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Seeking Gazelles in Polar Bear Country

Introduction

You are probably all familiar with the inventor of the snowmobile, Joseph-Armand Bombardier. He was from the Eastern Townships of Quebec and he merits a place in our history books just as much as Maurice Richard and Félix Leclerc.

You may be less familiar with Montréaler Arthur Sicard, who also had an idea that had a profound impact on the Quebec and Canadian economies. Born in 1876, Sicard spent his childhood working on the family farm. He was often prevented from delivering milk in the winter because of the snow blocking the roads. Observing combine harvesters at work in the fields in summer gave him an idea for a snowblower. Sicard's invention was launched in 1925, and the City of Outremont bought the first model two years later. The snowblower not only improved the lives of city dwellers by making car travel easier in winter, it also had a major and unexpected impact on Canadian economic activity, facilitating winter road transport between Montréal, New York and Toronto.

When we think of innovation, we think of people like Sicard and Bombardier, who start from scratch, invent new products or processes, and create companies that soon become drivers of the economy. These innovators help increase our productivity.

In recent decades, advanced economies have experienced a sharp decline in productivity growth. This trend is worrisome because, in the long run, productivity growth determines the evolution of our standard of living. To give you an idea of how much it matters, last year Canadians would have earned an additional

I would like to thank Pierre St-Amant and Ben Tomlin
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$13,000 if our productivity had increased at the same pace as seen in the late 1990s.[1]

And since productivity determines the level at which the economy can operate without creating inflationary pressures, understanding its evolution in an inflation-targeting regime like ours is vital to us at the Bank of Canada.

Economists who are studying this trend are naturally asking whether there are fewer innovators like Bombardier and Sicard today than in the past. They are also trying to explain why productivity is weak in all advanced economies.

To answer this question, we have to look beyond the usual macroeconomic indicators and examine the innovation process at the firm level.

Today, I would like to highlight some of the major trends in firm behaviour that have given rise to vigorous debate among economists. First, I will describe how the data point to declining dynamism in the Canadian economy. I will then offer some possible explanations for this trend and will review how dynamism and other factors affect economic growth. I will conclude by briefly discussing the implications for monetary policy and achieving our inflation target.

Declining Dynamism

Let's start with a simple intuition: in a dynamic economy, innovative companies are expected to emerge and replace companies with older business models. Think of Sicard, whose invention clearly brought huge long-term benefits but also led to job losses, especially the jobs of workers who cleared roads using horse-drawn snowplows.

As such, a strong and dynamic economy should be driven, in part, by the entry of new firms and the exit of less-viable firms.[2] This renewal involves a needed reallocation of labour toward growing industries.[3] This dynamic process of innovation was called "creative destruction" by the economist Joseph Schumpeter in the 1930s.

Data collected by Statistics Canada show that there has been a surprising and sustained decline in the entry rate of new firms since the early 1980s. Relative to total active firms, the entry rate of new firms was 24 per cent in 1984. It has decreased by half since then, which is a considerable drop (**Chart 1**). The firm exit rate has also declined—but by less—from almost 17 per cent in 1984 to about 11 per cent, according to the most recent data.

The decline in entry and exit rates is also reflected in the weaker rate of labour reallocation.[4] For the past 10 years, new firms have created fewer jobs than

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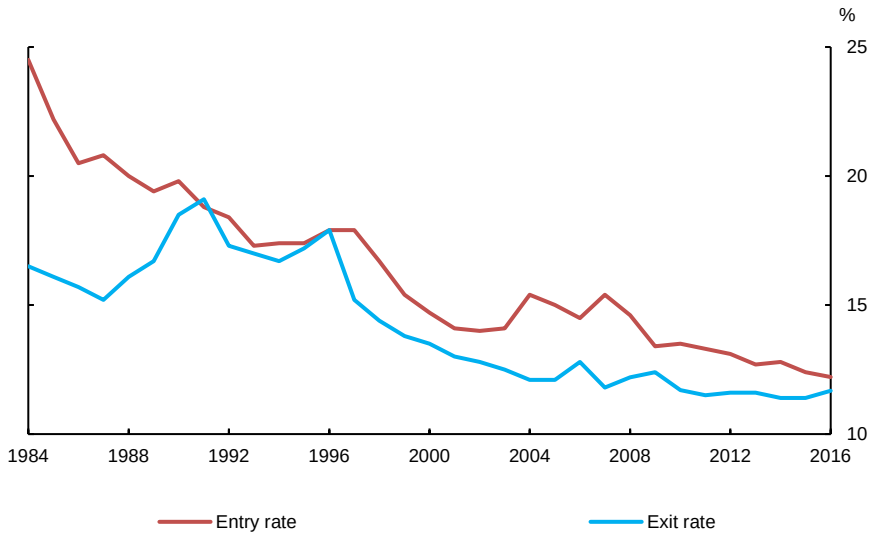
[1] C. A. Wilkins, "Blame It on the Machines?" (speech to the Toronto Board of Trade, Toronto, April 18, 2017).
[2] S. S. Poloz, "Reconstruction: Rebuilding Business Confidence in Canada" (speech to the Oakville Chamber of Commerce, Burlington, Ontario, June 19, 2013).
[3] Of course, this constant reorganization of economic activity can be facilitated by assistance programs such as employment insurance.
[4] D. Leung and S. Cao, "The Changing Pace of Labour Reallocation in Canada: Causes and Consequences," *Bank of Canada Review* (Summer 2009): 31–41.

before. Simply put, the data seem to point to a loss of dynamism in the Canadian economy.

This decline in dynamism is especially striking because it is broad-based. It can be seen in almost all industries and across the country, showing up, for example, in rates of entrepreneurship (**Chart 2**). This trend has also appeared in most OECD countries.

Chart 1: Aggregate entry and exit rates of new firms have been declining

Aggregate entry and exit rates, annual data

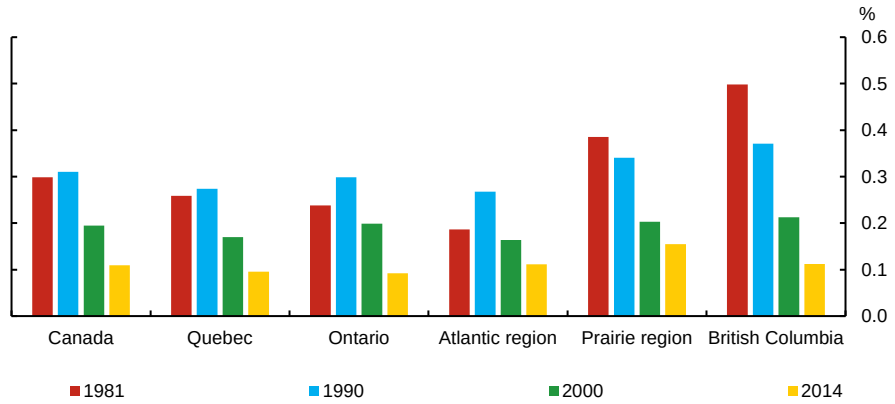


Sources: Bank of Canada calculations using data from Statistics Canada's Longitudinal Employment Analysis Program. For the year 2016, quarterly firm creation data were used.

Last observation: 2016

Chart 2: Chart 2: Rates of entrepreneurship have declined in all regions

Rates of entrepreneurship by region, annual data



Source: Bank of Canada calculations using data from Statistics Canada's Labour Force Survey

Last observation: 2014

The main concern about a loss of dynamism is that it will lead to less innovation and diminishing long-term growth. The estimated potential growth rate of the economy is about 1.5 per cent, adjusted for inflation. Compared with previous

decades, when potential output sometimes rose to more than 3 per cent per year, this is a significant drop.[5] And this is the context in which the loss of dynamism must be considered.

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To better understand the possible effects of a loss of dynamism, we need to understand its causes—a more difficult task than it sounds. Some leads are more promising than others. The fact that we see this loss of dynamism not only in Canada but also in most OECD countries suggests that its causes are not unique to Canada and that there may be common factors.[6]

A first factor to consider is population aging. The younger you are, the more likely you are to become an entrepreneur and start your own company.[7] The appetite for risk is perhaps more intense when you have less to lose and the expected benefits are spread out over a greater number of years. However, our data show that the rate of entrepreneurship has dropped for *all* age groups. Indeed, we even see that the decrease in entrepreneurship is greater among people aged 25 to 44.[8] So population aging can explain only part of the decline in entrepreneurial activity.

On the other hand, this decline may be because emerging entrepreneurs face greater opportunity costs than before; that is, the shortfall in income they would suffer if they quit their job to launch their company is now higher. In fact, since the 1980s, the most significant decrease in entrepreneurship rates that we've seen has been among those whose wages have increased the most; namely, university graduates.[9] New technologies, which often benefit those with more technical skills, have likely contributed to this trend.

In many cases, these new technologies also generate significant economies of scale and network effects that lead to greater industrial concentration, in turn leading to a loss of economic dynamism. On the one hand, the expectation of positive benefits is what encourages business innovation. On the other hand, if the largest companies constantly increase their share of the market, it is increasingly difficult to compete with them.[10]

In fact, industrial concentration figures are quite astonishing. In the United States, industrial concentration since the early 1970s has increased in 75 per cent of its industry sectors. There are now fewer US firms listed on the stock exchange than

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[5] A. Agopsowicz, B. Gueye, N. Kyui, Y. Park, M. Salameh and B. Tomlin, "Annual Reassessment of Potential Output Growth in Canada,"Bank of Canada Staff Analytical Note 2017-5 (April 2017).
[6] Organisation for Economic Co-operation and Development, "The Future of Productivity," 2015.
[7] S. Cao, M. Salameh, M. Seki, P. St-Amant, "Trends in Firm Entry and New Entrepreneurship in Canada," Bank of Canada Staff Discussion Paper No. 2015-11 (October 2015).
[8] Ibid.
[9] Ibid.
[10] D. Andrews, C. Criscuolo and P. N. Gal, "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy," OECD Productivity Working Papers 5, OECD Publishing, 2016.

there were 40 years ago, while US GDP is three times higher.[11] In line with this trend, markups in several industries have been steadily increasing over the past three decades.[12] Here in Canada, the rate of industrial concentration is historically high. Estimates from economists at Innovation, Science and Economic Development Canada tell us that the median concentration of Canadian industries in the early 2000s was about 75 per cent higher than in the United States.[13]

The economies of scale and network effects in several sectors put new firms that produce at higher costs at a disadvantage. You must be very optimistic and have a great deal of confidence in your business model to launch a retail business these days, when giants like Walmart and Amazon are making life difficult for established companies. For example, with its diverse network of producers, Walmart can change its source of supply to minimize operating costs a lot more easily than a newly launched company can.[14]

However, the effects of concentration and declining entry rates on innovation and productivity are not unequivocal. Many large companies use leading-edge technology and are pushing boundaries as never before—such as the firms developing self-driving cars. Today, large companies know that they must continually invent new products or services to stay one step ahead of their competitors. A good example of this is Apple, with the introduction of its iPhone in 2007 and the different versions the company has introduced since then.

Dynamism and Potential Growth

Competition is therefore essential to innovation and can certainly come from established companies. But the possibility of new companies revolutionizing an industry encourages established firms to innovate. Viewed in this light, the loss of dynamism could be symptomatic of a decline in innovation and long-term productivity, paradoxically during a period when technological advances seem to be increasing exponentially. Indeed, this question may warrant further investigation so that we better understand which new firms are most likely to contribute to growth.

Statistics show that the shelf-life of new companies ranges between two extremes. About half of firms close their doors within five years of their creation. But younger companies that do make a name for themselves tend to grow very rapidly. It is this propensity to grow by leaps and bounds that inspired the term “gazelle.”

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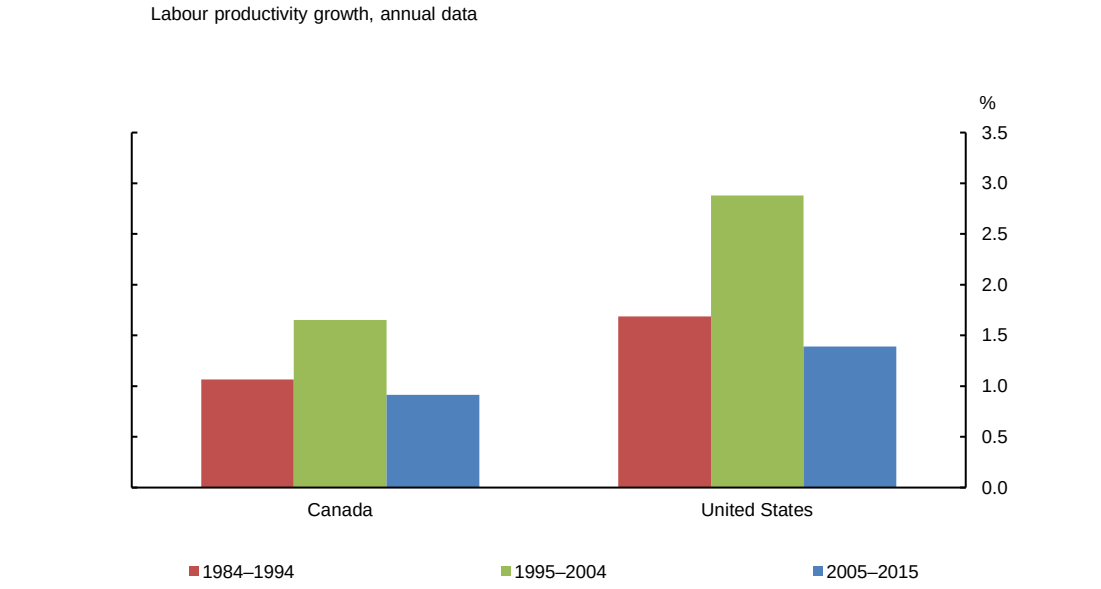
[11] G. Grullon, Y. Larkin and R. Michaely, “ Are U.S. Industries Becoming More Concentrated?” 2016.
[12] J. De Loecker and J. Eeckhout, “The Rise of Market Power and the Macroeconomic Implications,” National Bureau Of Economic Research Working Paper No. 23687, 2017.
[13] M. Duhamel and S. Crépeau, “Competition Intensity in Canada: A Critique of Recent OECD Findings,” Industry Canada Working Paper No. 2008-09.
[14] Research has shown, for example, that large importing firms have a higher elasticity of substitution across products in Canada. See M. B. Devereux, W. Dong and B. Tomlin, “Importers and Exporters in Exchange Rate Pass-through and Currency Invoicing,” *Journal of International Economics* 105: 187–204, March 2017.

These young, transformative companies that are growing at dizzying speeds have a good chance of developing new technologies that increase productivity. However, the impact of innovation on productivity is difficult to assess. Breakthroughs in robotics, artificial intelligence or financial technologies are phenomenal, but are still not reflected in our productivity measures at the national level (**Chart 3**). And the impact of an innovation is very uncertain, which is why many new companies go bankrupt after only a few years. Predicting whether an innovative company will revolutionize markets is just as risky as guessing if a first-round choice in the hockey draft will become a new superstar goalie like Carey Price. Most of the time, you get another very ordinary player.

Chart 3: Labour productivity has slowed in Canada and the United States



Source: Statistics Canada

Last observation: 2015

Nevertheless, among OECD countries, firm productivity is operating at two speeds. Firms at the cutting-edge of technology—big guns such as Google and Tesla—are three to four times more productive than other companies.[15] Given the declining dynamism we are seeing, this gap is not being reversed by the exit of less-productive firms, which probably feel less need to adopt cutting-edge technology. These firms therefore contribute to reducing national productivity. In this context, encouraging the adoption of new technologies is essential.

Given that about a quarter of productivity growth is driven by innovations from new firms, gazelles play an essential role, particularly in the high-tech sector.[16]

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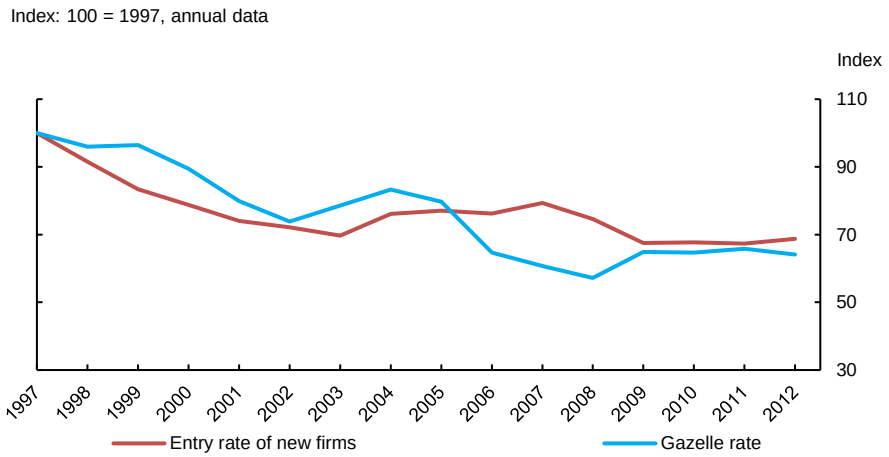
[15] D. Andrews, C. Criscuolo and P.N. Gal, "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy," OECD Productivity Working Papers 5, OECD Publishing, 2016.

[16] See, for example, D. Garcia-Macia, C. Hsieh and P. Klenow, "How Destructive Is Innovation?" National Bureau of Economic Research Working Paper No. 22953, 2016; U. Akcigit and W. R. Kerr, "Growth Through Heterogeneous Innovations," National Bureau of Economic Research Working Paper No.16443, 2010; and L. Foster, J. C. Haltiwanger, and C. Syverson, "The Slow

So it's worrying that the share of gazelles in the Canadian economy has declined markedly since 1997 (**Chart 4**). Surprisingly, we see this decline in the information and technology sector.

Chart 4: The rates of entry of both new firms and gazelles have declined



Note: The entry rate of new firms is obtained by dividing the number of entries by the average total number of firms in the previous and current year. Gazelle rate is defined as the number of gazelles divided by total number of firms.

Source: Custom tabulation from Statistics Canada's Longitudinal Employment Analysis Program

Last observation: 2012

That said, the entry and exit rates of new firms also follow the business cycle, and the Canadian economy has performed a lot better than expected over the past five quarters. For example, productivity has increased significantly since mid-2016, especially in the goods sector. It is also encouraging to note that the most recent data show that the rate of entry for new firms appears to have stabilized over the past few quarters (**Chart 5**).

The economy's growth rate is expected to decline over the next few quarters, but it should still exceed that of potential output. We therefore expect an increase in entry rates and a decline in business exits over the coming quarters.[17] Moreover, the contribution of new firms to increasing the productive capacity of the economy could give rise to a virtuous circle of growth.

For the Bank, understanding how the productive capacity of the economy evolves is crucial. Indeed, our monetary policy is based on the fact that the rate of inflation tends to stabilize near our target of 2 per cent when the economy is running at capacity. When the economy operates at a level higher than potential output, inflation tends to accelerate and, conversely, decelerates when the economy operates below its potential output. An increase in productive capacity resulting from new firm creation would therefore allow the economy to grow faster without creating inflationary pressures. In concrete terms, higher potential

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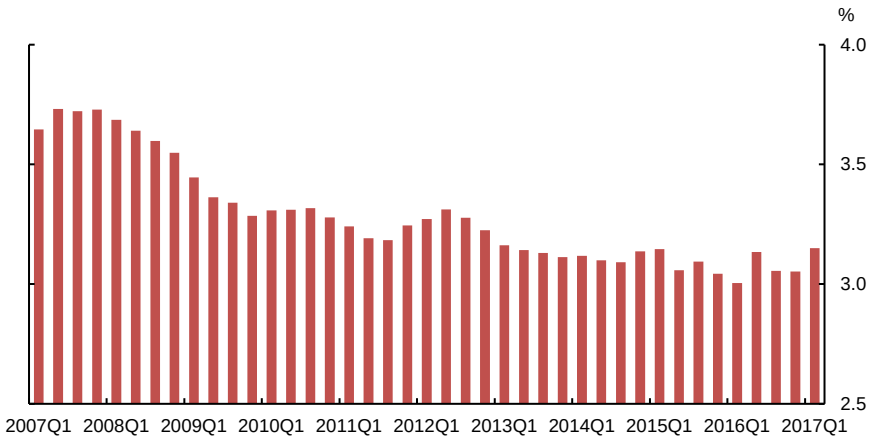
Growth of New Plants: Learning About Demand?" National Bureau of Economic Research Working Paper No. 17853, 2012.

[17] S. S. Poloz, "Reconstruction: Rebuilding Business Confidence in Canada" (speech to the Oakville Chamber of Commerce, Burlington, Ontario, June 19, 2013) and "Returning to Natural Economic Growth" (speech to the Vancouver Board of Trade, Vancouver, British Columbia, September 18, 2013).

output would lead to a long-term improvement in the standard of living of Canadians.

Chart 5: The rate of entry for new firms may have finally stabilized

Four-quarter moving average, quarterly data



Source: Bank of Canada calculations using Statistics Canada's quarterly firm creation data

Last observation: 2017Q1

Conclusion

In recent quarters, Canada's economic growth has been strong, exceeding that of all the other G7 economies. The sharp depreciation of the Canadian dollar following the drop in oil prices may have contributed to the growth of gazelles by facilitating access to external markets and increasing the benefits of greater economies of scale. What I find encouraging is that, despite the decline in dynamism, the sectoral adjustment required as a result of the fall in oil prices happened within the anticipated time frame. This episode shows that the Canadian economy is still flexible enough to absorb a major shock.

That said, significant challenges remain, as our productivity is still well below that observed south of the border.[18] Productivity growth could certainly be increased by reducing the barriers that future gazelles may face, which would further stimulate the Canadian economy. A report from the World Bank notes that Canada is one of the easiest countries in which to start a business.[19] On the other hand, it is nevertheless more difficult for businesses to grow beyond a certain point, possibly because of the size of our markets. The free trade agreement with Europe is an encouraging example, because it can help our gazelles grow. Here in Canada, the agreement signed earlier this year on reducing barriers to interprovincial trade is also a good sign, although several areas are still excluded. In addition, new gazelles are likely to have more difficulty

[18] Centre for the Study of Living Standards, "Aggregate Income and Productivity Trends: Canada vs United States, 1961–2015."

[19] World Bank, "Doing Business: Measuring Business Regulations," 2017.

financing intangible investments, which they increasingly need, than tangible investments, which, unlike the former, may be offered as collateral.

I would be remiss if I did not mention a Sherbrooke initiative that is addressing these challenges. I'm talking about Sherbrooke Innopole, an organization dedicated to accelerating business development in five new areas. In collaboration with the city, Innopole three years ago founded Espace-inc, a business incubator whose results have exceeded initial expectations. So far, it has helped launch 24 companies.[20] Similar initiatives are under way elsewhere in Canada. We hope they will be successful and that they will help entrepreneurs of the calibre of Sicard and Bombardier to emerge.

In the meantime, the best contribution the Bank of Canada can make in this regard is to promote economic stability by keeping inflation at 2 per cent, thereby facilitating investment decisions.

[20] Espace-inc, "Bilan d'impact 2015-2016."