that this is not the case. In model 3 we test the strategy-moderation hypothesis (hypotheses 3) by including interaction effects for the born global dummy with both the duration and squared duration variables.

In order to capture the assumed curvilinear relation between new product innovations and export duration, we calculated the square of the duration variable. If the first-order effect and the squared-term are both significant, then we can assume a curvilinear relationship between the independent and dependent variables. If both, the first order and the squared term, have a positive sign, there will be a u-shaped relation; if the first-order term is positive and the squared coefficient is negative, then the relationship has an inverted u-shape (which we predicted).

As shown in model 2, both, hypothesis 1 and hypothesis 2, receive support. Hypothesis 1 assumed that in the short term there is a positive relation between export duration and new product innovations. We find support for this hypothesis, since the first order effect of export duration is positive and significant. We further find that the relationship, however, turns from positive into negative when we account for longer term effects. This is demonstrated by the significant and negative squared export duration coefficient. We also plot the curvilinear relation between export duration and innovativeness in Figure 1. As highlighted in Figure 1, the learning by exporting effect is positive for the first time in the international market, and then after some time shows an increasingly negative effect. This means that after the initial innovation-boom, the likelihood for another product innovation based on export duration is diminishing over time. Thus hypothesis 2 is supported.

Insert Figure 1 about here.

In model 3, we introduce the interaction effects for testing the different learning effects for born globals and gradual internationalizers. Both interaction variables, born global time duration and times squared duration are significant. Thus, the learning by exporting effect for born globals is a significantly different one than for gradual internationalizers. Even though the total levels of learning by exporting are not significantly different from each other

(as shown by the non-significant born global strategy coefficient in model 2) for both strategies, the learning path is significantly different. We display the interaction in Figure 2.

There it is shown that born globals have higher learning by exporting in early stages of exporting than gradual internationalizers. This slope therefore is in line with the “learning advantages of newness” assumption (Autio et al., 2000). After some time, however, the innovation likelihood diminishes more strongly for born globals, meaning that new product innovations become less likely after some time than for gradual internationalizers. Gradual internationalizers on the other hand also show an inverted u-shaped relation, but their curve is flatter than for born globals. Accordingly, hypothesis 3 is confirmed.

Insert Figure 2 about here.

DISCUSSION AND CONCLUSION

Previous studies mostly covered the macro level effects of learning by exporting or, if applying a firm-level perspective, mainly focused on large MNEs. While the general assumption of learning by exporting has received strong support in recent studies (e.g. Love & Ganotakis, 2013, Salomon & Jin, 2008), we still know relatively little about the time dependence of these learning effects and if different internationalization strategies show distinct learning trajectories. These questions are even more pending for SMEs, representing an important, yet understudied, firm population. We try to fill these research gaps. This study is among the first to observe the learning by exporting effects among SMEs in a dynamic, longitudinal way. By applying a large-scale longitudinal dataset, we contribute to the understanding how internationalization improves SMEs’ innovativeness.

Our study holds two major contributions to the IB literature: 1) identifying differences in short term and longer term learning by exporting effects and 2) demonstrating distinct

learning trajectories for born global and gradually internationalizing SMEs. Regarding the first contribution, we provide a dynamic angle on learning by exporting effects. We show that learning by exporting particularly takes place in the first time after a firm started to export and is significantly reduced in the longer term. Particularly in the first time after market entry, SMEs will internalize the information from new customers, competitors and cooperation partners, leading to an “innovation-boom” early after entering a foreign market. Another reason for the accelerated innovativeness in the short run, are product adaptations to differing institutional demands and regulations in the export market. Some products may not conform to the market rules in another country and thus require adaptation, which is likely to occur particularly in the first time after export initiation. These new product developments early after market entry are resource demanding (Shaver, 2011) and thus cause strain to the newly internationalized firm (Pedersen & Petersen, 2004). SMEs, chronically short on financial resources will compensate this strain caused by the initial innovation-rush by dampening their innovative performance in subsequent phases after market entry. In that time they are able to exploit market potential and foster market growth rather than the introduction of new products.

We therefore forward a dynamic perspective on learning by exporting underscoring the importance to account for the different mechanisms that facilitate or inhibit innovativeness at different stages after foreign market entry. Our findings may also help to explain some of the somewhat mixed results of previous studies on the learning by exporting effect. The curvilinear relation between export duration and innovativeness may be the reason why some studies find a positive effect (e.g. Aw et al., 2007), while others did not (e.g. Bernard & Jensen, 2004). If our study was limited on the short period after market entry, we would find support for the general positive learning by exporting effect. If using longitudinal data, but without addressing the inverted u-shaped relation, we might have found a non-significant direct effect of learning by exporting. Therefore, our study suggests that both is true, but not

at the same time. This also shows the need for future studies to apply longitudinal data when observing learning by exporting.

Our second contribution concerns the fields of IB and international entrepreneurship. Previous studies assumed that born global firms realize learning advantage of newness (Autio et al., 2000) because they do not have to unlearn “old” routines established in the domestic market, which might be less suitable to the international environment. Our research corroborates this argumentation in part and advances it. We find that born globals have a significantly different learning trajectory than gradual internationalizers. Shortly after export initiation, they learn significantly faster, as having a higher likelihood to introduce new products per time-unit spent abroad. Therefore, we find support for the notion that born globals have learning advantages of newness. However, in the longer term, these learning advantages level out. Gradual internationalizers not only pursue a more stable internationalization pattern than born globals, but also seem to unfold a more gradual, but stable innovation pattern as well. In the longer term, the learning by exporting effect diminishes more strongly for born globals than for gradual internationalizers, leaving them, after some time at the same level. Information overload and the necessity to adapt a firm’s processes are stronger for born global firms, acting in multiple and more diverse international environments. Thus, the need to consolidate after the innovation-rush in the first period after internationalization is even greater for these firms and for their gradually internationalizing counterparts. Born globals may have to restrain their innovative output more strongly than gradual internationalizers, since born globals face additional financial and managerial strain caused by their rapid and intensive internationalization. Even though increased exports and innovation can be complementary (Golovko & Valentini, 2011), we show that at some stages of the internationalization process both have a conflicting relation (Roper & Love, 2002). This conflicting relation in latter stages is even more pronounced if firms conducted significant international expansion in early years after inception (Hashai, 2011). The born global strategy

taxes the limited resource base more strongly and is more prone to liabilities of foreignness (Hymer, 1976). These liabilities of foreignness do not only require for new product developments, but also for other market adaptation, like a different marketing or branding strategy. This cost additional resources and will therefore leave fewer resources for ongoing innovation output.

Our study has some limitations, fueling future research avenues. We focused on innovativeness as dependent variable and specified learning by exporting as the gains in innovativeness own to export duration. This is in line with a number of studies on learning by exporting (Love & Ganotakis, 2013; Salomon & Jin, 2008; Salomon & Shaver, 2005) and it reflects the ongoing conversation about the interdependencies of exports and innovations in the IB domain (e.g. Golovko & Valentini, 2011). However, learning by exporting is not necessarily limited increased to innovative output, but might forward other capabilities such as process capabilities or marketing capabilities. To address this concern, we performed another regression using productivity as dependent variable. Productivity is another often used variable to capture learning by exporting effects. The post-hoc analysis, where we kept everything equal but the dependent variable, reproduced our findings on new product innovation almost perfectly. Thus, our reasoning and our results receive further support. However, future studies should emphasize learning of further specific capabilities, such as marketing or process capabilities in addition to innovativeness of technological capabilities. Ideally, this would be executed in a longitudinal fashion. According to our reasoning, firms have a stronger technological learning in the short term period. It would be interesting to study, if after the new product innovations have been executed, market development (i.e. the development of marketing capabilities for the international markets) is emphasized in latter stages or if the adaptation of the marketing capabilities is conducted in parallel to the innovation processes.

Moreover, our data covers manufacturing SMEs from a developed economy. Using such a sample is reasonable for observing learning by exporting. However, it would be interesting to have a stronger look into learning by exporting effects in services industries and for emerging economy firms. Service firms may exhibit quite different learning patterns than manufacturers, as their “products” show significantly different features than those of manufacturing firms. As regards to emerging market internationalizers, it remains to study, if learning by exporting is comparable to their counterparts from developed economies, since important contingencies like support from institutions and trade agencies, as well as country-of origin image effects, may be quite different for emerging country exporters.

Summing up our study corroborates to recent studies arguing for a learning by exporting effect. Providing longitudinal firm-level evidence, we however also forward a dynamic perspective and show that learning by exporting is duration dependent and contingent upon the market entry strategy pursued by SMEs.

REFERENCES

- Arnold, J. M., & Hussinger, K. (2005). Export behavior and firm productivity in German manufacturing: A firm-level analysis, *Review of World Economics*, 141(2), 219-243.
- Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of age at entry, knowledge intensity, and imitability on international growth, *Academy of Management Journal*, 43(5), 909-924.
- Aw, B. Y., Roberts, M. J., & Winston, T. (2007). Export market participation, investments in R&D and worker training, and the evolution of firm productivity, *The World Economy*, 30(1), 83-104.
- Baldwin, J. R., & Gu, W. (2004). Trade liberalization: Export-market participation, productivity growth, and innovation, *Oxford Review of Economic Policy*, 20(3), 372-392.
- Barkema, H. G., & Vermeulen, F. (1998). International expansion through start-up or acquisition: A learning perspective, *Academy of Management Journal*, 41(1), 7-26.
- Baum, M., Schwens, C., & Kabst, R. (2013). International as opposed to domestic new venturing: The moderating role of perceived barriers to internationalization, *International Small Business Journal*, 31(5), 534-560.
- Bayona, C., García-Marco, T., & Huerta, E. (2001). Firms' motivations for cooperative R&D: An empirical analysis of Spanish firms, *Research Policy*, 30(8), 1289-1307.
- Bernard, A. B., Jensen, J. B., & Lawrence, R. Z. (1995). Exporters, jobs and wages in US manufacturing, 1976-1987, *Brookings Papers on Economic Activity, Microeconomics*, 1995, 67-119.
- Bernard, A. B., & Jensen, J. B. (1999). Exceptional export performance: Cause, effect, or both?, *Journal of International Economics*, 47(1), 1-25.
- Bernard, A. B., & Jensen, J. B. (2004). Exporting and productivity in the USA, *Oxford Review of Economic Policy*, 20(3), 343-357.
- Blomstermo, A., Eriksson, K., & Sharma, D. D. (2004). Domestic activity and knowledge development in the internationalization process of firms, *Journal of International Entrepreneurship*, 2(3), 239-258.
- Bloodgood, J., Sapienza, H. J., & Almeida, J. G. (1996). The internationalization of new high-potential U.S. ventures: Antecedents and outcomes, *Entrepreneurship Theory and Practice*, 20(4), 61-76.
- Bruneel, J., Yli-Renko, H., & Clarysse, B. (2010). Learning from experience and learning from others: How congenital and inter organizational learning substitute for experiential learning in young firm internationalization, *Strategic Entrepreneurship Journal*, 4(2), 164-182.
- Castellani, D. (2002). Export behaviour and productivity growth: Evidence from Italian manufacturing firms, *Review of World Economics*, 138(4), 605-628.
- Clerides, S. K., Lach, S., & Tybout, J. R. (1998). Is learning-by-exporting important? Micro-dynamic evidence from Colombia, Mexico and Morocco, *Quarterly Journal of Economics*, 113(3), 903-947.
- Cuervo-Cazurra, A., Maloney, M., & Manrakhan, S. (2007). Causes of the difficulties in internationalization, *Journal of International Business Studies*, 38(5), 709-725.
- De Clercq, D., Sapienza, H. J., Yavuz, R. I., & Zhou, L. (2012). Learning and knowledge in early internationalization research: Past accomplishments and future directions, *Journal of Business Venturing*, 27(1), 143-165.
- Filatotchev, I., & Piesse, J. (2009). R&D, export orientation and growth of newly listed firms: European evidence, *Journal of International Business Studies*, 40, 1260-1276.

- García, F., Avella, L., & Fernández, E. (2012). Learning from exporting: The moderating effect of technological capabilities, *International Business Review*, 21(6), 1099-1111.
- Ghoshal, S. (1987). Global strategy: An organizing framework, *Strategic Management Journal*, 8(5), 425-440.
- Girma, S., Kneller, R., & Pisu, M. (2005). Exports versus FDI: An empirical test, *Review of World Economics*, 141(2), 193-218.
- Golovko, E., & Valentini, G. (2011). Exploring the complementarity between innovation and export for SMEs growth, *Journal of International Business Studies*, 42(3), 362-380.
- Greenaway, D., & Kneller, R. (2007). Firm heterogeneity, exporting and foreign direct investment, *Economic Journal*, 117(517), 134-161.
- Greenaway, D., Kneller, R. A., & Gullstrand, J. (2006). Exporting may not always raise firm productivity, *Review of World Economics*, 141(4), 561-582.
- Grossman, G. M. & Helpman, E. (1991). Trade, knowledge spill-overs, and growth. *European Economic Review*, 35(3), 517-526.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organizational subunits, *Administrative Science Quarterly*, 44(1), 82-111.
- Hashai, N. (2011). Sequencing the expansion of geographic scope and foreign operations by “born global” firms, *Journal of International Business Studies*, 42(8), 995-1015.
- Helpman, E., & Krugman, P. (1985). *Market structure and international trade: Increasing Returns, Imperfect Competition, and the International Economy*, Boston, MA, MIT Press.
- Helpman, E., Melitz, M., & Yeaple, S. (2004). Export versus FDI with heterogeneous firms, *American Economic Review*, 94(1), 300-316.
- Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects of innovation and firm performance in product diversified firms, *Academy of Management Journal*, 40(4), 767-798.
- Hoskisson, R. E. (1987). Multidivisional structure and performance: The contingency of diversification strategy, *Academy of Management Journal*, 30(4), 625-644.
- Huber, G. P. (1991). Organizational learning: An examination of the contributing processes and the literatures, *Organization Science*, 2(1), 88-115.
- Hutzschenreuter, T., & Guenther, F. (2009). Complexity as a Constraint on Firm Expansion Within and Across Industries, *Managerial and Decision Economics*, 30(6), 373-392.
- Hymer, S. (1976). *The international operations of nation firms: A study of foreign direct investment*, Cambridge, MA, MIT Press.
- Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm: A model of knowledge development and increasing foreign market commitment, *Journal of International Business Studies*, 4(1), 20-29.
- Johanson, J., & Vahlne, J.E. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership, *Journal of International Business Studies*, 40(9), 1411-1431.
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm, *Journal of International Business Studies*, 35(4), 124-141.
- Lee, H., Kelley, D., Lee, J. & Lee, S. (2012) SME survival: The impact of internationalization, technology resources, and alliances. *Journal of Small Business Management*, 50(1), 1-19.
- Love, J. H. & Ganotakis, P. (2013). Learning by exporting: Lessons from high-technology SMEs, *International Business Review*, 22(1), 1-17.
- Love, J. H., & Mansury, M. A. (2009). Exporting and productivity in business services: Evidence from the United States, *International Business Review*, 18(6), 630-642.

- Lu, Y., Zhou, L., Bruton, G., & Li, W. (2010). Capabilities as a mediator linking resources and the international performance of entrepreneurial firms in an emerging economy, *Journal of International Business Studies*, 41, 419-436.
- Masten, S.E. (1993). Transaction costs, mistakes and performance: assessing the importance of governance. *Managerial and Decision Economics*, 14(2), 119-129.
- Mudambi, R., & Zahra, S.A. (2007). The survival of international new ventures, *Journal of International Business Studies*, 38(2), 333-352.
- Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of International New Ventures, *Journal of International Business Studies*, 25(1), 45-64.
- Pedersen, T., & Petersen, B. (2004). Learning about foreign markets: Are entrant firms exposed to a "shock effect"? *Journal of International Marketing*, 12(1), 103-123.
- Pedersen, T., & Shaver, J. M. (2011). Internationalization revisited: The big step hypothesis, *Global Strategy Journal*, 1(3/4), 263-274.
- Reeb, D., Sakakibara, M., & Mahmood, I. P. (2012). From the editors: Endogeneity in international business research, *Journal of International Business Studies*, 43(3), 211-218.
- Roper, S., & Love, J. H. (2002). Innovation and export performance: Evidence from the UK and German manufacturing plants, *Research Policy*, 31(7), 1087-1102.
- Salomon, R., & Jin, B. (2008). Does Knowledge Spill to Leaders or Laggards? Exploring Industry Heterogeneity in Learning by Exporting, *Journal of International Business Studies*, 39(1), 132-150.
- Salomon, R., & Shaver, J. M. (2005). Learning by exporting: New insights from examining firm innovation, *Journal of Economics and Management Strategy*, 14(2), 431-460.
- Santangelo, G., & Meyer, K. E. (2011). Extending the internationalization process model: Increases and decreases of MNE commitment in emerging economies, *Journal of International Business Studies*, 42(6), 894-909.
- 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), 914-33.
- Sapienza, H.J., De Clercq, D., & Sandberg, W. R. (2005). Antecedents of international and domestic learning effort, *Journal of Business Venturing*, 20(4), 437-457.
- Shaver, M. J. (2011). The benefits of geographic sales diversification: How exporting facilitates capital investment, *Strategic Management Journal*, 32(10), 1046-1060.
- Smith, K. G., Collins, C. J., & Clark, K. D. (2005). Existing knowledge, knowledge creating capability, and the rate of new product introduction in high-technology firms, *Academy of Management Journal*, 48(2), 346-357.
- Van Biesebroeck, J. (2005). Exporting raises productivity in sub-Saharan African manufacturing firms, *Journal of International Economics*, 67(2), 373-391.
- Yeoh, P. L. (2004). International learning: Antecedents and performance implications among newly internationalizing companies in an exporting context, *International Marketing Review*, 21(4/5), 511-535.
- Young, J., Wheeler, C., & Davies, J. R. (1989). *International market entry and development*, Englewood Cliffs, NJ, Prentice Hall.
- Zahra, S. A., Ireland, R. D., & Hitt, M. A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance, *Academy of Management Journal*, 43(5), 925-949.
- Zettinig, P., & Benson-Rea, M. (2008). What becomes of international new ventures? A co-evolutionary approach, *European Management Journal*, 26 (6), 354-365.
- Zhang, M., Tansuhaj, P., McCullough, J. (2009). International entrepreneurial capability: The measurement and a comparison between born global firms and traditional exporters in China, *Journal of International Entrepreneurship*, 7(4), 292-322.

TABLES AND FIGURES

Table 1: Descriptive statistics

Name	Mean	S.D.	Min	Max
BG	0.08	0.27	0	1
Employees	21.71	33.38	1.00	591
Productivity	97.28	80.35	0	1879
Products	2.69	2.85	0	49
Product Innovations	0.83	1.76	0.00	46
Export Duration	3.25	1.98	1	9

Notes: Firm-year observations = 7,255.

Table 2: Strategic choice model

	Born Globals vs. Gradual Internationalizers	
SIZE	-0.0160***	(0.0057)
PRODUCTIVITY	0.0005	(0.0016)
PRODUCTS	0.3131***	(0.0479)
Major Export Region (reference region: rest of the world)		
NA	-0.7532**	(0.3809)
EU	1.4662***	(0.4544)
ASIA	0.7282	(0.5015)

Notes: N = 1689. Log likelihood = -344. Pseudo R² = 0.1872.

SECTOR, LOCATION, and YEAR dummy variables are included but not reported for sake of brevity.

***p<0.01; **p<0.05; * p<0.1. Standard errors in parentheses.

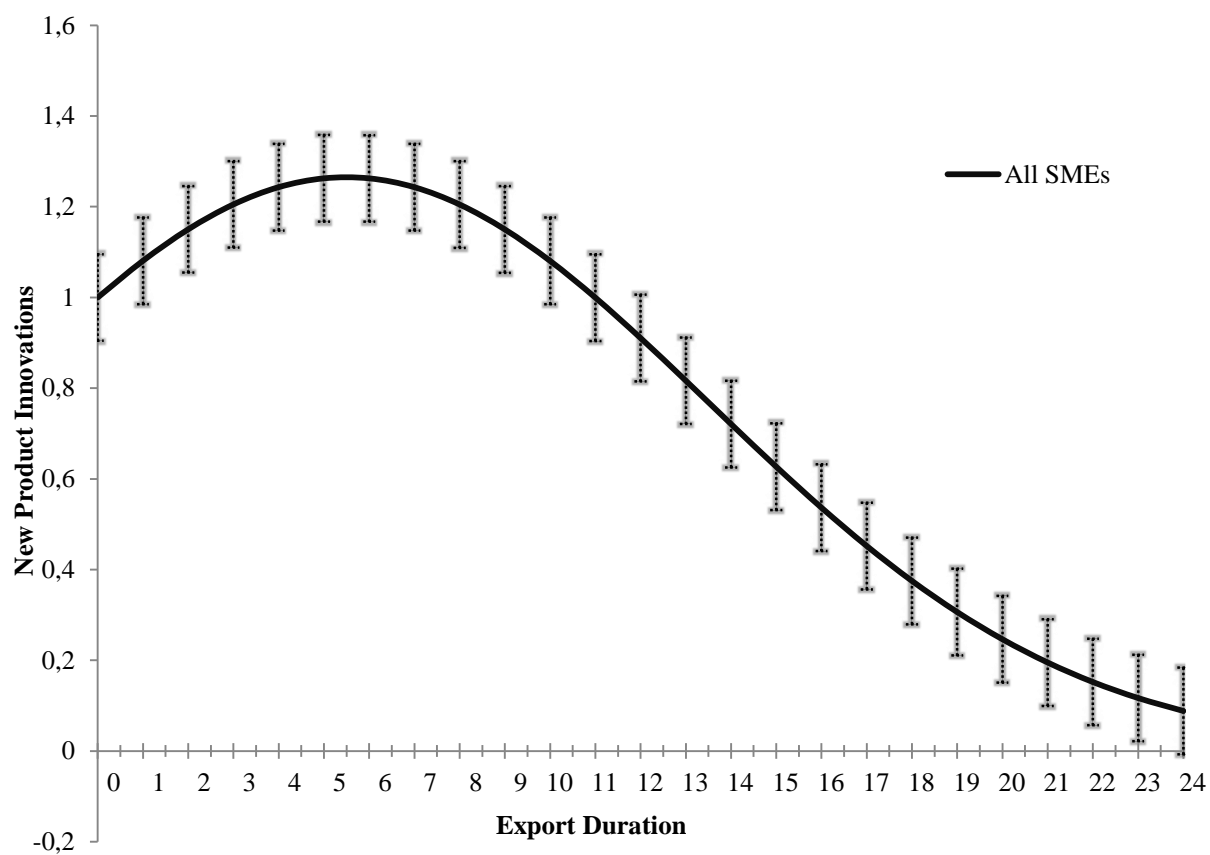
Table 3: New product innovations: results from negative binomial regressions

(Dependent variable: new product innovations)

PRODUCT INNOVATIONS	Model 1	Model 2	Model 3
BG	0.3280*** (0.0842)	0.5005 (0.2758)	0.3063 (0.2859)
EXPORT DURATION	1.0248*** (0.0428)	1.0265*** (0.0429)	1.0015*** (0.0433)
EXPORT DURATION ²	-1.1189*** (0.0525)	-1.1203*** (0.0526)	-1.0819*** (0.0536)
BG×EXPORT DURATION			0.2113*** (0.0587)
BG×EXPORT DURATION ²			-0.3272*** (0.1022)
INITIAL EMPLOYEES	0.0051*** (0.0008)	0.0050*** (0.0008)	0.0051*** (0.0008)
INITIAL PRODUCTS	0.0532*** (0.0167)	0.0679*** (0.0191)	0.0642*** (0.0190)
INVERSE MILLS RATIO		-0.2205*** (0.0793)	-0.2243*** (0.0793)
Major Export Region (reference region: rest of the world)			
NA	-0.0683 (0.0739)	-0.0802 (0.0744)	-0.0657 (0.0742)
EU	0.1054 (0.979)	0.1156 (0.984)	0.1032 (0.982)
ASIA	0.0962 (0.1048)	0.0868 (0.1056)	0.0902 (0.1050)
Log Likelihood	-8209	-8215	-8208

Notes: Firm record = 1689. Firm-Year record = 7257. Firms=SECTOR, PROVINCE, YEAR and EXPORT REGION dummy variables are included but not reported for sake of brevity.

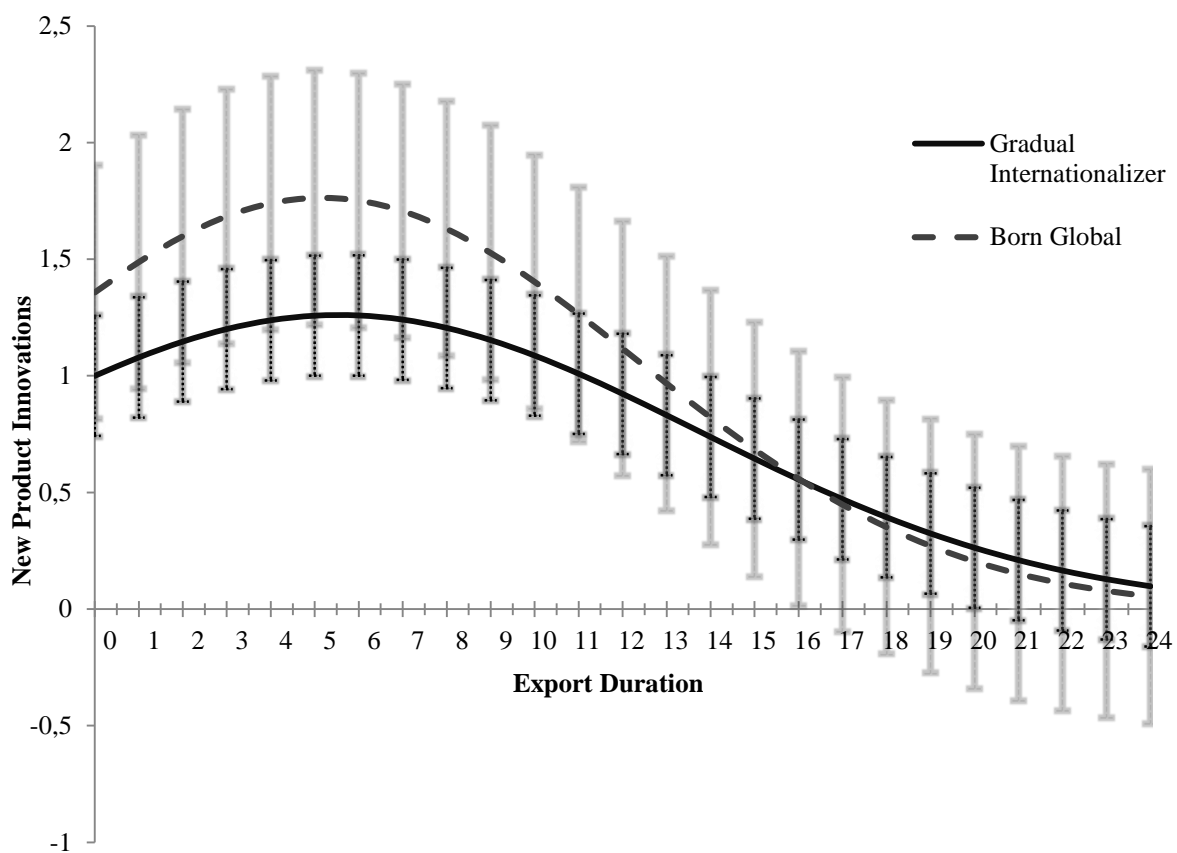
***p<0.01; **p<0.05; * p<0.1. Standard errors in parentheses.

Figure 1: Learning by exporting: short term vs. longer term effects

Note: intervals around the slope represent standard errors

Export duration displayed in months

Figure 2: Different learning trajectories of born globals and gradual internationalizers



Note: intervals around the slopes represent standard errors

Export duration displayed in months