

Pondering Productivity

Over the past decade, many questions have been raised about the state of Canadian productivity, the most recurrent being: *Why has Canadian productivity growth been so low?* The questions become more poignant when Canada is compared to other countries—particularly with respect to the widening productivity gap that has emerged with our neighbours south of the 49th parallel.

A recent article written by Kevin Carmichael in *The Globe and Mail Blog* caught our attention, as it suggested that one potential explanation for the productivity gap between Canada and the United States could be the differing employment structures of the two countries. For example, while Canada's largest companies (by market capitalization) are mostly in the financial services sector (such as TD Canada Trust and the Royal Bank of Canada), in the United States they are found in primary and manufacturing industries (such as Exxon Mobil and Apple).¹ The article postulates that because labour productivity is generally higher in goods-producing sectors (primary and manufacturing) than in services-producing ones (banking and finance), this could be a driving force behind the differential in productivity growth in each country.

While the article focused on company size by market capitalization, we thought it would be interesting to consider the composition of the Canadian and US economies in terms of their employment structures, as described by detailed industry sector. Furthermore, with comparable industry-specific output data (gross domestic product, or GDP) for each country, it is possible to consider labour productivity levels in each industry sector and how they have changed over recent years in both Canada and the US.

Before jumping into the numbers it is important to emphasize why issues of labour productivity will become increasingly important to all Canadians. The leading edge of the post-World War II baby boom generation celebrates their 65th birthday this year, thus marking the beginning of Canada's third great demographic transition—a transition that will see our dependency ratio (the ratio of the working-aged to non-working-aged population) begin to rise, the growth rate in our labour force begin to slow (even in the face of growing labour force participation in the older age groups), and funding of our social services (such as health care and the Canada Pension Plan) become increasingly challenging. With labour force growth that is expected to be below one percent annually by the end of the decade—and is expected to continue to trend downwards thereafter²—any growth in Canada's economy above this rate must be generated through gains in productivity.

¹ *Do Canadians lack the productivity gene?* Kevin Carmichael, *Globe and Mail Blog*, Friday, September 2, 2011 <http://www.theglobeandmail.com/report-on-business/economy/economy-lab/daily-mix/do-canadians-lack-the-productivity-gene/article2151348>.

² *The Perfect Storm*, Urban Futures: <http://www.urbanfutures.com/reports/Report%2066.pdf>.

We should also define “productivity” and explain how we use it in the context of this brief analysis. One of the most common measurements of productivity is GDP per worker, also known as *labour productivity*. While not the most detailed measure, it is often the most widely quoted, as data are readily available and therefore more easily compared between countries. One refinement to GDP per worker is GDP per hour worked, which considers the total value of output produced not in the context of all workers, but the total hours worked by all of the workers. Finally, there is multifactor productivity: while labour productivity focuses on the output per worker (or per hour worked), multifactor productivity attempts to measure output relative to the combination of all inputs that contribute to production (such as labour, capital, and technology, as well as intermediate inputs such as energy). While it is a more comprehensive measure, it is also much more difficult to calculate and compare between countries.

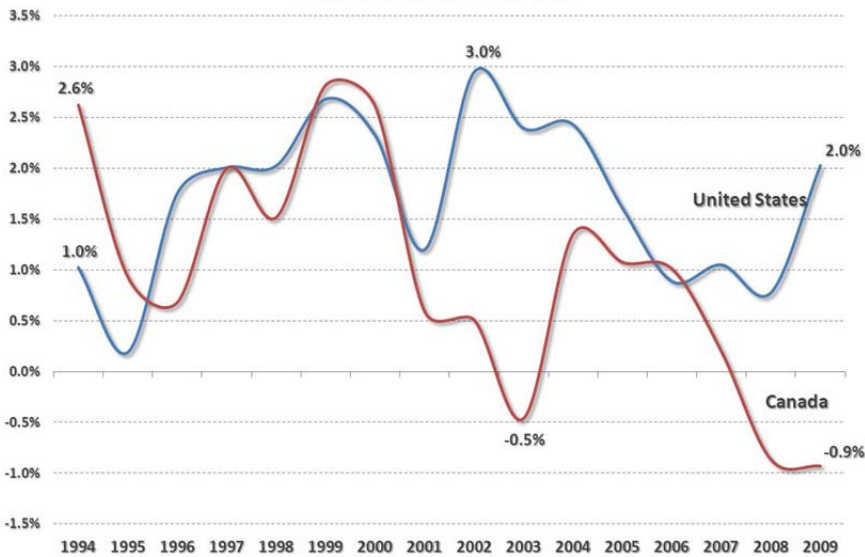
For purposes of this analysis we are considering labour productivity (GDP per employed person), due to the fact that a consistent database of both industry-specific employment and output data are available for both Canada and the United States through the North American Industry Classification System (NAICS). Thanks to this standardized industry classification system we can consider total employed labour force by industry sector, total output for each of those sectors, and as a result, the associated levels of labour productivity for each industry sector over the 2003 to 2008 period (the years for which complete data sets are available in both countries). In considering changes to labour productivity over this period, we have used constant-dollar output, by industry, to control for the impact of changing market prices within each industry sector.

Labour Productivity: A Brief History

The most recent available data show that between 1994 and 2009 annual total labour productivity growth in Canada went from mediocre to worse, falling from an average of 1.8 percent through the last half of the 1990s, to just below one percent through the first half of the 2000s, and further to only 0.1 percent between 2005 and 2009 (Figure 1). This decline in our annual rate of labour productivity growth was clearly exacerbated by the recent global financial crisis, as labour productivity actually *declined* by 0.9 percent in both 2008 and 2009.

While the recent downturn could be expected given the magnitude of fiscal and economic challenges we faced both domestically and in many of our key trading markets, US labour productivity growth in recent years was less impacted by the economic challenges of 2008-09. In fact, US labour productivity growth not only remained positive in 2008 (0.8 percent), it *increased* in 2009 (two percent), the highest growth since 2004.

**Figure 1: Change in Labour Productivity,
Canada & the United States**



So while between 2008 and 2009—the height of what many are calling the greatest economic downturn since the Great Depression—labour productivity grew in the United States and *declined* in Canada. It is instructive to understand what drove this pattern of change. Between 2008 and 2009, GDP in both Canada and the United States declined, by 2.6 and 2.4 percent, respectively. Over the same period employment in both countries also declined, although to a much greater

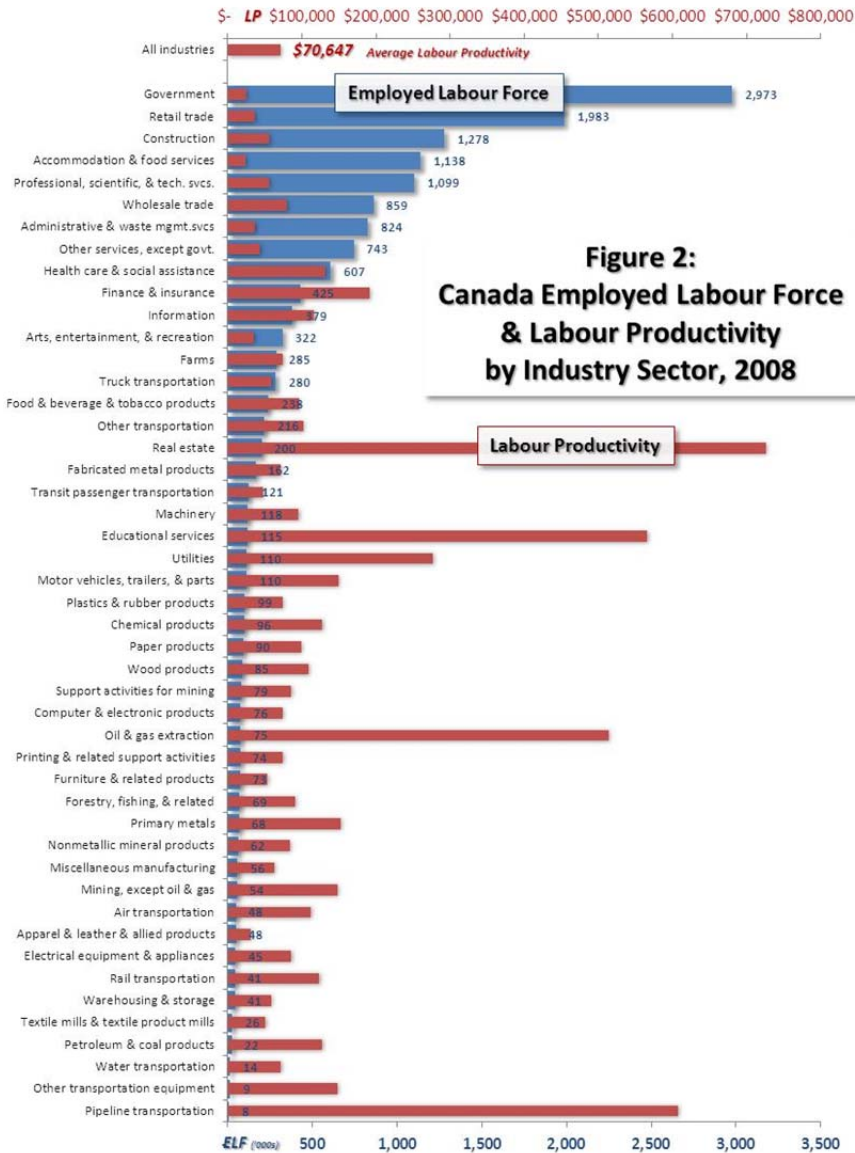
extent in the United States: while employment in Canada fell by 1.7 percent, employment in the US fell by 4.4 percent. Thus, while Canada was better able to maintain the size of its employed labour force over this period than was the United States, the US was better able to maintain its economic output (GDP), despite heavy job losses. The results of these changes were that the US was able to sustain labour productivity growth, while in Canada labour productivity fell due to the disproportionate decline in GDP relative to employment. Given these outcomes, one might conclude that the recent divergence in labour productivity between the two countries can be attributed to structural employment differences. But is this really the case? To answer this we need to directly consider the employment structure of each country's economy.

The Canadian Context

In 2008 there were 17,068,020 people employed in Canada's labour force. Figure 2 shows that the largest employment sector was government services, accounting for 17 percent (3.0 million) of Canada's total employed labour force. The next largest sector was retail trade, accounting for 12 percent (2.0 million), followed by construction (seven percent, 1.3 million), accommodation and food services (seven percent 1.1 million) and Professional, scientific and technical services (six percent, 1.1 million).

Interestingly, while Canada's economy would be considered diverse by most measures, these top five industry sectors accounted for fully half of all employment in Canada. Furthermore, if the top ten sectors (in terms of total employment) are considered, they constitute three-quarters of all employment in Canada.

With respect to the productivity of Canada's 17 million workers, given total GDP of \$1.2 billion in 2008, each worker produced an average of \$70,647 in that year. A wide range in labour productivity was seen amongst the sectors, ranging from a high of \$725,488 in



**Figure 2:
Canada Employed Labour Force
& Labour Productivity
by Industry Sector, 2008**

real estate services to a low of \$23,762 in accommodation & food services. Within this broad range, several interesting points emerge. For starters, sectors that can be characterized as demonstrating high labour productivity, such as real estate, educational services, and oil and gas extraction, employ relatively few workers. As an example, the real estate services sector accounts for only 1.2 percent of all jobs in Canada, educational services 0.7 percent, and oil and gas 0.4 percent. In all, the five sectors with the greatest labour productivity in Canada represented only 3.0 percent of Canadian employment.

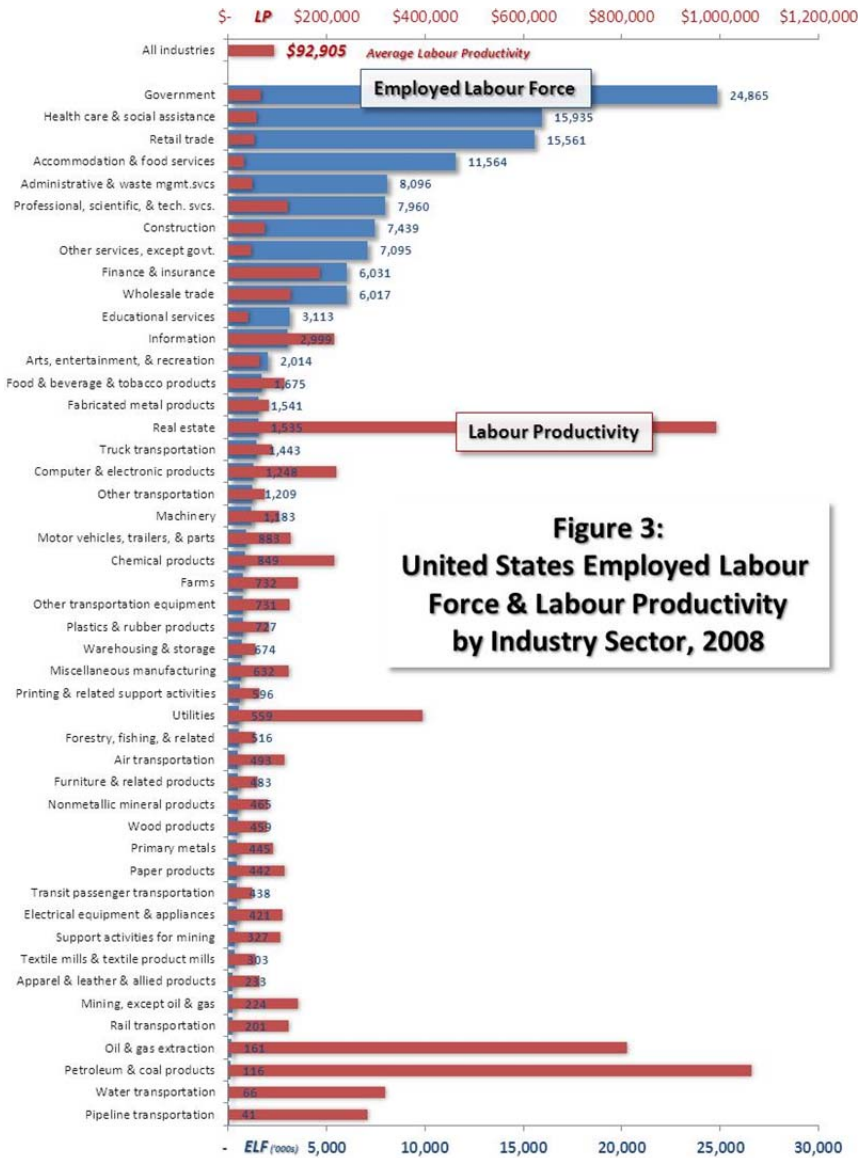
The obverse to this is seen in our largest employment sectors: while the top five sectors represented half of all employment in Canada, labour productivity in each of these sectors fell well below the average for all sectors. Collectively, labour productivity

in the top five employment sectors in Canada was \$36,413 per worker in 2008, almost 50 percent below the \$70,647 average for all workers.

The picture that this paints is an economy with a significant proportion of its employment in sectors that have inherently low levels of labour productivity. In some instances this might be expected: a significant share of employment in Canada happens to be in service-producing sectors, where labour productivity tends to be relatively low and more difficult to increase (a doctor can only serve so many patients in a day!)

The United States

So how different was the situation in the United States? Figure 3 shows the hierarchy of industry sectors in the United States. The largest employment sector in 2008 was government services, employing 24.9 million people and accounting for 17 percent of all



**Figure 3:
United States Employed Labour
Force & Labour Productivity
by Industry Sector, 2008**

jobs in the US, exactly the same share as in Canada. Health care and social assistance ranked second in the US, employing 15.9 million people or 11 percent of all workers; in Canada, retail was second and health care and social services ranked tenth.

That said, retail trade ranked third in the US, with its 15.6 million workers comprising 11 percent of the US employment base (just below Canada’s 12 percent). The next two largest sectors were accommodation and food (11.6 million, eight percent) and administrative and waste management services (8.1 million, six percent). Similar to Canada, these top five sectors accounted for slightly more than half of all employment in the United States (53 percent).

The similarity between the two economies is evident, with three of the same sectors falling within the five largest

sectors in each economy. In fact, if broadened beyond the five largest sectors to the top ten, a perfect correspondence is seen between the two countries, albeit the sectors appear in a slightly different order. In other words, the structure of the US and Canadian economies is not significantly different from one another in terms of the sectors within which people are employed.

Relative to average output of \$92,905 per worker, each of the top five sectors in the US come in below this level of productivity. Average aggregate productivity within these top five sectors was \$54,539 per worker in 2008; 41 percent below the average for all workers. Additional similarities are seen in labour productivity within other sectors, with one of the most productive sectors being real estate services (\$992,769 per worker, only slightly behind petroleum and coal products, at \$1.06 million) and the lowest being in accommodation & food services (\$31,953 per worker).

Final Thoughts

What can we conclude from these data? While there are differences that exist between the Canadian and US economies in terms of our relative employment composition, these differences are mostly evident outside of our largest employment sectors: the majority of workers in each country (70 percent in Canada and 77 percent in the US) were employed in the same ten largest industry sectors (albeit with a slightly different rank order). As such, it is difficult to conclude that differences in the employment structure of the two countries' economies would explain the differences in labour productivity between them.

This points us toward the Canada-US labour productivity gap being a function of same-sector differences in labour productivity. For example, if the top five employment sectors in Canada are considered, we see that while labour productivity in the government sector in Canada was 65 percent below average, it was only 29 percent below average in the US. A similar situation is seen for retail trade (49 percent below average in Canada versus 43 percent in the US) and construction (21 percent below in Canada and 20 percent below in the US). While accommodation and food services was similar between the two countries (both being 66 percent below average), labour productivity in professional, scientific and technical services was 21 percent below average in Canada and 30 percent above average in the US. While labour productivity in Canada's top five sectors was 50 percent below the average for all workers, labour productivity in the top five employment sectors in the US was 40 percent below average.

While this may help us understand why there exists a productivity gap between Canada and the US, it does beg one additional question: why has this productivity gap been growing over time, and in recent years growing more rapidly?

Research on this topic is abundant; however, definitive and specific answers are not. That being said, at a high level, recent research by Statistics Canada³ and other organizations, has shown that over the past decade differences between US and Canadian labour productivity were not the result of labour composition (i.e. the skill level of the workforce) or capital intensity, but rather slower growth in multifactor productivity⁴ in Canada. In fact, while multifactor productivity has increased in the US since 2000, it has actually declined in Canada. This decline was driven by falling productivity in two main sectors: mining, oil and gas extraction, and manufacturing. It has been hypothesized that declining multifactor productivity in the mining, oil and gas

³ The Canadian Productivity Review, *Productivity Performance in Canada, 1961 to 2008: An Update on Long-term Trends*, John Baldwin and Wulong Gu, Economic Analysis Division, Statistics Canada, ISBN 978-1-100-13304-1, 2009.

⁴ Multifactor productivity measures the efficiency with which the economy translates a range of productive inputs (labour, capital, and intermediate inputs such as energy, materials, and business services, among other things) into output.

sector was related to changing global prices for energy and other commodities, while the decline in Canadian manufacturing productivity was associated with the rising value of the Canadian dollar.

These are important findings, but it's not the end of the story. The next chapter of research into Canada's labour productivity performance should delve further into issues relating to multifactor productivity, measuring more precisely the role played by technological change, market scale, barriers to trade and market entry, and intermediate inputs such as energy, materials, land, and purchased services. Given Canada's looming demographic challenges, our labour productivity performance will become increasingly important to the health of our economy. As such, we'll be keeping a keen eye on recent trends and new information as we dig further into issues of Canadian productivity. Stay tuned!