CHAPTER 3
Small Business Entry Rates, Demography, and Productivity Performance in Selected Developed Countries

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Introduction

Several perspectives motivate this volume of essays. One is that entrepreneurial activity is vital to the economic well-being of a nation. A second is that demography is an important determinant of entrepreneurial activity. A third is that entrepreneurial activity has been declining, and might continue to decline, in part because of recent and prospective demographic developments, and in the absence of policy initiatives that can effectively counteract demographic influences on entrepreneurial activity.

1 The authors thank Sasha Parvani for her thorough data collection and research assistance and for her comments on earlier drafts of this paper.

This chapter provides some statistical background relevant to these perspectives. In particular, it provides some data for several developed countries indirectly bearing upon changes in entrepreneurial activity in recent years. It should be noted that available data do not allow us to construct a time series that directly measures entrepreneurial activity. Rather, our data focuses on the entry and growth of small firms over time in several OECD countries.

The relevant literature draws distinctions between entrepreneurship and small businesses, on the one hand, and between start-up businesses and small businesses, on the other. It is beyond the scope of this chapter to identify and assess the various definitions of entrepreneurship that are found in the literature. We merely note that most definitions view entrepreneurship as a process whereby individuals discover, evaluate, and exploit opportunities to create something new. In the process, they assume risks and earn rewards.[2] Small business ventures are often the outcome of entrepreneurial activity, although not all small firms are "entrepreneurial" in the sense that many are not established and do not grow based primarily upon innovation. Moreover, many ventures are started by entrepreneurs, but fail.[3] In short, identifying trends in the creation and growth of small business ventures is, at best, an approximation to measuring trends in entrepreneurial activity.

In defense of our pragmatic measurement approach, it is generally the case that successful entrepreneurial activity is associated with the creation and growth of small firms. Hence, a slowdown in the formation and growth of small businesses is also likely to reflect a slowdown in entrepreneurial

2 See, for example, Amit, Glosten, and Muller (1993). For a comprehensive discussion of measures of entrepreneurship, see Godin, Clemens, and Veldhuis (2008).

3 The OECD (1996) notes that less than one-half of start-ups survive for more than five years and only a fraction develop into high-growth firms that make important contributions to job creation. Furthermore, it claims that between 30 and 60 percent can be characterized as innovative.

activity.[4] Furthermore, small and medium-sized enterprises contribute disproportionately to innovation (Iammarino and McCann, 2006) and, thereby, to improvements in productivity and standards of living. They also make important contributions to job creation.[5] As Gourio, Messner and Siemer put it: "New businesses contribute to growth by increasing competition, by innovating and by capturing market share from less productive incumbents" (2016: 214). As such, identifying trends in small business creation and growth rates provides important and direct information about a nation's economic health, as well as indirect information about entrepreneurial activity that ultimately underlies innovation and the growth of new markets.

Our primary goal in this chapter, therefore, is to present evidence showing changes in the prominence of small firms over time for a number of developed countries including Canada. In doing so, we employ several measures of changes in the participation of small firms in developed economies. We find that birth rates for small firms have decreased in recent years for a sample of developed countries for which data are available. We also find that the relative economic importance of small (and medium-sized) firms has declined over a similar period, while the economic importance of relatively large firms has increased. We take this as evidence that entrepreneurial activity has also declined in recent years.

As noted above, changing demography has been implicated in recent and prospective declines in entrepreneurial activity, most notably by Liang, Wang, and Lazear (2014). Their basic argument is that an aging population suppresses entrepreneurial activity primarily because older workers occupy key positions in established organizations, thereby blocking younger workers from acquiring business skills. Also, the energy and creativity that entrepreneurs need to possess are more abundant in countries with young-

4 Recent empirical work has also tried to measure entrepreneurial quality. (See, for example, Guzman and Stern, 2016). Improvements in entrepreneurial quality can potentially mitigate the adverse effects of slow-downs in start-up rates for small businesses.

5 Decker, Haltiwanger, Jarmin, and Miranda (2016) note that young firms, usually small, make a long-lasting contribution to aggregate employment despite high failure rates.

er populations. Hence, another piece of data that we present and consider is demographic trends in our sample countries, including projections of changes in the age distributions of the populations in those countries.[6]

A specific focus of Russell Sobel's chapter in this volume, as well as ours, is the change in the share of the population in the age cohort that is considered particularly entrepreneurially inclined, i.e., those in their late 20s to early 40s.[7] We review Sobel's evidence on recent changes in critical age cohorts, as well as projected changes in those cohorts. We also provide some additional demographic data relevant to a changing entrepreneurial cohort. Perhaps the most fundamental conclusion we draw from the data is that the age cohort(s) associated with entrepreneurial activity declined noticeably in recent years. While the most relevant age cohort promises to remain relatively stable for the near future, it will begin to decrease significantly in about 10 years' time. Hence, unless societies can elicit more entrepreneurial activity from a shrinking set of potential entrepreneurs, developed countries, unfortunately, can look forward to slower rates of innovation and other manifestations of market dynamism, other things constant.

A third set of data we examine focuses on productivity performance. As noted earlier, in the literature, productivity growth has been prominently linked to entrepreneurial activity, as discussed in the first chapter of this volume. Many observers have noted the marked slowdown in productivity growth in virtually all developed countries in the past decade compared to the period from around 1995–2005, (United Nations, 2017). We document the slowdown in this chapter. We also compare productivity performance over time in our sample countries to our data on small business start-ups and small business growth for those countries. Clearly, a careful statistical analysis is required to identify economic linkages between our

6 The demography argument, along with relevant data on age distribution changes in several developed countries, is presented in detail in Russell Sobel's chapter in this volume.

7 We also look at a narrower age cohort, specifically, those aged 30–40 years.

data on small business activity and productivity performance.[8] Hence, the data comparisons we discuss and present are, at best, suggestive. With this caveat in mind, our data highlight a correspondence between decreases in the relative importance of small business activity and a slow-down in productivity growth. They also underscore the importance of linkages between demography and entrepreneurship discussed in Sobel's chapter in this volume. Specifically, policymakers need to identify and encourage initiatives to promote entrepreneurship to offset unfavorable future changes in demography and the resulting adverse impact on productivity growth.

Finally, we discuss changes in industrial concentration ratios over time to assess changes in the relative importance of large versus small firms in the US and Canada. This data analysis is complementary to that which looks at the changing start-up rates for small businesses. Indeed, the latter analysis might help shed light on the reasons for the observed recent decreases in rates of small business start-ups and the slower growth of small businesses, inasmuch as an increasing number of antitrust scholars have argued that technological change is contributing to the growth of network economies that, in turn, create competitive advantages for large firms, and make the entry and growth of small firms more difficult (Taplin, 2017). This development, to the extent it is relevant, would be manifested in, among other things, increasing market shares of large firms or, equivalently, increasing industrial concentration ratios.

Our broad conclusion is that small firms have become less important participants in our sample of developed countries in recent decades, and that notable slowdowns in productivity growth rates might be linked to this development. Furthermore, the aging of the populations of developed economies augurs poorly for a pick-up in small business start-ups and growth rates without the implementation of policy initiatives to offset this development. Finally, increasing industrial concentration ratios indirectly reinforce our conclusion about decreasing entrepreneurial activity.

8 For a recent econometric study linking declining firm entry to US productivity performance, see Alon, Berger, Dent, and Pugsley (2017).

The chapter proceeds as follows. The next section presents some data on the changing age distribution of our sample of developed countries. The third section reviews data on recent start-up rates for small businesses in several developed countries. The fourth and fifth sections, respectively, discuss evidence bearing upon changes in productivity and the relative importance of large firms in developed economies. The final section offers a summary and conclusion.

Demographic developments

Russell Sobel's chapter in this volume examines some recent demographic changes affecting Canada, the US, the UK, and Australia from 1965 to 2015. His main point is that the trends for all four countries are similar. Namely, the populations in those countries have been aging. Specifically, the median age from 1965 to 2015 has risen by an average of 9.5 years in those four countries, and it is projected to rise by an average of 5.3 more years through 2065.[9]

Sobel also estimates the percentages of the populations of the four countries between the ages of 25 and 49 for the three years 1965, 2015, and 2065. Given the aging of the populations from 1965 to 2015, the percentages of the populations in the four countries in the 25–49 age bracket increased over that period. Across the four countries, the percentage of the population in that age bracket increased by 2.7 percentage points. However, Sobel's projection is that the percentage of the population aged 25–49 will fall by an average of 4 percentage points over the next 50 years. By 2065, the percentage of the population in this age group will fall to between 29 and 30 percent in the four countries compared to a range of 33 to 35 percent in 2015 (Sobel, this volume, figure 2).

9 In 2015, the median ages in the UK and Canada were slightly higher than in the US and Australia, and the differences will persist over the next 50 years. See Sobel, this volume, figure 1.

Table 1: Average Share of the Populations Age 30–39, by Decade

Decade	1980s	1990s	2000s	2010s	2020s	2030s	2040s
Australia	15.59%	15.90%	14.74%	14.05%	14.00%	12.47%	12.74%
Canada	16.32%	17.41%	14.46%	13.61%	13.65%	12.21%	12.05%
United States	15.66%	16.58%	14.00%	12.98%	13.69%	13.07%	12.40%
United Kingdom	13.76%	14.73%	14.70%	13.17%	13.09%	11.75%	12.10%
Germany	13.43%	16.34%	14.75%	12.18%	12.84%	11.25%	10.50%
OECD	14.96%	15.50%	14.68%	13.36%	12.75%	11.85%	11.57%

Note: The 1980s begin in 1981.

Source: Australian Bureau of Statistics, 2007, 2012, 2016; Eurostat, 2012, 2017; Statistics Canada, 2017a; US Census Bureau, 2017; author calculations.

In his chapter, Sobel thoroughly discusses the relevance of the age distribution of the population to entrepreneurship, along with some evidence on the precise nature of the relationship between the two phenomena. The vast majority of the available evidence supports the broad finding of Liang, Wang, and Lazear (2014) that the relationship between entrepreneurship and aging follows an inverted U-shape. That is, entrepreneurship rates are maximized among individuals (and populations) roughly somewhere between the ages of the late 20s and early 40s. A number of studies pinpoint the peak of the inverted U-shape to be in the 30s (Sobel, this volume).

If the peak of the inverted U-shaped relationship between age and entrepreneurship is in the 30s, it is useful to refine Sobel's age distribution data to focus specifically on the percentage of the population of our sample countries that are, or will be, in the 30–39 year age bracket. Table 1 presents this data; it reports the share of the population aged 30–39 for our four Anglo-Saxon countries as well as for Germany and for all OECD countries.[10]

10 Since innovation benefits associated with new start-ups in one country are likely to be captured in part by consumers in other countries, it is interesting to identify whether

In general, we are less interested in year-to-year changes in the age distributions of countries than in longer-run changes, both historical and projected. Hence, table 1 reports the percentage of the population aged 30–39 for our sample of countries averaged over decade-long intervals covering the period from the 1980s to the 2040s.

As table 1 shows, all of the developed countries it identifies show a decreasing percentage of their populations in the "prime" entrepreneurial age category from the 1980s to the 2040s. On average, in these five countries, the share of the population aged 30–39 will decline by approximately 26 percent between the 1990s (when this age group's share of the population peaked) and the 2040s.

While these advanced industrial countries are expected to follow this general trend, a number of small differences in the patterns of the five sample countries are worth noting. Germany is expected to face the largest overall decline, as the prime entrepreneurial age share of the population is expected to drop by more than 35 percent from slightly over 16 percent of the population in the 1990s to 10.5 percent in the 2040s. Canada, in which the 30–39 age group comprised the largest share of the total population among the sample, will also experience an over 30 percent decline in this age group's share of the population by 2040. The United Kingdom is expected to experience the smallest decline in the share of the population that is at their prime entrepreneurial age (30-39) by the 2040s. This is likely the result of the UK having the lowest share of the population in the prime entrepreneurial age category of any of our sample countries in the 1990s, when this age group's share peaked.

It is, perhaps, good news that in four of our sample countries (Australia, Canada, the US, and the UK), the share of the population of prime entrepreneurial age will be above the OECD average. Indeed, only in Germany is the share of population aged 30-39 expected to be lower than the OECD average. Although this might be good news for Australia, Canada, the US, and the UK relatively speaking, given the linkage between demographics

favorable or unfavorable changes in demography are widespread across countries, or whether they are specific to particular countries.

and entrepreneurship, the large decline of this age group's share within these countries should be cause for concern because of the impact that it could have on business formation and associated entrepreneurial activity.

Another small bit of good news is that there is projected to be a modest increase in the percentage of the population in the 30-39 year range in the 2020s compared to the 2010s in at least three of the individual countries identified in table 1. Hence, to the extent that the age distribution of the population is a critical determinant of entrepreneurial activity, demographic developments will either be slightly favorable, or at least not harmful, to small business start-up activity in the 2020s compared to the preceding decade. However, beyond the 2020s, there will again be a fairly marked decline in the 30-39 year old age cohort in the populations of our sample countries. One might therefore infer that policy instruments to encourage entrepreneurship will become increasingly important to the economic welfare of developing countries given the stagnant and even decreasing share of the population that is demographically predisposed toward entrepreneurial behavior.

Small business start-ups and growth

This section presents and discusses data and other evidence bearing upon the issue of whether the rates of small business start-ups and growth have changed over time in the context of overall business performance. Given the demographic trends discussed above, specifically the changing age structure of the populations of advanced industrialized countries, we should expect to see some slowing of small business start-up activity, if not an outright decline.[11]

11 Of course, we do not mean to say that demographic change is the sole driver of business start-up activity; however, the previously cited research of Liang, Wang, and Lazear (2014) points to the likelihood that the aging population of our sample countries will affect business start-up rates.

At least two caveats should be acknowledged before presenting any information on small business start-up activity. The first is that there is no universal definition of what constitutes a "small business." Definitions are usually based on total employment, but the categorization of firm size classes varies across countries. For example, the European Union identifies organizations with fewer than 10 employees as being "micro enterprises," while small enterprises are defined as organizations with between 10 and 49 employees (see Eurostat, 2009). Other developed countries, most notably the US, make no such distinction between micro enterprises and small enterprises in their reporting of data. Furthermore, there is no theoretical basis for a specific employment cut-off to distinguish a small enterprise from a medium-sized enterprise. For example, it is clearly arbitrary to set a lower limit of 10 employees to define a small enterprise and equally arbitrary to set an upper limit of 49.

Our definition of small business enterprises is implicitly dictated by the availability of published data. That is to say, we report the distribution of enterprises by the employment size classifications as given by available data. However, our view is that the spirit of the literature focusing on entrepreneurship emphasizes the relevance of a small number of individuals starting an innovative organization. Hence, our perspective is that for the purposes of this chapter, small business enterprises should be defined as being closer in size to what the European Union identifies as micro enterprises rather than what it defines as the larger small enterprises, i.e., close to 50 employees.

A second caveat is that innovative small firms have the greatest impact on the economy. In this regard, only a portion of start-up small businesses focuses on innovation. The OECD (1996) estimates that between 30 and 60 percent of small and medium-sized enterprises can be characterized as innovative. Of those, 10 percent are technology-based. However, of the innovation-focused start-ups, only a very small portion will turn out to be successful in the sense that they will grow into large businesses. Lester (2017) documents this phenomenon in the case of Canada. Hence, data focusing on small business start-ups and growth do not necessarily coincide

with the emergence and growth of small firms that will make important contributions to job creation and productivity growth.

There is no consistent time series data that allow us to identify the growth or decline in the number of successful innovative small businesses. Nor is there sufficient evidence to enable researchers to identify the characteristics of small firms that are likely to be successful businesses, at least on an *ex ante* basis. Hence, all one can infer is that a faster rate of small businesses start-ups increases the likelihood of an economy enjoying the emergence and growth of major enterprises that will create substantial increases in employment and income along the lines of Microsoft and Facebook.

We were able to obtain data on small business entry and exit for a number of developed countries, primarily Canada, the US, the UK, Germany, and Australia. Table 2 provides one broad measure of small business entry rates; it reports the number of small business entrants relative to the total number of incumbent small businesses. The available data does not permit the use of a common measurement of small business size across the few countries for which relevant data are available. Nor does it allow a comparison over an identical period of time. However, the quantitative definitions of small business enterprises and the time periods covered are sufficiently similar, in our opinion, to allow comparisons to be drawn across the sample countries. In our view, what matters most is how entry rates have been changing within the sample countries over time.[12]

As table 2 shows, small business entry rates declined in all five of our sample countries over our period of analysis.[13] Australia, in particular, ex-

12 Cao, Salameh, Seki, and St-Amant (2017) also measure entrepreneurship as the number of new self-employed workers who hire employees. This measure provides essentially the same information as small business start-up rates, at least for Canada.

13 As noted in table 2, the definition of small business varies across countries. For Canada and the US, small businesses are defined as those having 20 or fewer employees. For the other countries, the definition of a small business is fewer than 10 employees. We also note that the time periods for the individual countries shown in table 2 are the same as those used for all subsequent data presented for the sample countries as they relate to small business entry and exit rates.

Table 2: Small Business Entry Rates per 100 Small Business Incumbents, Three Year Averages, 2003–2014

Period	2003–2005	2006–2008	2009–2011	2012–2014
Australia*	17.59	14.99	14.14	12.57
Canada*	15.74	15.74	14.29	13.73
United States*	13.61	13.12	10.68	11.30
Germany**§	6.06	6.62	6.36	4.76
United Kingdom**	15.48	14.72	11.60	14.94

Notes:

* Small enterprise defined as 20 or fewer employees.

** Small enterprise defined as fewer than 10 employees.

§ 2003–2005 is based on 2004 and 2005 data for Germany.

There is a break in the data for the United Kingdom and Germany, in that a new reporting system was adopted for these two countries from 2008 onwards.

Source: Australian Bureau of Statistics, 2007, 2012, 2016; Eurostat, 2012, 2017; Statistics Canada, 2017a; US Census Bureau, 2017; author calculations.

perienced a large fall-off in small business entry rates between 2003 and 2014. For example, during the 2003–2005 period there were, on average, 17.6 small business start-ups for every 100 small businesses already operating in Australia. However, from 2012 to 2014, Australia's small business entry rate had fallen to 12.6 per 100 incumbent small businesses. While Australia experienced the largest decline of the five sample countries, the other four countries all saw decreases in small business entry rates of between 0.6 and 2.3 start-ups per 100 incumbents from the beginning of our analysis period to the end.[14]

It should not be surprising to find that small business entry rates declined after 2008, as this coincides with the onset of the major recession that

14 Criscuolo, Gal, and Menon (2014) document that most developed countries saw declines in young firm activity between 2001 and 2012..

commenced in the United States and, to a lesser extent, in other developed countries at the end of that year. [15] In particular, a decline in small business start-ups after 2008 is unsurprising given that real economic growth rates following 2008 were below those in the pre-2008 period for our sample countries. Hence, the data presented in this section of the chapter might be seen as identifying the impact of slower real economic growth on small business entry rates, since we do not explicitly account for the influence of other possible factors such as demographic changes. However, while the slower real economic growth rates after 2008 may certainly have contributed to a slowdown in business start-up activity, the declines in small business entry rates appear to be part of a longer-term trend, in that they appear to have begun years before the 2008 recession hit. This suggests that the deleterious economic effects stemming from the 2008 recession likely do not fully explain the observed declines in small business startups experienced by most of our sample countries after 2008.

One might argue that it is more meaningful and interesting to calculate the start-up growth rates for small businesses compared to the stock of all businesses rather than to the stock of small enterprises. In fact, since small businesses constitute the bulk of all active business enterprises, there would be little difference in such calculations compared to the pattern described in table 2.[16] It is also interesting to assess whether changes in entry rates for small businesses differ from those for medium and larger sized businesses, particularly given a prevailing view that changes in credit market conditions after 2008 have made it more difficult for small businesses to obtain financing compared to medium and larger sized businesses. We calculate an entry rate for medium and large sized enterprises and report the results in table 3. We identify medium and large sized enterprises by

15 Sedlacek and Sterk (2017) provide some statistical evidence on how employment fluctuations in start-up companies are pro-cyclical. That is, employment in start-ups will decline during periods of relatively slow economic growth.

16 For example, in 2014, small businesses in Canada (as defined above) comprised almost 93 percent of all business enterprises. The comparable percentages for the US, UK, Germany, and Australia were 85, 79, 40, and 93, respectively.

Table 3: Medium and Large Business Entry Rates per 100 Medium and Large Incumbents, Three Year Averages, 2003–2014

Period	2003–2005	2006–2008	2009–2011	2012–2014
Australia*	8.28	4.49	2.68	2.75
Canada*	1.89	1.25	0.85	0.77
United States*	2.64	2.68	2.02	1.96
Germany**§	8.40	7.47	6.73	6.16
United Kingdom**	9.59	9.46	7.87	8.66

Notes:

* Medium and Large enterprises defined as those with more than 20 employees.

** Medium and Large enterprises defined as those with 10 or more employees.

§ 2003–2005 is based on 2004 and 2005 data for Germany.

There is a break in the data for the United Kingdom and Germany, in that a new reporting system was adopted for these two countries from 2008 onwards.

Sources: Australian Bureau of Statistics, 2007, 2012, 2016; Eurostat, 2012, 2017; Statistics Canada, 2017a; US Census Bureau, 2017; author calculations.

subtracting small enterprises from total enterprises, where small enterprises are defined as they were in table 2, and where the time period division is the same as in table 2 for the five countries for which requisite data are available: Canada, the US, the UK, Germany, and Australia.

Again, for all five countries, entry rates for medium and large businesses relative to the existing stock of similar sized businesses fell across the periods of analysis. Furthermore, the differences between the periods are comparable to those reported in table 2. That is, the decrease in entry rates of medium and large business enterprises comparing the pre and post-2008 experiences are comparable to the decreases in the relative entry rates of small businesses. To this extent, any increased barriers to the entry of small businesses after 2008 were also apparently experienced by medium and larger-sized businesses.

Table 4: Small Business Exit Rates per 100 Small Business Incumbents, Three Year Averages, 2003–2014

Period	2003–2005	2006–2008	2009–2011	2012–2014
Australia*	5.86	10.60	9.32	9.44
Canada*	14.95	14.91	14.52	14.07
United States*	11.89	12.76	12.97	11.26
Germany**§	2.21	2.73	2.09	1.98
United Kingdom**	12.86	13.31	14.19	11.71

Notes:

* Small enterprise defined as 20 or fewer employees.

** Small enterprise defined as fewer than 10 employees.

§ For Germany: 2003–2005 is based on 2005 data, and 2006–2008 is based on 2006 and 2007 data..

There is a break in the data for the United Kingdom and Germany, in that a new reporting system was adopted for these two countries from 2008 onwards.

Sources: Australian Bureau of Statistics, 2007, 2012, 2016; Eurostat, 2012, 2017; Statistics Canada, 2017a; US Census Bureau, 2017; author calculations.

In addition, regarding the impact on entry of small businesses resulting from the recession of 2008 and the subsequent slow economic recovery, one would expect to see relative increases in exit rates of small businesses in the post-2008 period, as well. We calculated the exit rates of small businesses as a percentage of the population of all enterprises for Canada, the US, the UK, Germany, and Australia comparable to the entry rates reported in table 2. Table 4 reports the exit rates. The results in this latter case are mixed as compared to those in table 2. Specifically, small business exit rates actually were lower for Canada, the United States, the UK, and Germany for the 2012–2014 period compared to the pre-2008 periods. The opposite was the case for Australia. In short, across four of the five sample countries, there was no tendency for exit rates of small businesses as a share of the small business population to increase in the post-recession period. One might infer that conditions in the period after 2008 were less

Table 5: Ratio of Small Business Entries to Small Business Exits, Three Year Averages, 2003–2014

Period	2003–2005	2006–2008	2009–2011	2012–2014
Australia*	300.01	141.39	151.77	133.25
Canada*	105.34	105.52	98.43	97.65
United States*	114.39	102.76	82.33	100.30
Germany**#	274.77	242.23	304.29	240.68
United Kingdom**	120.33	110.59	81.74	127.60

Notes:

* Small enterprise defined as 20 or fewer employees

** Small enterprise defined as fewer than 10 employees

Due to data limitations Germany's small business entry rate for the 2003–2005 period was based on 2004 and 2005 data, while the exit rate for 2003–2005 was based only on 2005 data and the exit rate for 2006–2008 was based on data for 2007 and 2008.

There is a break in the data for the United Kingdom and Germany, in that a new reporting system was adopted for these two countries from 2008 onwards.

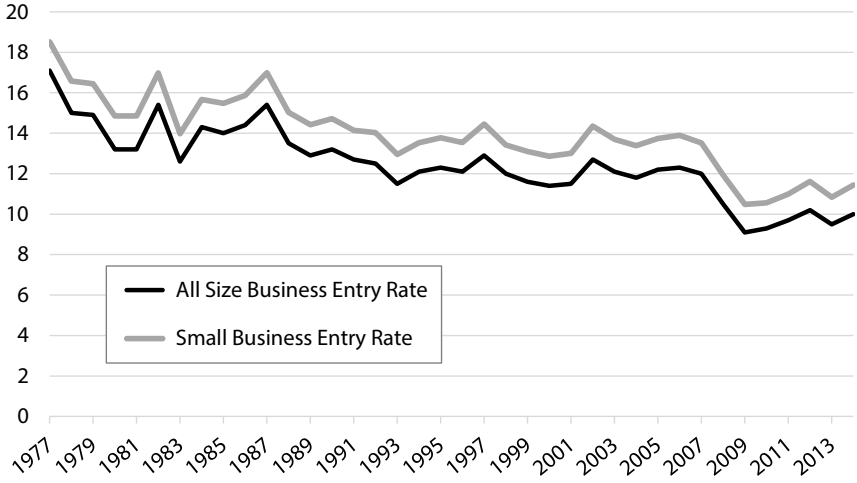
Sources: Australian Bureau of Statistics, 2007, 2012, 2016; Eurostat, 2012, 2017; Statistics Canada, 2017a; US Census Bureau, 2017; author calculations.

favorable to the entry of small businesses than they were to the survival of small businesses.

Some additional evidence on this latter assertion is provided by data reported in table 5, which shows entry rates of small businesses relative to exit rates for the five sample countries for the four periods expressed as a ratio. In the case of four countries, the entry of small businesses relative to the exit of small businesses declined from the first period to the final period. The decline was especially marked for Australia. Only the UK experienced a higher small business entry-to-exit ratio at the end of our period of analysis.

All of the countries in our sample experienced declines in their small business start-up rates, a proxy measure for entrepreneurship, across the 12-year period that we examined. However, regarding the link between de-

Figure 1: United States Business and Small Business Entry Rates, 1977–2014



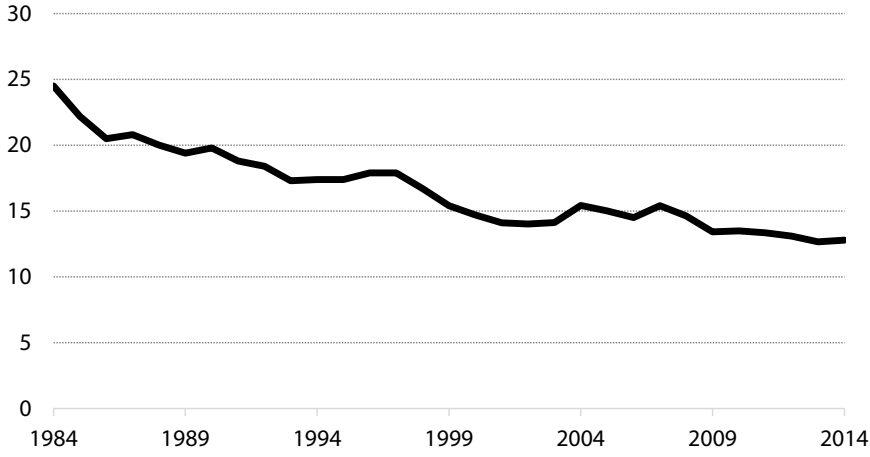
Sources: US Census Bureau, 2017; author calculations.

mographic changes and entrepreneurship, it is more useful to analyze longer term trends in business entry rates, as demographic shifts take place, for the most part, over long time horizons. Unfortunately, long-term data for business entry rates is difficult to come by, and thus we are only able to present a longer term analysis for the US, Canada, and the UK.

Beginning with the United States, figure 1 displays both the "all size" business entry rate and the small business entry rate from 1977 to 2014. Both entry rates show significant declines over the almost 40-year period. More specifically, the small business entry rate for the US declined from 18.5 entrants per 100 incumbents in 1977 to 11.4 entrants per 100 incumbents in 2014, a decline of almost 40 percent.[17] The all-size business entry rate experienced a similar decline. It is important to reiterate that most

17 Decker, Haltiwanger, Jarmin, and Miranda (2016) note that the US has experienced a decline in the employment share of young firms in most sectors since 1980, and even in the "information" sector pre-2000.

Figure 2: Canadian Business Entry Rates, 1984-2014



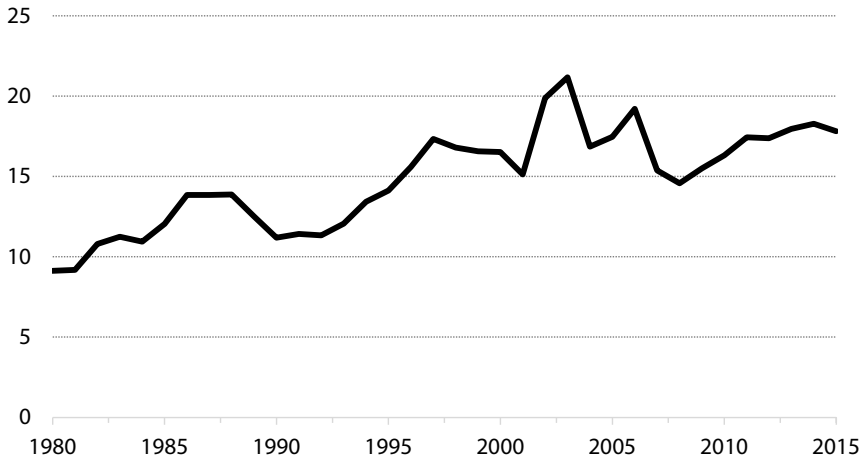
Sources: Statistics Canada, 2017a; Macdonald, 2014.

start-ups are small businesses and, further, that a slower start-up rate for small businesses decreases the likelihood that an economy will enjoy the emergence and growth of future major enterprises that will create substantial increases in employment and income.

The long-run business entry rate for Canada presented in figure 2 displays similar characteristics to that of the US. In Canada, business entry rates fell from 24.5 per 100 incumbents in 1984 to 12.8 per 100 incumbents in 2014, a decline of almost 50 percent.[18] It is relevant to note that the broad decline in business entry rates in both Canada and the US pre-dates the 2008 recession by decades, which suggests that a variety of factors, not

18 Similar data are presented and discussed in Cao, Salameh, Seki, and St-Amant (2017). They note that this decline was mainly shaped in the period after 1998. They also highlight that entry rates for the mining, quarrying, and oil and gas sector do not display strong declines, possibly because of relatively high commodity prices in the period after 2000.

Figure 3: United Kingdom Business Entry Rates, 1980-2015



Note: In October 2009 the Northern Ireland Register Merged with the register for Great Britain to Create a UK Register. UK figures are reported from 2009/10 onwards.

Sources: UK Companies Register, 2016.

simply the recession and slow economic recovery after 2008, were possible contributors to the phenomenon identified in figures 1 and 2.

Figure 3 presents data on business entry rates for the UK back to 1980. The longer term trend for the UK is much different from that for Canada and the US. Instead of showing a continuous decline, the UK's business entry rate increased for the most part, peaking in 2003. Since 2003, however, the business entry rate has fallen, and although in the latter part of this period it did increase slightly, that growth appears to have leveled off. The explanation for why business entry rates increased at the same time as they were falling in developed countries such as Canada and the US likely derives from different domestic economic conditions. Card, Blundell, and Freeman describe the economic situation in the UK before reforms were started in the 1980s as being characterized as a "highly regulated economy,

with large nationalized industries, an extensive welfare state, and exceptionally obstreperous labour-management relations" (2004: 1). After reforms in the 1980s and 1990s, the UK began to see improvements in its economic position, as both economic growth and productivity began to improve. This improvement in domestic economic conditions likely explains, at least to some extent, why business start-up rates improved throughout the 1980s and 1990s in the UK. The question that remains is whether forces that are likely to put downward pressure on business entry rates, such as demographic changes and Great Britain's withdrawal from the European Union, will begin to exert a stronger effect on said rates.

In addition to the analysis of business entry rates, another indication of the changing environment for small business entry in recent years is the decrease in the total number of IPO (Initial Public Offerings) transactions on public stock exchanges involving small businesses. For example, Economides, Lakoue-Derant, and Smirnova (2016) discuss the recent history of Alternative Investment Market (AIM)-listed companies on the London Stock Exchange, which largely represents small-cap stocks. They report that the total number of AIM-listed companies on the London Stock Exchange was around 400 in January 1999. It hit a high of around 1,600 at the beginning of 2008 and declined to around 1,000 in September 2015. Declines in IPO activity for small firms have also been identified in the post-2000 period for the United States and Europe (Mason, 2011). Some portion of the decrease in IPO listings of small businesses is a consequence of the growth of new sources of financing, such as private equity firms. However, Ritter, Signori, and Vismara (2012) also identify as an important cause an increased difficulty of small firms to remain profitable, in part because of the growing importance of economies of scope.[19] These authors found that among small-firm IPOs, the percentage that are profitable in the three years after going public declined from 67.1 percent in 1995–2000 to 44.4 percent in 2001–2011. The comparable downtrend has been less pronounced for large-firm IPOs (from 91.3 percent to 80.1 percent). The

19 Economies of scope are efficiency gains related to operating in more than one product or geographic market.

poor stock market conditions following the steep recession of 2008 are also implicated in the decline in IPO listings.

In summary, small business start-up rates appear to have slowed, certainly in the post-2008 period and earlier in Canada and the US. To be sure, start-up rates for medium and larger businesses have also slowed. Thus, Morath (2017) notes that during the latest economic expansion commencing in 2009, new businesses have accounted for a little more than 11 percent of all new private sector jobs created in the US. During the 1990s, the figure was 15 percent. However, since small businesses account for the overwhelming number of business start-ups, adverse entry conditions facing small businesses are the primary cause for concern about slower job growth.

Perhaps a more fundamental point to note here is that successful small business entry and growth is basically a "numbers game." That is to say, the overwhelming majority of small business start-ups do not become large and successful firms. For example, Mason (2011) found that for the UK, just 6 percent of firms created 54 percent of all net new jobs in 2002–2008. One might infer that relatively robust entry rates for small businesses are necessary for an economy to experience and benefit from the emergence of a Facebook or a Microsoft, since only a very small percentage of start-ups will go on to create major economic benefits in the form of increased employment and productivity growth.

The evidence that small business start-up rates have slowed in recent years is, therefore, of real economic concern.[20] This evidence further motivates later chapters, which discuss possible policy initiatives to encourage faster start-up rates. In the next section of this chapter, we briefly review the link between business start-up rates and productivity.

20 The Kauffman Foundation (2017) notes a recent (2015–2016) uptick in new firm formation for the United States but concludes that new firm formation remains in a long-run deficit. Statistics Canada (2017c) also reports a small increase in enterprise start-ups in 2015 for Canada.

Productivity performance

In this section, we review recent developments in productivity performance. In particular, we highlight the often-discussed and worrisome decline in productivity performance in developed economies that has been implicated in stagnant real income levels of workers and relatively slow real economic growth rates. To the extent that the relative decline in start-up activity is linked to lower rates of innovation and technological change, it might also be implicated in decreasing rates of productivity growth in recent years.

Economists refer to two main measures of productivity: labour productivity and multifactor productivity. Labour productivity is defined as real output per worker hour and depends upon the quantity of services of capital used per hour of labour and the services of other inputs, primarily knowledge that is not directly embodied in physical capital. The latter is usually referred to by the shorthand description: technological change.[21] Multifactor productivity is typically defined as real output divided by the weighted combination of the services of labor and capital, and it approximates technological change.[22] While real wage changes are most directly related to changes in labour productivity, increases in a nation's overall standard of living are tied to increases in multifactor productivity. Moreover, the importance of start-up business activity, as noted earlier, is related to new products and production and organizational processes that are brought into existence by new businesses. Hence, multifactor productivity growth as an approximation to an economy's rate of technological change is of most direct interest for purposes of this chapter.

Table 6 reports the average annual rate of growth of multifactor productivity for 1986 to 2015, segmented by specific time periods. The data are reported for Australia, Canada, the US, the UK, and Germany. There

21 Improvements in the "quality" of labour and economies of scale also contribute to productivity performance, although technological change is the single most important source of productivity growth. See Acharya (2005).

22 The weights are the shares of payments going to those two factor inputs.

Table 6: Average Annual Multifactor Productivity Growth Rate, 1986-205

Period	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015
Australia	-0.01	1.10	1.58	0.74	-0.26	0.74
Canada	-0.23	0.85	1.35	0.50	-0.18	0.67
Germany	1.68	1.50	1.13	0.67	0.39	0.83
United Kingdom	0.82	1.12	1.52	1.62	0.03	0.19
United States	0.68	0.69	1.42	1.61	0.70	0.27

Source: OECD, 2017.

are some notable differences across the sample countries in their histories of multifactor productivity growth. For example, Germany is clearly an outlier for the period 1986–1990, while the US and the UK are outliers for the period 2001–2005. However, all of the sample countries experienced a substantial decline in average multifactor productivity growth during 2006 to 2010 compared to earlier periods, which primarily reflects the depth of the recession of 2008 and 2009. While average multifactor productivity growth during the 2011–2015 period is higher than in the preceding five years, with the notable exception of the US, its recent performance still lags substantially behind the growth rates experienced during the 1990s.

Technological change is a complex phenomenon, and it is simply impossible to ascribe the relatively weak growth rate of multifactor productivity over the past 10 years or so entirely to a slower rate of growth of small business startups. Nevertheless, Alon, Berger, Dent, and Pugsley (2017) provide statistical evidence showing a negative relationship between firm age and productivity growth for the US. The magnitude of the relationship is substantial though it fades over time, such that nearly the entire effect disappears after 10 years. However, given a continued declining rate of new firm start-ups, the negative productivity effect will be renewed with each generation of new firm entry. New firm start-ups have also been found to contribute to productivity growth through the process by which

more productive firms replace less productive firms (the exit rate is also important in this process).[23] New firms can also be a source of innovation and can push incumbent firms to become more productive through the competitive process (Cao, Salameh, Seki, and St-Amant , 2017). Finally, Gourio, Messer, and Siemer (2016) show that economic shocks that lead to new firm entry promote productivity growth over a sustained later period. Conversely, they assert that the decline in the number of US startups observed during the period of the pronounced recession of 2008-2009 of about 25 percent is responsible for a 2.5 percent decline in GDP per capita over the same period.

In short, to the extent that small business start-ups are an important mechanism through which productivity-enhancing changes are introduced into an economy, the prolonged failure of multifactor productivity growth to return to rates that characterized the 1990s underscores the importance of understanding why small business start-up rates have slowed in recent years. It also highlights the relevance of public policies as they affect the growth rate of start-ups.

Industrial concentration

The last characteristic we consider is industrial concentration. This concept is a measure of the degree of competition in an industry. The higher the concentration ratio, the weaker the presumed level of competition. Recent claims have been made that key industries, particularly in the United States, have become dominated by a relatively small number of firms, which, in turn, is making it more difficult for small firms to enter those industries and be financially successful (Dwyer, 2017; Morris and Seetharaman, 2017). The focus of this claim has been directed particularly at Internet-based industries. For example, Dwyer (2017) notes that Google gets about 77 percent of US search advertising revenue, while Google and Facebook together account for about 56 percent of the mobile ad market.

23 For some evidence on the importance of this "churning" process, see Gu and Li (2017).

Amazon is responsible for around 30 percent of all US e-commerce, while Facebook's share of mobile social media traffic is around 75 percent. So-called network economies are alleged to be a major reason for the large market shares commanded by companies like Amazon and Facebook. Network economies are a market characteristic whereby the more people there are using a technological platform, the more valuable that platform is to new users.

Academic researchers have also identified the rise of the "superstar" firm and the possible implications for entry and survival rates of small firms.[24] Unfortunately, comprehensive time series data on industrial concentration is difficult to obtain for most countries. However, the evidence is quite clear that industrial concentration has increased significantly in the United States. For example, Grullon, Larkin, and Michaely (2016) document that US industries have become more concentrated since the beginning of the 21st century. By one major measure of industrial concentration, the Hirschman-Herfindahl Index (HHI), concentration has systematically increased in over 75 percent of US industries.[25] They also note that in real terms, the average publicly traded firm is three times larger in 2016 than it was 20 years earlier. One factor that they identify as contributing to increased industrial concentration is increasing "technological barriers to entry" which can be likened to network economies described in the preceding paragraph.

Since the emergence and growth of superstar firms is largely a US phenomenon, one would not expect other developed countries to experience increases in industrial concentration comparable to those experienced by the United States. Recent data from Statistics Canada provides some insight into this phenomenon for Canada. Specifically, it reports the percentage of employees in small and large firms over the period 2001–2016. Small firms are identified as those with 0 to 19 employees. Large firms are

24 See, for example, Autor, Dorn, Katz, Patterson, and Van Reenan (2017).

25 Another measure of concentration, the share of industry sales accounted for by the four largest firms in an industry, documents a similar increase in industrial concentration in the US over the past two decades.

those with 500 or more employees. Statistics Canada's data show that the share of employment in Canada accounted for by large firms has increased by almost three percent since 2001, while the share of Canadian employment accounted for by small firms has declined more than seven percent in the period (Statistics Canada, 2017b). While this data is not a direct measure of changes in industrial concentration, it is consistent with the US experience of large firms becoming more prominent in the domestic economy compared to small firms, although the Canadian experience may not be as marked as the US experience.

Summary and conclusions

While we can make no claim to have identified a statistical association between the aging of the populations of developed countries and the decrease in small business start-up rates over time in those countries, the circumstantial evidence is noteworthy. Specifically, the relatively sharp decrease in the share of the population most likely to be entrepreneurs is consistent with a decrease in relative start-up rates for small businesses that we identified earlier.[26] The decrease in start-up rates for new businesses is also consistent with diminished productivity growth rates discussed above. In this regard, Acemoglu and Restrepo (2017) highlight the importance of the rapid adoption of automation technology as an antidote to declining productivity associated with population aging. Their observation, in turn, underscores the importance of private and public sector policies to diminish the overall negative impact that population aging has on productivity growth.

26 Cao, Salameh, Seki, and St-Amant (2017) conclude that an aging population explains a small portion of the secular decline in entrepreneurship in Canada since the early 1990s and for a more important portion since around 2000. However, they argue that demographic changes are not a dominant factor explaining the aggregate decline in the new entrepreneurship rate, at least in Canada's case.

To be sure, the causes of the declines in entrepreneurship identified earlier are unlikely to be simple and may not be identical across countries. For example, while the US evidence highlights the importance of a changing age distribution as a factor suppressing entrepreneurship (Liang, Wang, and Lazear, 2014), Cao, Salameh, Seki, and St-Amant (2017) identify a decline in entrepreneurship across all age groups for Canada, although above-average declines are identified for the 25–34 and the 35–44 age groups. There is also some contradictory evidence regarding the importance of demography *per se* to entrepreneurship.

To our knowledge, existing research has not yet identified statistically the precise contributions of various possible determinants of observed declines in entrepreneurship rates. Some observers have identified a growth in average firm size leading to increased industrial concentration as a factor increasing barriers to entry facing start-up firms. This observation has been applied especially to the US experience, and it is questionable whether it can be generalized to other developed countries that have experienced slowdowns in new business start-up rates. It is also true that increased concentration can be the consequence of slowdowns in new business-start-up rates, as well as a contributor. More research is required to understand the determinants of the recent behavior of small business start-ups. The remaining chapters of this volume are dedicated to this latter task.

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