TRILLIUM NETWORK
FOR ADVANCED MANUFACTURING

Canada's Manufacturing Sector: A Decade in Review

AUGUST 2020

PAUL BOOTHE, BRANDON CHANG, AND DAVID MOLONEY

Introduction and Summary

Canada's manufacturing sector was dealt a severe blow by the 2008-09 Global Financial Crisis (GFC), that had triggered the deepest economic recession as of that point since the 1930s, both in Canada and world-wide. The resulting economic pain was felt broadly across Canada and remains a benchmark even in the context of the economic shock caused by the 2020 COVID-19 pandemic.

This is the third in the Trillium Network for Advanced Manufacturing's series of reports that focus on the evolution of Canadian manufacturing over the past decade. While other reports examine particular industries such as automotive and breweries, this report examines the evolution of Canadian manufacturing as a whole.

A typical caricature of Canada's manufacturing sector over the past decade would paint some version of a downward spiral. And yet, as this report illustrates, growth in Canadian manufacturing since the GFC has broadly matched overall economic growth in Canada in key respects.

This report reconciles those two summary assessments by adding as perspective how Canadian manufacturing fared in the years leading up to that crisis, and through the crisis itself.

Understanding this trajectory has to some degree been complicated by factors driving the explosive growth of global manufacturing (and prosperity) beyond the traditional "industrialized" economies, led by developing and middle-income countries. The report provides a check against such broader developments by comparing the evolution of Canada's manufacturing sector to that of manufacturing in the United States. Finally, factors driving growth in the service-producing industries in Canada, as elsewhere, are also highlighted.

Two core facts stand out from this report that demand more detailed analysis and a considered policy response. First, value-added created in Canada's manufacturing sector has recovered substantially over the past decade and is broadly in line with the overall economy but has not regained the levels seen before the 2008-09 GFC. Second, total manufacturing employment has not returned to the levels of the first year of the recession.

While these facts are rather stark, the underlying factors are complex and open to interpretation. For example, the fact that employment remains below the levels of 2008 clearly reflects both output levels and the increased productivity required for firms to remain globally competitive. This in turn has required a shift of labour to other sectors of the economy, with attendant challenges for facilitating the necessary adjustment, including attracting capital.

In this report, we take an initial high-level view of Canadian manufacturing. Further work will look in more detail at developments and dynamics over time within key sub-sectors of Canadian manufacturing.

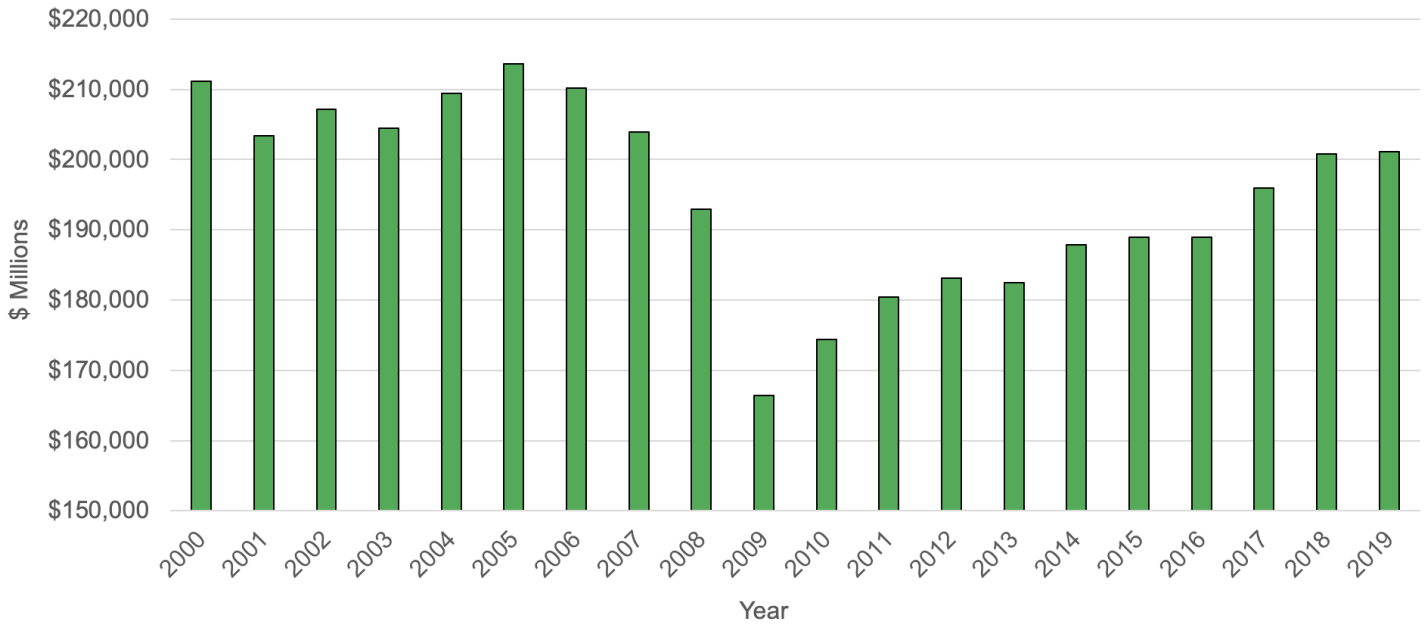
Manufacturing GDP (*Value Added*)

As Figures 1 and 2 illustrate, real (i.e. inflation-adjusted) manufacturing GDP was relatively flat over the period 2000 to 2007, with a slight downward trend. The cumulative decline of 3.4 percent over the period significantly underperformed Canada's economy as a whole, which grew by a cumulative 19.5 percent in real terms.

Real manufacturing GDP declined sharply beginning in mid-2008 and through to mid-2009 as global demand collapsed. Canadian GDP overall fell by a cumulative 2.5 percent from 2007 to 2009, but Canada's manufacturing sector was hit much harder, falling 18.4 percent over the two years. The automotive industry in particular led a range of industries into deep cutbacks or even shutdowns and restructuring.

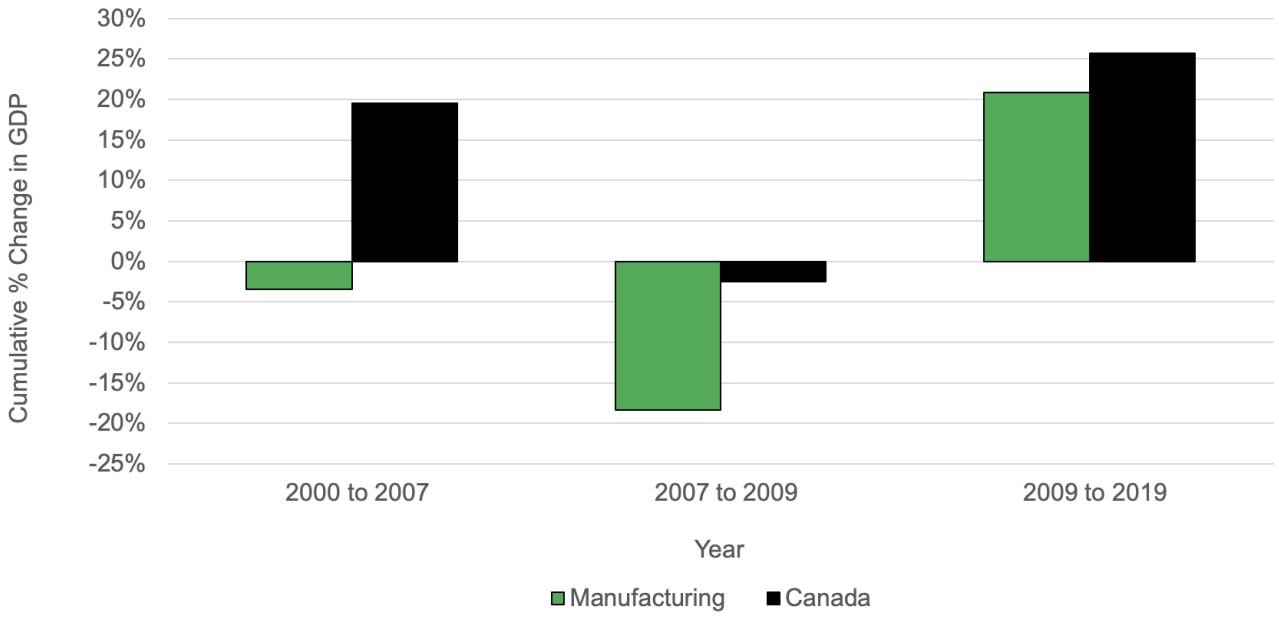
Over the past decade, real GDP recovered substantially both in manufacturing and throughout the Canadian economy broadly. As Figure 2 illustrates, growth in manufacturing output over the past decade fell short of economy-wide growth but by much less than is broadly assumed. However, Figures 1 and 2 together also illustrate the extent to which manufacturing has not fully recovered the lost levels of activity posted as of 2007, just prior to the GFC.

Figure 1 – Manufacturing GDP, 2000-2019



- Data Source: Statistics Canada, 2020 (Table: 36-10-0434-03)

Figure 2 – Manufacturing GDP vs. Total GDP



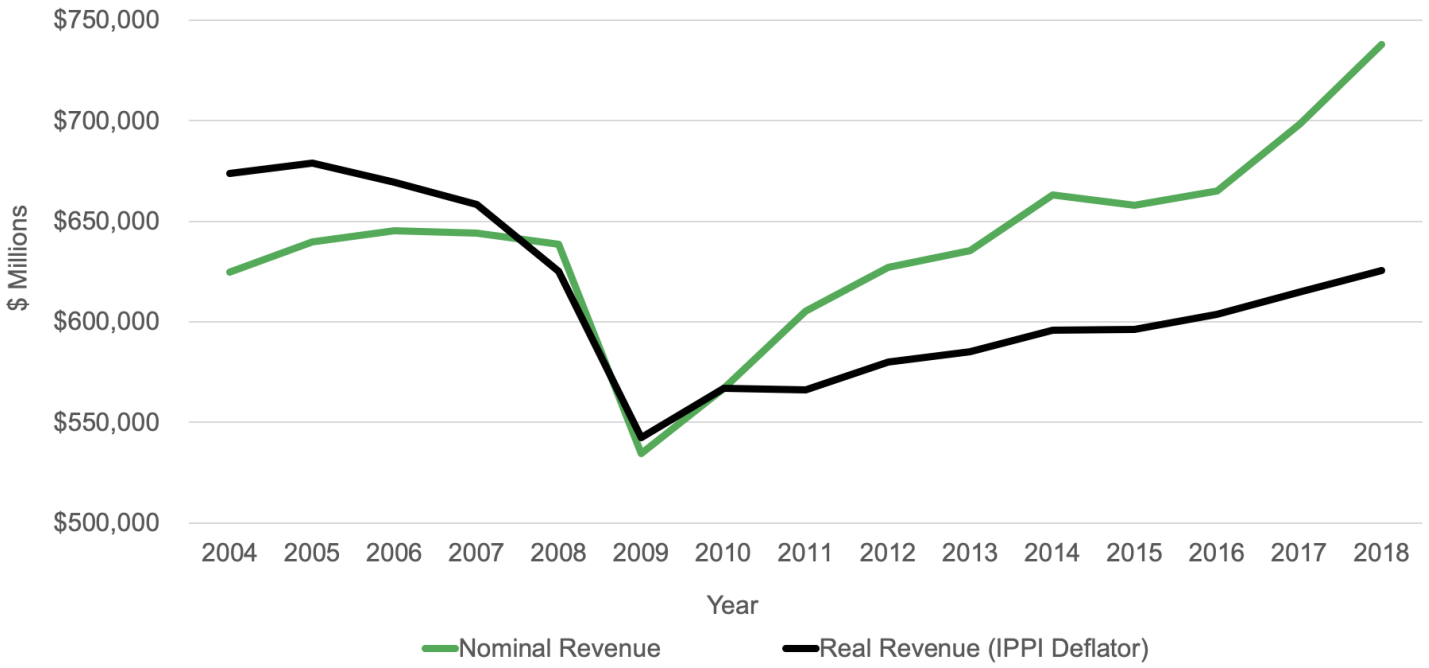
- Data Source: Authors' Calculations; Statistics Canada, 2020 (Table 36-10-0434-03)

Manufacturing Revenue (*Sales*)

Total manufacturing revenues comprise the total net sales at current prices of Canadian manufacturing firms. This measure captures the total turnover value of firms' operations, in contrast to measures of value added (such as GDP), which capture sales less the economic cost of all inputs.

As Figure 3 illustrates, manufacturers' revenues were broadly flat leading up to the GFC, in nominal (current prices) terms. However, consistent with developments in the GDP data, when deflated by Statistics Canada's Industrial Product Price Index, real revenues had already been falling as of 2006. The GFC led to a further drop of 17.6 percent (at constant prices) in revenues booked in 2009 relative to 2007.

Figure 3 - Manufacturing Revenue, 2004-2019



Data Source: Authors' Calculations; Statistics Canada, 2020 (Tables 16-10-0117-01 and 18-10-0029-01)

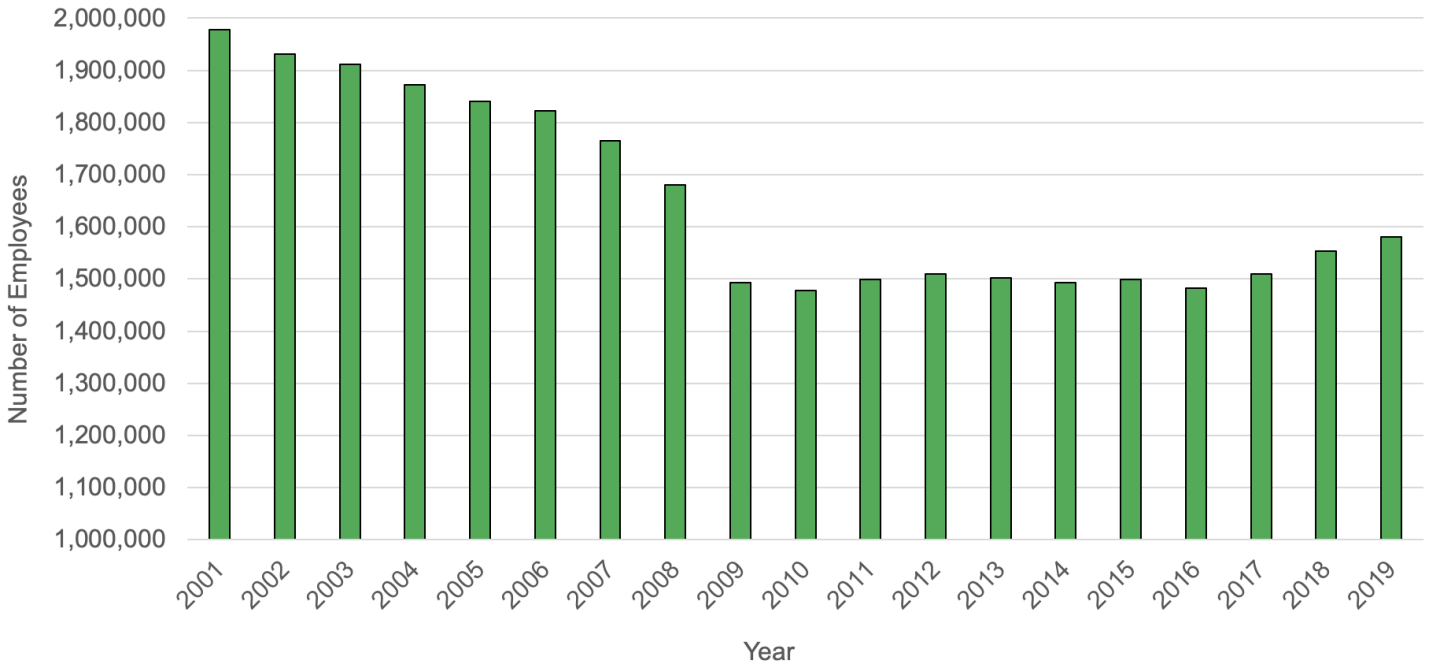
Following the recession, revenues rebounded in both real and nominal terms, albeit at much more modest rates when adjusted for inflation. Manufacturers' revenues did recover to pre-GFC levels by 2014 in nominal terms, with growth stalling through 2016 before accelerating notably through 2017 and 2018. However, closer to the pattern in the value-added GDP data, real revenues only just recovered to the 2008 level as of 2018.

Employment

Any review of manufacturing employment in Canada has been a cautionary tale over the past two decades, even though it has evolved in two quite distinct chapters.

As was the case in many of the advanced industrialized countries, manufacturing employment was already declining in Canada between 2001 and 2007, down 213,000 jobs (10.8 percent) overall. This reflected competitive pressures as global supply chains spread rapidly and required productivity gains both internal to firms and via outsourcing of non-core functions. The GFC accelerated this downtrend sharply, as 84,000 jobs were lost as the crisis began in 2008. A further 187,000 jobs were cut in 2009 and 16,000 jobs were lost on average in 2010, well beyond the end of the economy-wide recession in mid-2009 (see Figure 4).

Figure 4 – Manufacturing Employment, 2001-2019



Data Source: Statistics Canada, 2020 (Table 14-10-0202-01)

Manufacturing employment remained relatively steady between 2010 and 2017

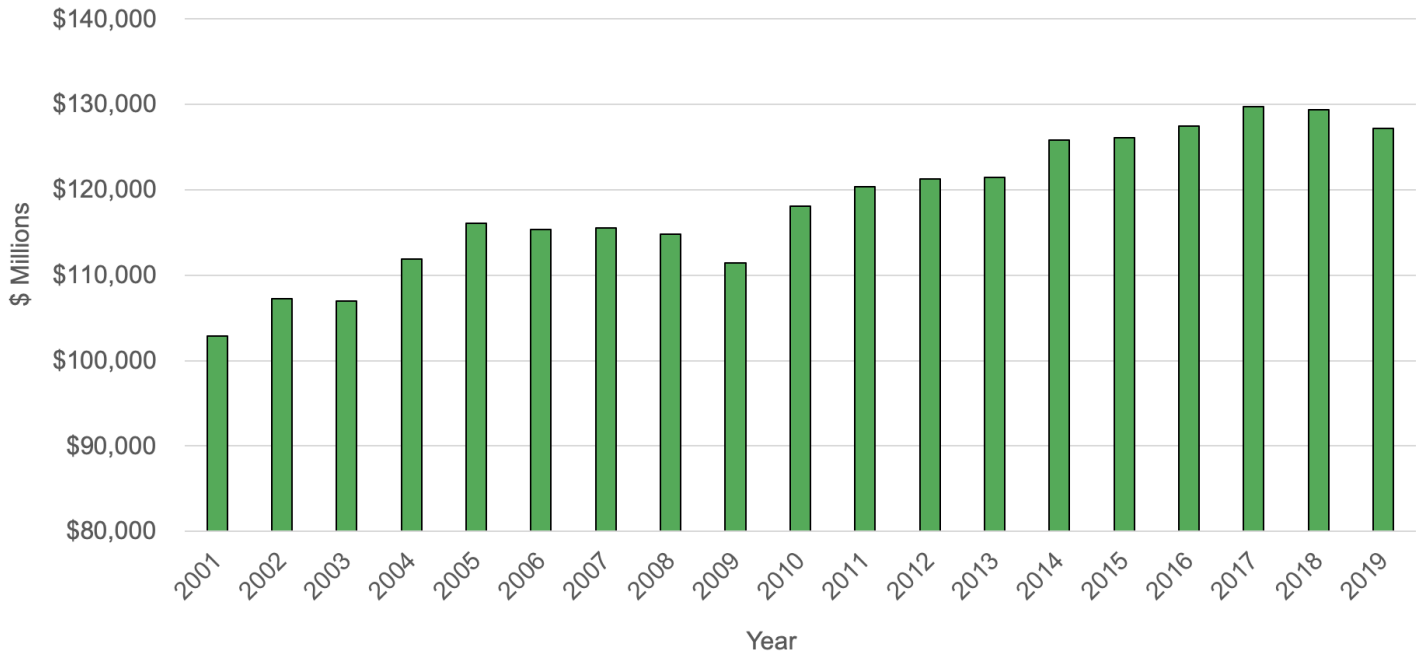
Manufacturing employment remained relatively steady between 2010 and 2017, with modest increases recorded in 2018 and 2019. The latter rebound reflects at least in part the notable growth of labour-intensive food manufacturing industries such as meat processing and commercial bakeries.

The overall outcome translates into modest growth in manufacturing productivity sector-wide over the decade, as is reviewed in the next section. Nonetheless, the marked impact on employment levels between 2001 and 2010 looks to be permanent. As of 2019, one-third (103,000) of the 287,000 manufacturing jobs lost between 2007 and 2010 (annual averages) have been replaced within the sector. As noted earlier, 2019 employment levels remain 6 percent below the annual average for 2008, one-half of which year was in the economy-wide recession. Further assessment is warranted of the sub-sector (3-digit NAICS code industries) dynamics over this period to better understand the more detailed impacts in terms of resulting shifts in workforce to other sectors of the economy.

Output per Employee

Manufacturing output per employee grew moderately from 2001 through 2019, averaging about 1.2 percent annually (Figure 5). Within that trend, two periods of 2.5 percent annual growth (2001 to 2005 and 2009 to 2014) were each offset by a period of broadly-flat performance that followed. Overall, this pattern supports an inference that the employment performance generally reflects the modest rebound in output growth as opposed mainly to efforts to sharply boost productivity in pursuit of market penetration and profitability.4).

Figure 5 – Manufacturing Output per Employee, 2001-2019



Data Source: Authors' Calculations; Statistics Canada, 2020 (Tables 36-10-0434-03 and 14-10-0202-01)

An important caveat, however, recognizes that productivity levels differ markedly across the sub-sectors of Canadian manufacturing, such that differing rates of market growth and market share at the sub-sector level can shift the overall averages materially. For example, modest declines in overall manufacturing output per employee over the last two years may in the main reflect the growth in the share of relatively labour-intensive agri-food manufacturing in the overall manufacturing mix, as noted above.

Exports

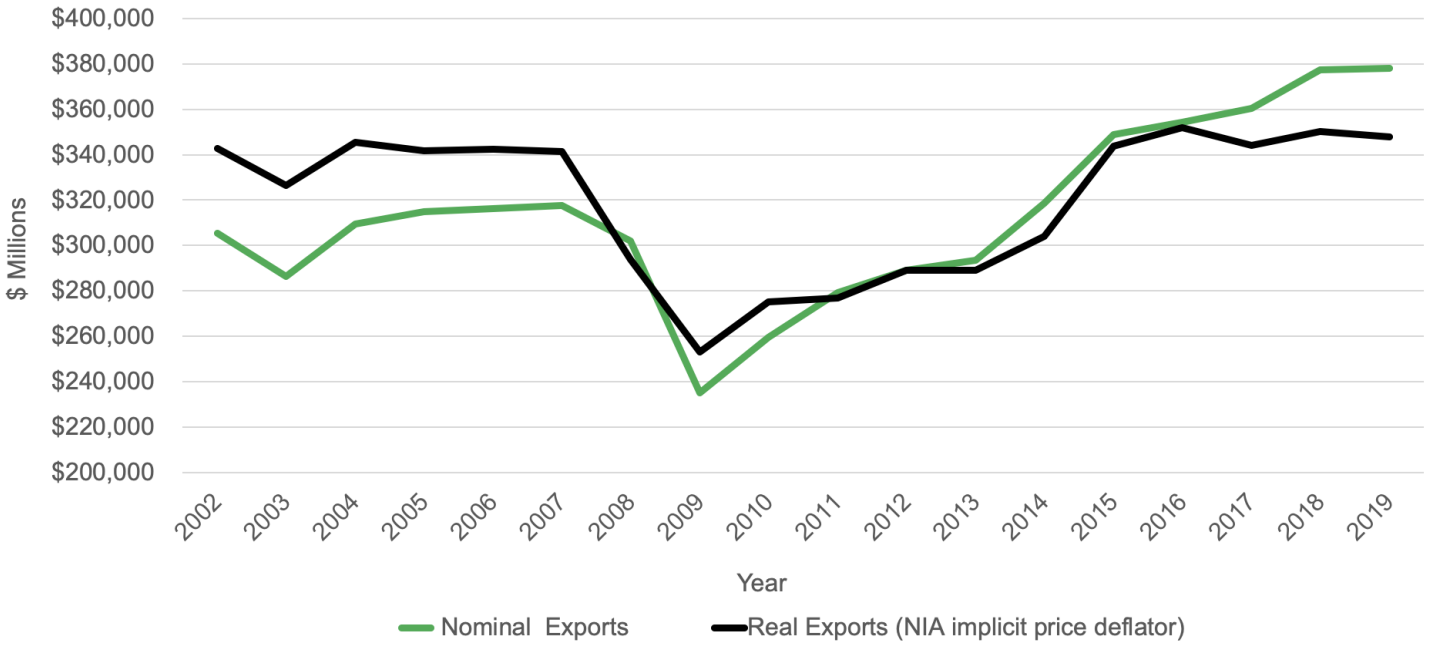
Canadian manufacturing exports fluctuated in a relatively narrow range from 2002 to 2008, at both current and constant prices (Figure 6). They fell sharply through the course of the GFC, at rates that significantly exceeded the declines in both revenues and GDP: a 26 percent decline in both real and nominal export values from 2007 to 2009.

Post-recession, exports also rebounded more sharply than did output and revenues, although 2007 levels were still only regained by 2014, at current prices, and by 2015 at constant prices.

As depicted in Figure 7, exports have long accounted for a substantial share of total revenue for manufacturers, fluctuating narrowly just below the 50 percent level in nominal terms and slightly above it at constant prices prior to the GFC. In real terms, the GFC shock was less sharp than might have been expected, at 5.3 percentage points, but was relatively drawn-out, with full recovery only in 2015. At current prices, the GFC's impact was almost identical in both size and duration.

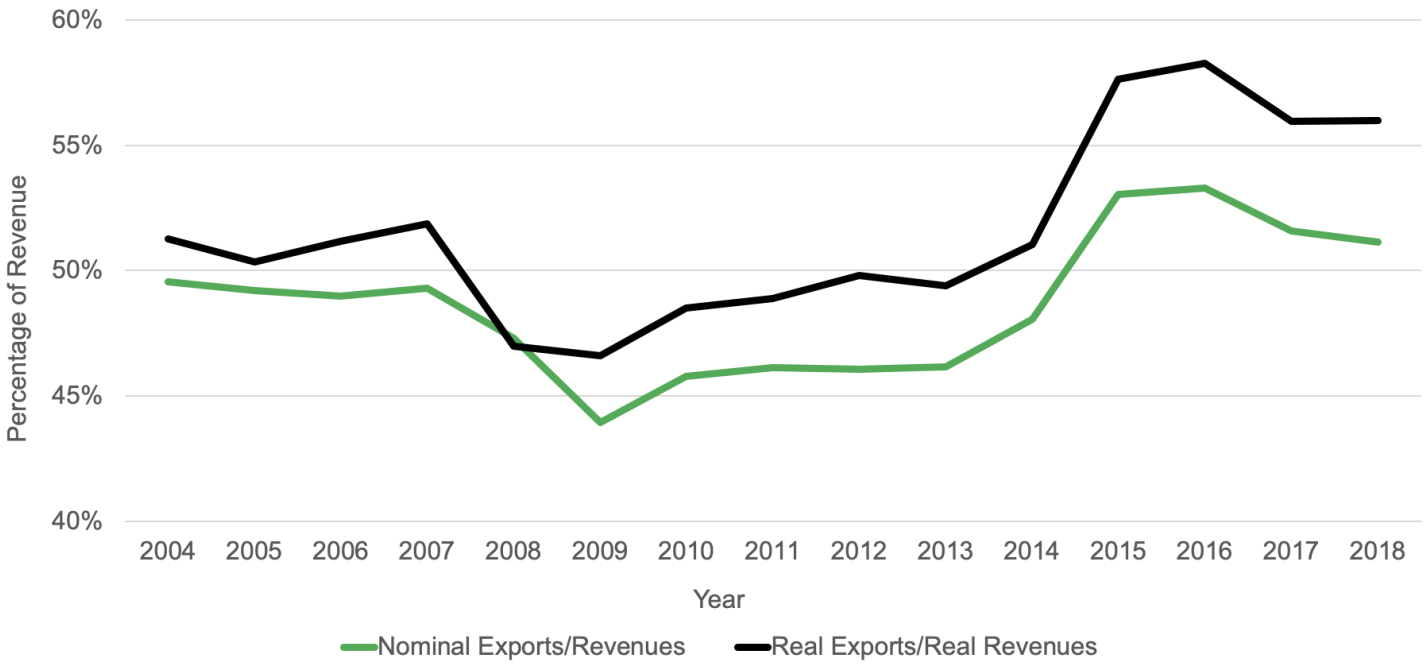
Separately, it is notable that the share of manufacturing revenues derived from exports hit new highs by 2015 and maintained at least a portion of those gains.

Figure 6 – Manufacturing Exports, 2002-2019

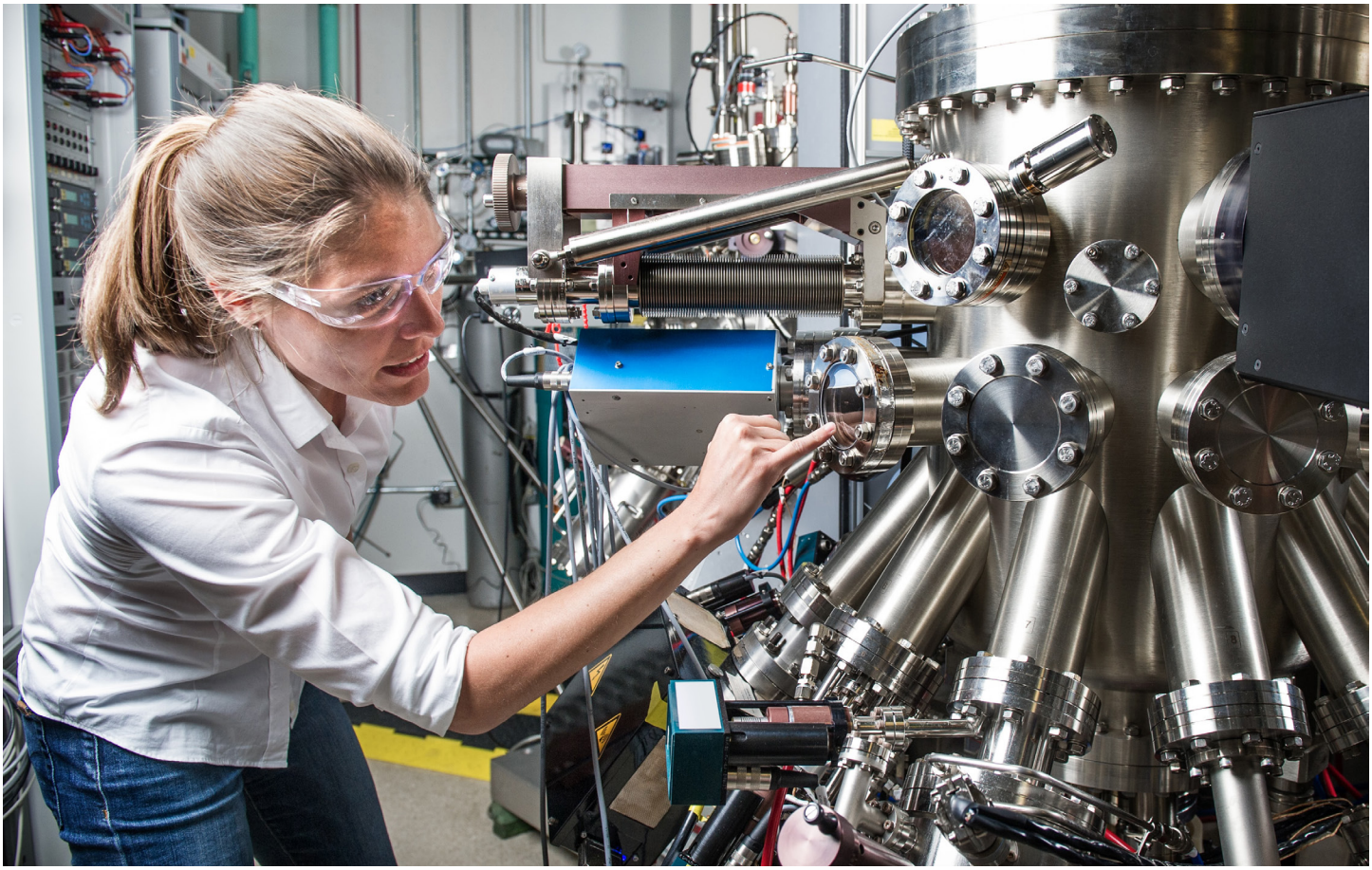


Data Source: Authors' Calculations; ISEDC Trade Data Online, 2020; Statistics Canada, 2020 (Table 36-10-0130-01)

Figure 7 – Share of Manufacturing Exports in Revenues, 2004-2018



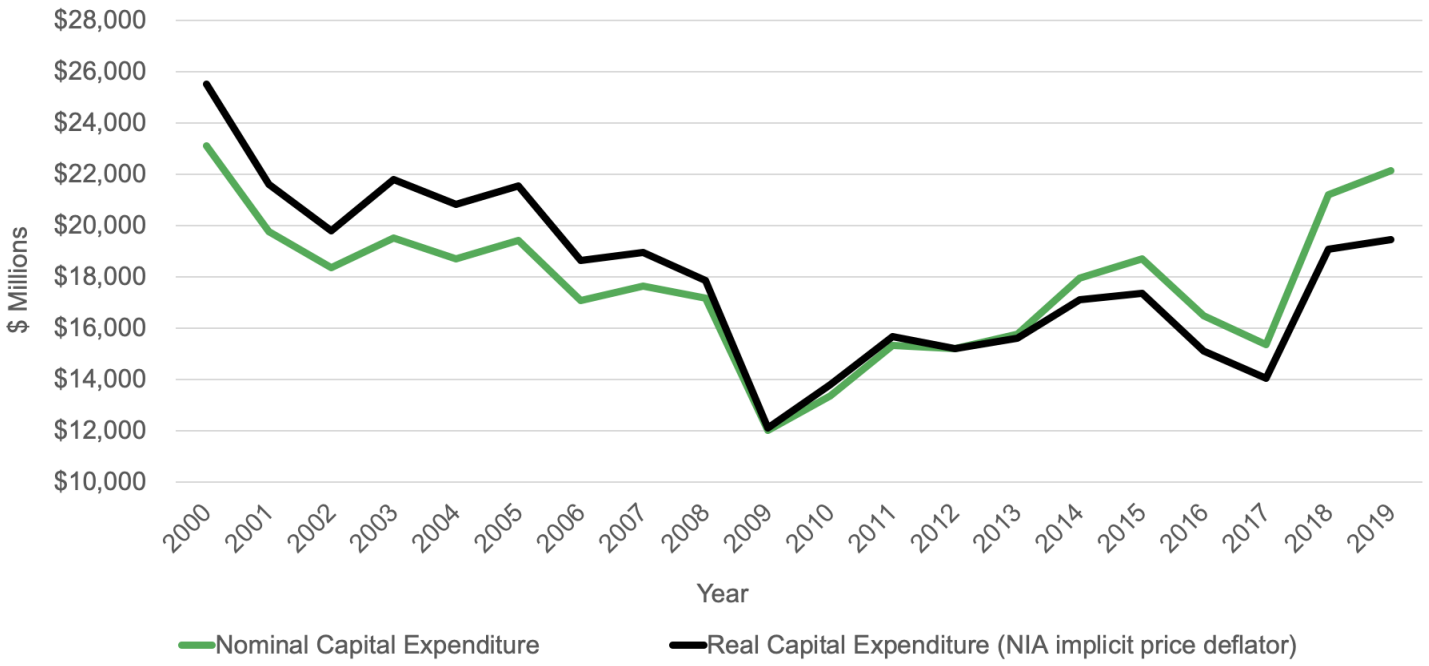
- Data Source: Authors' Calculations; ISEDC Trade Data Online, 2020; Statistics Canada, 2020 (Tables 36-10-0130-01, 16-10-0117-01 and 18-10-0029-01)



Capital Expenditures

Capital expenditures by Canada's manufacturers fell markedly on trend throughout the decade from 2000, with the GFC representing a steepening of that underlying trend, whether depicted in current or constant prices. At current prices, capital expenditures fell by 24 percent from 2000 to 2007, with the GFC causing a drop of 32 percent through 2008 and 2009 alone. The declines in real terms were quite similar overall: declines of 26 percent over 2000-2007 and of 36 percent through 2008 and 2009. Capital expenditures began to recover as of 2010, regaining the 2007 levels by 2014 in nominal terms but only recovering fully by 2018 in real terms after reversing a new two-year slide from 2015 to 2017 reaching 19 percent (see Figure 8).

Figure 8 – Manufacturing Capital Expenditures, 2000-2019



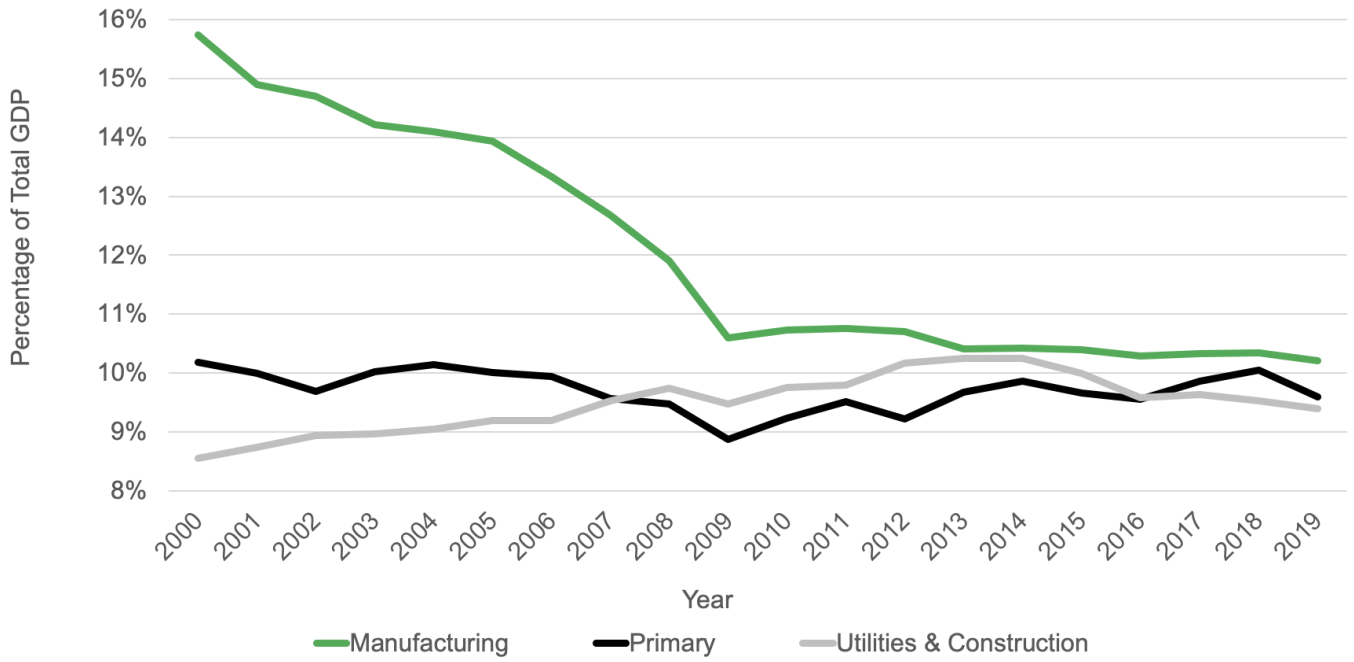
Data Source: Authors' Calculations; Statistics Canada, 2020 (Tables 34-10-0036-01 and 36-10-0130-01)

Share of Manufacturing in Canadian Economy

It is well-known that the manufacturing sector's share in the Canadian economy as a whole fell markedly from 2000 to 2009, dropping from 15.7 percent to 10.6 percent (Figure 9). What is less well appreciated is that its share has remained broadly stable since then, drifting down only very slightly to 10.2 percent over the decade to 2019.

Nonetheless, a longstanding period has now ended during which manufacturing accounted for a substantially larger share of Canada's GDP than either the combined "Primary Industries"[1] or utilities and construction combined. This convergence was not due mainly to growth in the share of the latter, which have been broadly stable, but rather to the decline in manufacturing's share prior to 2009.

Figure 9 – GDP Share, Manufacturing vs. Other Goods-Producing Sectors, 2000-2019



Data Source: Authors' Calculations; Statistics Canada, 2020 (Table 36-10-0434-03)

Nor is the shrinking share of manufacturing in the overall economy due to rapid growth in the size of government. As Table 1 illustrates, the key shift in the high-level structure of the economy in the past two decades was the outperformance of Service Industries other than core government activities (which are captured in "Public Administration"). The bulk of this shift took place prior to 2009, however, although it continued at a gradual pace through 2019.

[1] Primary Industries are taken here to include NAICS codes 11 (Agriculture, forestry, fishing and hunting) and 21 (Mining, quarrying and oil and gas extraction).

Table 1: GDP Shares by Sector (%)

	2000	2009	2019
Public Administration	6.7	7.5	6.8
Other Services	58.9	63.5	64.0
Manufacturing	15.7	10.6	10.2
Primary Industries	10.2	8.9	9.6
Utilities & Construction	8.5	9.5	9.4

Data Source: Authors' Calculations, Statistics Canada, 2020 (Table 36-10-0434-03)

Further research is warranted in support of a deeper understanding of the firm-level dynamics that accompanied this shift. In particular, closer examination is warranted of the degree to which this shift towards the service industries reflects the "outsourcing" from manufacturers' operations of a wide variety of functions. In this case, offsetting shifts in GDP share – down in manufacturing and up in services – would represent continued activity in services to business but under different corporate models, as opposed to shifts in the broad allocation of labour to fundamentally different activities.

"Outsourcing" has been underway for decades and studied extensively, although more often in the context of "offshoring" of economic activity rather than industrial restructuring per se. Nor is it unique to manufacturing. (See for example Baldwin and Gu, 2008.) The drive for productivity growth under the pressure of increasing global competition required reassessment of business models in Canadian manufacturing as in other industries and other industrialized countries. Functions that were judged as non-core and more cost-effective if purchased from firms that specialize in such activities included both manufacturing functions and a wide range of business services. Widespread examples of the latter types of outsourcing by manufacturers ranged from corporate trucking fleets and janitorial services to accounting and IT support.

While this trend to outsourcing internal services began well before 2000, there is some evidence that it has continued in Canadian manufacturing since 2009[2] . Aggregate data are difficult to assemble given that statistical agencies classify "establishments" on the basis of their principal or main few activities. Detailed changes in ancillary operations or functions are thus difficult to capture at a broad level. Further analysis is nonetheless worth pursuing.

[1] For example, the "Supply and Use Tables" that underlie Statistics Canada's Input-Output tables indicate an upward trend through 2016 (the latest available data) in the proportion of gross manufacturing output devoted to purchased services. See Statistics Canada 15-602.

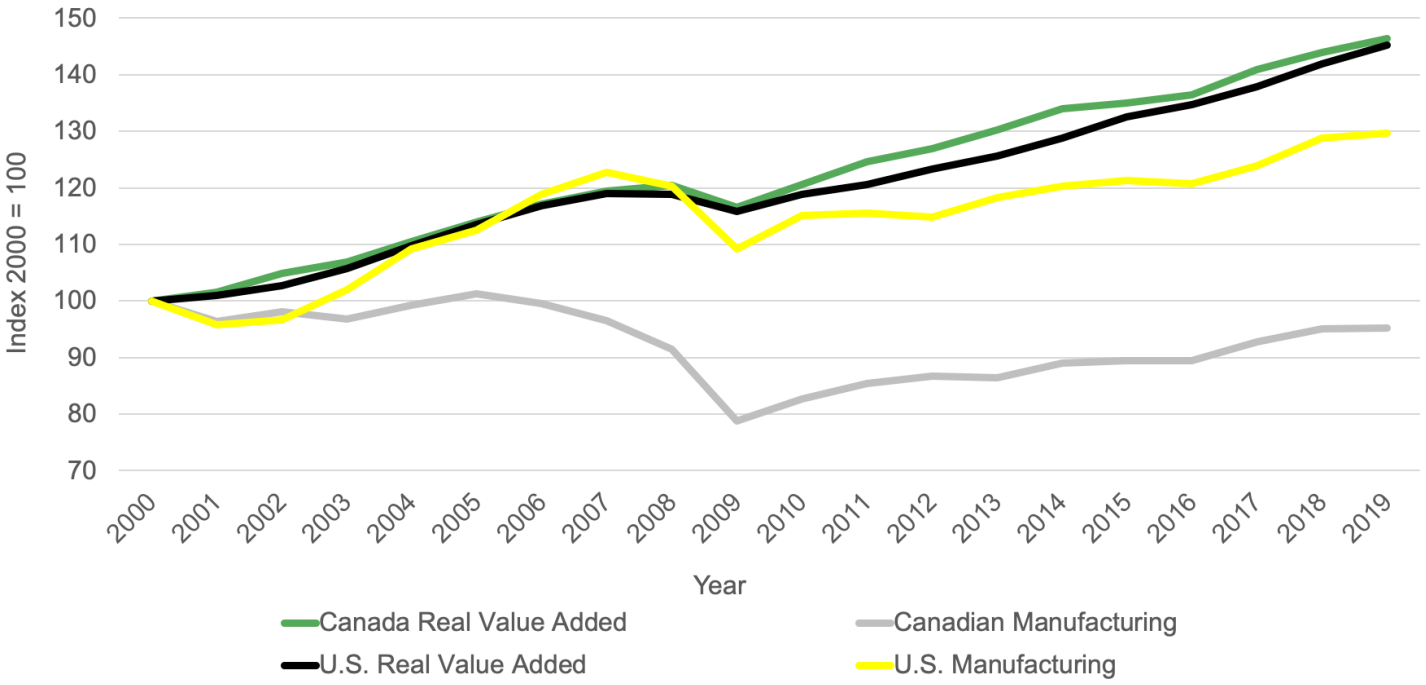
How does Canadian Manufacturing Compare to the U.S.?

The fact that Canada's manufacturing sector did not return fully to the levels reached prior to the GFC raises the obvious question as to whether the underlying factors are particular to Canada, or to manufacturing in the advanced economies more generally, or perhaps to a blend of both.

Equally obvious is to first broach those issues via a look at the performance of our closest neighbour, the market with which Canada's manufacturing sector is most closely integrated in terms of supply chains, as well as trade in final goods, going in both directions.

Figure 10 highlights the degree to which aggregate real value-added in Canada and the U.S. have tracked each other remarkably closely over the past decade. It also confirms that while the U.S. manufacturing sector has also clearly lost significant ground to the rest of that economy since the beginning of the GFC, the margin by which it is trailing is far less that that observed in Canada. More specifically, it confirms that U.S. manufacturers did eventually reach the pre-GFC level of real value-added. Nonetheless the fact that this recovery took a full decade – to 2017 – to complete does suggest that factors constraining manufacturing growth in Canada have not been entirely unique or home-grown.

Figure 10 – Canadian & U.S. Manufacturing Growth, 2000-2019

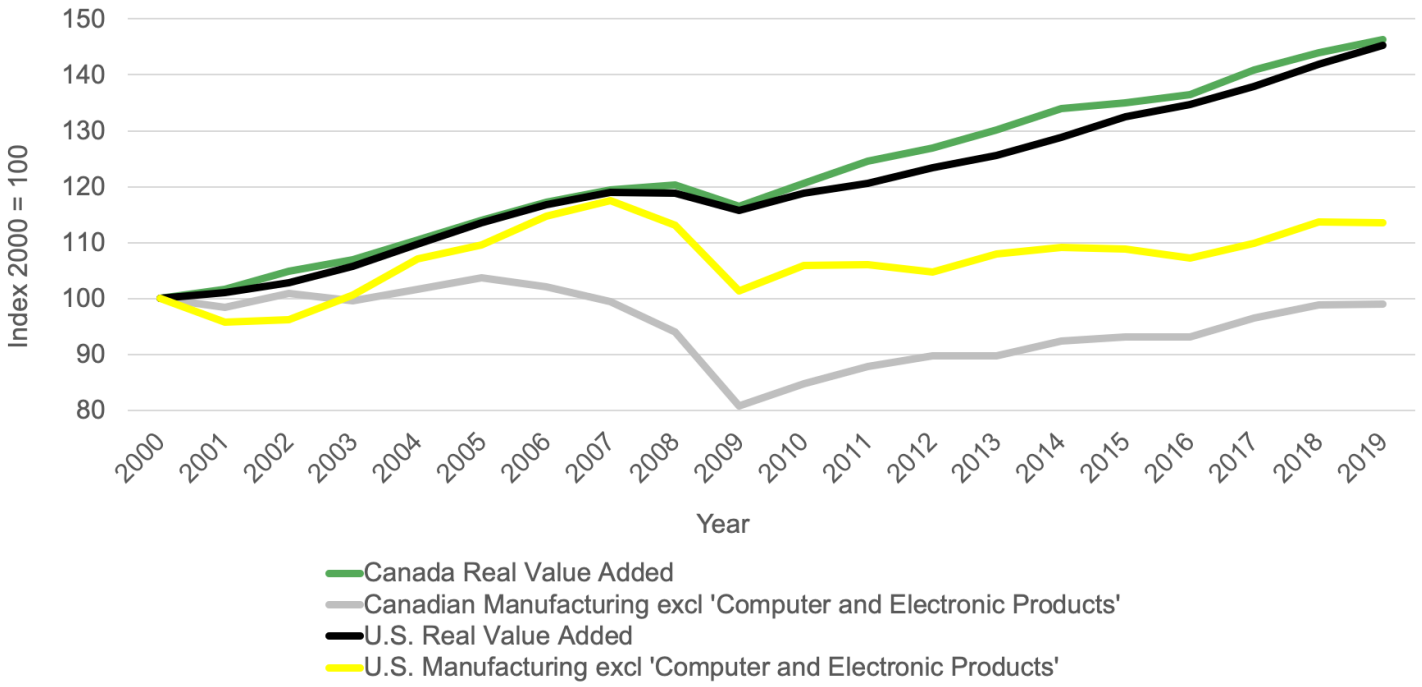


- Data Source: Authors' Calculations; Statistics Canada 2020 (Table 36-10-0434-03); U.S. Bureau of Economic Analysis (Real Value Added by Industry)

Previous comparative analysis (Clark and Couture, 2017) points to the importance of one specific industry in which Canada's manufacturing sector has grown far more slowly than that of the U.S. Using data through 2016, Clarke and Couture examined the relative performances of varying sub-sectors of the two countries' manufacturing sector. They demonstrated that a key driver of national differences in growth – whether before, during, or after the GFC – was the difference in performance of the Computer and Electronics Products manufacturing industries (C&EP) in the two countries. In 2000, this sector accounted for 1.1 percent of Canada's manufacturing output, compared to a 4.8 percent share in the U.S., a difference that widened rapidly thereafter. Canada's C&EI output fell 55 percent by 2019, to a 0.3 percent share of overall manufacturing. In sharp contrast, its U.S. counterpart grew by over 300 percent through 2019, jumping to a 16 percent share of overall manufacturing.

Figure 11 updates this portion of Clark and Couture's analysis by adding data for 2017 to 2019 to a look at growth in real value-added when C&EI are stripped out of both economies. Two conclusions emerge as relevant as we look to interpret Canada's performance. First, when C&EI are removed from the analysis of both countries, the remaining 84 percent of the U.S. manufacturing sector has been unable to completely recover from the GFC crisis, just as we have observed for Canada. Secondly, the balance of Canada's manufacturing sector posted growth of 22 percent between 2009 and 2019, far outstripping the 12 percent growth posted by the balance of U.S. manufacturing over that period.

Figure 11 – Canadian and U.S. Manufacturing Growth (Excluding Computer & Electronic Products), 2009-2019



Data Source: Authors' Calculations; Statistics Canada 2020 (Table 36-10-0434-03); U.S. Bureau of Economic Analysis (Real Value Added by Industry)

Cross-country comparisons of two-digit industry sectors are fraught with risk of misinterpretation. The foregoing analysis cuts both ways in that regard. Nonetheless, it does suggest that inferences about why Canada's manufacturing sector has lost relative weight over the past two decades should be drawn from analyses of dynamics beyond our borders as well as within. More specifically, the marked divergence between the fates of this high-value sub-sector in Canada vs in the United States does raise a broad range of questions that remain open to this day as to causes – ranging from government policies to financial sector structure -- and thus to how to avoid similar outcomes elsewhere.

Concluding Remarks

This review of Canada's manufacturing sector has taken a fairly broad-brush approach in order to set the stage for further, more-detailed examination of the underlying dynamics within the sector. Key findings include:

- Confirmation that the sector has performed better than is generally thought in the decade since the GFC, relative to the overall Canadian economy.
- Evidence as well that Canadian manufacturing performed better through that decade, relative to its U.S. counterparts, than is generally understood.
- Confirmation of the substantial – and likely permanent - shifts in the allocation of the Canadian labour force across the job market that have resulted from the sector's competitive response to the ongoing global evolution of manufacturing capacity and innovation. Governments and educational institutions all have important roles to play in ensuring that such major shifts in labour as well as capital are supported and facilitated.

Future reports in this series will continue to deepen our understanding of underlying dynamics of Canadian manufacturing.

References

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Sean Clarke and Lydia Couture (2017) “Real Growth of Canadian Manufacturing Since 2000” **Economic Insights** No. 074

TRILLIUM NETWORK
FOR ADVANCED MANUFACTURING

Trillium Network for Advanced Manufacturing
Room 6306
Social Science Centre
Western University
London, ON N6A 5C2

info@trilliummfg.ca

519 661 3351