



Getting the facts right on born globals

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Abstract Policymakers in several countries have recently taken steps to promote the rapid export expansion of small- and medium-sized enterprises (SMEs). The goal of these policies has been to create successful export-intensive startups, which are often referred to as born globals. These measures are motivated by studies claiming that born global firms are disproportionately important for job creation and economic growth. Using detailed register data on the universe of Swedish manufacturing startups founded 1998–2014, we find that born globals are a very small group of firms whose long-run size and growth do not outperform other exporting firms. We also show that removing continuing firms and spinouts from the analysis is crucial for obtaining correct results. Thus, the notion that born globals are superior to firms that follow a more gradual internationalization process, a conclusion largely based on case studies and surveys, does not withstand scrutiny. Policymakers must therefore be aware that encouraging

more born globals need not necessarily lead to large benefits for the overall economy, especially in terms of employment.

Keywords Born globals · Exporting · Firm growth · Globalization · Job creation

JEL classifications F14 · F23 · L25 · M13 · L26

1 Introduction

The forces of globalization present both a market opportunity and a competitive challenge for entrepreneurs. Policymakers have thus become interested in encouraging and accelerating startups' export activity in order to promote economic growth and boost job creation. This has led many countries to adopt policies that assist small- and medium-sized enterprises (SMEs) and startups to expand into export markets. The goal of these policies has been to create successful export-intensive firms, which are often referred to as *born globals*.

The term born globals was first coined in a report by McKinsey (Rennie 1993) to describe enterprises that are able to quickly and successfully engage in foreign exports. Born globals are characterized by an ability to overcome the initial barriers that are associated with entry into foreign markets without first establishing a strong home market presence. The ability of these firms to circumvent a more lengthy process before taking steps to become internationally competitive has piqued the interest of many governments in both developed and

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developing countries.¹ For example, in 2015, the Swedish government published an export strategy that specifically emphasized the importance of encouraging born global firms.² One part states that “There are many successful examples of Swedish companies that have been international from the start, but there could be even more of these so-called born globals,” implying that born globals can be created through government support. There are few studies, however, that rigorously investigate the performance advantages typically associated with born globals compared to other exporting firms.

Our study has two aims. First, we examine the long-run performance outcomes of born globals compared to other exporters in terms of employment, sales, and value added. Second, we examine how removing continuing firms and spinouts affects the results. Given the widespread use of government policies that encourage exporting, we ask whether a born global export strategy leads to larger and faster-growing firms compared to a more gradual export strategy. We focus on the dynamics of firm size in this study because it is a central element of economic growth. Many firms in the data appear as though they are a genuinely new firm but have simply changed their organizational number or been spun out from an existing firm. We show that removing such firms from the analysis yields much more modest results.

Policymakers’ interest in born globals is driven by several studies by academics and think tanks from the 1990s and onward. These studies claimed that born globals were growing in numbers throughout the world (Rennie 1993; UNCTAD 1993; OECD 1997). A study by Eurofound (2012), the European Union agency for the improvement of living and working conditions, claimed that as much as one-fifth of all new firms in Europe are born globals and concluded from survey data that such businesses are characterized by higher employment growth. The OECD (2013) claimed that such firms played a pivotal role in mitigating the economic downturn of the great recession. If these claims are true, it would be difficult not to concur with Eurofound’s (2012, p. 3) conclusion:

Bearing in mind that born globals’ effect on the economy and labour market is not limited to a single country but, due to their international activities and the knock-on effects of these, become apparent at the European level, it is not only up to national, but also to EU policymakers to enhance their potential.

However, these strong statements and policy conclusions are often based on results from surveys and case studies, which focus on a highly selective group of successful born globals that may not be fully reflective of the behavior of born globals in general. Cavusgil and Knight (2015) and Zander et al. (2015) have thus called for a more rigorous approach to study born globals in the fields of Strategic Management and International Business, namely using longitudinal data on all exporters in an economy in order to obtain a proper control group of other startups. In this study, we use detailed annual data covering all Swedish manufacturing startups founded 1998–2011. Since our data spans 1998–2014, this allows us to follow born globals and other exporting firms in the data for up to 17 years. As a small open economy with many export-oriented firms, Sweden is the ideal testing ground for evaluating the performance of born globals.

Our study contributes to a small and recent literature that uses register data to estimate the impact of a born global export strategy on long-run firm size. These studies focus on manufacturing, where detailed firm-level export data that covers the universe of firms in a particular country is readily available. On the one hand, a born global export strategy may lead to firm growth by accessing consumers in as many markets as possible, providing the firm with a competitive edge (Oviatt and McDougall 1994). Indeed, the very definition of born globals rests on the assumption that these firms “derive a substantial proportion of their revenue from the sale of products in international markets” (Knight and Cavusgil 2004), which may lead to firm growth. On the other hand, however, international expansion is risky (Bonaccorsi 1992; Knight and Cavusgil 2004). Whether the pro-growth or anti-growth mechanism dominates is thus an empirical question.

Several existing empirical studies of born globals’ long-run performance focus on non-size measures such as sales per employee, profits over sales and labor productivity (Braunerhjelm and Halldin 2019), *Tobin’s q* (Garcia-Garcia et al. 2017), or long-run export performance (Kuivalainen et al. 2007; Hashai 2011). We focus on firm size since we are interested in how a born global export strategy contributes to growth. Our work is most

¹ Initiatives to promote born global firms currently exist in, inter alia, Japan, South Korea, China, the Netherlands, Brazil, and Canada (Growth Analysis 2016).

² Government Communication 2015/16:48.

similar to two existing studies that include firm size in the analysis and employ large-scale firm-level longitudinal register data. Choquette et al. (2017) find that Danish born globals in manufacturing have higher sales and employment compared to other exporters. Braunerhjelm and Halldin (2019) mainly focus on non-size measures of firm performance, but they do include employment as a size measure and find that Swedish born globals in the manufacturing sector have higher employment levels 5 years after the establishment of a born global firm compared to other similarly aged exporting firms.

Our work is distinct from Choquette et al. (2017) and Braunerhjelm and Halldin (2019) in many respects. Our data covers the period 1998–2014, which allows us to study the performance of firms after the financial crisis. In contrast, Braunerhjelm and Halldin’s analysis was limited to the 1998–2008 period. We study firm size comprehensively in terms of firm-level employees, sales, and value added, while Braunerhjelm and Halldin’s only size measure is firm-level employment. At the same time, we also apply best practices in terms of removing continuing firms and spinouts from the analysis, which was a major limitation in the Choquette et al. study. Our ability to properly identify startups yields much weaker results compared to Choquette et al. In contrast to Braunerhjelm and Halldin, we find no statistically significant born global size advantage in terms of employment. We find no statistically significant firm size difference in terms of sales or value added either. Our results thus suggest that the firm size advantage related to a born global strategy previously found in the Swedish data are not robust.

We also include value added as a third proxy for firm size, which is novel to the born global literature that tends to focus on employment and sales. Value added is a common measure of firm size in the economics literature and is the basis for GDP. Moreover, using value added as a metric for firm size circumvents the problem that some firms are highly engaged in the import and export of intermediate inputs, which inflate sales but adds very little value in-house (Johnson and Noguera 2012).

The rest of the paper is organized as follows. We summarize the literature explaining the size and growth of born globals in Section 2. Data sources, the definition of born globals, descriptive statistics, and our regression methodology are provided in Section 3. The regression results are presented and discussed in Section 4. Conclusions follow in Section 5.

2 Explaining the size and growth of born globals

The notion that exporting firms in general may have beneficial effects on employment and growth is often motivated from a vast international economics literature, which has found that exporters tend to outperform their non-exporting peers in terms of productivity, employment, capital intensity, financial resources, and spending on R&D and investments (Bernard and Jensen 1999; Mayer and Ottaviano 2008). But these same studies also show that very few firms export, and even fewer firms are export-intensive. Born globals are distinct from other exporters by their ability to overcome the initial barriers associated with entry into foreign markets without first establishing a strong home market presence. Many studies have found born globals to be small, yet fast-growing exporters (Knight and Cavusgil 1996; Moen and Servais 2002; Knight 2015).

Both market-level and firm-level factors can explain the emergence of born globals. Knight and Cavusgil (1996) hypothesize that structural change and new technologies were important underlying factors that encouraged the development of born globals. In terms of firm-level factors, Hagen and Zucchella (2014) discuss the long-term growth of born global firms and reason that the “openness” of the founders and the early preparation for growth determine both the extent and speed of organizational learning, which in turn drives long-run growth. In the international economics literature, there is broad empirical support for the “selection into exporting” hypothesis, which asserts that only firms that are sufficiently productive self-select into exporting and that the source of this productivity advantage predates their entry into export markets (Bernard and Wagner 1997; Bernard and Jensen 1999, 2004).

Since the aim of this study is to provide evidence regarding the claim of born global firms’ superior performance compared to startups with a more gradual export strategy, especially in the long run, the theoretical literature on the advantages and liabilities associated with a born global strategy is highly relevant. Starting with the advantages, Autio et al. (2000) argue that the early pursuit of international opportunity induces superior entrepreneurial behavior and leads to faster growth. Autio et al. suggest that young firms can more easily adapt their processes and structure to new markets, which allow young firms to enjoy the “learning advantages of newness.” Young firms, for example, may be able to integrate knowledge about foreign markets

quicker than large incumbents (Johanson and Vahlne 2009; Figueira-de-Lemos et al. 2011; Casillas and Moreno-Menéndes 2014). Bell et al. (2003) posit that a rapid internationalization provides a first-mover advantage by locking in customers and more efficiently exploiting proprietary knowledge. Almor (2011) shows that Israeli born globals handled the Great Recession of 2008 better than other firms, due in part to their ability to tap customers in many markets. A born global export strategy may encourage firm growth by accessing consumers in as many markets as possible, providing the firm with a competitive edge (Oviatt and McDougall 1994).

In a related vein, the international economics literature has tested for the presence of “learning by exporting,” whereby firms can improve their performance as a consequence of exporting due to a learning process. Aw et al. (2000) posit that firms can also become more productive after expanding to export markets by obtaining economies of scale in production. However, empirical support for the “learning by exporting” hypothesis is mixed. Wagner (2002), Andersson and Lööf (2009), and De Loecker (2013) find positive productivity effects using German, Swedish, and Belgian data, respectively, including employment growth and wage increases in German firms. At the same time, Clerides et al. (1998) and Aw et al. (2000) find no such evidence of “learning by exporting” effects for Columbian, Mexican, Moroccan, Korean, and Taiwanese firms. The learning mechanism is sensitive to export intensity, as Andersson and Lööf (2009) show.

The literature also describes many liabilities associated with a born global strategy. Although exporting may lead to higher revenues, it is seen by many firms as a risky strategy (Bonaccorsi 1992; Knight and Cavusgil 2004). Increased exposure to risk may lead to a survival bias among studies that employ case studies and surveys to examine successful born globals. Born globals’ need for exporting knowledge from the very beginning, as well as new and more complex risk profiles due to foreign market exposure, can lead to negative effects on employment and growth (Luostarinen and Gabrielsson 2006). Knowledge and skills in navigating foreign markets are crucial, and firms with an aggressive international expansion may face a disadvantage of “foreignness” (Zaheer and Mosakowski 1997; Rugman and Verbeke 2007) and “newness” (Stinchcombe and March 1965; Zahra 2005) compared to foreign incumbents, which may adversely affect the

performance of some firms. Young firms are particularly constrained with respect to management competencies and other resources, which can make rapid internationalization risky (Andersson and Wictor 2003; Oviatt and McDougall 2005; Sapienza et al. 2006; Carr et al. 2010). Sui and Baum (2014) find that born globals face increased liabilities of foreignness compared with other strategies, which make them more prone to failure. Sleuwaegen and Onkelinx (2014) find that survival rates are lower for born globals, which appear to stem from their “liability of newness.”

Overall, there are arguments for both advantages and liabilities associated with a born global strategy, and it is ultimately an empirical question as to which effect dominates. Observable differences in size or other characteristics between born globals and other exporting firms at founding may be indicative of the selection mechanism. The learning by exporting hypothesis would suggest that differences will become more important over time, although this could also be driven by differences in initial unobservable characteristics, such as entrepreneurial ability, that take time before they are observed in firm performance.

A related factor to consider is that the relative ease of scalability, which is a common attribute among born globals (Kudina et al. 2008; Cannone and Ughetto 2014), can imply that employment growth does not rise proportionately with output growth among these firms. The ease of scalability is often associated with the presence of economies of scale, whereby fixed production costs are a large component of total costs compared to the variable cost of production. If labor costs are primarily a fixed production cost, then employment growth will lag behind growth in sales and value added as firms’ output expands. Therefore, studies evaluating the performance of born globals should look at output-based measures of size in addition to employment, such as value added.

3 Data and methodology

3.1 Data sources

We use firm-level register data covering all limited liability companies for the years 1998–2014 in manufacturing (NACE Rev. 2 industries 10–33), obtained from Statistics Sweden. Firm accounting variables such as sales, value added, and the number of employees

are collected by Statistics Sweden directly from firms' tax returns. We use Statistics Sweden's definition of value added, which is defined as sales minus input use.

We match the accounting data with detailed firm-level data on firms' exports, which is derived from Swedish customs records. In order to avoid erroneously classifying continuing firms that change their organizational number as new firms, we use a system developed by Statistics Sweden. Firms are classified as continuing firms even if they change their organizational number as long as at least 50% of their workers continue to be employed at the same establishment. Firms are classified as spinouts if the employees that "moved" made up less than 50% of total workers at the old firm and at least 50% of the total at the new firm.

Instead of following Choquette et al. (2017) and comparing born globals with all other new firms, an approach that would entail the complex task of controlling for selection into exporting in the subsequent analysis, we follow Braunerhjelm and Halldin (2019) and opt to compare born globals with other exporting firms. Other exporting firms are also more comparable to born globals in terms of size, which makes them a more suitable control group. Moreover, using other exporters as the control group allows us to address our research question, which is whether a born global export strategy is beneficial in terms of firm size and firm growth compared to a more gradual export strategy. In order to maintain an identical sample regardless of the outcome variable, we restrict the analysis to only those firm-year observations that report positive employment, sales, and value added.

3.2 Defining born globals

The definition of born globals aims to capture a unique type of export firm with an accelerated export process, in contrast to the traditional internationalization process whereby firms build up a customer base in the domestic market and then gradually expand internationally (Bilkey and Tesar 1977; Johanson and Vahlne 1977; Cavusgil 1980). Research on born globals has mainly focused on documenting their characteristics and understanding the underlying trends that give rise to these types of firms (Moen and Servais 2002). These studies found that born globals are typically innovation-intensive (Andersson and Wictor 2003; Cavusgil and Knight, 2015) and human capital-intensive (McDougall et al. 1994, 2003; Knight 2001; Melén and Nordman 2007), and are characterized

by a production process that is easily scalable (Kudina et al. 2008; Cannone and Ughetto 2014).

There is a lack of a harmonized definition of born globals in the literature, although many efforts have been made to define them, both qualitatively and quantitatively. The quantitative definition of born globals is usually defined along two dimensions: the degree of export intensity (exports as a share of total sales must exceed a certain value) and the age of the firm at which this export intensity criterion is met.³ In the literature, numerous definitions have been applied (see, e.g., Braunerhjelm and Halldin 2019; Gabrielsson and Kirpalani 2004; Oviatt and McDougall 1994; Rennie 1993), such as export activity within 2–10 years and a minimum export share of total sales ranging between 20 to 80%. In a literature review by Bader and Mazzarol (2009), they found 12 different definitions across 126 studies, where Oviatt and McDougall's (1994) definition was the most referenced. They defined born global firms as an extreme version of "international new ventures" that are international from inception and derive a significant competitive advantage from the sales in multiple countries.⁴ Born globals are startups by definition and are thus not established as a spinout of an existing firm. This distinction is an important difference compared to many international new ventures (Oviatt and McDougall 1994) that begin life as spinouts.

In this study, we define born globals as startups with at least 25% of their sales in exports within 3 years of founding since it is the most commonly used definition in the literature. This definition stems from Moen and Servais (2002) and Knight and Cavusgil (2004), and is used in studies of Swedish born globals by Nordman and Melén (2008), Melén and Nordman (2009), and Braunerhjelm and Halldin (2019). Choquette et al. (2017) also use this definition in their study of Danish born globals. As a robustness check, we also use a 50% export threshold. Given that Sweden is a relatively small and open economy where many firms export, several startups also meet the more stringent 50% rule.

³ Born globals can also be defined qualitatively as certain types of businesses, typically high-tech and IT firms.

⁴ International new ventures share born globals' focus on export markets, but in contrast to born globals, they may emerge as a spinout from an existing firm and can also pursue a more gradual and region-based export strategy. Oviatt and McDougall (1994) use the term "global startups," and McAuley (1999) uses the term "instant exporters." Knight and Cavusgil (1996) were among the first in the academic literature to refer to such firms as born globals.

3.3 Descriptive statistics

The number of firms included in the analysis under various sample restrictions is given in Table 1. The base sample consists of 27,344 firms in the manufacturing sector that appears as a new firm between 1998 and 2011. Once we remove spinouts and continuing firms, we are left with 15,093 true startups that were born between 1998 and 2011. For at least 1 year, 3496 of these firms engage in export. Of these, only 560 qualify as born globals, as at least 25% of their sales are exports within 3 years of founding.⁵ We also report the number of born globals using a 50% export threshold, which cuts the number of born globals in half in all cases.

We also restrict our sample to domestically owned startups that have less than 20 employees at founding in order to further ensure that our analysis is focused on true startups. Once we impose these further restrictions, the sample is reduced to 3322 exporters. Only 517 firms in this more restricted sample are classified as born globals using the 25% rule. The domestic ownership and employee restrictions help to ensure that spinouts are not erroneously included as born globals despite implementing Statistics Sweden's approach to removing spinouts. The results in Table 1 emphasize that only 3.6% of manufacturing firms are born globals once spinouts are removed. Startups with a more gradual export strategy are far more common, exceeding the number of born globals by a factor of 6. Moreover, removing spinouts and continuing firms from the sample reduced the total number of startups by 45% and the number of born globals by as much as 67%, while the other restrictions had little effect on the total number of born globals (merely reducing the share of born globals by 2.6 percentage points).

Descriptive statistics are presented in Table 2, where we report the sample averages for the firm size measures and control variables under different sample restrictions for 6-year-old born globals and other exporting firms founded 1998–2008 in the manufacturing sector. Table 2 highlights the importance of removing spinouts and continuing firms from the analysis in order to avoid erroneous conclusions. When spinouts are removed, the average number of employees among born globals falls by 95%, and average sales and value added falls

even more. Firm size in terms of employees, value added, and sales suggest that 6-year-old Swedish manufacturing born globals are small and similar to other same-age exporting firms, averaging less than five employees, and value added and sales of SEK 3.4 and 10.1 million, respectively, once spinouts are removed.⁶ The measures of firm size and capital stock decrease only marginally as more restrictions are applied to the sample despite that foreign-owned firms and spinouts tend to be larger than new firms. The share of college-educated employees remains stable across different sample restrictions. It is clear from Table 2 that on average, the born global firms and the firms in the control group are fairly similar in terms of size. The most noteworthy difference is that born globals have a higher share of educated workers compared to other exporters.

The average number of employees per firm among born globals, other exporting firms, and non-exporting firms in our final sample is illustrated in Fig. 1. The figure suggests that born globals employ roughly the same number of workers as other exporting firms regardless of age. It is only among the very small number of 16-year-old born globals that any discernible difference can be seen. Employment among non-exporting firms is much lower, suggesting that other exporting firms are a more relevant control group than non-exporting firms. The bars in Fig. 1 show that the number of firms in the sample decreases with firm age, which is due to a combination of exits and truncation due to the fact that we only observe firms until 2014, regardless of age.

The average sales and value added among born globals, other exporters, and non-exporting firms under our final sample is presented in Figs. 2 and 3, respectively. We find that born globals' sales are similar to other exporting firms, and slightly larger in terms of value added in later years, although the sample size in later years is very small.

3.4 Regression methodology

We test whether born global firms founded between 1998 and 2011 are larger than other exporting firms r

⁵ Firms whose exports reach 25% of sales in their first or second year, but not in later years, are thus counted as born globals.

⁶ The differential between average sales and value added indicates that as much as two-thirds of sales by exporting firms consists of purchased inputs, some of which may be imported. To the extent that this is true, net exports by born globals is commensurately lower.

Table 1 Total number of firms, exporters, and born globals under various sample restrictions, Swedish manufacturing firms founded 1998–2011

Sample restriction	Total number of firms	Total number of exporters	Total number and share of born globals	
			25% rule	50% rule
1. No restriction	27,344	9022	6.3% (1711)	2.9% (786)
2. (1) + not spinout	15,093	3496	3.7% (560)	1.7% (250)
3. (2) + not foreign-owned	14,911	3397	3.5% (525)	1.5% (231)
4. (3) + less than 50 employees	14,889	3387	3.5% (525)	1.6% (231)
5. (3) + less than 20 employees	14,243	3322	3.6% (517)	1.6% (227)

Note: Sample restriction criteria use the information for the year that the firm is founded.

years after founding. We thus perform a cross-section regression analysis at the firm-level using OLS, which takes the following form

$$\log(\text{Size}_{i, \text{age}=r}) = \alpha + \beta(\text{BornGlobal}_i) + \gamma \text{Size}_{i, \text{age}=0} + \delta_t + \delta_s + \varepsilon_{it}, \quad (1)$$

where $\text{Size}_{i, \text{age}=r}$ is the size proxy for firm i , r years after founding. We regress Eq. (1) separately using employees, sales, and value added as measures of firm size. The main explanatory variable of interest is the born global indicator variable, BornGlobal_i , which equals one if firm i meets the born global criteria and takes a value of zero otherwise. $\text{Size}_{i, \text{age}=0}$ controls for the size of the firm during the first year after founding. We

include a set of calendar year indicators, δ_t , which control for the impact of year-specific factors on firm size, such as the business cycle. The year fixed effects also act as cohort fixed effects in the cross-section specification, and control for the fact that economic conditions at the time of establishment might have a long-term impact on the performance of startups. We also include a set of 2-digit NACE Rev. 2 industry fixed effects, δ_s , which control for the fact that certain industries were more likely to grow than others during the 1998–2014 period.

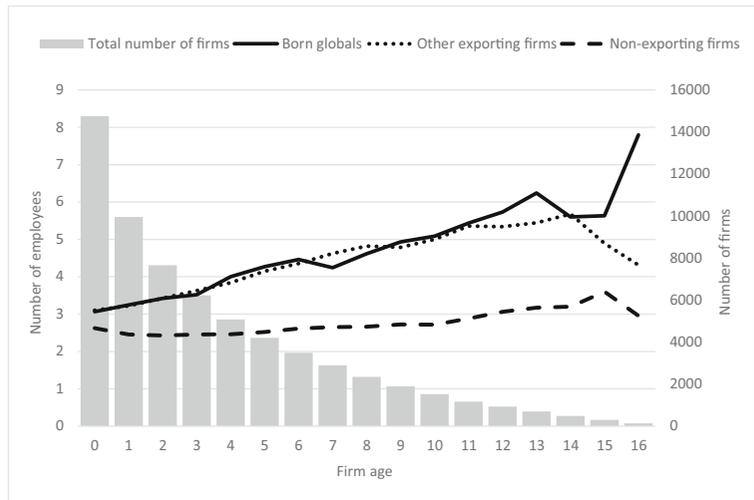
Since we log the firm size measures, a positive point estimate for the born global indicator variable indicates that born globals are $(e^\beta - 1) \times 100$ percent

Table 2 Descriptive statistics for 6-year-old born globals and other exporting firms under various sample restrictions, Swedish manufacturing firms founded 1998–2008

Variable (averages)	No restriction	+ not spinout	+ not foreign-owned	+ < 50 employees	+ < 20 employees
Panel A: born globals					
Employees	111.8	4.6	4.5	4.5	4.5
Sales (million SEK)	419.9	10.1	9.4	9.4	9.4
Value added (million SEK)	126.9	3.4	3.1	3.1	3.1
Share educated workers	0.18	0.21	0.20	0.20	0.20
Capital stock (million SEK)	104.5	1.1	1.1	1.1	1.1
Panel B: other exporters					
Employees	26.7	4.9	4.8	4.8	4.4
Sales (million SEK)	47.4	8.1	7.8	7.8	7.1
Value added (million SEK)	14.9	2.6	2.6	2.6	2.4
Share educated workers	0.12	0.14	0.14	0.14	0.14
Capital stock (million SEK)	10.1	1.4	1.3	1.3	1.2

Note: Workers are defined as college educated if they have completed at least 2 years of post-secondary education. Sample restriction criteria use the information for the year that the firm is founded. The number of 6-year-old born globals is constant across columns (3), (4), and (5) (123 firms); therefore, the descriptive statistics are identical.

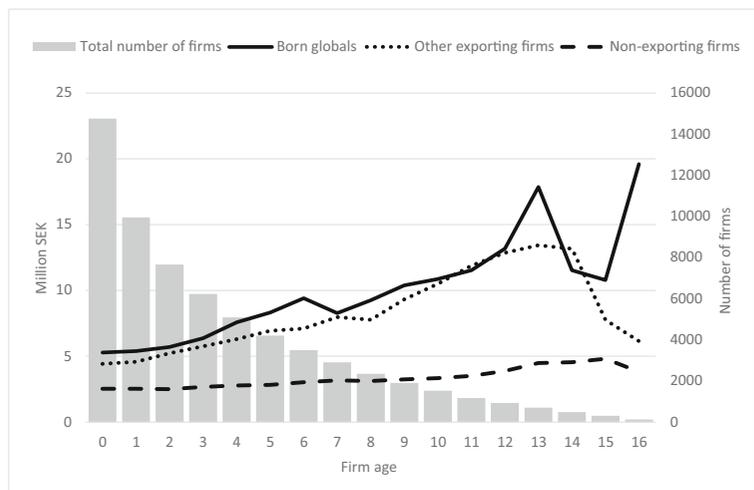
Fig. 1 Average employment and number of firms by firm age, Swedish manufacturing firms founded 1998–2011, born globals, other exporting firms, and non-exporting firms



larger in size compared to other exporters. The null hypothesis is that there is no size difference in terms of employment, sales, or value added compared to other exporting firms.

Our analysis differs from Braunerhjelm and Halldin (2019) in two main respects. First, Braunerhjelm and Halldin are based on older data, namely firms born during the years 1998–2003 with performance measured during 2003–2008. In contrast, we find a smaller and less statistically significant born global size advantage in our longer and more recent sample of startups. Second, we focus on firm size as a measure of performance, whereas Braunerhjelm and Halldin focus mainly on non-size performance, such as sales per employee, profits over sales, and labor productivity.

Fig. 2 Average sales and number of firms by firm age, Swedish manufacturing firms founded 1998–2011, born globals, other exporting firms, and non-exporting firms



Note: USD 1 ≈ SEK 8.

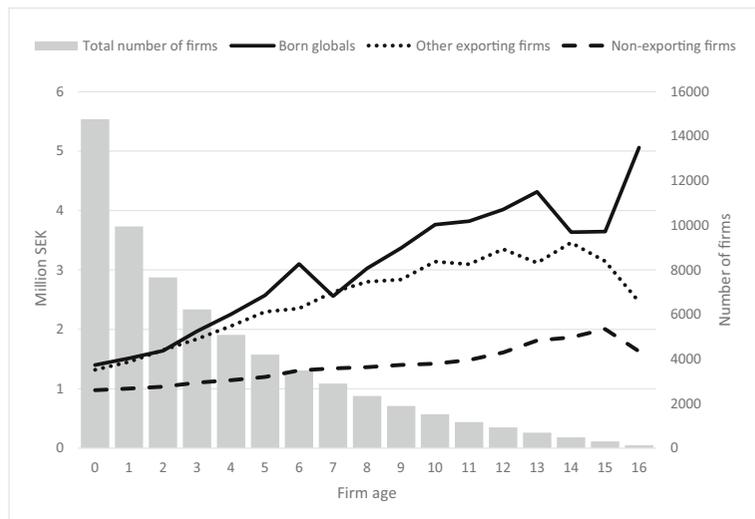
4 Results and discussion

We now present our regression results. We first present the regression results separately for each age group, an approach used by both Choquette et al. (2017) and Braunerhjelm and Halldin (2019). As a robustness check, we also employ a panel regression approach, similar to Choquette et al. and show the importance of correctly removing continuing firms and spinouts.

4.1 Regression results by firm age

In Figs. 4, 5, and 6, we present the results of the regression analysis by firm age. All specifications include year fixed effects, 2-digit NACE Rev. 2 industry

Fig. 3 Average value added and number of firms by firm age, Swedish manufacturing firms founded 1998–2011, born globals, other exporting firms, and non-exporting firms



Note: USD 1 ≈ SEK 8.

fixed effects and firm size at age zero. The figures are based on regression Eq. (1), which employs the fully restricted sample of all exporters in Table 1 (3322 firms) and illustrates the point estimate for the $BornGlobal_i$ indicator variable and the corresponding 95% confidence interval.

The first vertical bar of Fig. 4 illustrates the regression results when the dependent variable is logged employment the year after the firm is born (age = 1). We report the regressions for each age group in our data up to 12 years after founding. The full set of regression results up to 16 years are reported in Tables 5 and 6 in the Appendix. We perform these regressions by firm age

in order to study the relative performance of born globals in both the short and the long run. The gradient of these point estimates over firms' lifespans is also informative regarding the relative growth in employment, sales, and value added for born globals versus other exporting firms in the long run. The 95% confidence intervals span zero in all specifications, which imply that the point estimate for the $BornGlobal_i$ indicator variable is statistically insignificant at the 5% level across all age cohorts. The gradient of the point estimates suggests that employment growth among born globals is very similar to other exporters, which corroborates our descriptive findings in Fig. 1.

Fig. 4 Difference in employment by firm age, born globals versus other exporting firms

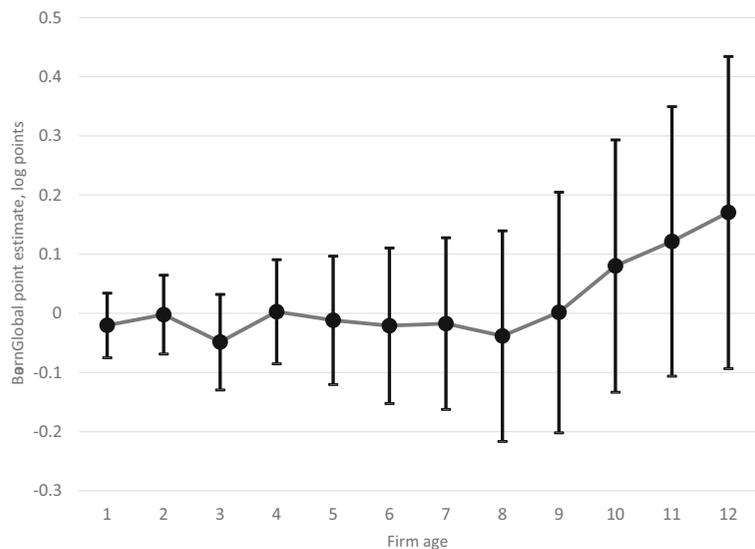


Fig. 5 Difference in sales by firm age, born globals versus other exporting firms

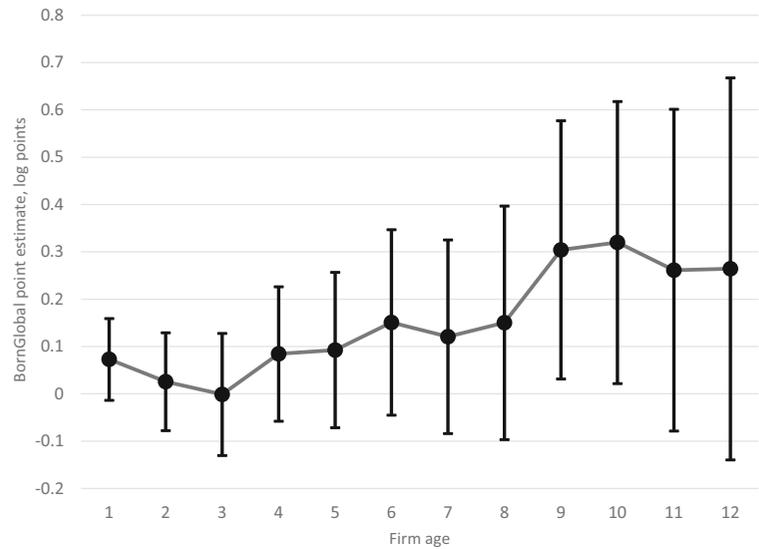
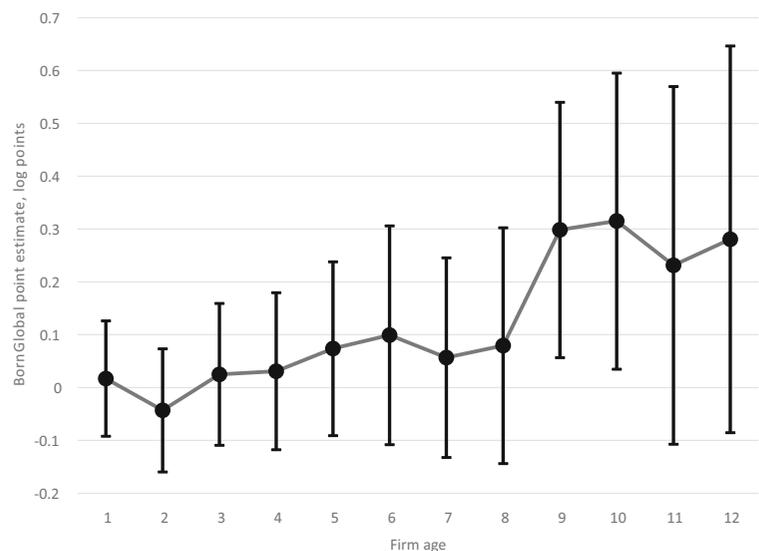


Figure 5 illustrates the regression results by firm age when logged sales is the dependent variable. We find that the 95% confidence intervals for the *BornGlobal_i* indicator variable spans zero in all specifications except for firms between 9 and 10 years old.

Finally, Fig. 6 illustrates the regression results by firm age when logged value added is the dependent variable. We find that the estimate for the *BornGlobal_i* indicator variable is statistically different from zero only when firms are between 9 and 10 years old, whereas the point estimates are statistically insignificant for all other firm ages.

Fig. 6 Difference in value added by firm age, born globals versus other exporting firms



In Fig. 7 in the Appendix, we check whether our results are robust to using a more export-intensive definition of born globals. In this robustness check, we define born globals using a 50% 3-year rule, which is reasonable given the fact that Sweden is a relatively small economy. Approximately 200 exporters meet this stricter definition of born globals. The regression results by firm age, using logged employment as the size measure, are illustrated in Panel a. We once again find no statistically significant born global employment advantage compared to other exporting firms among any age cohorts. The results using logged sales are illustrated in

Panel b, where we find a statistically significant size advantage for born globals that are 9 years old. Finally, the regression results using logged value added are illustrated in Panel c, where we find a statistically significant size advantage among 9-year-old born globals. Overall, we find that our results are robust to using this stricter definition of born globals.

4.2 The importance of removing continuing firms and spinouts

In Table 3, we perform a panel regression, which combines data on firms of all ages. We include industry and year fixed effects as in Eq. (1), and we also include firm-age fixed effects to account for the fact that firm size may differ by age irrespective of export strategy. This exercise allows us to compare our results to the panel approach used by Choquette et al. (2017), who attempt to remove continuing firms and spinouts by dropping the top 1% of firms by employment the first year they appear in the data. Their cutoff corresponds to firms with between 50 and 70 employees in their first year. In the odd-numbered columns of Table 3, we follow Choquette et al. by dropping firms with more than 60 employees in the first year. In the even-numbered columns, we use our more sophisticated approach to removing continuing firms and spinouts, which correspond to the same restrictions imposed on the regressions presented in Figs. 4, 5, and 6. Using Choquette et al.'s approach to removing continuing firms and spinouts yields a statistically significant point statistic for the born global indicator variable for all outcomes. In contrast, using our approach to removing continuing firms and spinouts leads to an insignificant point statistic for employment and value added, while the relative sales advantage of born globals compared to other exporters drops from 82 to 10%, with statistical significance dropping from the 1 to the 5 % level.⁷

The point estimates using the panel specification in the even-numbered columns of Table 3 are similar to the average point estimates across all ages in our earlier analysis, and the main difference is the standard errors, which are smaller in the panel specification. Standard errors in a panel setting with a limited time dimension tend to be underestimated (Bertrand et al. 2004), which

⁷ The conversion of the born global point estimate to percent in columns (3) and (4) are as follows: $(e^{0.60} - 1) \times 100 \approx 82$ and $(e^{0.010} - 1) \times 100 \approx 10$.

suggests that our original cross-section specification estimating the effects separately for each age group provides a more conservative and trustworthy estimate of statistical significance.

We also show the importance of removing continuing firms and spinouts for our earlier analysis in Table 4, where we focus on 6-year-old firms for illustrative purposes. Panels A, B, and C in Table 4 present the results using logged employees, sales, and value added, respectively, as measures of firm size. In column (1), we estimate the size premium associated with born globals without any sample restrictions. In column (2), we estimate the size premium of born globals after removing spinouts so that the sample includes only true startups. In column (3), we present the regression results after removing firms that are foreign-owned in order to ensure that our results are not driven by foreign-owned affiliates. In columns (4) and (5), we present the regression results after further restricting the sample to include only firms with less than 50 employees and 20 employees in their first year, respectively.

Panel A of Table 4 presents the results for employment. In column (1), prior to removing spinouts, we find a large and statistically significant employment premium associated with born globals. However, the premium vanishes once we remove continuing firms and spinouts from the analysis in column (2). This non-significant result persists across columns (3), (4), and (5) as we remove foreign-owned firms and firms with unusually high employment in their first year. In panel B of Table 4, we find a positive and statistically significant size premium in terms of sales before removing spinouts. However, we again find no statistically significant born global size advantage in terms of sales once continuing firms and spinouts are removed and the full set of sample restrictions is imposed. Similarly, in panel C of Table 4, we find no evidence of a statistically significant size premium in terms of value added once spinouts and continuing firms are removed. Firm size the first year after founding, which we include as a control variable, is positive and significant at the 1% level across all specifications.

4.3 Discussion

We draw two main conclusions from our results. First, we find no evidence of a born global size premium in terms of employment, and weak evidence in terms of sales and value added. In the regressions by age,

Table 3 Panel regression results, born globals versus other exporters: Comparison

	log(Employees) _{<i>i</i>}		log(Sales) _{<i>i</i>}		log(Value added) _{<i>i</i>}	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>BornGlobal_i</i>	0.064** (0.028)	0.00018 (0.033)	0.60*** (0.047)	0.10** (0.050)	0.18*** (0.038)	0.054 (0.047)
<i>Emp_{i,age=0}</i>	0.081*** (0.0016)	0.20*** (0.0053)				
<i>Sales_{i,age=0}</i>			0.00094** (0.00046)	0.10*** (0.0087)		
<i>Value added_{i,age=0}</i>					0.12*** (0.0088)	0.26*** (0.031)
Method to remove continuing firms	No foreign-owned, < 60 employees at founding	Baseline	No foreign-owned, < 60 employees at founding	Baseline	No foreign-owned, < 60 employees at founding	Baseline
Observations	49,745	19,495	49,745	19,495	49,745	19,495
<i>R</i> ²	0.54	0.45	0.12	0.33	0.38	0.28

Note: Same sample restrictions as column (5) in Table 2 (continuing firms and spinouts removed, domestically owned and less than 20 employees in the year of founding). Age fixed effects, year fixed effects and 2-digit NACE Rev. 2 fixed effects included in all specifications. Odd-numbered columns use the Choquette approach to removing spinouts and continuing firms, even-numbered columns use the full set of restrictions used in Table 2, column (5). Robust standard errors are in parentheses, clustered at the firm level in all specifications. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

reported in Figs. 5 and 6, we find that born globals display a size advantage only among firms aged 9 or 10. Second, we find much smaller sales premia compared to Choquette et al. (2017). Choquette et al. find that born globals are between 96 and 182% larger than other exporting firms in terms of sales.⁸ We thus fail to detect the quantitatively large born global size advantages found by Braunerhjelm and Halldin (2019) and Choquette et al. (2017).

Cavusgil and Knight (2015) and Zander et al. (2015) have called for more rigors in the measurement of born globals' performance. Our study shows that the methods and assumptions used to identify born globals and suitable control group are crucial when studying born globals' performance in the context of register data. In particular, our results highlight the importance of correctly identifying startups based on where the workers were previously employed. We also show that non-exporters are too different from exporters in terms of size in order to be included in the control group. Our inability to detect a born global size premium is at odds

with the few other studies that examine size dynamics in longitudinal register data, which suggests that a connection between firm growth and a born global export strategy is by no means a settled issue.

Our results also have some implications that might further the theory on born globals. There are two possible theoretical interpretations of our results. One interpretation is that the costs of a born global strategy cancel out the advantages in terms of reaching more customers abroad. In this case, one may conjecture that born globals could potentially be more successful if such costs could be avoided. Another possible interpretation of our results is that both the benefits and costs of a born global strategy versus a more gradual export strategy are negligible in terms of their impact on firm size. Further study with more detailed data would be required in order to determine whether or not there are particular costs associated with the born global export strategy that negatively affect long-run performance, such as "foreignness" (Zaheer and Mosakowski 1997; Rugman and Verbeke 2007) or "newness" (Stinchcombe and March 1965; Zahra 2005). Lastly, the weakly positive result for sales and value added may be due to the presence of economies of scale in production, whereby export growth leads to higher output among born globals but does not result in a corresponding increase in employment in these firms.

⁸ We use Choquette et al.'s (2017) point estimates reported in their Table 6, column (1) to perform the calculations. The lower bound is derived from the difference between their born global (BG) and born exporter (BE) point estimates $((e^{2.55-1.88} - 1) \times 100 \approx 96)$. The upper bound is derived from the difference between their born global (BG) and late exporter (LE) point estimates $((e^{2.55-1.51} - 1) \times 100 \approx 182)$.

Table 4 Regression results, born globals versus other exporting firms, six-year-old firms

	No restriction (1)	+ not spinout (2)	+ not foreign-owned (3)	+ < 50 employees (4)	+ < 20 employees (5)
Panel A: $\log(\text{Employees})_{i,\text{age}=6}$					
<i>BornGlobal_i</i>	0.66*** (0.063)	0.017 (0.065)	0.0025 (0.067)	0.0025 (0.067)	-0.021 (0.067)
<i>Employees_{i,\text{age}=0}</i>	0.00061*** (0.00015)	0.13*** (0.0097)	0.12*** (0.0095)	0.12*** (0.0095)	0.17*** (0.0078)
Observations	3501	1262	1239	1239	1228
R^2	0.18	0.36	0.35	0.35	0.34
Panel B: $\log(\text{Sales})_{i,\text{age}=6}$					
<i>BornGlobal_i</i>	0.92*** (0.073)	0.15 (0.097)	0.17* (0.099)	0.17* (0.099)	0.15 (0.10)
<i>Sales_{i,\text{age}=0}</i>	0.00026*** (0.000095)	0.081*** (0.0077)	0.084*** (0.0090)	0.084*** (0.0090)	0.092*** (0.012)
Observations	3501	1262	1239	1239	1228
R^2	0.19	0.28	0.27	0.27	0.24
Panel C: $\log(\text{Value added})_{i,\text{age}=6}$					
<i>BornGlobal_i</i>	0.79*** (0.073)	0.13 (0.10)	0.099 (0.11)	0.099 (0.11)	0.099 (0.11)
<i>Value added_{i,\text{age}=0}</i>	0.00069*** (0.00020)	0.18*** (0.033)	0.18*** (0.034)	0.18*** (0.034)	0.18*** (0.046)
Observations	3501	1262	1239	1239	1228
R^2	0.16	0.19	0.18	0.18	0.16

Note: Same sample restrictions as column (5) in Table 2 (continuing firms and spinouts removed, domestically owned and less than 20 employees in the year of founding), plus restricted to 6-year-old firms. Age fixed effects and 2-digit NACE Rev. 2 fixed effects included in all specifications. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5 Conclusion

Promoting the emergence and growth of born globals is seen in many circles as a desirable policy goal. Such advice is typically motivated by reference to studies claiming that born globals are disproportionately important for job creation and economic growth. As a result, such firms have become the target of policy interventions in many countries. We have analyzed whether born globals lead to higher employment, sales, and value added in the long run. We study this question using detailed firm-level data on the universe of Swedish manufacturing firms founded between 1998 and 2011, which allows us to follow firms until 2014, i.e., for a period of up to 17 years.

Overall, our results do not suggest any robust evidence of a size or growth advantage associated with born globals in the Swedish manufacturing sector. Our results stand at odds with other studies using register data to study the performance outcomes of born globals.

We show that the measured performance advantage of born globals hinges critically on restricting the sample to true startups and excluding spinouts. The evidence presented here suggests that there is no clear advantage in terms of long-run employment, sales, or value added associated with a born global strategy. This could be driven by the fact that the costs and risks of a born global strategy cancel out any of the benefits associated with reaching more foreign markets, or that the costs and benefits are both too small to detect.

Our results also suggest that a born global export strategy is practiced by a small number of Swedish manufacturing firms; a mere 3.6% of all new manufacturing firms founded 1998–2011 were born globals. Policymakers must therefore be aware that encouraging more born globals need not necessarily lead to large benefits for the overall economy, especially in terms of employment. Our study also holds a valuable lesson for entrepreneurs, namely that adopting an aggressive global export strategy from the start, rather than

entering export markets more gradually, does not necessarily lead to higher firm growth.

Our study is subject to certain limitations that deserve mention. First, our analysis is limited to manufacturing due to the availability of data on trade in goods, but many born globals are active in the service sector. Future research into born globals in the service sector would thus be highly relevant. Second, the nature of the register data limits our ability to study the particular management strategies

used by each firm. Such studies may shed light on the underlying mechanisms that lead to success or failure. Large-scale detailed survey data based on questionnaires that combine more management strategy detail with large sample sizes may thus be a fruitful avenue for future research. Third, our study does not address the aspect of firm exit, which affects the composition of the sample over time. We thus leave a study incorporating exit into studies of long-run performance for future research.

Appendix

Fig. 7 Difference in employment, sales, and value added by firm age and born globals defined using 50% 3-year rule. Panel **a** employment. Panel **b** sales. Panel **c** value added

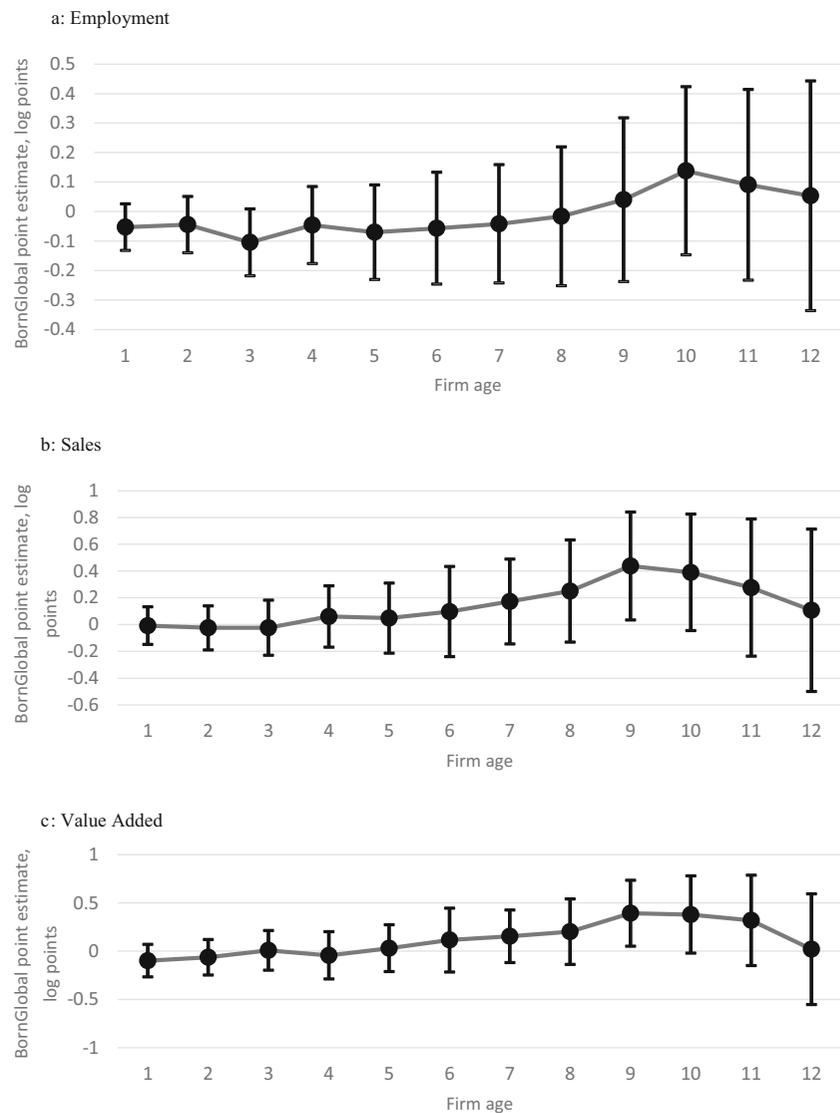


Table 5 Regression results, born globals versus other exporting firms, by firm age, ages 1–8

Firm age	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: $\log(\text{Employees})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	-0.020 (0.028)	-0.0019 (0.034)	-0.049 (0.041)	0.0028 (0.045)	-0.012 (0.055)	-0.021 (0.067)	-0.017 (0.074)	-0.038 (0.091)
<i>Employees_{i,\text{age}=0}</i>	0.21*** (0.0055)	0.20*** (0.0058)	0.19*** (0.0065)	0.18*** (0.0064)	0.18*** (0.0071)	0.17*** (0.0078)	0.18*** (0.0082)	0.18*** (0.0092)
Observations	2678	2269	1951	1675	1420	1228	1050	884
R^2	0.53	0.44	0.40	0.39	0.37	0.34	0.34	0.33
Panel B: $\log(\text{Sales})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	0.073* (0.044)	0.026 (0.053)	-0.0012 (0.066)	0.084 (0.073)	0.093 (0.084)	0.15 (0.10)	0.12 (0.10)	0.15 (0.13)
<i>Sales_{i,\text{age}=0}</i>	0.11*** (0.0085)	0.12*** (0.0083)	0.11*** (0.0092)	0.10*** (0.0098)	0.10*** (0.011)	0.092*** (0.012)	0.11*** (0.014)	0.092*** (0.014)
Observations	2678	2269	1951	1675	1420	1228	1050	884
R^2	0.39	0.36	0.31	0.28	0.27	0.24	0.25	0.23
Panel C: $\log(\text{Value added})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	0.017 (0.056)	-0.043 (0.059)	0.025 (0.068)	0.031 (0.076)	0.074 (0.084)	0.099 (0.11)	0.057 (0.096)	0.080 (0.11)
<i>Value added_{i,\text{age}=0}</i>	0.24*** (0.034)	0.24*** (0.039)	0.22*** (0.038)	0.22*** (0.032)	0.21*** (0.041)	0.18*** (0.046)	0.22*** (0.047)	0.20*** (0.068)
Observations	2678	2269	1951	1675	1420	1228	1050	884
R^2	0.24	0.23	0.20	0.22	0.18	0.16	0.19	0.19

Note: Same sample restrictions as column (5) in Table 2 (continuing firms and spinouts removed, domestically owned and less than 20 employees in the year of founding). Year fixed effects and 2-digit NACE Rev. 2 fixed effects included in all specifications. Constant term included but not reported. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.01$

Table 6 Regression results, born globals versus other exporting firms, by firm age, ages 9–16

Firm age	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Panel A: $\log(\text{Employees})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	0.0018 (0.10)	0.080 (0.11)	0.12 (0.12)	0.17 (0.13)	0.23 (0.16)	0.10 (0.19)	0.37 (0.27)	0.61 (0.53)
<i>Employees_{i,\text{age}=0}</i>	0.18*** (0.011)	0.17*** (0.012)	0.17*** (0.013)	0.18*** (0.015)	0.18*** (0.021)	0.16*** (0.024)	0.12*** (0.046)	0.18*** (0.053)
Observations	744	610	493	414	322	231	141	63
R^2	0.34	0.30	0.29	0.33	0.31	0.31	0.26	0.53
Panel B: $\log(\text{Sales})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	0.30** (0.14)	0.32** (0.15)	0.26 (0.17)	0.26 (0.21)	0.35 (0.24)	0.038 (0.28)	0.63* (0.37)	1.27 (0.82)
<i>Sales_{i,\text{age}=0}</i>	0.097*** (0.015)	0.10*** (0.017)	0.096*** (0.017)	0.11*** (0.019)	0.099*** (0.024)	0.084*** (0.024)	0.018 (0.036)	0.040 (0.095)
Observations	744	610	493	414	322	231	141	63
R^2	0.25	0.25	0.25	0.30	0.25	0.25	0.25	0.57
Panel C: $\log(\text{Value added})_{i,\text{age}=r}$								
<i>BornGlobal_i</i>	0.30** (0.12)	0.32** (0.14)	0.23 (0.17)	0.28 (0.19)	0.27 (0.19)	-0.17 (0.31)	0.56* (0.30)	0.82 (0.75)
<i>Value added_{i,\text{age}=0}</i>	0.27*** (0.046)	0.31*** (0.050)	0.28*** (0.051)	0.31*** (0.057)	0.27*** (0.069)	0.25*** (0.067)	0.090 (0.10)	0.50*** (0.18)
Observations	744	610	493	414	322	231	141	63
R^2	0.22	0.21	0.19	0.24	0.23	0.21	0.28	0.55

Note: Same sample restrictions as column (5) in Table 2 (continuing firms and spinouts removed, domestically owned and less than 20 employees in the year of founding). Year fixed effects and 2-digit NACE Rev. 2 fixed effects included in all specifications. Constant term included but not reported. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.01$

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