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How to cite this publication

Please cite the final published version:

Choquette, E., Rask, M., Sala, D., & Schröder, P. (2017). Born Globals - Is there Fire Behind the Smoke? *International Business Review*, 26(3), 448-460. <https://doi.org/10.1016/j.ibusrev.2016.10.005>

Publication metadata

Title:	Born Globals - Is there Fire Behind the Smoke?
Author(s):	Choquette, E., Rask, M., Sala, D., & Schröder, P.
Journal:	<i>International Business Review</i>
DOI/Link:	10.1016/j.ibusrev.2016.10.005
Document version:	Accepted manuscript (post-print)

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Born Globals - Is There Fire Behind The Smoke?

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Abstract

Are Born Globals really different from firms with other start-up histories? We address this question based on a unique longitudinal data set that tracks all Danish manufacturing start-ups founded between 1994 and 2008 (23,201 firms). This novel application of register data allows us to provide the first detailed account of Born Globals compared to proper control groups of other start-ups. Chiefly we investigate firm performance, which in turn permits inference on socioeconomic impact. We find that the occurrence of BGs is not specific to certain sectors, nor does their frequency change in light of rapid ICT progress. However, we find that Born Globals have significantly higher turnover and employment levels as well as job growth rates. Moreover, they show a considerably wider market reach, but little to no productivity advantage compared to firms with less or later internationalization. Thus, Born Globals are special in some but not all aspects.

Keywords

Global start-up; international entrepreneurship; export; longitudinal; secondary data source; econometrics; register data; Born Global

Highlights

- First paper to compare Born Globals to relevant control groups of other start-ups
- Unique longitudinal register data covering more than 20,000 Danish start-ups
- Statistic tests on performance differences between Born Globals and control groups
- Born Globals have superior turnover, employment levels and geographic reach
- Born Globals exhibit no long-term growth lead or productivity advantage

Acknowledgement:

We would like to thank the participants of the following conferences for their comments on earlier versions of this manuscript: EIBA 2013 in Bremen, Germany; IE mini Conference 2014 in Odense, Denmark; AIB 2014 in Vancouver, Canada; European Trade Study Group (ETSG) conference 2014 in Munich, Germany. We acknowledge financial support from the Tuborg Foundation.

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ABSTRACT

Are Born Globals really different from firms with other start-up histories? We address this question based on a unique longitudinal data set that tracks all Danish manufacturing start-ups founded between 1994 and 2008 (23,201 firms). This novel application of register data allows us to provide the first detailed account of Born Globals compared to proper control groups of other start-ups. Chiefly we investigate firm performance, which in turn permits inference on socioeconomic impact. We find that the occurrence of BGs is not specific to certain sectors, nor does their frequency change in light of rapid ICT progress. However, we find that Born Globals have significantly higher turnover and employment levels as well as job growth rates. Moreover, they show a considerably wider market reach, but little to no productivity advantage compared to firms with less or later internationalization. Thus, Born Globals are special in some but not all aspects.

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1. INTRODUCTION

New ventures that from their inception generate a significant share of their turnover on international markets, so-called Born Globals, are a unique firm archetype. The main thrust of existing research has naturally aimed at identifying the antecedents and drivers behind the creation of such firms. In contrast, research questions addressing Born Globals' performance in comparison to other start-ups, and in turn their respective socioeconomic impact, have so far been much harder to assess. The main obstacle is a lack of data. Even though systematic empirical evidence is hard to come by, the literature has reasoned that Born Globals are associated with a superior performance and hence a series of desirable effects for the surrounding economy. For example:

“Born Globals are often drivers of national economic development and innovativeness”
(Rialp, Rialp, & Knight, 2015)

“These “born global” firms represent important contributors to many economies...”
(Zander, McDougall-Covin, & Rose, 2015, p. 27)

Similarly, OECD (2013) argues that such firms played a central role in tackling the economic downturn in the aftermath of 2007.

Several other open questions surrounding Born Globals are on the agenda (Gray & Farminer, 2014). Recent reviews of the literature (Cavusgil & Knight, 2015; Zander, et al., 2015) have called for comparative studies with other start-ups:

“From a methodological point of view, studying born global firms in isolation makes it difficult to determine what attributes are specific to rapid internationalizers, as opposed to small, entrepreneurial firms that internationalize more gradually. Among the issues to be considered in comparative studies between born global firms and those that internationalize less rapidly is that of how these firms mature.” (Zander, et al., 2015, p. 32)

Accordingly, a second pillar of assessing performance that scholars have called for are research designs that examine the later-in-life performance of Born Globals in longitudinal studies in comparison to proper control groups of other start-ups (Cavusgil & Knight, 2015; Zander, et al.,

2015). In sum, leading scholars of the field have pinpointed severe gaps in the literature, i.e. the need for evidence on the superior performance of Born Globals compared to other start-up firms and studies that follow the entities over time.

The present paper offers a first attempt at closing this gap. We want to understand in what ways performance outcomes (which in turn will contribute to socioeconomic impact) of Born Globals are different from firms with other start-up histories. We demonstrate the feasibility of a novel approach applying large-scale firm-level register data. Our unique longitudinal firm-level data set covers the population of all Danish manufacturing firms. This register-based firm-level data allows us to identify all start-ups established between 1994 and 2008. This arrives at a total of 23,201 firms that we are able to follow until 2011. With such data, it is possible – for the first time in the literature – to carefully design proper control groups consisting of firms that have a start-up and internationalization history different from that of Born Globals, i.e. new ventures that stay local or start-ups that feature less rapid or less intensive exporting patterns compared to Born Globals. This novel feature of control groups and the ability to follow firms over a prolonged period of time (including their possible closure) allow us to examine and compare central performance characteristics of Born Globals to other types of firms in their early years and later in life, based on statistical models.

We provide novel results on the distribution of Born Globals across sectors and time as well as a wide range of crucial performance measures compared to other types of start-ups. In particular, we consider turnover, employment, productivity, i.e. value-added activity/profitability, and market reach (each time both in terms of levels and growth rates). Moreover, monitoring firms over time enables us to track whether or not such characteristics stick with firms of a certain type throughout their lifetime.

The approach we propose has several advantages, but also costs compared to survey-based research or case studies that have been the backbone of the literature. The type of longitudinal study that we are able to conduct is, as proposed by Cavusgil & Knight (2015), a stronger

method when studying and comparing start-ups. One of the reasons is, that we can avoid the survivor bias present in other research designs, i.e. our sample covers the complete population of start-ups, and thus includes firms that during our 17 years of observation shut down. In contrast, the typical snapshot of a survey- and case-based study by definitions only samples among survivors. Moreover, the customary single-sector studies (e.g. high tech sector) can be biased by sector-specific changes that potentially influence outcomes, and hence results are difficult to generalize. Again, the current longitudinal study can avoid this issue by covering all manufacturing firms, across all sub-sectors. Still, these advantages come at a cost. First, our research design can only address questions that are meaningfully answered based on standard accounting data (i.e. information that firms are required by law to report to government authorities and similar registers).¹ Second, register data is only accessible in anonymized form, thus, we cannot identify specific firms, let alone go back and harvest additional information or interviews.

A central design feature of our empirical approach resides in the fact that we compare the performance of Born Globals (say in terms of turnover, employment, productivity and export scope) to those of other firms that since their inception either never internationalized or did so at a slower pace and/or on a smaller scale. In particular, we group firms, i.e. the population of all start-ups, into four exclusive sets: Born Globals, Born Exporters, Late Exporters or Stay Locals. Accordingly, we assess Born Globals in comparison to a range of meaningful classes of other firms (control groups): those that export less in their start-up phase, those that export later in their lifetime, and lastly those that never export during our period of observation. To the best of our , this has not been done in the literature to date, but it is of paramount importance in order to identify if Born Globals are a phenomenon in its own right or simply a subgroup that is indistinguishable from say other start-ups with low-intensity international activity.

The papers most closely related in spirit to the current approach are Sui and Baum (2014), who focus on the survival of different types of international start-ups, and Sleuwaegen & Onkelinx

¹ In our case, data access is granted through Denmark Statistics. See Section 3 for further details on the data.

(2014), who compare the behaviour of newly internationalized firms to that of established exporters. In fact the works of Sui & Baum (2014) and Sleuwaegen & Onkelinx (2014) apply the same type of tools (e.g. regression analysis) and data (e.g. large-scale firm-level register data) that we utilize here. Yet, these authors do not address general performance differences of Born Globals, and consequently, neither do they assess socioeconomic impact.

Still, some recent studies provide suggestive first evidence of such performance differences. For Israel, Almor (2011) argues that high tech companies and especially Born Globals allowed the Israeli economy to escape from the brunt of the Great Recession of 2008. Similarly, as highlighted by Cavusgil and Knight (2015), studies by Eurofound (2012, 2013, 2016), the official agency of the European Commission with a mandate to provide policy-relevant research, assess that Born Globals – more than other start-ups and exporters – can contribute to the economic and labour market recovery in Europe; an argument also evoked by the OECD (2013).

Obviously, such first evidence and the general assumptions in the literature concerning the superior socioeconomic performance of Born Globals must be viewed against the downside of specific and potentially costly challenges that early and intensive exporting will bring. For example, Born Globals' need for globalization knowledge from the start as well as new and complex risk profiles due to foreign market exposure should clearly affect performance in a negative way (Luostarinen & Gabrielsson, 2006). Additionally, since Born Globals are international start-ups, they will face liability of foreignness in regard to their foreign local competitors (Zaheer & Mosakowski, 1997) and liability of newness in relation to established competitors (Stinchcombe, 1965; Zahra, 2005).

In sum: the jury is still out. To date, research has not been able to properly test and systematically verify if there is a superior performance of Born Globals compared to other firms. Thus, we do not know if Born Globals really are unique in their performance, let alone whether they actually are distinctive engines of socioeconomic development for their home economies. Accordingly, in this paper we seek to understand if Born Globals are different

compared to firms with other (less international) start-up histories. We ask: is there fire behind the smoke?

The remainder of the paper is structured as follows: In Section 2, we provide a brief review of the literature on Born Globals in order to synthesize four theoretical hypotheses. Then the empirical approach adopted in our paper is presented, followed by a presentation of the data (Section 3). Section 4 presents our empirical results. Section 5 discusses results and implications for future research. Section 6 concludes.

2. THEORY AND HYPOTHESIS DEVELOPMENT

The current paper dives into the performance of Born Globals in comparison to other start-ups. In other words, we focus on the actual firm performance that follows after the creation of the entity. Based on existing literature, we develop four central hypotheses that are suitable for statistical testing with large-scale firm-level register data. As simple as this exercise might seem, we uncover a range of central but previously untested hypotheses and insights.

2.1 Are Born Globals Specialists?

Are Born Globals a type of start-ups that arises only in certain sectors or environments, i.e. are they specialists? In the very first paper defining Born Globals it was stated that: "The Born Global story is not about particular technologies or sectors of the economy; fast-growing firms were found in all industries" (Rennie, 1993, p. 49). However, McDougall, Oviatt, & Shrader (2003) found that international new ventures generally operate in more globally integrated industries (such as knowledge- and technology-intensive industries) than domestic firms. In effect, the literature has not settled on the issue. In part, this is caused by research often focusing on specific sectors such as the computer, software or internet industry (e.g. Coviello & Munro, 1997; Glavas & Mathews, 2014; Lopez, Kundu, & Ciravegna, 2009) or other "high tech" industries (e.g. Almor, 2011; Hagen & Zucchella, 2014). Actually, Fernhaber, McDougall, and Oviatt (2007) suggested that scholars should be careful to rely on single-industry studies and technology-based examples from multiple industries. In general, the international entrepreneurship literature abstains from cross-contextual studies (e.g. Coviello & Jones, 2004;

Rialp, Rialp, & Knight, 2005). Obviously, with a given sector focus no results on the prevalence of the Born Global phenomenon across the economy can be derived. Moreover, the literature has theorized that due to falling internationalization costs (e.g. ICT developments) the frequency of Born Globals is increasing (Cavusgil & Knight, 2015; Zander, et al., 2015). Moreover, as globalization increases generally, the role of international new ventures like Born Globals is growing (Moen, 2002; Zahra & George, 2002). In line with these theory streams, we hypothesize that:

Hypothesis 1. Born Globals compared to firms with other start-up histories are concentrated in specific industries and their frequency has increased over time.

Industry structure is a complex set of interacting relationships (Fernhaber, et al., 2007). The underlying mechanisms captured here are for example that in some industries fast internationalization could be a necessity due to high fixed costs, i.e. big investments in R&D and/or production equipment, which need to be recovered with large-scale sales from start. Similarly, generally falling internationalisation costs (say the advent of ICT) and increasing globalization will affect the frequency of internationally active start-ups.

2.2 Are Born Globals Special?

Several important dimensions of the Born-Global phenomenon are only sporadically covered in existing research. For example, only scarce attention has been given to actual firm performance in comparison to other start-ups, and whether and how the performance of Born Globals contributes to the society in which they are located. Obviously, issues such as the growth contribution of export-driven new ventures compared to domestic start-ups (Hessels, 2008) are of widespread policy interest, in particular for small open economies. However, it has been difficult to derive insights on the socioeconomic impact of Born Globals from existing research. A particular problem is the lack of large-scale, longitudinal studies (Coviello & Jones, 2004; Gray & Farminer, 2014; Rask & Servais, 2015), although this methodology is frequently called upon when proposing avenues for future research in International Entrepreneurship (e.g. Nummela, 2015). Recent work on international new ventures – in line with the approach

developed in the present paper – has featured some first uses of larger-scale, longitudinal assessments of the phenomenon (e.g. Casillas & Moreno-Menéndez, 2014; Sleuwaegen & Onkelinx, 2014; Sui & Baum, 2014; Sui, Yu, & Baum, 2012). Despite the widespread assertion that Born Globals have a superior performance and hence are socioeconomically desirable, an extensive literature search harvests little in terms of actual evidence supporting the general perception. In Israel, one of the largest centres in the world for start-up enterprises and with a high frequency of internationally active firms, findings show that high tech companies and especially Born Globals allowed the Israeli economy to escape from the brunt of the Great Recession of 2008 (Almor, 2011). Furthermore, recent studies show that in spite of their young age and small size, Born Globals possess high job creation potential (Eurofound, 2012, 2016). Moreover, these studies note that Born Global entrepreneurs and staff tend to be highly skilled and educated (Eurofound, 2012) and display a higher degree of innovativeness (Eurofound, 2016) – characteristics that via the underlying production function should in principle result in higher productivity levels - i.e. higher value added activity (Van Praag & Versloot, 2007).

In other words, there is limited to no empirical evidence of Born Globals' performance in comparison to other start-ups, and hence no proven link to the impact of Born Globals on the society in which they are located. However, we know from the entrepreneurship literature that most entrepreneurial activities are considered to be beneficial for their surrounding society (Schumpeter, 1934/1961) in terms of economic growth or job creation (Baumol, 1968) as well as in terms of higher productivity (Wennekers & Thurik, 1999) compared with large established firms. A recent Danish study finds that start-ups account for approximately one third of the total job creation in the economy (Malchow-Møller, Schjerning, & Sørensen, 2011). In other words, start-ups generally appear to grow faster and create more jobs than other firms. Moreover, while their relative contribution to the overall level of productivity is limited, start-ups show relatively higher growth rates of value added and productivity (Van Praag & Versloot, 2007).

Apart from turnover, employment and productivity, regional reach has been theorized as an important performance indicator: Rugman and Verbeke (2004) classify true multinationals as those who have a true global reach and highlight how these few special firms are an important

link between the local economy and globalization. In other studies the performance of start-ups on international markets, i.e. their market scope, has been used to define Born Globals. Oviatt & McDougall (1994) distinguished newly established firms that are involved in few countries from those that are involved in many countries, with Born Globals characterizing those firms that from the beginning serve numerous international markets (G. A. Knight & Cavusgil, 1996). As such, we would expect Born Globals to outperform other types of internationally active start-ups when it comes to market scope.

Hence, from the existing literature about the behaviour of Born Globals discussed above and with inspiration from the entrepreneurship literature dealing with start-ups in general, we expect that a possible superior performance and hence larger socioeconomic impact of Born Globals will manifest in higher levels of turnover, employment and productivity. In particular, it should be noted that aggregated private-sector productivity is a crucial determinant of overall GDP growth. Moreover, firm-level productivity is a measure of value-added activity, which in turn is strongly correlated with profitability (Van Praag & Versloot, 2007). Note, that our included performance indicators thus reflect those from the seminal work of G. A. Knight and Cavusgil (2004). We hypothesize that:

Hypothesis 2. Born Globals compared to firms with other start-up histories have higher turnover, number of employees, number of export markets and productivity.

There are two established theoretical mechanisms that can lead to Hypothesis 2. Firstly, Born Globals are fast learners, they experientially learn through exporting, building trust and commitment that create stronger firms for developing businesses further (Johanson & Vahlne, 2009). Secondly, and not mutually excluding, internationalization in itself could be an activity only possible for the most productive or largest firms, i.e. selection is taking place (Wagner, 2007, 2012).

While Hypothesis 2 addresses the performance level of the firm (say absolute size), we now turn to growth performance. Particularly, in the dynamic environment of the economy the

growth performance of the entity (say the creation of new jobs) or the productivity improvements that a firm is able to implement are of interest. Enlarging the scope of a firm's markets may be translated into economies of scale and the possibility of further growth, which otherwise could have been curtailed by the size of the domestic market. As Born Globals is the type of start-ups with the most impressive exporting pattern, we would expect this to result in higher growth performance compared to firms with different start-up histories. This reasoning is in line with a survey of 59 Finnish start-ups which found that early initiation of internationalization was related to faster growth (Autio, Sapienza, & Almeida, 2000). Accordingly, our third hypothesis states that:

Hypothesis 3. Born Globals compared to firms with other start-up histories have higher growth rates of turnover, number of employees, export markets and productivity.

Both the firm characteristics in terms of levels (H2) and growth rates (H3) have a range of implications. However, it is not obvious that the differences or similarities identified in longitudinal studies are necessarily true throughout the lifetime of the studied firms (Cavusgil & Knight, 2015; Zander, et al., 2015). For example, an observed superior growth performance of Born Globals compared to other start-ups could be solely driven by stark performance differences in the first years of existence. Accordingly, to complete our space of investigation we hypothesize the following:

Hypothesis 4. The hypothesized differences in H2 and H3 between Born Globals and firms with other start-up histories are independent of firm age: this means that Born Globals maintain their special characteristics over time.

In particular H4 will help to assess if Born Globals, as a class of firms, indeed have a lasting impact on the surrounding economy that is different from other, less internationally active start-ups. We address this last hypothesis with our longitudinal study design as a strong method when studying start-ups (Cavusgil & Knight, 2015).

3. DATA AND METHOD

There have been two chief barriers for researchers attempting to tackle the questions posed by Hypotheses 1 to 4. First, a lack of suitable and sufficient data, and second, fundamental challenges in designing and monitoring proper control groups for comparison. In particular, a straightforward descriptive comparison of Born Globals to average firms in the economy or sector is problematic on two accounts. Firstly, Born Globals are by definition start-ups, thus any Born Global feature disclosed by data in comparison to the average firm might simply capture effects common to all start-ups. Second, Born Globals are by definition international. Thus again, the researcher would risk accounting the general effect of internationally active firms as a unique Born Global feature. The ability to define and test Born Globals against a range of control groups is in effect the key distinguishing contribution of our analysis. The underlying idea is by no means new. McDougall et al. (2003) developed a comparison between international new ventures and domestic new firms and found them to be significantly different. Their finding of persistent performance differences between domestic and internationally orientated firms is mirrored in an ample empirical literature based on longitudinal firm-level data sets (see Wagner, 2007; 2012 for surveys). As will be elaborated in Table 1 and Figure 1, we use two variables to categorize different types of start-up histories: export intensity (export revenue/total revenue) in a given year and age of a firm. Thus, minimum requirements for data are that it tracks firms from their inception over a prolonged period of time. Thus data is needed that records the age of a firm when it first internationalizes, as well as the volume of exports and total revenue on a yearly basis. Firm-level register data fits this bill.

To accurately test Hypotheses 1 to 4, we need a data set that contains newly established firms, their year of foundation, total and foreign sales as well as information on the various performance characteristics, such as sales, employment, productivity, and market reach over time. We construct such a data set by combining different firm registers available from Statistics Denmark. The first register (FIRMASTATS) contains annual firm-level information such as turnover, employment, value added, and industrial affiliation. The first year in which we observe activity of a firm in the data set gives us the year of foundation and defines firm age for

subsequent periods. Next, using a unique firm identifier, it is possible to link the firm data to the customs data register of manufacturing exports (UHDI).² This data set provides detailed information on each firm's exporting activities in each year (1994-2011) at the destination level, i.e. the scope of internationalization. The combined data set enables us to fully and reliably categorize the universe of all Danish manufacturing start-ups established in the period 1994 to 2008 according to the speed and extent of their internationalization. Moreover, all firms are tracked in the data until they cease to exist or until the end of our observation period in 2011.

In constructing our final sample we only evoke two data-cleaning rules. First, we eliminate observations which show inconsistent or wrongly coded figures, i.e. we omit firms with data entries of a negative total turnover, a foreign negative turnover, export revenues greater than total revenues, non-current assets or total assets that are negative, and value added and equity that are both negative. This removes approximately 4 % of the observations. Second, since we focus on the start-up history of firms, we want to eliminate spin-offs from the data. Arguably, spin-offs might face different conditions compared to start-ups. We separate spin-offs from proper new firm start-ups by first year employment size, such that we exclude the 1 % largest firms at inception.³

This combination of registers arrives at a data set allowing us to follow a total of 23,201 manufacturing start-ups founded between 1994 and 2008 from their year of inception until they cease to exist (or until the last observation in 2011), giving us 123,254 firm-year observations in total.

3.1 Definition of Born Globals

The central first step in our analysis is the identification of Born Globals. Table 1 summarizes a selection of different definitions of Born Globals used in previous studies and shows that the

² Firm-level service export data is not available. This implies that we confine our analysis to manufacturing firms.

³ This corresponds to a first-year employment size threshold between 50 and 70 full-time equivalent employees. The precise cut-off threshold cannot be displayed due to data confidentiality restrictions. Results are robust to higher and lower cut-offs.

field is not fully settled on a consensus yet. In this paper we follow previous research done in the Nordic countries and operationalize Born Globals as firms that within three years from inception export at least 25 % of their turnover (G. Knight, Madsen, & Servais, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvista, & Servais, 2007; Madsen, Rasmussen, & Servais, 2001; Nummela, Saarenketo, Jokela, & Loane, 2014). It is a working definition that ignores the destinations served, but rather captures the involvement of firms on international markets by means of sales volume abroad (extent) and the rapidity at which international activities are implemented (speed). Some researchers have argued that an export intensity of 25 % may be too low a cut-off for very small economies (Madsen, 2013; Rasmussen, Madsen, & Servais, 2012; Sleuwaegen & Onkelinx, 2014). Yet, the average export intensity of internationally active firms in our sample is only 22%. Hence, a 25% cut-off is fully sufficient to create a clear separation according to different types of start-up histories, and it evidently prevents firms with reactive sporadic export patterns from being included in the Born Global category.⁴

Table 1: Overview of previous definitions of Born Globals

Source	Speed	Extent	Scope	Coverage
Rennie (1993)	2	75	Multiple	Australia
Knight & Cavusgil (1996)	2	25	n.a.	USA
Madsen, Rasmussen & Servais (2001)	3	25	n.a.	Denmark
McDougall, Oviatt & Shrader (2003)	6	n.a.	n.a.	USA
Knight, Madsen, & Servais (2004)	3	25	n.a.	USA and Denmark
Chetty & Campbell-Hunt (2004)	2	80	Worldwide	New Zealand
Luostarinen and Gabrielsson (2006)	n.a.	51	n.a.	Finland
Kuivalainen, Sundqvista, & Servais (2007)	3	25	Measured as market distance	Finland
Loane, Bell, & McNaughton (2007)	6	25	n.a.	Australia, Canada, Ireland & New Zealand
Zhou, Wu, & Luo (2007)	3	20	Multiple	China
Kuivalainen, Saarenketo, & Puumalainen (2012)	3	25	5	Finland
Eurofound (Eurofound, 2012)	3,5	25	n.a.	EU
Sleuwaegen & Onkelinx (Sleuwaegen & Onkelinx, 2014)	5	n.a.	Minimum 5 countries in minimum 2 regions	Belgium
Sui & Baum (2014)	2	25	Exported to non-US market during first year of export activity	Canada
Nummela, Saarenketo, Jokela & Loane (Nummela, et al., 2014)	3	25	n.a.	Finland, Israel & Ireland

Notes: Speed: Maximum time before starting international activity, in years; Extent: Minimum share of foreign sales as a per cent of total sales; Scope: Minimum number of markets exported
Source: Adapted from Gabrielsson and Kirpalani ((Gabrielsson & Kirpalani, 2012) and Eurofound (Eurofound, 2012), supplemented with additional literature used in the current paper.

⁴ In our data, only one in five internationally active start-ups fulfills the Born Global criteria.

Some previous research has included the number of export destinations (scope) when defining Born Globals, see Table 1. Market scope has frequently been discussed in terms of how many markets it takes to define a firm as a true Born Global compared to, for instance, being Born Regional (Baum, Schwens, & Kabst, 2015; Johanson & Vahlne, 2009; Rugman, Verbeke, & Nguyen, 2011). This issue is, of course, mostly relevant when examining firms in countries with dominating trade partners (such as the Canadian-US trade relation) and is of little concern in the case of Denmark. Still, some authors have set up a threshold of five countries (Kuivalainen, et al., 2012; Sleuwaegen & Onkelinx, 2014) in at least two regions, where one should be outside the EU for European firms (Madsen, 2013; Sleuwaegen & Onkelinx, 2014). In the current paper, we do not employ scope as a defining parameter but rather treat it as an outcome variable of firm performance, i.e. checking whether Born Globals defined on their export intensity alone have a wider market reach.

3.2 Definition of Control Groups

A central contribution of our study in terms of research design lies in the fact that we take the distinction into different exporting patterns advocated by Cavusgil & Knight (2015) and Zander, et al. (2015) seriously. In particular, this entails development and application of proper control groups to which Born Globals can be compared. The way we define other firm types according to their start-up history is therefore of central importance for our analysis. To conclude properly on whether Born Globals are a special type of firm, we have to compare them to other firms that are similar in many respects but not in the salient characteristic of Born Globals. In line with our working definition, we employ as the relevant characteristics the speed and the extent to which firms become international players after inception. Therefore, the comparison groups are constructed based on these two central dimensions, see Figure 1.

Figure 1: Definition of firm type according to their speed and extent of exporting

As a first step, we split all firms according to the speed at which they first internationalized: (1) firms that start exporting during the first three years of existence, (2) those that start exporting after three years from foundation, and (3) those that do not export during our period of observation. The first group of fast internationalizing start-ups is further refined by looking at the extent of export activities over time, with Born Globals (BG) being firms that export at least 25% of their turnover within the first three years of existence. In contrast, the firms that also export within the first three years of existence but at a lower intensity are called Born Exporters (BE). Firms from the second group, for which exporting occurs later on, are labelled Late Exporters (LE). Finally, those that never export while observed in our data we label Stay Locals (SL). The distinct categories within the control group are essential for our analysis since they allow us to assess whether Born Globals perform better than other types of firms, i.e. firms with different start-up histories. In particular, such distinction takes into account the heterogeneity of firms constituting our control group. This turns out to be central. Consider the alternative approach, where the control group simply lumps all other firms in the economy or sector (i.e. long established as well as more recent start-ups). In such a scenario any Born Global effect observed in the data could simply be a start-up effect. Similarly, consider lumping our three categories Born Exporters, Late Exporters and Stay Locals into one single control group, now

any Born Global effect could simply be driven by a superior performance of internationally active firms compared to pure Stay Local firms. In fact, we expect Born Globals to be much more similar to Born Exporters than to Stay Locals and even Late Exporters. Thus, if one wants to dissect the Born Global phenomenon correctly, a detailed control design is essential.

3.3 Dependent Variables

We compare Born Globals to firms with different start-up histories on four performance dimensions: turnover, employment, export scope, and labour productivity (both in levels and growth). *Turnover_{it}* is measured as the logarithm of firm *i*'s value of sales in year *t*, *Employment_{it}* is measured as the logarithm of firm *i*'s full-time equivalent employment in year *t* (including the entrepreneur), *Export_scope_{it}* is measured as the number of destinations firm *i* is exporting to in year *t*, and *Labour_productivity_{it}* is measured as the logarithm of firm *i*'s value added per (full-time equivalent) employee in year *t*. The annual growth in employment is defined as the rate at which full-time equivalent employment has grown from year *t-1* to year *t*, i.e. *Employment_{it} - Employment_{it-1}*. The annual growth in turnover and productivity is defined in a similar fashion. Growth in export scope is defined as the absolute growth in number of export markets from year *t-1* to year *t*.

3.4 Method

In order to address Hypothesis 1, the frequency of Born Globals must be studied and compared to the three control groups across industries. We do this in two steps. First, we compute the sectorial concentration of each type of firm with the use of a Herfindal index defined as

$$H_k = \sum_{j=1}^J s_{jk}^2$$

where *s_{jk}* is the share of firm type *k* (e.g. BG, BE, LE or SL) active in industry *j* and *J* is the total number of sectors in our sample (*J*=23). A high value of *H_k* indicates a highly concentrated distribution of firm type *k* in only a few sectors. While comparing the Herfindal Index of the different firm types allows us to detect differences in terms of sectorial concentration, it does

not provide information on whether Born Globals concentrate in specific sectors that are different from the specializations in the control groups. Accordingly, we complete our analysis by conducting a Spearman rank correlation test, which informs us on whether the rankings of sectors by frequency for any pair of firm types covary. More technically, after having ranked the sectors for each of the four firm types (based on the frequency distribution of observations), we compute the difference in ranking for each type and sector pairs. This difference is then used to compute the Spearman correlation coefficient, ρ , in the following way:

$$\rho = 1 - (6 \sum d_i^2) / (n^3 - n)$$

where d_i is the difference between ranks of a sector for two groups of firms (say BG and BE) and n is the number of sectors in our sample (i.e. 23). We then test whether ρ is different from 0, using usual t-tests where the null-hypothesis refers to the case of perfectly correlated rankings across categories of interest ($\rho = 1$). Hence, rejecting the null-hypothesis would mean that the rankings of sectors across start-up types differ.

For Hypotheses 2 and 3 we need to measure performance differences across the four types of firms. They are tested using the linear regression model (pooled OLS):

$$y_{it} = a + \beta_1 BG_i + \beta_2 BE_i + \beta_3 LE_i + z + j + t + jt + e_{it}$$

where y_{it} represents the performance dimension y of firm i in year t . In our model, we exploit the heterogeneity of our control group by distinguishing between performance differences of Born Globals, Born Exporters and Late Exporters compared to Stay Locals. Thus, significant coefficients for β_1 , β_2 , and β_3 represent significant differences from Stay Locals. Similarly, we test for differences between β_1 and β_2 and β_1 and β_3 using Wald tests, i.e. passing the Wald test β_1 versus β_2 for a given performance category y tells us that Born Globals are in fact different from Born Exporters. Importantly, the model also includes firm-level control variables (z) such as firm age, to ensure that we only compare firms that are at the same level of development, and firm size, to account for the fact that firm size and productivity might be related and that larger firms are more likely to export. In both models we include industry (j) and time (t) fixed effects

to account for unobserved industry or time shocks that could lead to performance differences across firms as well as industry time trends (jt) to account for unobserved, time-variant industry-specific shocks. The inclusion of ample controls, fixed effects and time trends ensures that the differences identified by the statistical tests of the regression models can in fact be awarded to the type of firms (e.g. BG, BE, LE or SL) and are not due to some erroneous outside factors.

For Hypothesis 4 we test whether performance differences persist over time by estimating our model specification on sub-samples of firms of different age.

4. RESULTS

Tables 2, 3 and 4 depict the fundamental traits of our full data set. From Table 2 (right panel) it can be seen that approximately 1,200 to 2,000 new firms are established per year in the period 1994 to 2008. This results in 23,201 firms and 123,254 firm-year observations (left panel) in total, i.e. we observe the average firm for 5.31 years. Table 2 will be revisited in the discussion of findings in relation to Hypothesis 1.

Table 2. Distribution of observations and firms by firm type across years

	Distribution of observations, by firm type					Distribution of firms (flow measure)		
	BG	BE	LE	SL	Total	Total # of new firms established in year t	# of BG established in year t	Share of BG out of all firms established in year t
1994	62	94	67	1,564	1,787	1,951	68	0.03
1995	111	170	143	2,766	3,190	1,722	50	0.03
1996	175	245	209	3,743	4,372	1,696	66	0.04
1997	241	351	293	4,609	5,494	1,753	75	0.04
1998	295	450	359	5,302	6,406	1,635	54	0.03
1999	342	531	424	5,809	7,106	1,575	69	0.04
2000	368	693	507	4,665	6,233	1,921	74	0.04
2001	403	756	578	4,785	6,522	1,191	68	0.06
2002	449	802	635	5,010	6,896	1,213	77	0.06
2003	462	827	703	5,279	7,271	1,277	58	0.05
2004	472	883	743	5,658	7,756	1,301	53	0.04
2005	474	909	773	6,164	8,320	1,362	39	0.03
2006	490	982	805	6,566	8,843	1,454	45	0.03
2007	499	1,043	816	7,091	9,449	1,511	42	0.03
2008	514	1,110	824	7,611	10,059	1,639	40	0.02
2009	486	1,025	788	6,260	8,559	.	.	.
2010	455	946	750	5,641	7,792	.	.	.
2011	430	884	718	5,167	7,199	.	.	.
Total	6,728	12,701	10,135	93,690	123,254	23,201	878	
Pct. of all observations	0.05	0.10	0.08	0.76		Overall share of BG	0.04	

Note: BG: Born Globals; BE: Born Exporters; LE: Late Exporters; SL: Stay Locals. Observations refer to firm-year observations.

Table 3. Summary statistics

Variables	Whole sample			BG		BE		LE		SL	
	# of observations	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Levels											
Turnover (log)	123,251	14.02	2.04	16.22	1.64	15.58	1.55	15.28	1.61	13.52	1.89
Employment	123,254	6.06	28.94	23.46	63.17	13.26	36.9	10.36	15.55	3.37	23.8
Labour productivity (log)	121,714	12.11	1.29	12.86	0.88	12.71	0.85	12.64	0.88	11.92	1.34
# export destinations	18,090	5.76	8.64	11.23	11.96	3.24	4.36	2.3	3.3		
Yearly growth											
Turnover (rate)	96,787	1.92	138.20	1.42	42.87	3.68	301.21	1.1	18.02	1.79	109.34
Employment (rate)	96,787	0.16	5.53	0.38	5.26	0.4	15.66	0.21	2.04	0.1	1.29
Labour productivity (rate)	95,971	0.72	20.59	0.38	5.47	0.85	56.83	0.43	8.51	0.76	8.4
# export destinations	13,329	0.39	3.09	0.64	4.11	0.26	2.33	0.19	2.11		

Note: BG: Born Globals; BE: Born Exporters; LE: Late Exporters; SL: Stay Locals. Firms established between 1994 and 2008 only.

Table 3 shows that in our sample the average start-up has six full-time equivalent employees (including the founder). Moreover, Table 3 gives a flavour of the differences between Born Globals and other firms with different start-up histories. The data suggests that the former are larger (both in terms of sales and employment), slightly more productive, and are present on more export markets. In contrast, differences in yearly growth do not show a clear ranking of Born Globals and other firm types (BE, LE, SL). Our empirical analysis including controls and fixed effects will enable us to disentangle and conclude on the statistical significance of such differences – or the absence hereof – across the four groups of firms.

Finally, Table 4 reports export scope (market reach) for the three firm types that do export (BG, BE, LE). The table discloses a wider market reach on the geographic dimension for the BG category.

Table 4. Market reach

Exporting to:	Share of firms, within types		
	BG	BE	LE
... BRICS	0.48	0.23	0.13
... outside EU15	0.74	0.50	0.23
... outside EU25	0.73	0.50	0.23
... developed countries	0.76	0.50	0.23
... developing countries	0.56	0.25	0.08
... least developed countries	0.20	0.04	0.01

Note: BG: Born Globals; BE: Born Exporters; LE: Late Exporters; SL: Stay Locals. All BE and LE shares are significantly different from BG shares, at the 1% level.

4.1 Hypothesis 1

We turn first to Hypothesis 1. Table 5 presents the distribution of observations (i.e. firm-year observations) in our sample across sectors and start-up types. The first five columns show that the majority of firms within our sample are found in Fabricated metal products, Publishing and printing, Machinery and equipment, as well as Food products and beverages and to some extent Furniture, i.e. sectors that – with the exception of Printing and publishing – also feature extensively in aggregated Danish foreign trade figures. Eyeballing the data, the distribution of observations for each firm type across sectors appears fairly similar. We do not observe any industries that attract or foster a higher concentration of Born Globals compared to the three control groups. This is also the case when we only look at high tech industries such as: Office machinery and computers; Electrical machinery and apparatus; and Radio, television and communication equipment.

The Herfindal index calculated for each firm type reveals two interesting points: (1) there is no difference between the level of concentration in particular industries for the different firm types, and (2) the low value of the Herfindal index per se shows that concentration is limited, i.e. the formation of new firms spreads fairly evenly across manufacturing sectors, independent of firm type. However, while we can conclude that the level of concentration across sectors does not

differ across the four groups of firms, the Herfindal index does not reveal if different firm types dominate in different sectors. Hence we turn to the Spearman rank correlation test. The results of this test depicted in the bottom of Table 5 confirm what we expected from looking at the absolute distribution of observations across sectors, namely that we cannot reject a perfect correlation between the rankings of the different sectors of Born Globals and the other three types (BE, LE, SL).

Table 5. Sectorial distribution of observations, across firm types

Manufacturing of:	Distribution of observations by firm type and sector					Ranking of sectors across firm types			
	BG	BE	LE	SL	Total	BG	BE	LE	SL
Food products and beverages	508	708	559	11.149	12.924	5	7	6	3
Tobacco products ^a	n/d					22	23	23	23
Textiles	253	570	286	2.112	3.221	8	8	11	11
Wearing apparel; dressing and dyeing of fur	199	253	136	2.897	3.485	10	14	15	9
Tanning and dressing of leather ^a	n/d					20	20	22	21
Wood and products of wood and cork, except furniture	140	505	456	3.077	4.178	14	9	7	8
Pulp, paper and paper products	74	232	68	451	825	19	15	18	18
Publishing, printing and reproduction of recorded media	180	1.003	1.027	17.233	19.443	12	4	3	2
Coke, refined petroleum products and nuclear fuel ^a	n/d					23	22	21	22
Chemicals and chemical products	182	457	210	870	1.719	11	10	12	15
Rubber and plastic products	465	804	453	1.744	3.466	6	6	8	13
Other non-metallic mineral products	247	412	332	3.104	4.095	9	11	10	7
Basic metals	80	80	89	1.161	1.410	17	19	17	14
Fabricated metal products, except machinery and equipment	610	1.997	2.185	22.857	27.649	3	2	1	1
Machinery and equipment n.e.c.	1.626	2.226	1.726	8.042	13.620	1	1	2	5
Office machinery and computers ^a	n/d					15	18	20	17
Electrical machinery and apparatus n.e.c.	330	860	802	3.534	5.526	7	5	5	6
Radio, television and communication equipment and apparatus	145	211	119	690	1.165	13	16	16	16
Medical, precision and optical instruments, watches and clocks	561	386	406	2.692	4.045	4	12	9	10
Motor vehicles, trailers and semi-trailers	89	121	141	384	735	16	17	14	19
Other transport equipment	80	274	185	1.981	2.520	18	13	13	12
Furniture; manufacturing n.e.c	806	1.424	890	8.694	11.814	2	3	4	4
Recycling ^a	n/d					21	21	19	20
Tobacco products; Tanning and dressing of leather; Coke, refined petroleum products and nuclear fuel; Office machinery and equipment; Recycling	153	178	65	1.018	1.414				
Total	6728	12.701	10.135	93.690	123.254				
					HH	0.108	0.094	0.112	0.131
					Rank test		0.88	0.86	0.83

Note: BG: Born Globals; BE: Born-Exporters; LE: Late Exporters; SL: Stay Locals. ^a The actual number of observations for these sectors cannot be displayed (n/d) due to data confidentiality. Still these observations are included in all calculations that follow. HH is the Herfindal index. Rank test displays the bilateral Spearman correlation coefficients – we cannot reject that they are different from 1.

Therefore, in the context of manufacturing start-up firms, Born Globals are not confined to certain sub-sectors, i.e. they are no more specialists than firms with other start-up histories. Thus H1 is rejected. In fact, our findings reveal that while some sectors appear to be more conducive to the emergence and entry of new firms, these sectors appear to be the same sectors for Born Globals as for the three control groups. It is noteworthy that our large-scale, register data-driven results are in fact in line with the very first paper defining Born Globals, which also concluded that Born Globals could be found in all industries (Rennie, 1993).

Regarding the frequency of Born Globals over time, as described in Table 2, our data discloses that there is no systematic increase in the share of Born Globals among all start-ups in Denmark. The share of Born Globals among start-ups in our sample amounts to 4% of firms and 5% of observations – with little variation over the years – while the majority of firms (76% of our observations) never export (Stay Locals). Previous studies have documented shares of Born Globals among young firms, ranging from 2% of all firms to up to 50% of all young firms in Denmark (Eurofound, 2012). To some extent these differences in frequency illustrate the fact that previous assessments have been based on one-time surveys, which necessarily creates sampling bias and/or survival bias. The strength of using register data – as in the present paper – is exactly that we observe the entire population; this enables us to circumvent these types of biases and to follow firms from their inception over time. Our sample covers a decisive time period that has featured a strong reduction of internationalization costs. Yet, the share of Born Globals among all start-ups sits at a level of 2-4%, possibly with the exemption of the years 2001 and 2002, which coincide with the dotcom boom. This is even more surprising, as the Danish economy has increased its total exports from below 40% of GDP to above 50% of GDP in the time period we cover. To sum up, on grounds of our data, Hypothesis 1 must be rejected.

4.2 Hypothesis 2 - Levels

The second set of hypotheses that we test relates to the perception that Born Globals are special, i.e. have a superior firm performance and thus contribute importantly to the economic development of the societies in which they originate. Table 6 presents the first set of results from the econometric regression model introduced earlier in Section 3.4. The common belief and assumptions of the literature captured in Hypothesis 2 are to a large extent confirmed by the data. Recall that the base category in the regression is Stay Local start-ups. Thus, significant coefficients on BG, BE and LE imply differences from Stay Locals. Moreover, we show the results of Wald tests for mean comparison between Born Globals and Born Exporters as well as Late Exporters (bold font indicating statistically significant difference).

Table 6. Performance of Born Globals compared to other firm types (in levels)

Dependent variable	Firm size		Export scope		Productivity	
	Turnover (ln)	Employment (ln)	# of export destinations		Value added per worker (ln)	
	(i)	(ii)	(iii)		(iv)	
BG	2.551*** (0.021)	1.632*** (0.017)	8.004*** (0.152)		0.274*** (0.015)	
BE	1.879*** (0.015)	1.173*** (0.012)	1.378*** (0.101)		0.265*** (0.010)	
LE	1.513*** (0.016)	0.942*** (0.012)			0.236*** (0.010)	
Firm age	0.060*** (0.001)	0.038*** (0.001)	0.199*** (0.017)		0.027*** (0.001)	
Employment			2.537*** (0.059)		0.343*** (0.003)	
Year fixed effects	yes	yes	yes		yes	
Industry fixed effects	yes	yes	yes		yes	
Industry-time trends	yes	yes	yes		yes	
N	123,251	123,254	18,090		121,714	
R2	0.408	0.299	0.401		0.305	

Notes: All regressions are estimated using pooled linear regression models. Robust standard errors in parentheses. BG: Born Globals; BE: Born Exporters; LE: Late Exporters. Base category: Stay Locals, except in column (iv) where base category is Late Exporters. ***, **, and * denote 10, 5, and 1% significance levels, respectively. Bold numbers denote that the mean comparison with BG is statistically significant with at least 10% significance level (Wald test).

We find that Born Globals are larger in terms of turnover and employment levels as well as number of export markets compared to all other types of firms (columns (i) to (iii)). When it comes to productivity, Born Globals have an advantage compared to Stay Locals and Late Exporters but not compared to Born Exporters. The Wald test in column (iv) states that the productivity level of Born Globals is not different from that of Born Exporters, i.e. firms that export early in life but at a lower intensity. However, turning to the export scope, Born Globals are dramatically different from the other internationally active firms (BE & LE), see column

(iii) – where Late Exporters are the base category. Note that this effect kicks in even though we purposefully did not use scope as a defining characteristic of Born Globals. These findings confirm what an eyeballing of Table 4 already disclosed. Not only are Born Globals present on more geographical markets, but they also have a broader market reach with roughly half of them exporting to BRICS countries and developing countries, and the major part of Born Globals export to markets outside the EU region, which corresponds to at least double as much compared to other internationalized start-ups (BE & LE). Note that in this respect the Born Globals in our data set (based on the population of all start-ups that we follow over time) are in line with earlier studies (Kuivalainen, et al., 2012; Madsen, 2013; Sleuwaegen & Onkelinx, 2014). To sum up: Results in Table 6 confirm Hypothesis 2.

4.3 Hypothesis 3 – Performance Differences in Growth Rates

Turning to Table 7 (Hypothesis 3), the picture becomes more mixed. In Table 7 we find that differences between Born Globals and the control groups in terms of growth over the years are ambivalent. We do not find full support for H3, in which, based on the limited evidence found in the literature, Born Globals were expected to contribute via higher growth rates of turnover, export markets and labour productivity compared to firms with other start-up histories. What we do find is that the four types of firms are indistinguishable from each other in terms of their growth in turnover and productivity. Still, in terms of growth in number of markets, Born Globals outperform the other two types of internationally active firms (BE & LE).

Most interesting are the results on job creation, one of the direct links to socioeconomic impact. Table 7 shows that all three internationally active firm types (BG, BE, LE) differ from the Stay Locals in terms of generating higher employment growth (job creation). However, Born Globals are indistinguishable from Born Exporters (Wald test). Thus, our results show that it is not the fact of having a large share of sales coming from exports that matters for job creation but rather being fast at internationalizing. Thus to sum up: Hypothesis 3 is partially rejected and partially supported.

Table 7. Performance of BG compared to other firm types (growth)

	Firm size				Export scope		Productivity	
Dependent variables	Turnover (yearly growth rate) (i)		Employment (yearly growth rate) (ii)		Number of export destinations (yearly growth) (iii)		Value added per worker (yearly growth rate) (iv)	
BG	0.382	(0.907)	0.358***	(0.073)	0.137*	(0.076)	0.452	(0.338)
BE	2.759	(3.415)	0.394**	(0.174)	-0.148**	(0.063)	0.749	(0.807)
LE	0.263	(0.656)	0.207***	(0.033)			0.279	(0.247)
Firm age _{t-1}	-0.115	(0.085)	-0.042***	(0.003)	-0.077***	(0.010)	-0.090***	(0.007)
Employment _{t-1}					0.147***	(0.030)	-0.404***	(0.144)
Year fixed effects	yes		yes		yes		yes	
Industry fixed effects	yes		yes		yes		yes	
Industry-time trends	yes		yes		yes		yes	
N	96.787		96.787		13.329		95.971	
R2	0.004		0.008		0.053		0.007	

Notes: All regressions are estimated using pooled linear regression models. Robust standard errors in parentheses. BG: Born Globals; BE: Born Exporters; LE: Late Exporters. Base category: Stay Locals except in column (iii) where base category is Late Exporters. ***, **, and * denote 10, 5, and 1% significance level, respectively. Bold numbers denote that the mean comparison with BG is statistically significant with at least 10% cent significance level (Wald test).

4.4 Hypothesis 4 – Differences Later in Life

One reason for the absence of differences in the dimensions of turnover and productivity growth may come from the fact that different types of firms pursue opposing growth path. For instance, one could imagine that Born Globals experience a sharp increase in employment and turnover in their first years of existence because they need to juggle a larger scope of activities and different markets. In contrast, other ventures that are slower at internationalizing or that remain on the domestic market could exhibit a more gradual growth path. This is tested by looking at the evolution of the different types of firms in relation to the chosen socioeconomic outcomes at different ages, i.e. Hypothesis 4. Table 8 illustrates that Born Globals, but also other types of internationally active firms (BE & LE), grow more in terms of employment in the first year than Stay Locals.

Table 8. Performance of BG compared to other firm types (growth), over years of existence

	(i) YEAR 2	(ii) YEAR 3	(iii) YEAR 4	(iv) YEAR 5	(v) YEAR 10
Panel A	Growth in turnover				
BG	7.981* (4.732)	-0.613 (0.389)	0.059 (0.142)	-2.240 (1.584)	-0.037 (0.037)
BE	24.188 (22.995)	-0.347 (0.222)	-0.124** (0.057)	-2.474 (1.746)	0.005 (0.032)
LE	4.580* (2.384)	-0.269 (0.595)	0.714 (0.643)	-1.581 (1.354)	0.053 (0.043)
N	17.796	14.919	12.679	10.138	3.927
R2	0.009	0.103	0.014	0.016	0.071
Panel B	Growth in employment				
BG	2.455*** (0.510)	0.027 (0.020)	-0.026* (0.015)	-0.025 (0.016)	-0.033** (0.016)
BE	2.610** (1.161)	0.044** (0.019)	-0.006 (0.010)	0.049 (0.034)	-0.014 (0.016)
LE	0.842*** (0.163)	0.183*** (0.048)	0.141*** (0.033)	0.216 (0.147)	0.016 (0.015)
N	17.796	14.919	12.679	10.138	3.927
R2	0.021	0.032	0.037	0.016	0.058
Panel C	Growth in labour productivity				
BG	2.039 (1.513)	-0.368 (0.231)	0.082 (0.314)	-0.028 (0.143)	-0.029 (0.070)
BE	5.035 (5.117)	-0.150 (0.105)	-0.068 (0.291)	0.086 (0.149)	0.149 (0.129)
LE	1.356 (0.934)	-0.147 (0.160)	-0.817 (0.818)	0.064 (0.121)	0.145* (0.086)
Empl oyment nt _{t-1}	-2.076** (0.862)	-0.110** (0.050)	0.014 (0.138)	-0.088*** (0.027)	-0.075*** (0.025)
N	17.627	14.840	12.602	10.060	3.884
R2	0.013	0.178	0.026	0.020	0.109
Panel D	Growth in number of export markets				
BG	1.847*** (0.273)	0.645*** (0.216)	-0.247 (0.163)	-0.174 (0.254)	0.208 (0.310)
BE				0.061 (0.194)	0.100 (0.217)
Empl oyment nt _{t-1}	0.518*** (0.131)	0.447** (0.174)	0.067 (0.071)	0.014 (0.090)	0.071 (0.120)
N	1.072	1.497	1.561	1.421	785
R2	0.357	0.193	0.236	0.188	0.169

Note: BG: Born Globals; BE: Born Exporters; LE: Late Exporters; SL: Stay Locals. ***, **, and * denote 10, 5, and 1% significance levels, respectively. Bold numbers denote that the mean comparison with BG is statistically significant with at least 10% significance level (Wald test). Reference category: start-ups that never internationalize (Stay Locals) except in Panel D where Born Exporters are the reference category in columns (i), (ii), and (iii), and Late Exporters are the reference category in columns (iv) and (v)

Born Globals and Born Exporters do, according to our results, experience a similar rapid growth in employment in their first year while Late Exporters experience a relatively smaller growth, though still larger than Stay Locals. Interestingly, this trend reverses in later years where Born Globals experience a weaker growth than Stay Locals (Years 4 and 10) and Late Exporters (Year 5). When it comes to growth in turnover and labour productivity, Born Globals do not in general display a different growth path than other firms. In other words, the absence of average

growth differences for Born Globals found in Table 7 is not driven by different types of growth patterns over the firms' lifetime.

An underlying explanation for the results provided in Tables 6 and 7 is of course that Born Globals start "big". Results in Table 9 confirm this view by showing that Born Globals have more sales and employ more people from day one.

Table 9. Performance of BG compared to other firm types (levels), over years of existence

	(i) ESTABLISHMENT YEAR	(ii) YEAR 2	(iii) YEAR 3	(iv) YEAR 4	(v) YEAR 5	(vi) YEAR 10
Panel A	Turnover (ln)					
BG	2.775** (0.0 * 70)	2.740 (0.0 *** 63)	2.583 (0.0 *** 66)	2.551 (0.0 *** 65)	2.441 (0.0 *** 66)	2.380*** (0.096)
BE	2.164** (0.0 * 46)	2.035 (0.0 *** 43)	1.947 (0.0 *** 43)	1.840 (0.0 *** 46)	1.771 (0.0 *** 48)	1.692*** (0.075)
LE	1.471** (0.0 * 61)	1.557 (0.0 *** 52)	1.579 (0.0 *** 49)	1.543 (0.0 *** 48)	1.490 (0.0 *** 50)	1.423*** (0.067)
N	22.348	18.544	15.552	13.198	10.609	4.097
R2	0.332	0.384	0.376	0.374	0.368	0.365
Panel B	Employment (ln)					
BG	1.264** (0.0 * 48)	1.599 (0.0 *** 49)	1.571 (0.0 *** 51)	1.579 (0.0 *** 54)	1.610 (0.0 *** 56)	1.821*** (0.082)
BE	0.984** (0.0 * 30)	1.171 (0.0 *** 32)	1.159 (0.0 *** 33)	1.156 (0.0 *** 35)	1.160 (0.0 *** 38)	1.273*** (0.062)
LE	0.619** (0.0 * 34)	0.819 (0.0 *** 36)	0.889 (0.0 *** 37)	0.916 (0.0 *** 38)	0.937 (0.0 *** 40)	1.082*** (0.056)
N	22.350	18.545	15.552	13.198	10.609	4.097
R2	0.217	0.278	0.280	0.282	0.293	0.329
Panel C	Labour productivity (ln)					
BG	0.686** (0.0 * 56)	0.439 (0.0 *** 46)	0.360 (0.0 *** 46)	0.371 (0.0 *** 45)	0.257 (0.0 *** 43)	0.065 (0.049)
BE	0.598** (0.0 * 36)	0.381 (0.0 *** 31)	0.342 (0.0 *** 30)	0.249 (0.0 *** 31)	0.230 (0.0 *** 30)	0.082* (0.044)
LE	0.450** (0.0 * 43)	0.415 (0.0 *** 36)	0.378 (0.0 *** 33)	0.322 (0.0 *** 32)	0.228 (0.0 *** 32)	0.118*** (0.039)
Employ ment	0.606** (0.0 * 10)	0.388 (0.0 *** 09)	0.348 (0.0 *** 09)	0.312 (0.0 *** 09)	0.284 (0.0 *** 09)	0.230*** (0.013)
N	22.072	18.335	15.365	13.046	10.468	4.039
R2	0.301	0.294	0.279	0.269	0.250	0.228
Panel D	Number of export markets					
BG	3.786** (0.3 * 04)	5.213 (0.3 *** 26)	5.844 (0.3 *** 50)	6.678 (0.4 *** 52)	6.985 (0.4 *** 50)	10.256*** (0.818)
BE				0.320 (0.3 *** 15)	1.127 (0.2 *** 83)	1.143** (0.504)
Employ ment	1.759** (0.1 * 57)	2.103 (0.1 *** 73)	2.247 (0.1 *** 92)	2.442 (0.2 *** 06)	2.179 (0.1 *** 60)	3.137*** (0.321)
N	1.332	1.879	1.998	1.948	1.752	937
R2	0.404	0.407	0.431	0.438	0.482	0.528

Note: BG: Born Globals; BE: Born Exporters; LE: Late Exporters; SL: Stay Locals. ***, **, and * denote 10, 5, and 1% significance levels, respectively. Bold numbers denote that the mean comparison with BG is statistically significant with at least 10% significance level (Wald test). Reference category: start-ups that never internationalize (Stay Locals) except in Panel D where Born Exporters are the reference category in columns (i), (ii), and (iii), and Late Exporters are the reference category in columns (iv), (v), and (vi).

This strategy of starting big may sometimes be a necessity. In order to sell their products to many countries, they need to start out with a large workforce. But because they reach a rather large scope and intensity already at an early stage, they do not tend to grow substantially thereafter. This being said, it is important to stress that all firms in our sample are start-ups, which (compared to older or incumbents firms) normally is understood as firms that “engender relatively much employment creation, productivity growth and produce and commercialize high-quality innovations” (Van Praag & Versloot, 2007, p. 351). To sum up: Tables 8 and 9 partially confirm H4.

Overall, these results, which are obtained by comparing Born Globals to proper control groups, lend full support to Hypothesis 2 and partial support to Hypothesis 3. Thus, Born Globals are indeed special when it comes to job creation and export scope (both in levels and growth) and to some extent productivity and turnover (in levels only, moreover no statistical significance to productivity levels of Born Exporters). Moreover, differences in levels, presented in Table 9, are persistent over firm age and in general support the findings of Table 6. As discussed above, the absence of significant differences in growth persists throughout the evolution of the different firm types, with the exception of employment growth. In that respect, Born Globals experience a larger growth in early years compared to other firms but thereafter the growth difference vanishes and even becomes smaller for Born Globals in later years. This leads to a partial confirmation of Hypothesis 4.

5. DISCUSSION

In sum, the above findings bring forward previously unnoticed nuances to the existing literature. Our research design allows us to assert that Born Globals really are special in terms of some – but not all – central performance characteristics. And consequently, also have a differentiated socioeconomic impact, such as job creation (e.g. Almor, 2011; Eurofound, 2012, 2016). The research design, hypotheses and data that we rely on allow us to monitor a number of key firm performance characteristics. For example, turnover, productivity, and employment, and – given the time dimension of our data - also growth in these variables. While it is the primary objective

of our research to assess and compare firm performance and possibly its development over time, several of these variables constitute (once aggregated) central drivers of socioeconomic impact. Most obvious is job creation, which is the sum of employment growth among firms. Similar for firm productivity; whereby private-sector productivity is the single most important driver of aggregated growth in the economy, i.e. GDP growth and real wage developments.

The most important results, which stem from our comparison of Born-Global firms with three carefully designed control groups - Start-ups with less intense (Born Exporters), less rapid (Late Exporters) or no internationalization (Stay Local) - are as follows:

Born Globals are found in all industries and their frequency is indistinguishable from that of other start-ups. Moreover, the frequency of Born Globals has not changed much over time, despite rapidly reduced internationalisation costs. Born Globals exhibit superior performance in terms of turnover levels, employment levels and market reach (number of export destinations) compared to all other start-ups. On the last point it is noteworthy that about half of all the Born Globals in our data export to BRICS countries and developing countries, and the major part of Born Globals export to markets outside the EU region.

Yet, in several dimensions, Born Globals are not that different from some of or all the other groups of start-ups. For example, on the central performance characteristic of productivity they are indistinguishable from Born Exporters. Similarly, when looking at how our 4 classes of start-ups evolve over time, that is in terms of growth rates, differences often disappear. Compared to other internationally active start-ups Born Globals do not exhibit significantly higher growth in terms of turnover and productivity, two dimensions that carry important socioeconomic impact.

These results constitute important contributions and implications, not least for future theoretical development and policy purposes. Firstly, our paper has illustrated the workability of separating start-ups into meaningful control groups and the Born Global category and monitoring these firms over a prolonged period of time based on large-scale longitudinal register data and

available econometric tests. As such, these methodologies and the categorisation we develop should be readily applicable in comparable data sets from other countries and time periods.

Second, the inclusion of other exporting start-ups allowed us to create a comparable basis for understanding Born Globals. Our novel identification of control groups allowed us also to conclude on the medium and long-run performance of Born Globals, which will open the door for theoretical refinements trying to explain why these start-ups evolve the way they do. Third, in order to distinguish Born Globals from firms with other start-up histories, we confirm an important hierarchy of the classifying categories (internationalisation, speed, extent): To have exporting activities is the most important category, then comes how fast these activities occur after the firm is born, and the third level is the export share.

To illustrate the relevance of this distinction consider the following: Our empirical results show that Born Globals contribute to job creation to a larger extent in their first years of existence, i.e. at foundation. Later in life, this difference vanishes somewhat. In general, we find that job creation stems from the speed of internationalization more than from the extent of internationalization. Born Globals are indistinguishable from Born Exporters, which means that the fact of being fast to export matters more for the socioeconomic impact than having a large export share.

Fourth, there are important policy implications from the results presented in Section 4. Specifically, by showing how Born Globals compare to firms with alternative start-up histories in the longer run, this paper provides insights into the questions as to whether helping or encouraging firms to internationalize early and intensively is in the best interest of an economy or not (i.e. the design of export promotion programs). In some sense – when we study growth performance – our findings reveal that what the special thing about Born Globals is their internationalization – a characteristic that they share with Late Exporters and swift but low-intensity Born Exporters. In fact, Born Exporters and Born Globals arrive at comparable performances when it comes to socioeconomic growth contributions. Accordingly, if policymakers aim at such growth effects, policies should focus on promotion of international

trade for start-ups (and worry less about the intensity of the international engagement). Helping firms to develop their start-ups' business model with a global perspective – by the results of this study – would for example contribute to domestic job creation. Finally, by the same token, a central managerial implication emerges in relation to the importance of thinking global when founding the firm. Our results show that a global outlook – maybe not surprisingly – comes along with greater turnover. Thus, a global scale means – at least in the context of a small open economy such as Denmark - big-scale thinking.

Several avenues are interesting for future research. First and foremost, more work on the growth path of Born Globals compared to other start-ups (that is beyond the start-up phase) must be carried out. Case studies may be an efficient methodological approach to address this. In addition, a focus on firms with other types of international activities, say Foreign Direct Investment would complement our analysis as it would enable us to understand whether the limited growth of Born Globals compared to other firm types identified here, is a result of growth taking place outside their home country. Moreover, it would be natural to extend the analysis to non-manufacturing start-ups once such data becomes available, an exercise that could depict systematic differences between services and manufacturing. Finally, it would be relevant via register-based data to research the emergence of these firms. In particular, by merging data with employee information and the career history of the founder. We suspect that such research would contribute greatly to the debate surrounding the creation of the firms and thereby facilitate a cross-fertilization between international business and entrepreneurship research, where the focus should be on the individual entrepreneurs and not on firm performance.

6. CONCLUSION

In order to understand the true nature of Born Globals, we examine their firm performance and consequently in turn their impact on society. We ask if they really are different from other start-ups. The answer we find is that they are different in many but not all aspects. Thus, there is fire behind the smoke.

This paper develops a novel research design based on large-scale register data and compares Born Globals with three carefully designed control groups: Start-ups with less intense (Born Exporters), less rapid (Late Exporters) or no internationalization (Stay Local). We compare the resulting four classes of firms on a range of performance characteristics. The data we use to test for statistical differences and similarities is a unique longitudinal firm data set (register data), covering more than 14 years of data on the universe of all manufacturing start-ups in Denmark.

We find that Born Globals are on many, but not all, dimensions different from other start-ups. Born Globals are found in all industries and are not confined to certain (say high tech) sectors. In fact, their occurrence by sector is indistinguishable from that of other start-ups. Moreover, the frequency of Born Globals has not changed over time, possibly with a mild exception around the years of the dot-com peak. Turning to firm performance, Born Globals exhibit superior performance on a number of dimensions, i.e. they are special. Our findings show that Born Globals perform better than other types of firms on key indicators such as turnover levels, employment and number of export destinations. However, on the central performance dimension of productivity they are indistinguishable from Born Exporters. Importantly, we succeed in showing that Born Globals display significantly wider geographic reach.

Finally, when looking at how the 4 classes of start-ups evolve over time, the differences are not nearly as pronounced. We show that Born Globals compared to other international active start-ups do not exhibit significantly higher growth in terms of turnover or productivity, two dimensions that carry a large socioeconomic impact. Nevertheless, they appear to contribute to job creation to a larger extent in their first years of existence.

We acknowledge financial support from the Tuborg Foundation.

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