The Big Shift

Changes in Canadian Manufacturing Employment, 2003–2018

Full Report

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Summary

In Canada, employment in manufacturing fell by over 500,000 positions between 2003 and 2009, with over 300,000 of the net decline occurring before the Great Recession of 2008-2009. Since then, there has been almost no employment growth in the sector. This research examines some straightforward questions: who was affected by this job loss, what happened to them, and what was the effect on the communities in which they had been employed? Were manufacturing jobs replaced with comparable jobs, in terms of skill level and pay, in the communities in which they were lost?

The short answer is that these jobs were only partially replaced with comparable ones in the construction, wholesaling, and trucking industries in the major metropolitan centres of Toronto, Montreal, and Vancouver, as well as in communities within commuting distance of these three cities. Other traditional manufacturing communities, such as Windsor and St. Catharines-Niagara, experienced substantially smaller growth in these sectors and a larger drop in their employment rate. Our research divides census metropolitan areas into three types: traditional manufacturing centres proximate to one of Canada's three major metros (or, in Toronto's case, a big metro unto itself), which we refer to as "economically connected" manufacturing centres; traditional manufacturing centres not proximate to a major metro, which we refer to as "economically isolated" manufacturing centres; and communities with traditionally small manufacturing footprints.

Between 2003 and 2018, there was a 5.7% decline in the employment rate for 25- to 54-year-old men without post-secondary education in connected manufacturing centres, and a 9% decline in isolated manufacturing centres; there was no change in the employment rate for this group in communities with a smaller manufacturing footprint. The overall employment rate for 25- to 54-year-olds fell by 0.6% in connected manufacturing communities and by 2% in isolated manufacturing communities, while it rose by 2.9% in other communities. In other words, traditional Canadian manufacturing centres have still not fully recovered from the 2003-2009 employment decline in manufacturing, and those not proximate to Toronto, Montreal, or Vancouver have been particularly challenged.

A decline in an industry's employment level affects both workers in that industry and workers with a similar skills profile, along with the communities where these industries are located. For this study, we created a methodology to define a sustained employment decline and found that between 1997 and 2018, 55 distinct industries experienced a sustained employment decline. Of those 55 industries, 35 were in manufacturing. Thirty-four of the 35 manufacturing industries saw a post-1996 employment peak between the years of 1997 and 2004, showing that employment declines in the sector began well before the Great Recession of 2008-2009, though employment declines accelerated during that recession. Most of the overall employment decline in these industries occurred before the Great Recession, likely due to a combination of enhanced overseas competition, a rising Canadian dollar, and accelerated automation.

We examine the manufacturing industries that experienced a sustained decline and the impacts on the types of workers they have historically employed. We also analyze the disemployment question from the perspective of occupation and geography. We do not restrict our attention to individuals who had been employed in the sector, as some of the economic impacts are due to reduced hiring and job opportunities caused by the disappearance of these jobs.

Because they had more manufacturing employment than the Canadian average, communities such as Miramichi, Oshawa, St. Catharines-Niagara, Prince Albert, Kitchener-Cambridge-Waterloo, and Windsor have experienced disproportionately high levels of employment disruption from the decline in manufacturing employment. Men, particularly those with lower levels of formal education, were especially impacted by disemployment in manufacturing, although women also experienced significant reductions in employment in some subsectors. The primary factor contributing to a community's ability to absorb the decline in manufacturing employment is a proximity to Toronto, Montreal, or Vancouver. Manufacturing employment in connected communities saw substantially smaller declines in the employment rates for affected groups, in part due to offsetting employment gains in the trucking, home building, and infrastructure construction industries. Economically isolated manufacturing communities saw more significant reductions in the employment rate for these groups, particularly Windsor and St. Catharines-Niagara.

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SECTION 1:

What Happened to Canadian Manufacturing Employment?

Introduction

Despite the significant attention paid to Canada's loss of manufacturing jobs at a broader level, little is known about how individual Canadian regions have fared since the manufacturing employment decline of 2003-2009, caused by a combination of increased overseas competition, a rising Canadian dollar, and the 2008-2009 Great Recession. We ask and answer several questions in this report, the most important of which is:

Were old manufacturing jobs replaced by comparable jobs (in terms of skill level and pay) or by different jobs, marking a permanent shift in the nature of employment?

We address this question by drawing on employment data, with a focus on the census metropolitan area (CMA)[1] and census agglomeration (CA) level, to examine the effects of manufacturing employment decline in each community. The short answer is that jobs were replaced in some areas of the country, but not in others, particularly the Southwestern Ontario communities of St. Catharines-Niagara, London, Sarnia, Chatham-Kent, and Windsor.

This report answers our most important question in three steps, each with an associated section. In Section 2, we examine employment transitions from the perspective of industry – which industries saw job growth, which saw declines, and which demographic groups gained and lost from this transition. In Section 3, we conduct a similar analysis, but in terms of occupation, which provides us a better understanding of what types of jobs were lost and gained

1 Definitions of CMA and CA from Statistics Canada: "A census metropolitan area (CMA) or a census agglomeration (CA) is formed by one or more adjacent municipalities centred on a population centre (known as the core). A CMA must have a total population of at least 100,000 of which 50,000 or more must live in the core. A CA must have a core population of at least 10,000. To be included in the CMA or CA, other adjacent municipalities must have a high degree of integration with the core, as measured by commuting flows derived from previous census place of work data." (Statistics Canada, 2018b, para. 1)

within these industries. Finally, in Section 4, we apply a regional lens on these transitions by examining the data at the CMA and CA levels to understand how communities across Canada were affected by these employment transitions.

Project Roadmap

Our analysis is conducted over three sections, each of which begins with a series of questions to examine the manufacturing employment transition between 1997 and 2018.

In this section, we examine the nature of those transitions, as it is important to understand the depth and timing of manufacturing employment decline in Canada, along with its potential causes. In order to examine the impact of manufacturing disemployment on workers and communities, we need to have a better understanding of the causes of the phenomenon and where it was felt. To do this, we need to analyze the existing body of literature on manufacturing decline and discover which questions have been left unanswered.

In Section 2, we examine disemployment from the industry's perspective. We determine which manufacturing industries lost workers, the industries that may have absorbed them, and the type of workers who would have traditionally been employed in those industries. We examine which demographic groups were particularly affected by disemployment, and if those groups experienced worsened labour market outcomes (in terms of either employment or earnings) than the general population.

In Section 3, we conduct a similar analysis, but from the perspective of disemployment in manufacturing occupations, rather than the industry as a whole. This provides a more detailed picture of what happened in manufacturing. Because manufacturing firms employ everyone from research scientists to receptionists, not everyone who works for a manufacturing firm has a manufacturing occupation. We examine how the skill level of manufacturing work has changed over the last 20 years. As in Section 2, we examine the growth of other occupations to determine if manufacturing workers, and those who traditionally would have worked in manufacturing, were able to transition into new occupations. Finally, we consider the intersection of both manufacturing industries and manufacturing occupations to provide a more robust picture of employment trends over the past two decades.

In Section 4, we examine the impact manufacturing disemployment has had on communities across Canada. Manufacturing jobs were not evenly distributed in Canada and were instead clustered in a handful of communities. Furthermore, manufacturing employment may not have decreased at the same rate in each manufacturing community. We examine data at the CMA and CA level (Statistics Canada, 2018a) to gauge the impact, if any, of manufacturing disemployment on communities. Experience in other developed countries suggests that large metropolitan areas and communities proximate to them are better equipped to absorb the employment decline of an industry than other communities (Bolton and Hildreth, 2013). Although Bernard (2009) finds no significant difference in

adjustment for manufacturing employment in the pre-recession period, we believe it is worth revisiting this question a decade later to determine if there were differences in adjustment in the post-recession era.

As such, we divide our set of manufacturing communities into ones that are proximate (within 120 kilometres) to one of Canada's three metro CMAs (Toronto, Montreal, or Vancouver). This gives us eight "connected" manufacturing communities proximate to a metro CMA (including Toronto itself) and 17 "isolated" ones, which are not. We find that geography does make a substantial difference, as manufacturing communities proximate to Toronto, Montreal, or Vancouver were better able to adjust to the transition than their isolated counterparts. Part of this is due to a size effect, as larger regional economies are better able to absorb shocks. However, much of it is due to the fast growth of these regions in the last 20 years, which has created high numbers of construction, trucking, and warehousing jobs that employ workers of a similar demographic profile as manufacturing.

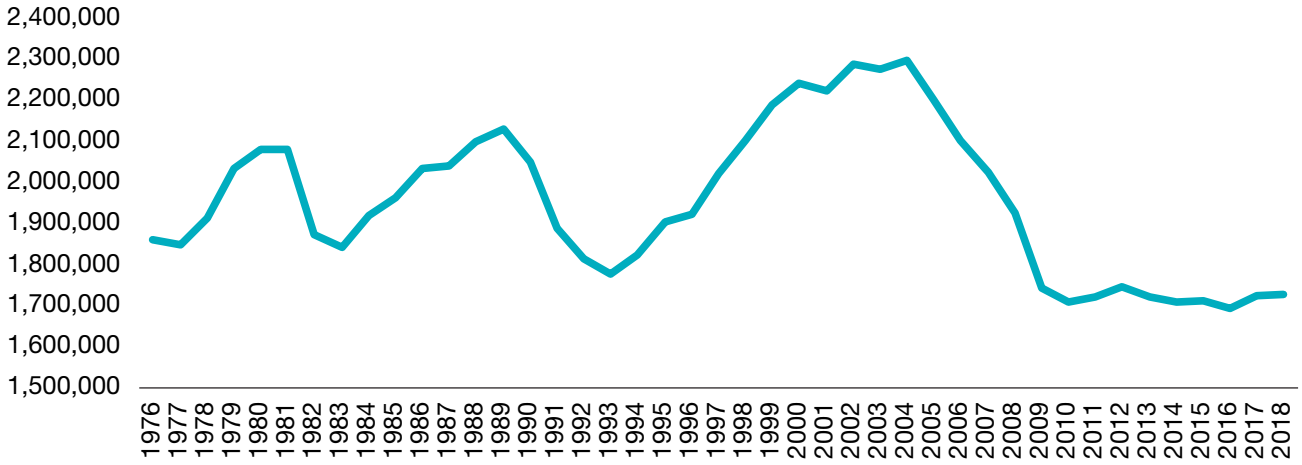
Finally, in Section 5, we examine why some CMAs experienced faster post-recession employment growth than others and discuss the policy implications. By breaking total employment growth out into two components, population growth and growth in the employment rate,[2] we find that population growth is the primary determinant of employment growth in Canadian CMAs. The fastest-growing CMAs in terms of population are either large cities, which attracted high levels of immigrants, or are CMAs proximate to large cities, which experienced an influx of residents from other parts of the country. In those fast-growing CMAs, the types of workers who traditionally worked in manufacturing found employment in the booming construction, warehousing, and trucking industries. As well, although the number of manufacturing jobs in Canada has changed little since 2009, there has been a shift to higher-skilled occupations within the industry. Skills training is crucial to ensure workers are qualified for those jobs in construction and manufacturing. Finally, since proximity plays such a crucial role in employment growth, policymakers can reduce commuting distances and times through infrastructure investments to increase interconnectedness between large and medium-sized cities.

Although the number of manufacturing jobs in Canada has changed little since 2009, there has been a shift to higher-skilled occupations within the industry. Skills training is crucial to ensure workers are qualified for those jobs in construction and manufacturing.

2 Employment rate refers to the percentage of individuals with a job as a percentage of the overall population of that demographic group.

FIGURE 1.1

Canadian Manufacturing Sector Employment by Year, 1976-2018



Source: Statistics Canada (2021a).

Manufacturing in Canada from 1997 to 2018

So, what happened to manufacturing between 1997 and 2018? Online Labour Force Survey data stretches back to 1976 and shows that net manufacturing sector employment in Canada had traditionally followed boom and bust cycles. This pattern appears to have ended in 2010, and we are currently in an unprecedented period of stability in terms of manufacturing

Canada lost over 500,000 jobs in the manufacturing sector between 2003 and 2009. Since then, manufacturing employment levels have been virtually unchanged.

TABLE 1.1

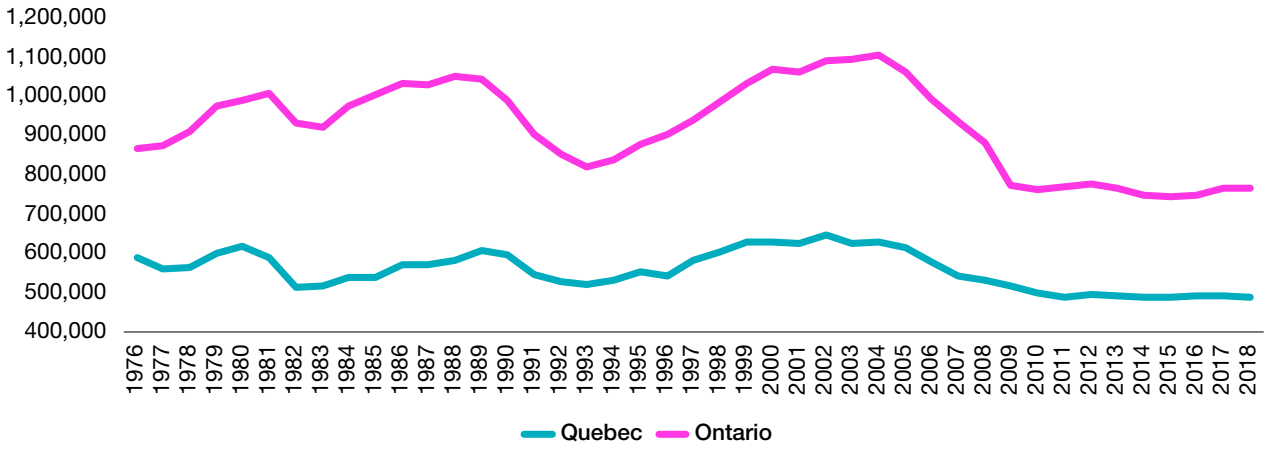
Canadian Manufacturing Employment: Four Eras

Period	Years	Net Employment Change (positions)
NAFTA Boom	1993-2003	498,200
China Shock	2004-2008	-350,200
Great Recession	2008-2009	-182,100
Post-Recession	2009-2018	-16,700

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 1.2

Canadian Manufacturing Sector Employment by Province, 1976-2018



Source: Statistics Canada (2021a).

employment. The employment growth of the 1990s plateaued around 2001. In 2003 and 2004, employment entered a steep decline, which escalated during the Great Recession of 2008-2009. Although manufacturing job loss continues to receive attention in our public discourse, the last decade has seen an unprecedented level of stability in the number of manufacturing jobs across Canada, as employment levels are virtually unchanged since 2009, as shown in Figure 1.1.

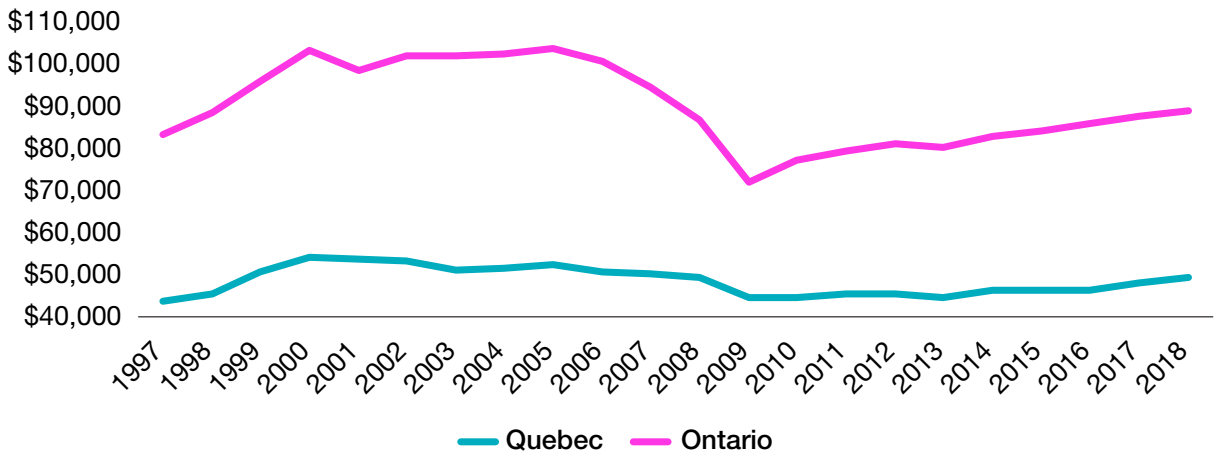
It is helpful to break down the data in Figure 1.1 into four eras, starting in 1993, as shown by Table 1.1. After the recession of the early 1990s, manufacturing employment experienced a period of rapid growth, creating nearly 500,000 jobs in just over a decade. Manufacturing employment peaked in the early 2000s and then experienced a rapid decline prior to the Great Recession, with a loss of 350,000 jobs. This disemployment accelerated during the Great Recession. In the decade that followed, from 2009 to 2018, the number of jobs in manufacturing has stayed essentially flat.

Manufacturing jobs are not equally distributed across the country, as manufacturing occurs primarily in two provinces: Ontario and Quebec. Parallel to patterns found for Canada as a whole, both provinces experienced boom-bust cycles of manufacturing employment prior to 2009. Manufacturing employment, in percentage terms, fell faster in Quebec between 2003 and 2008, whereas Ontario saw a more substantial drop during the Great Recession (refer to Figure 1.2). In both provinces, manufacturing sector employment has been relatively stable since the end of the Great Recession. There has been no significant difference in manufacturing employment trends in the two provinces, either before or after the Great Recession. This is particularly noteworthy, as much of the explanations around Ontario manufacturing employment decline cite “made-in-Ontario” factors such as electricity prices.[3] However, there appears

3 A LexisNexis search identified over 100 mainstream media outlets arguing a linkage between Ontario manufacturing job losses and electricity prices. A typical example is a Globe and Mail (McKenna, 2013) piece titled “Ontario drives manufacturers away with overpriced electricity”.

FIGURE 1.3

Manufacturing GDP at Basic Prices, Chained 2002 Dollars (x1,000,000) (CAD)



Source: Statistics Canada (2021b).

to be little difference in the employment trajectories of manufacturing employment in Ontario and Quebec, suggesting province-level factors played little or no role. Despite the similar manufacturing employment trajectories in the two provinces, we do believe the role electricity prices play in manufacturing employment trends is worthy of future study.

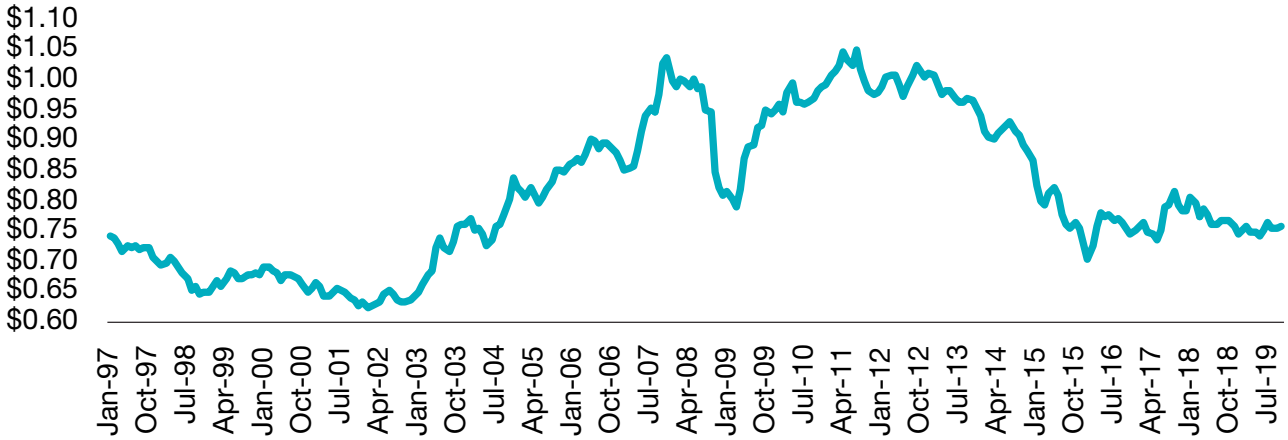
However, employment figures alone do not tell the whole story of a sector, as they do not distinguish between a sector experiencing overall decline, and one experiencing automation-related job loss. Examining the manufacturing sector in terms of output rather than employment provides additional context on trends in the sector. Both output and employment fell between 2005 and 2009. While employment has been flat since the end of the Great Recession, output has risen steadily (even when adjusting for inflation), indicating productivity growth and a "jobless recovery" of production in the sector, as shown by Figure 1.3.

So why did employment and output fall so much between 2003 and 2008? One popular theory is that the dramatic increase in the Canadian dollar during this period made Canada's manufacturing exports less competitive. The value of the Canadian dollar rose from 62 cents USD in 2002 to over US$1.00 in late 2007 (refer to Figure 1.4). This currency appreciation caused the Canadian manufacturing sector to be less competitive than its American counterparts, as firms located in Canada pay labour and other costs in Canadian dollars, whereas firms in the U.S. do not. An appreciation of the Canadian dollar, vis-à-vis the U.S. dollar, causes a proportional increase in labour costs to Canadian firms in terms of U.S. dollars.

However, we should note that Ontario and Quebec's Great Lake neighbours in the United States also experienced manufacturing employment declines between 2000 and 2009. So, any explanation of disemployment in manufacturing should not restrict itself to national borders and tell a "made-in-Canada" story, and Canadian

FIGURE 1.4

CAD to USD Exchange Rate, 1997-2019

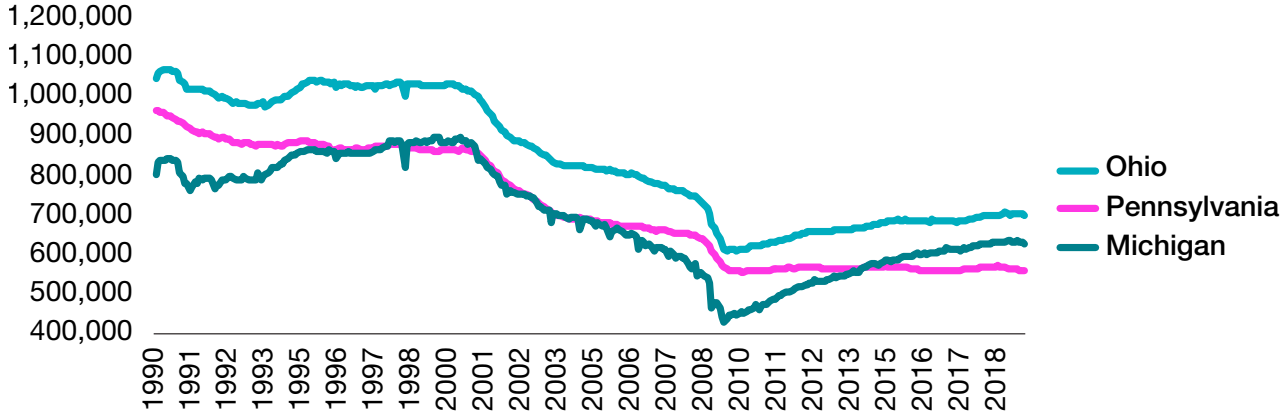


Source: University of British Columbia (2021).

disemployment cannot be entirely blamed on currency appreciation. Manufacturing employment in Ohio and Michigan fell faster and further during the 2000-2009 period than it did in Quebec and Ontario, but it has increased since then, whereas Ontario and Quebec's employment rates have not increased, as shown in Figure 1.5. The trend in Pennsylvania more resembles Canada's; a lower rate of decline before the Great Recession and little-to-no growth since then (refer to Figure 1.5). This raises a question worthy of future research: why did some Great Lake jurisdictions (Ohio, Michigan) experience a rebound in manufacturing employment after the Great Recession, while others (Ontario, Quebec, Pennsylvania) did not?

FIGURE 1.5

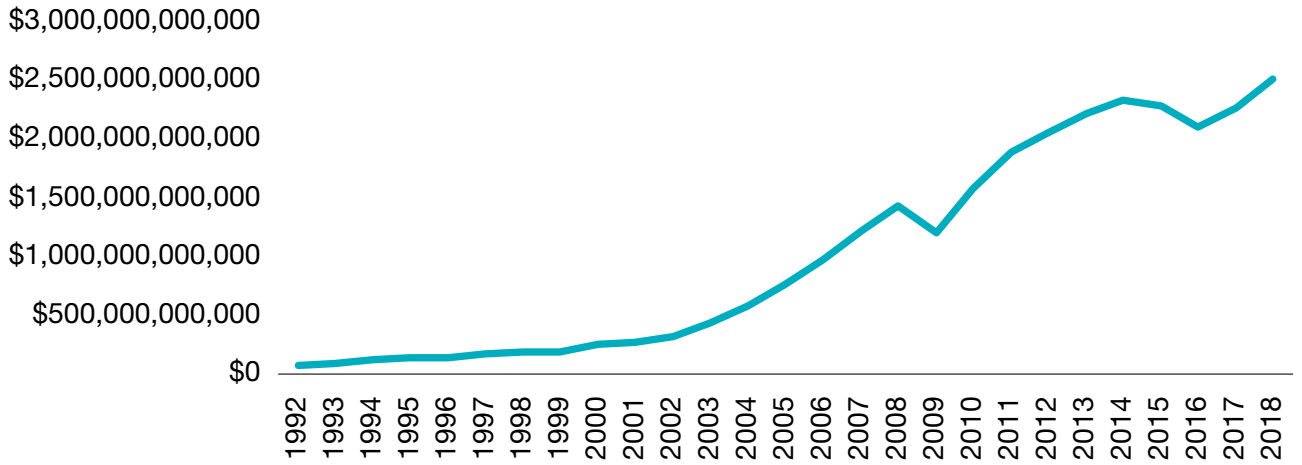
Manufacturing Sector Employment in Three U.S. States, 1990-2019



Source: Federal Reserve Bank of St. Louis (2020a; 2020b; 2020c).

FIGURE 1.6

Value of China's Worldwide Exports, 1992-2018 (USD)



Source: Federal Reserve Bank of St. Louis (2021).

Returning to the pre-Great Recession period, one potential cause for a decline in manufacturing employment on both sides of the Great Lakes is enhanced competition from other markets, most notably China, which was admitted to the World Trade Organization (WTO) in December 2001. The value of China's worldwide exports, which had been increasing before the country entered the WTO during that decade, is shown by Figure 1.6.

The likely causes of the pre-recession decline in manufacturing employment were the rising Canadian dollar during the period, along with competition from China (the "China Shock"). A comparison to manufacturing employment levels in the U.S. rust belt is instructive. The United States experienced the China Shock first, as a falling Canadian dollar helped insulate Canada's sector from lower cost competitors. This advantage was removed as the loonie began to rise in late 2002 (refer to Table 1.2), and Canada began feeling the China Shock in earnest.

By 2008, manufacturing employment levels had fallen by over 15%, relative to 2000, in both Ontario and Quebec, by over 25% in Pennsylvania and Ohio and by over 35% in Michigan—and that was before the Great Recession had started (refer to Figure 1.7). Since the end of the Great Recession and through 2018, neither Quebec, Ontario, nor Pennsylvania have experienced any recovery in manufacturing employment, though Ohio and Michigan, which were hit particularly hard by the Great Recession, have.

Not surprisingly, there are many existing studies that examine the causes of manufacturing decline and indicate the relative importance of each of these factors, which we discuss in the next section.

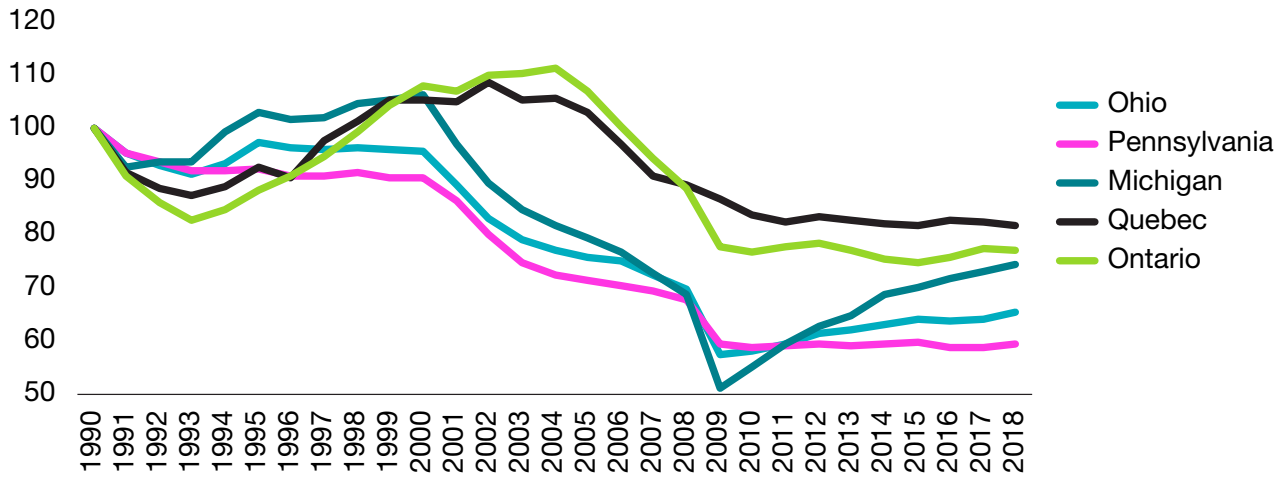
TABLE 1.2

Key Events Related to Canadian Manufacturing Employment, 1989-2018

Event	Date
Canada-U.S. Free Trade Agreement goes into effect	Jan. 1, 1989
Early 90s recession (Canada)	March 1990 – May 1992
NAFTA goes into effect	Jan. 1, 1994
U.S. dot-com recession	March 2001 – Nov. 2001
China joins WTO	Dec. 11, 2001
Canadian dollar hits all-time low (61.989 cents USD)	Jan. 18, 2002
Canadian dollar tops 80 cents USD	Oct. 20, 2004
Canadian dollar tops 90 cents USD	May 2, 2006
Canadian dollar tops $1.00 USD	Sep. 28, 2007
Great Recession (Canada)	Oct. 2008 – May 2009
CETA goes into effect	Sep. 21, 2017
CPTPP goes into effect	Dec. 30, 2018

FIGURE 1.7

Manufacturing Employment Levels (%) for Five Great Lake Jurisdictions, 1990-2018 (1990 = 100)



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b), accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c); Federal Reserve Bank of St. Louis (2020a; 2020b; 2020c)

Previous Studies on Manufacturing Decline

Several studies have examined the impact of the China Shock on manufacturing employment and communities, most notably Autor, Dorn and Hanson's (2016) work on disemployment in the United States. In the Canadian context, Murray (2017) estimates that enhanced competition from China is responsible for 21% of the disemployment in Canadian manufacturing between 2001 and 2011.

Murray (2017) examines manufacturing employment decline at a community level from the China Shock, and finds that in Canada, "increasing Chinese import exposure is negatively associated with employment growth as measured by the change in the employment rate" (p. 45) because any declines in manufacturing sector employment were only "partly offset by employment gains in non-exposed non-tradable industries" (p. iv). This should not be surprising, as there have been several studies both in Canada and internationally with similar findings.[4]

Effects of Manufacturing Employment Decline on Workers

There has been work conducted on general employment decline during the Great Recession. Chan et al. (2011) analyze workers who were laid off during the last three recessions (early 1980s, early 1990s and 2008-09). They find that displaced workers in 2008 were disproportionately older and better educated than in previous recessions. Interestingly, they find that displaced workers were less likely to come from the manufacturing sector than in previous recessions. Much of these differences can be explained by a changing Canadian workforce, as workers in general in 2008 were on average older, better educated, and less likely to work in manufacturing than in the early 1990s or early 1980s. Half of all displaced workers were able to find a paid job within four months of being laid off, as compared to 42% in previous recessions. Average weekly wages for the cohort finding a new job within four months declined by $31 ($734 to $703), though one-quarter of this group experienced a weekly wage drop of 23% or more (Chan et al., 2011).

Meckstroth (2013) examines American manufacturing job loss from 2007 to 2013 and finds that there was a decline in manufacturing employment of 2.3 million jobs, representing 17% of all manufacturing jobs. Although there was a rebound in manufacturing employment starting in late 2009, only 23% of the jobs lost (519,000 of 2.3 million) had been recovered by the end of 2012. Meckstroth finds that 59% of displaced manufacturing workers had a job three years later, with 41% of those finding another job in manufacturing (roughly 24% total). Other industries picking up a significant number of manufacturing workers were construction, retail trade, transportation and warehousing, professional and technical services, and management. A full 25% of

4 Murray (2017) provides a substantial literature review of these findings, with a particular emphasis on David Autor's research on the effect of the China Shock on the United States. Papers that examine the Canadian experience include Capeluck (2015a; 2015b) and Baldwin & Yan (2017a; 2017b).

displaced manufacturing workers remained unemployed by the end of 2012, and an additional 16% left the labour force entirely. Of those workers who did obtain new employment, 65% of those finding new jobs earned less at their new job, with 40% of those obtaining new employment seeing their rate of pay decline by 20% or more (Meckstroth, 2013).

An Austrian study by Frühwirth-Schnatter et al. (2018) finds that half of the workers laid off by a plant closure "cope relatively easily" with the plant closure, finding a job quickly at a comparable rate of pay. Of the remaining workers, 30% suffer significant employment and earnings losses, in that they have difficulty returning to stable jobs. The remaining 20% exit the labour market via early retirement (Frühwirth-Schnatter et al., 2018).

A 1993 study by Jacobson, LaLonde, and Sullivan examines earnings changes of displaced workers. They find that high-tenure workers experience a 25% decline in yearly income relative to those who did not experience a displacement. They find that the magnitude of this decline does not depend on the age and sex of workers, but the state of their former industry, as well as local labour market conditions, which also play a role. A follow-up study by Couch and Plazek (2010) found similar results, though with higher declines in earnings in the short run and more modest declines in the long run. There have also been at least two studies, as discussed below, that examine manufacturing employment transitions at a community level.

Effects of Manufacturing Employment Decline on Communities

The study that examines issues closest to ours is Bernard (2009). He investigates the 2004-2008 pre-recession employment decline in manufacturing in Canada. He finds that, during this period, there was little difference between the disemployment impacts of large communities and of small communities with significant manufacturing footprints.

Employment declines in one industry have trickle-down impacts on other industries, particularly at a local level. For example, the closure of an automotive plant in a community can impact the restaurant sector as former workers reduce their frequency of dining out. Bivens (2019) finds that for every 100 direct jobs lost in durable manufacturing, an additional 744.1 are indirectly lost in other sectors.[5] These job losses include jobs lost by suppliers; for every 100 jobs lost by the closure of a durables manufacturing plant (such as automotive assembly plants), suppliers (such as parts manufacturers) shed 289.1 jobs. An additional 454.9 jobs are lost due to reduced purchasing power of the workers of that plant. Utilities have

5 Manufacturing has one of the highest multipliers of any industry. Retail trade, for example, only registers a multiplier of 122.1 indirect jobs lost for every 100 retail jobs lost. There are a few reasons for manufacturing's relatively high multiplier. First, their inputs are far more likely to be sourced locally than is the case for the retail industry, so supply chain effects are felt domestically. Second, manufacturing jobs pay higher wages than retail jobs, causing a larger decline in induced jobs when a manufacturing plant closes. Third, manufacturing plants are often the primary employer in a community, which makes it more difficult for that community to adjust should a plant close (Bivens, 2019).

the highest estimated multiplier at 957.7, and retail has the lowest at 122.1. Our project builds on this research to examine the impact of manufacturing employment transition at the community level.

Emergence of Innovation Economies

Since the mid-1980s, we have seen an employment transition from manufacturing jobs to white collar service and technical jobs, as detailed in Enrico Moretti's ground-breaking 2012 book, *The New Geography of Jobs*. This employment transition has created regional winners and losers, as Moretti described in an interview with the Federal Reserve:

In the first three decades after World War II, manufacturing was the most important source of high-paying jobs in the United States. Manufacturing was geographically clustered, but the amount of clustering was limited. Over the past 30 years, manufacturing employment has declined, and the innovation sector has become a key source of good jobs. The innovation sector tends to be much more geographically clustered. Thus, in the past, having access to good jobs was not tied to a specific location as much as it is today. I expect the difference in wages, earnings, and household incomes across cities to continue growing at least for the foreseeable future. (Price, 2019, para. 11)

This transition has caused locations that are not in geographic proximity to one of those clusters to experience little-to-no employment growth. A 2018 Brookings Institute study found that U.S. metro areas with one million or more residents account for 72% of all American job creation since the end of the 2008-2009 Great Recession, with smaller metros (those with populations between 50,000 and 250,000) accounting for less than 6% (Hendrickson et al., 2018). A U.K. taxonomy of mid-sized cities refers to these smaller centres that are not proximate to a metro area of one million or more as "economically isolated communities" and notes that history and geography leave them "vulnerable to structural change or changing fashions" (Bolton & Hildreth, 2013, p. 12).

We have seen this geographic effect playing out in Ontario. A 2017 study by Lafleur and Eisen found that almost all of Ontario's net employment growth from 2008 to 2016 occurred in the large CMAs of Toronto and Ottawa, along with the "Golden Horseshoe" CMAs, which are proximate to Toronto (Barrie, Brantford, Guelph, Hamilton, Kitchener-Waterloo-Cambridge, St. Catharines-Niagara). With the possible exception of St. Catharines-Niagara, all of these mid-sized cities are well integrated into the larger regional Toronto economy. All other mid-sized cities, from Windsor in the southwest to Thunder Bay in the north to Cornwall in the east, have collectively experienced almost no employment growth.

Project Design and Methodology

The data for this project comes from Statistics Canada's Labour Force Survey (LFS) (Statistics Canada, 2020b), a monthly Canada-wide survey that includes a wealth of labour market information including employment and earnings, age, geography, industry, and occupation. The data was accessed through Statistics Canada's Real Time Remote Access (RTRA) system (Statistics Canada, 2020c). The RTRA system has LFS data stretching back to 1997, so we use that date as the starting point for our analysis. Additional information on data sources can be found in Appendix B.

In order to examine the effect of industrial employment decline, as well as employment decline by occupation, we must first have working definitions of "industry," "occupation," and "employment decline."

The Labour Force Survey defines "industry" as follows:

General nature of the business carried out in the establishment where the person worked (main job only), based on the 2012 North American Industry Classification System (NAICS). If a person did not have a job during the survey reference week, the information is collected for the last job held, provided the person worked within the previous 12 months. (Statistics Canada, 2020a, para. 60)

The 2012 NAICS has over 300 classifications for Canadian industries, 86 of which are in manufacturing.

"Occupation" is defined by the Labour Force Survey as follows:

This refers to the kind of work persons were doing during the reference week, as determined by the kind of work reported and the description of the most important duties. For those not currently employed, information on occupation is collected for the most recent job held within the previous year. Occupational classification is based on the 2016 National Occupational Classification (NOC). (Statistics Canada, 2020a, para. 74).

The 2016 NOC has 500 different occupational classifications, 81 of which are related to manufacturing-type activities (though not all of those workers will necessarily be employed by firms in the manufacturing sector).

When we examined the literature, we were not surprised to find that there is no standard definition for what constitutes an "employment decline," but we were surprised to find a lack of attempts to develop a data-driven methodology to define an employment decline (Couch & Placzek, 2010; Frühwirth-Schnatter et al., 2018; Meckstroth, 2013).

We took matters into our own hands and developed the following definition. Under our classification, an industry or occupation experiences an employment decline in Canada when it meets one of the following three conditions:

- A net reduction in employment of 20,000 or more persons and 40% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.
- A net reduction in employment of 10,000 or more persons and 50% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.
- A net reduction in employment of 2,500 or more persons and 80% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

Declining employment levels in an occupation or industry do not necessarily mean increased layoffs, as attrition and voluntary exits can also be factors.

Because our interest is in industries and occupations that did not recover from decline, we also impose the condition that in 2018, employment must have remained 30% below the 1997-2018 peak. As such, we refer to industries and occupations as experiencing an unreversed decline, to distinguish them from industries that saw an employment decline (due to the Great Recession or some other factor) that subsequently recovered.

We took this staggered approach, where the threshold is lower for larger industries, for two reasons:

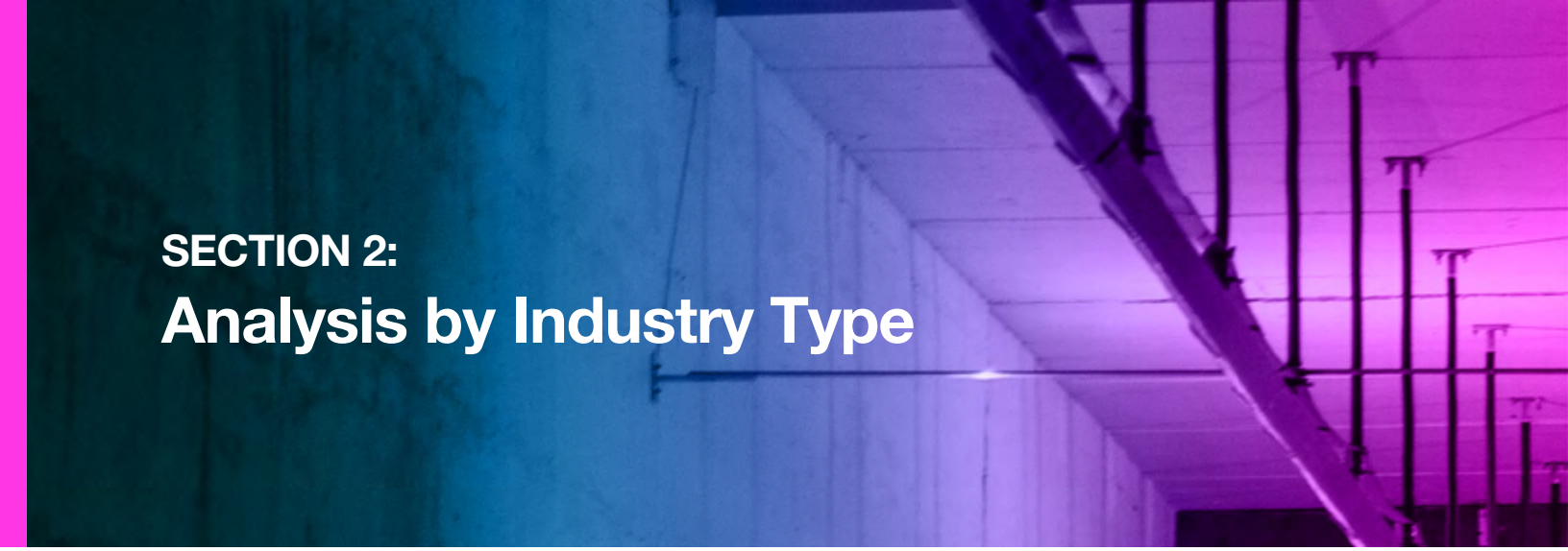
1. The economic impact of a decline in an industry or occupation is proportionate to its size. A small industry or occupation that suffers an employment decline will have a much more limited impact on the labour market or a community than a large one.
2. The Labour Force Survey is a survey, so it has inherent sample-size issues. There is inherently more statistical volatility or noise in the data for smaller industries

and occupations. Had we used a one-size-fits-all approach, we risk missing declines in large industries by setting the thresholds too large or setting a smaller threshold that would classify almost all small occupations and industries as being in decline, simply due to statistical volatility.

It is important to note that some (or all) of this job loss need not be due to an increase in the rate of layoffs. Some (or all) of the reduction may be due to a reduction in hiring, causing shrinkage in industry employment due to attrition where workers were exiting due to retirement or other factors and then were not replaced. Although less dramatic than a plant closure, this can still significantly impact communities due to a reduction in employment opportunities, particularly for the demographic groups (by age, sex, education level) who historically would have taken those jobs. Furthermore, a reduction in demand for these demographic groups will put downward pressures on their wages. As part of our analysis, we examine the employment outcomes for these demographic groups, including which industries saw increased employment of these workers and at what rates of pay.

As such, when conducting this analysis, it is crucial that we identify the demographic groups (and geographies) that were disproportionately affected by this decline. While manufacturing employees are disproportionately male, this does not apply to all subsectors; apparel and leather goods subsectors, for example, have a high proportion of female workers.

In the next section, we examine which of those manufacturing subsectors went into decline and which did not, to gain a better understanding of which groups were particularly affected.



SECTION 2:

Analysis by Industry Type

Introduction

In the early 2000s, nearly 2.3 million Canadians worked in the manufacturing sector. This figure shrank by 350,000 between 2003 and 2008, then by another 180,000 during the Great Recession of 2008-2009, leaving the sector at just over 1.7 million jobs in 2018. As a percentage of the workforce, manufacturing shrank from 14.5% in 2003 down to just 9.3% by 2018. Since then, employment has been relatively flat. Not every industry in the manufacturing sector saw a large decline in net employment; in fact, the decline was largely isolated to 35 of the 86 industries comprising the sector. Motor vehicle parts, cut and sew clothing, sawmills and wood preservation, and motor vehicle manufacturing experienced the largest employment declines between 2003 and 2009. Employment attrition due to retirement played a significant role in employment decline, though there was also substantial job loss during the Great Recession. The net employment decline in manufacturing was disproportionately experienced by younger men without post-secondary credentials. This demographic group did see employment increases between 2003 and 2008 in other industries, including oil and gas extraction, residential building construction, and warehousing and storage. While employment rates for other demographic groups went up between 2003 and 2008, they stayed flat for male and female workers[6] under the age of 45 without post-secondary completion. Employment rates for these workers dropped dramatically during the Great Recession and have yet to fully recover.

Analysis

Our primary question for this research is: Were old manufacturing jobs replaced by comparable jobs (in terms of skill level and pay) or different jobs, thus marking a permanent shift in the nature of employment? In order to address that overarching question, this section investigates the following six questions:

1. Which industries went into an employment decline from which they did not recover, and when did the decline happen? (This provides an indication of which jobs were lost.)

6 The employment data for this project is taken from Statistics Canada's Labour Force survey. The survey collects data on the sex of household members, providing the options "male" and "female". It does not collect data on gender identity. Given this limitation in the data, please interpret uses of the terms "men/man" and "women/woman" in this report as indicative of biological sex as opposed to gender. For the full list of questionnaire questions please refer to Appendix C: Labour Force Survey questionnaire, in Guide to the Labour Force Survey (Statistics Canada, 2020a).

2. How much of the employment decline was due to a reduction in hiring rather than individuals exiting the industry, voluntarily or involuntarily? (This gives an indication of why the jobs were lost. Were workers lured to other industries because they paid higher wages? Were the jobs lost because workers were fired? Or did the rate of hiring simply decline?)

3. Which demographics were particularly affected by the employment decline? (This provides an understanding of the types of workers particularly affected by the employment decline.)

4. What were the employment outcomes for those demographic groups? (This gives an indication as to whether lost jobs were made up elsewhere, or if there was an overall employment decline for a particular group.)

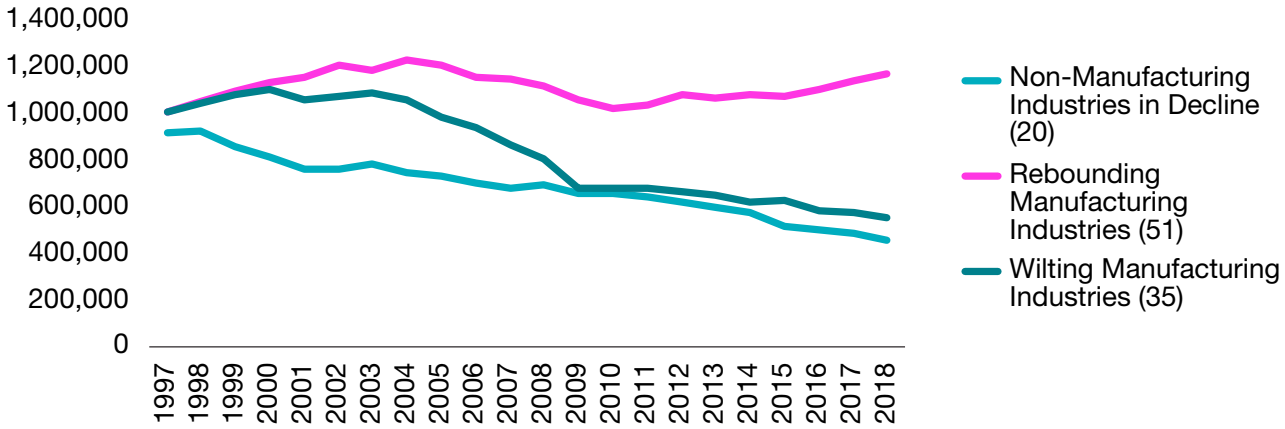
5. Did the affected demographic groups find employment in other industries? Which other industries? (If losses in manufacturing were offset in other industries, which industries were they?)

6. How did the employment transition alter the weekly earnings of the affected groups? (If wages increased for this group, this likely indicates that manufacturing workers were lured by higher wages in other industries. However, a relative decline in wages suggests that the employment transition may not have been entirely voluntary.)

Using the definitions of manufacturing and unreversed decline described in Section 1, we identify 55 industries that experienced unreversed employment decline, 35 of which are in the manufacturing sector (Statistics Canada, 2020b). In this paper, we refer to the 35 manufacturing industries that experienced employment decline as "wilting manufacturing industries," and the 20 non-manufacturing industries that experienced employment decline as "non-manufacturing industries in decline". That leaves us with another 51 industries, which did not meet our criteria of employment decline. We will refer to these industries as "rebounding manufacturing industries," as they experienced a smaller decline in the 2003 to 2009 period and employment levels have since returned to 2003 levels.

FIGURE 2.1

Manufacturing Employment Trajectories by Industry Type: Employment Levels in Canada, 1997-2018



Source: Statistics Canada (2020b). Labour Force Survey; accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Employment Levels in Manufacturing and Other Sectors

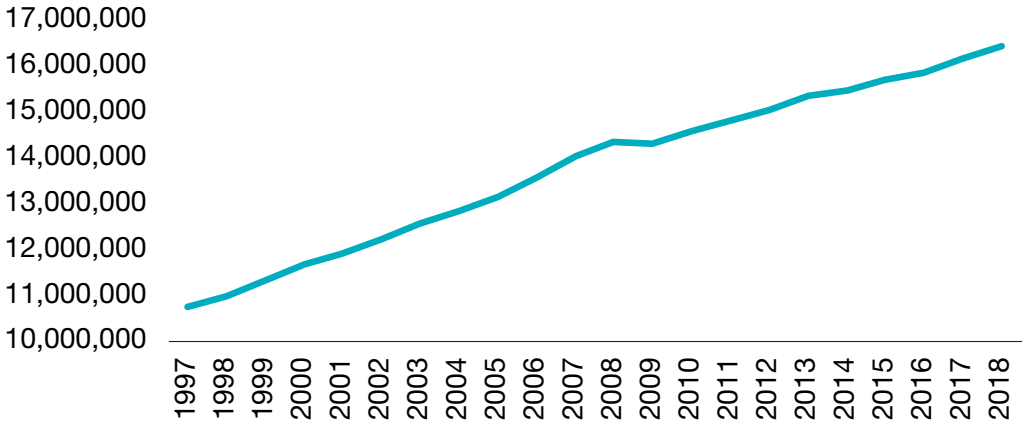
Rebounding manufacturing industries shed roughly 120,000 jobs between 2003 and 2009. By 2018, however, employment in these industries had recovered back to 2003 levels. Contrast this with wilting manufacturing industries, which shed over 400,000 positions between 2003 and 2009, and continued to decline beyond the end of the Great Recession. Employment in these manufacturing industries is just over half of what it was prior to the 2003-2009 decline (refer to Figure 2.1).

In contrast, all other industries, excluding the manufacturing sector and non-manufacturing industries in decline, experienced remarkably stable growth rates outside of the Great Recession of 2008-2009 (refer to Figure 2.2).

To consider what caused some manufacturing industries to experience unreversed employment decline while others did not is beyond the scope of this paper, but it is a topic worthy of future study. We can, however, identify the manufacturing industries that saw the biggest employment declines. The largest 2003-2009 employment declines in wilting industries were experienced within the following industries: motor vehicle parts manufacturing; cut and sew clothing manufacturing; sawmills and wood preservation; as well as motor vehicle manufacturing. Appendix A lists the ten weakest performing wilting manufacturing industries, in terms of net employment change, along with the ten weakest and ten strongest performing rebounding manufacturing industries.

FIGURE 2.2

Employment Trajectories in All Other Industries: Employment Levels in Canada, 1997-2018



Source: Statistics Canada (2020b). Labour Force Survey; accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

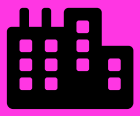
For each of our four types of industries (wilting manufacturing, rebounding manufacturing, non-manufacturing industries in decline, and all other industries), it is instructive to take the employment time series and break it down into four periods:

1. Before the decline in manufacturing jobs (1997-2003)
2. The pre-recession decline in manufacturing jobs (2003-2008)
3. The Great Recession (2008-2009)
4. The post-recession recovery (2009-2018)

This provides a clear picture of the dynamics of employment growth. Non-manufacturing industries in decline faced steady declines, while both types of manufacturing industries saw employment growth from 1997 to 2003 and decline from 2003 to 2009, with wilting industries continuing to decline post-2009 (refer to Table 2.1). All other industries saw steady growth, outside of a one-year decline during the Great Recession.

Wilting manufacturing industries have seen an employment decline of over 500,000 persons since 2003, with over 400,000 of these job losses occurring between 2003 and 2009. Who were these missing 400,000 people, where did they go, and what happened to the communities in which they had been employed? An obvious first place to look for them is in the unemployment data.

Manufacturing job loss was not distributed equally through the sector. ***Only 35 of 86 industries in manufacturing experienced a substantial and unreversed decline in employment.*** *These 35 included motor vehicle parts manufacturing, clothing manufacturing, as well as sawmills and wood preservation.*



Four Types of Manufacturing Industries

Wilting manufacturing industries:

Any industry in the manufacturing sector that experienced an employment decline, with 2018 employment levels in that industry 30% or more below the 1997-2018 peak. There are 35 manufacturing industries that meet these criteria.

Rebounding manufacturing industries:

Any industry in the manufacturing sector that did not "wilt". Either it did not meet the criteria for decline, or 2018 employment levels are less than 30% below the 1997-2018 peak (or both). Fifty-one manufacturing industries meet these criteria.

Non-manufacturing industries in decline:

Any industry outside the manufacturing sector that experienced an employment decline, with 2018 employment levels in that industry 30% or more below their 1997-2018 peak. Twenty non-manufacturing industries meet these criteria.

All other industries:

Any industry outside of the manufacturing sector that did not "wilt". In other words, it either did not meet the criteria for decline, or 2018 employment levels are less than 30% below their 1997-2018 peak (or both). In total, 208 non-manufacturing industries meet these criteria.

TABLE 2.1

Net Employment Change by Industry Type in Canada, 1997-2018

	1997-2003	2003-2008	2008-2009	2009-2018
Non-Manufacturing Industries in Decline (20)	-136,900	-84,700	-35,300	-204,800
Rebounding Manufacturing (51)	173,700	-65,300	-58,100	108,200
Wilting Manufacturing (35)	81,600	-284,100	-124,100	-126,300
All Other Industries (208)	1,825,000	1,777,100	-59,300	2,142,800

Note: Labour Force Survey data is rounded for disclosure reasons.

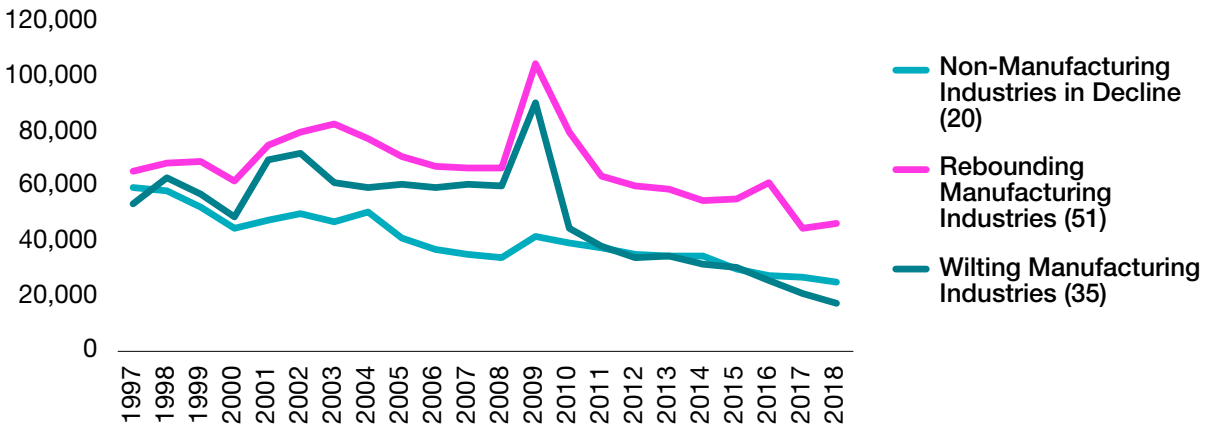
Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

What Caused Manufacturing Employment Levels to Drop?

The Labour Force Survey tracks unemployment levels for workers based on their previous job if they worked in the last 12 months. If workers are getting laid off in increasing numbers, we would expect to see this in the unemployment numbers at an industry level. But outside of the 2008-2009 Great Recession, unemployment does not look substantially elevated in our two types of manufacturing industries. The overall number of unemployed persons from the wilting manufacturing industries had been falling sharply since the end of the Great Recession, while employment in these industries had been slowly falling. Overall, the pre-recession 2003-2008 data suggests (but is far from conclusive) that attrition, rather than layoffs, is responsible for employment decline in these industries during these years, as shown by Figure 2.3.

FIGURE 2.3

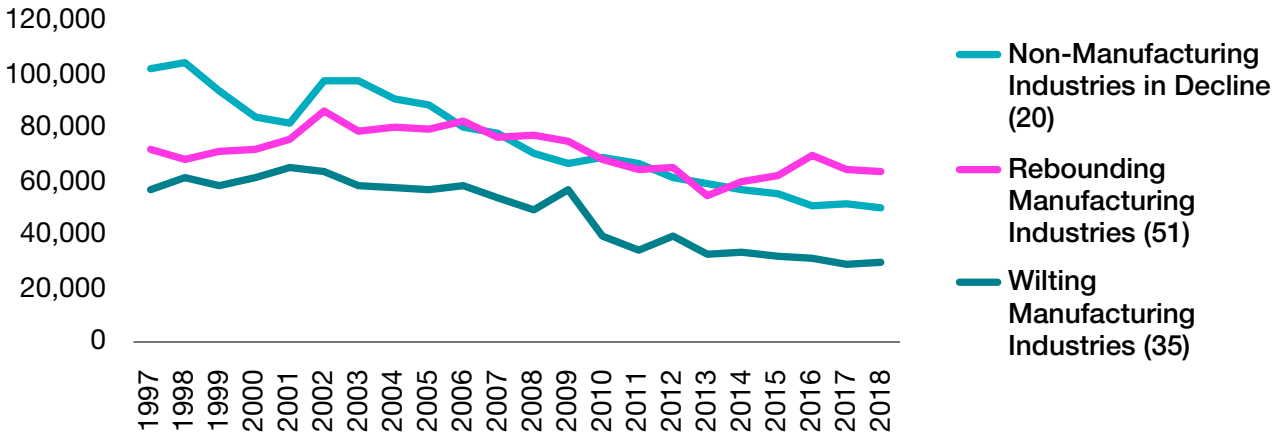
Manufacturing Employment Trajectories by Industry Type: Unemployment Levels in Canada, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 2.4

Manufacturing Employment Trajectories by Industry Type: Not-in-the-Labour-Force Levels in Canada, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Additional evidence can be obtained by examining the number of people who are currently out of the labour force (not employed, not looking for work), but had previously been employed in the last 12 months, based on the industry in which they last worked. A spike in the "out of the labour force" numbers would suggest that workers were leaving manufacturing (either voluntarily or involuntarily) and not looking for work in other industries. The out-of-the-labour-force data does not suggest that workers in wilting manufacturing industries were leaving their jobs and exiting the labour force in particularly high numbers. The unemployment and not-in-the-labour-force data appear to explain little of the disemployment in wilting manufacturing industries, particularly in the 2003-2008 period (refer to Figure 2.4). We find little evidence of any unusually high number of manufacturing workers dropping out of the labour force during the pre-recession years.

Insights into *why* manufacturing employment declined from 2003 to 2009 may be found in the Labour Force Survey's "why left last position" question, which tracks the reasons why someone left their job for those workers who are not currently employed but have worked within the previous 12 months.[7] The data for wilting manufacturing workers (Figure 2.5) does not suggest an unusually high number of involuntary exits for workers during the 2003-2008 pre-recession period, but it does suggest this was a factor during the Great Recession. Note that the number of job losers and job leavers has fallen substantially since the end of the recession. Again, this suggests (far from conclusively) that there was not an unusually high number of manufacturing workers losing their jobs prior to 2008. The rate of manufacturing job losses in rebounding manufacturing industries has dropped substantially since the end of the Great Recession and warrants further study.

7 See Appendix B for additional information.

FIGURE 2.5

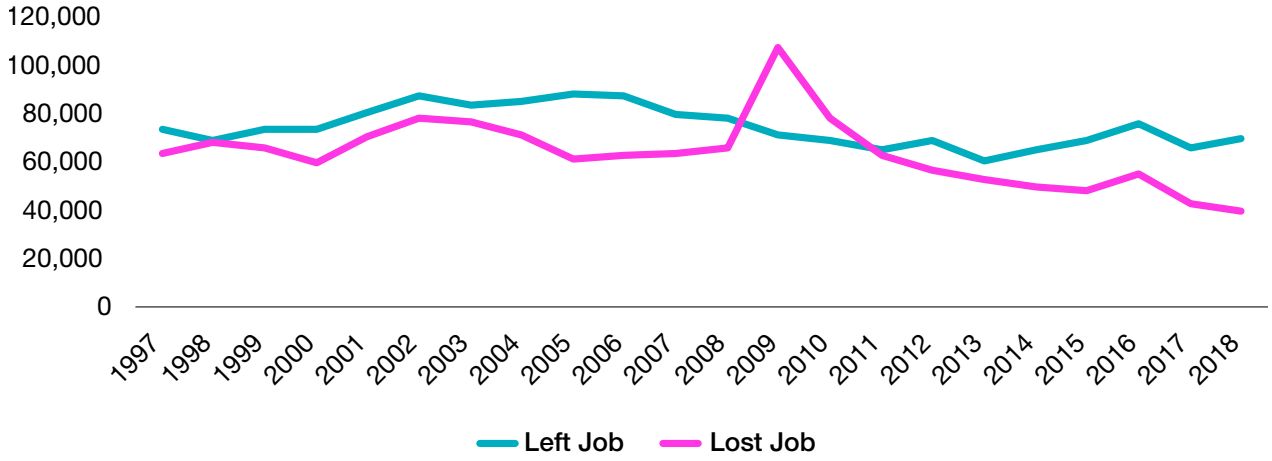
Former Workers in Wilting Manufacturing Industries: Why Left Last Position, 1997-2018

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The results for rebounding manufacturing workers are somewhat similar (Figure 2.6), though we see a higher rate of job leavers relative to job losers during the 2003-2008 period, and a much more gradual decline in both categories post-recession. The much higher ratio of job losers in 2003-2008 wilting manufacturing industries relative to those in rebounding manufacturing industries suggests disemployment through involuntary job loss should not be wholly discarded as an explanation for wilting manufacturing industries' poor employment performance between 2003 and 2008. There do appear to be differences in involuntarily job loss rates between the two types of manufacturing industries before the Great Recession.

FIGURE 2.6

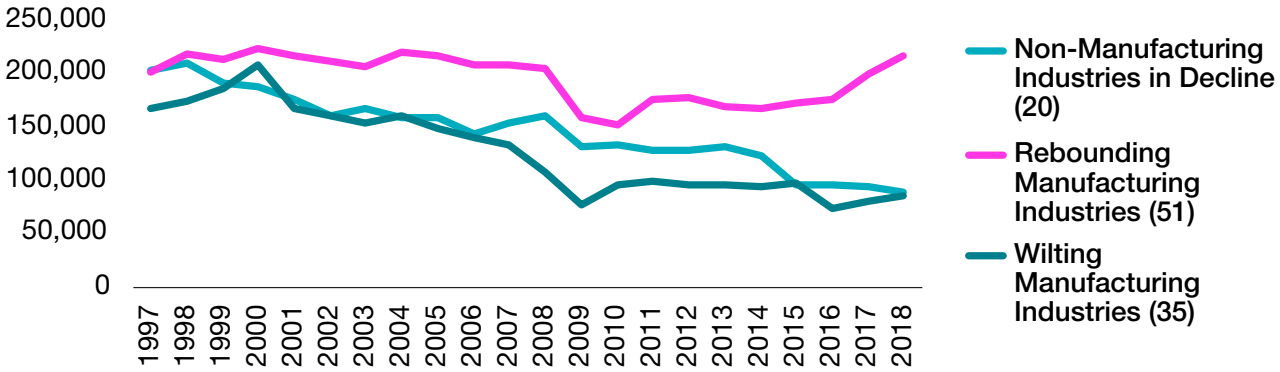
Former Workers in Rebounding Manufacturing Industries: Why Left Last Job, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 2.7

Number of Employees with Employer Less Than 12 Months, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Overall, the lost job versus left job data could suggest that if people were exiting wilting manufacturing industries at high rates, they were taking jobs in non-manufacturing industries, rather than being unemployed or out of the labour force. However, another phenomenon that could explain these results is that workers were leaving their jobs (and the industry) at their typical rate, but the rate of hiring had fallen, causing disemployment through attrition. The Labour Force Survey tracks how long a person has held their current job. A reduction in the number of people holding their job for only a short period of time could indicate a reduction in hiring.

The data on job tenure paints a somewhat clearer picture than the data on unemployment, out of the labour force, and job exits. The number of employees with their manufacturing firm for less than 12 months, shown in Figure 2.7, suggests, but cannot absolutely confirm, that a reduction in the rate of hiring did take place from 2003 to 2009. We see a substantial drop in the number of new employees before the Great Recession, but only in manufacturing industries with persistent employment decline (wilting manufacturing) and not for other manufacturing industries (rebounding manufacturing). This is suggestive, but not conclusive, that much of the employment decline experienced in wilting manufacturing industries came about through attrition and

reduced hiring. Unfortunately, we cannot link this directly to the overall rate of employment decline in the industry; this data tracks how long a person has been with their current employer, so it may simply indicate that workers were switching from manufacturing employer to manufacturing employer at a slower rate than they had in the past.

There does not appear to be an extraordinarily large number of manufacturing workers that became unemployed or left the labour force (either voluntarily or involuntary) prior to the Great Recession, which indicates that the employment decline can be explained by a reduction in hiring and by workers migrating to other industries. So, where did the workers that left manufacturing go? And what about the types of workers, in a demographics sense, that would have been employed by manufacturing industries in the past, but were not from 2003 to 2008? The first step to answering these questions is to break down manufacturing disemployment by demographic group.

The primary factors in the manufacturing job losses prior to the Great Recession appear to be a substantial reduction in hiring along with high levels of retirements. Although the number of the jobs in the sector fell dramatically, there was not a substantial rise in unemployed manufacturing workers until the start of the Great Recession.

TABLE 2.2

Demographic Groupings

Variable	Demographic Groupings
Sex (2)	Male, Female
Age (7)	15-24 25-34 35-44 45-54 55-64 65-74 75+
Education Levels (6)	Did not graduate high school (No HS) High school with some-to-no post-secondary (HS) Trades certificate or diploma (Trades) Community college or university certificate below Bachelor's (Certif) Bachelor's Degree (Bach) Above Bachelor's Degree (Above)

Demographic Groups Affected by the Decline in Manufacturing Employment

The Labour Force Survey includes data on age, sex, and highest educational attainment, so we can identify and isolate particular demographic groups. This report uses the demographic groupings listed in Table 2.2.

Our data, in Tables 2.3 and 2.4, shows that the net reduction in employment for wilting manufacturing industries was disproportionately experienced by middle-aged workers who had not completed post-secondary education, though there was also a substantial decline in the number of workers with trades certifications. In 2003, 55.2% of workers in wilting manufacturing industries had no post-secondary credentials, as compared to 50.9% of workers in rebounding manufacturing industries.

Although manufacturing is typically considered a male profession, one-third of the net employment decline was experienced by female workers. Female workers made up 29.5% of all workers in wilting manufacturing industries and 28.7% of workers in rebounding manufacturing industries.

Of the 400,000 net job loss in declining manufacturing industries between 2003 and 2009, nearly half was experienced by men under the age of 55 with no post-secondary completion or trades certificate.

TABLE 2.3

Wilting Manufacturing Industries: 2003-2009 Net Employment Change for Male Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-9,700	-23,100	-3,200	-4,500	-1,000	200	**-41,300**
25-34	-14,400	-24,100	-10,100	-14,300	-9,200	-2,300	**-74,400**
35-44	-30,600	-34,100	-23,600	-15,600	-900	-2,000	**-106,800**
45-54	-15,900	-12,800	-9,300	-5,400	-100	-2,800	**-46,300**
55-64	-9,400	3,400	-200	2,400	0	-200	**-4,000**
65-74	-300	1,200	100	-300	-100	400	**1,000**
75+	100	0	-100	0	-200	100	**-100**
Total	**-80,200**	**-89,500**	**-46,400**	**-37,700**	**-11,500**	**-6,600**	**-271,900**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 2.4

Wilting Manufacturing Industries: 2003-2009 Net Employment Change for Female Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-2,600	-7,500	-1,500	-3,300	-800	0	**-15,700**
25-34	-6,900	-10,300	-1,600	-4,100	-6,500	0	**-29,400**
35-44	-16,700	-26,200	-3,400	-3,500	-4,400	-1,100	**-55,300**
45-54	-11,300	-14,900	-1,100	400	-1,500	-100	**-28,500**
55-64	-5,500	-1,400	-100	0	1,100	-200	**-6,100**
65-74	-1,100	-100	-500	400	0	0	**-1,300**
75+	0	0	300	0	0	0	**300**
Total	**-44,100**	**-60,400**	**-7,900**	**-10,100**	**-12,100**	**-1,400**	**-136,000**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 2.5

Rebounding Manufacturing Industries: 2003-2009 Net Employment Change for Male Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-10,600	-14,600	-4,300	-3,900	-100	200	**-33,300**
25-34	-5,200	-13,600	-3,400	-7,300	-3,000	-2,900	**-35,400**
35-44	-23,100	-26,400	-11,700	-7,600	2,900	1,300	**-64,600**
45-54	1,200	-2,600	4,900	10,500	5,200	2,200	**21,400**
55-64	-3,700	7,800	1,500	200	6,000	2,300	**14,100**
65-74	500	600	1,700	500	1,200	1,600	**6,100**
75+	-200	-100	100	100	100	300	**300**
Total	**-41,100**	**-48,900**	**-11,200**	**-7,500**	**12,300**	**5,000**	**-91,400**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 2.6

Rebounding Manufacturing Industries: 2003-2009 Net Employment Change for Female Workers

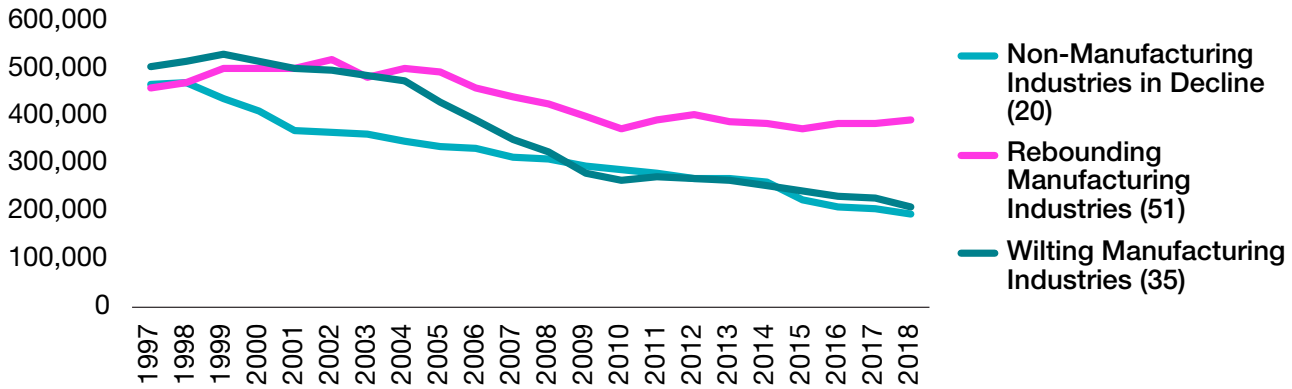
Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-2,400	-7,100	-100	-1,900	500	-400	**-11,400**
25-34	-1,800	-6,700	900	-4,900	-5,700	-600	**-18,800**
35-44	-7,700	-8,400	2,100	-3,700	2,800	-2,700	**-17,600**
45-54	-4,100	1,400	1,900	3,700	5,500	700	**9,100**
55-64	-900	3,100	1,500	300	1,200	1,200	**6,400**
65-74	100	400	600	100	-700	-300	**200**
75+	-100	-200	0	0	0	0	**-300**
Total	**-16,900**	**-17,500**	**6,900**	**-6,400**	**3,600**	**-2,100**	**-32,400**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Unlike in wilting manufacturing industries, the net employment decline in rebounding manufacturing industries was disproportionately felt by younger workers, as shown in Tables 2.5 and 2.6. This suggests, though does not confirm, that the more modest declines in rebounding manufacturing industries, prior to 2009, may be largely due to a reduction in hiring rather than workers exiting the industry. As with wilting manufacturing industries, most of the net employment decline was due to a reduction in workers without post-secondary completion. In fact, for rebounding manufacturing industry workers, there was minimal change in employment for those with post-secondary credentials between 2003 and 2009.

FIGURE 2.8

Employment Levels by Manufacturing Industry Type, Workers Aged 15-44 Without Post-Secondary Completion, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

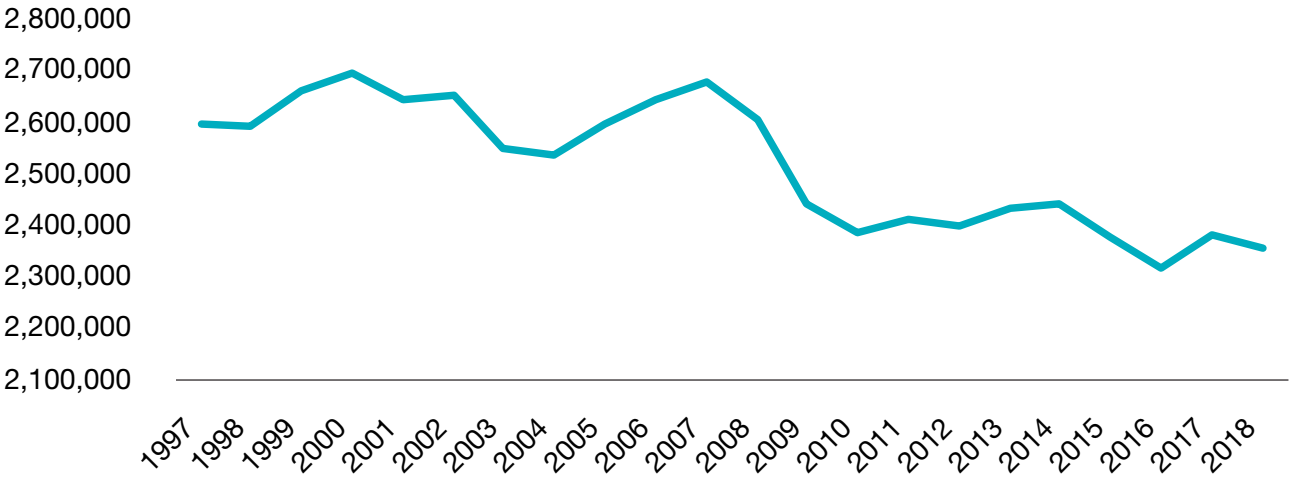
If we limit our analysis to individuals aged 15-44 who have not completed post-secondary education (the group most affected by the bulk of the job loss), we see an obvious decline in manufacturing employment (in both sets of manufacturing industries) during the pre-recession period of 2003-2008 (refer to Figure 2.8). The decline in wilting manufacturing industries is particularly sharp, with the number of workers under the age of 45 with no post-secondary education falling from nearly 500,000 in 2003 to under 300,000 in 2009.

Given the sheer size of this decline, if these individuals were finding employment in other sectors, it should be noticeable in the aggregate employment data for all other industries. We do see an increase in employment in all other industries for this group between 2004 and 2007, but it does not appear to be large enough to fully offset the decline of 216,200 positions in manufacturing employment between 2003-2008 for this demographic group, as shown in Figure 2.9.

In the pre-recession period between 2003 and 2008, the number of manufacturing workers under the age of 45 with no post-secondary credentials declined by nearly 200,000.

FIGURE 2.9

Employment Levels in All Other Industries, Workers Aged 15-44 Without Post-Secondary Completion, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Industries That May Have Benefited From the Decline in Manufacturing Sector Employment

There would appear to be at least some transition out of manufacturing into other industries for individuals aged 15-44 without post-secondary credentials. To begin to identify where these individuals could have ended up, we identified all industries that meet the following conditions:

- Net employment for this demographic group rose by at least 2,000 persons from 2003 to 2008.
- The increase in net employment between 2003 and 2008 for this demographic group was larger than the increase experienced from 1997 to 2003. We impose this condition because we want to isolate industries that may have seen an increase in these workers *because of* the manufacturing job decline and exclude industries that were naturally increasing in size.

There are 25 different industries that meet these conditions, which we call the "2003-2008 gainers (industries)," as shown in Table 2.7.

TABLE 2.7

2003-2008 Gainers (Industries)

NAICS	Description
2111	Oil and gas extraction
2131	Support activities for mining, and oil and gas extraction
2361	Residential building construction
2371	Utility system construction
2372	Land subdivision
2373	Highway, street, and bridge construction
2381	Foundation, structure, and building exterior contractors
2382	Building equipment contractors
4172	Construction, forestry, mining, and industrial machinery, equipment and supplies merchant wholesalers
4411	Automobile dealers
4412	Other motor vehicle dealers
4421	Furniture stores
4441	Building material and supplies dealers
4481	Clothing stores
4539	Other miscellaneous store retailers
4851	Urban transit systems
4884	Support activities for road transportation
4931	Warehousing and storage
5223	Activities related to credit intermediation
5324	Commercial and industrial machinery and equipment rental and leasing
5413	Architectural, engineering and related services
5629	Remediation and other waste management services
6113	Universities
7121	Heritage institutions
8121	Personal care services

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 2.8

Net Employment Change for Workers Aged 15-44 Without Post-Secondary Completion, 1997-2018

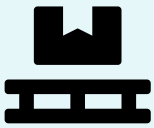
	1997-2003	2003-2008	2008-2009	2009-2018
Non-Manufacturing Industries in Decline (20)	-66,000	-61,600	-17,700	-53,600
All Other Industries	-39,900	-86,300	-90,000	-139,700
Wilting Manufacturing Industries (35)	-38,600	-127,000	-34,200	-40,200
Rebounding Manufacturing Industries (51)	-6,200	-68,800	-28,600	-17,000
2003-2008 Gainers (Industries) (25)	-3,300	145,000	-72,800	59,200

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Employment Prospects of Young Workers Without Post-Secondary Completion

We use these 25 industries to add a fifth category, the 2003-2008 gainers (industries), to our list of industries. While net employment growth in our 2003-2008 gainer industries does not completely offset the declines in our two sets of manufacturing industries, they are close to being in balance (refer to Table 2.8). This is suggestive, but far from conclusive, that these 25 industries, which include oil and gas, and warehouse storage, absorbed the types of workers who would have traditionally worked in manufacturing.

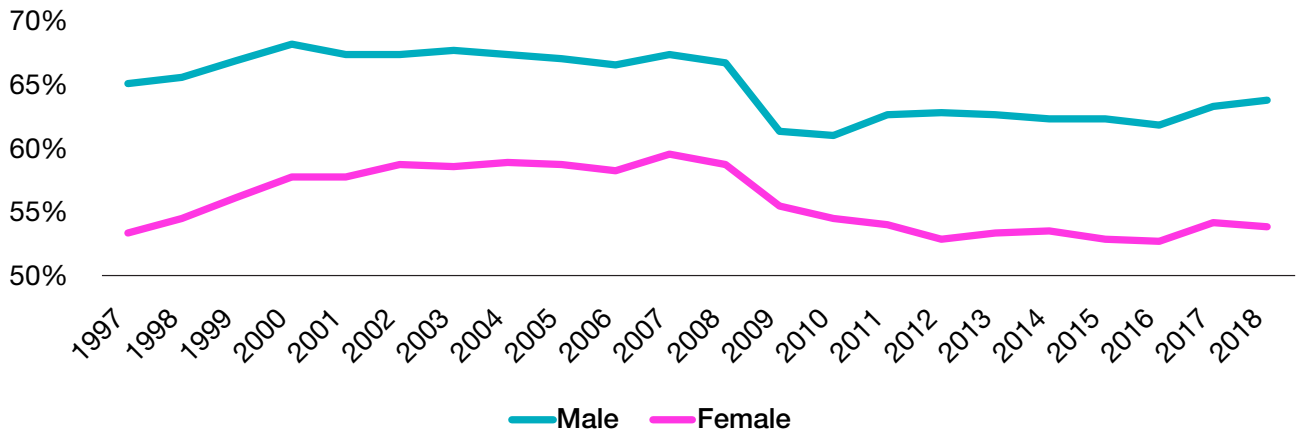
Additionally, for persons aged 15-44 living in Canada *without* post-secondary completion, we have seen little employment growth in the 2003-2008 gainer industries since the end



From 2003 to 2008, the manufacturing sector shed nearly 200,000 workers without post-secondary completion under the age of 45, while growing industries such as construction, warehousing, and oil and gas added 145,000. This suggests that these growing industries absorbed many of the types of workers who would have traditionally worked in manufacturing.

FIGURE 2.10

Employment Levels by Sex, Workers Aged 15-44 Without Post-Secondary Completion, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

of the Great Recession, while our other four sets of industries have been in decline. As such, the overall employment rate for young workers without post-secondary completion has remained largely unchanged since the end of the Great Recession, with the male employment rate hovering between 62 and 64 percent, and the female employment rate steady between 53 and 54 percent, as shown by Figure 2.10. Note that these employment rates are substantially below the rates experienced prior to the Great Recession.

For Canadians under the age of 45 with no post-secondary completion, the Great Recession has had a permanent scarring effect on employment.

FIGURE 2.11

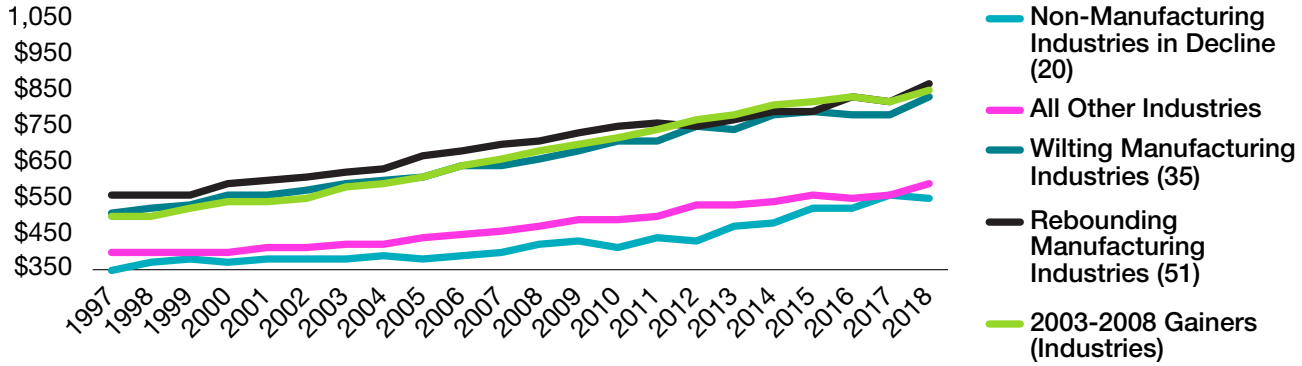
Employment Levels by Sex, Workers Aged 15-44 With Post-Secondary Completion, 1997-2018

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The experience for young workers with post-secondary credentials has been markedly different, as shown by Figure 2.11. The employment rate for men, which declined sharply during the Great Recession, is back to 2004 levels at over 84%. For young women *with* post-secondary credentials, employment rates hit an all-time high in 2018, at just under 80%.

FIGURE 2.12

Weekly Earnings by Industry Type for Workers Aged 15-44 Without Post-Secondary Completion, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Our list of 2003-2008 gainers (industries) is particularly heavy with construction and oil and gas positions, but by itself, this does not tell us the cause of the shift from one set of fields to another. Did increased employment demand from construction and oil and gas pull people from manufacturing, or did a decrease in employment demand from manufacturing create a pool of available workers for these industries? In other words, were workers enticed away from manufacturing jobs to take more attractive wages elsewhere, or were they pushed into other jobs as positions in manufacturing dried up?

One way we can try to answer this question is to examine the relative wages in the industries; we would only expect workers to voluntarily migrate to these industries if they pay higher wages. For 15- to 44-year-old individuals without post-secondary completion, we see negligible differences in weekly earnings between our gainer industries and our two sets of manufacturing industries (refer to Figure 2.12). This would suggest that workers were not being pulled away from manufacturing jobs to better paid positions elsewhere. We do see significant lower weekly earnings for rebounding manufacturing industries and "all other industries," which is largely, but not wholly, due to differences in hours worked: positions there are more likely to be part-time positions.

Differentials in earnings do not appear to explain why individuals aged 15-44 without post-secondary credentials took more jobs in 2003-2008 gainer industries and fewer jobs in manufacturing. There does not appear to be much difference in average weekly earnings across those industries during that time period.

Summary: Our Questions Answered

At the beginning of the section, we posed six questions, which we have attempted to answer. Our findings can be summarized as follows.

Which industries went into an employment decline from which they did not recover, and when did the decline happen?

Almost all employment loss in the manufacturing sector occurred between 2003 and 2009; since then, manufacturing employment across Canada has been relatively flat. However, some industries within the sector declined more than others. Furthermore, some industries saw an employment rebound after the Great Recession, whereas others continued to decline.

There were 20 industries outside of the manufacturing sector that met our criteria of employment decline. These industries include department stores, cattle ranching, newspaper and periodical publishers, logging, and oilseed and grain farming. The number of Canadians employed by these 20 industries fell by over half between 1997 and 2018, for a net employment decline of 461,700. Employment in these 20 industries has been in steady decline since 1997 and is unrelated to the Great Recession of 2008-2009.

The manufacturing sector also saw a significant employment decline during the years of 2003-2009. However, different industries in the sector had very different employment dynamics. Manufacturing employed approximately two million Canadians in 1997 and can be broken down into two categories, each employing one million Canadians that year. One set of manufacturing industries, which we refer to as rebounding manufacturing industries, saw an increase in employment to 1.2 million by 2003. These manufacturing industries experienced a net employment decline of roughly 5% (65,300 positions) between 2003 and 2008 and another 5% (58,100 positions) in the Great Recession period of 2008-2009. Since then, employment has rebounded back to 2003 levels.

The other set of manufacturing industries, which we refer to as wilting manufacturing industries, reached employment levels of 1.1 million by 2003. In the pre-recession period, companies in these industries shed over 25% of their net employment (284,100 positions), with an additional 11% reduction (from 2003 levels, an additional 124,100 workers) occurring during the Great Recession of 2008-2009. Between 2009-2018, these industries have shed roughly the same number of positions (126,300) as they did during the Great Recession (124,100). Overall, net employment has fallen by nearly half in wilting manufacturing industries since 2003, with much of the reduction occurring in the pre-recession 2003-2008 period.

TABLE 2.9

By the Numbers: Wilting and Rebounding Manufacturing Industries, 2003-2018

	Wilting Manufacturing Industries	Rebounding Manufacturing Industries
Total employment in 2003	1,090,200	1,186,200
Jobs gained/lost, 2003-2009	-408,200	-123,400
Jobs gained/lost 2009-2018	-126,300	108,200
Percentage of 2003 workforce without post-secondary credentials	55.2%	50.9%
Percentage of 2003-2009 job loss experienced by those without post-secondary credentials	67.2%	100%
Percentage of 2003 workforce who were female workers	29.5%	28.7%
Percentage of 2003-2009 job loss experienced by female workers	33.3%	26.3%
Percentage of workers over age 55 in 2003	10.7%	11.4%
Five biggest industries by employment in 2003	1. Motor Vehicle Parts Manufacturing 2. Cut and Sew Clothing Manufacturing 3. Printing and Related Support Activities 4. Pulp, Paper, and Paperboard Mills 5. Motor Vehicle Manufacturing	1. Plastic Product Manufacturing 2. Aerospace Products and Parts Manufacturing 3. Other Miscellaneous Manufacturing 4. Meat Product Manufacturing 5. Bakeries and Tortilla Manufacturing

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Overall, there was a substantial decline in manufacturing sector employment, which occurred in the 2003-2008 period before the Great Recession, with the sector as a whole shedding over 300,000 net positions. The rate of employment decline, however, accelerated during the Great Recession. Since the end of the Great Recession, employment has increased in rebounding manufacturing industries, but declined in wilting manufacturing ones.

Overall, there were few obvious differences between wilting and rebounding manufacturing industries, beyond their job losses, as shown by Table 2.9.

How much of the employment decline was due to a reduction in hiring rather than individuals exiting the industry, voluntarily or involuntarily?

There was significant involuntary job loss during the Great Recession. Prior to that recession, it would appear that much of the job loss was due to a combination of retirements, reduced rates of hiring, and younger workers without post-secondary credentials taking jobs in other industries, rather than employment reductions due to layoffs. The data, however, is not entirely conclusive.

In the pre-recession period, unemployment data does not suggest that net employment reductions led to a rise in unemployment among workers who formerly worked in the sector, both in rebounding and wilting manufacturing industries. However, a spike in unemployment does explain much of the accelerated disemployment during the Great Recession for both types of industries.

As with the unemployment data from the 2003-2008 period, there does not appear to be a significant rise in the number of persons out of the labour force who had worked in wilting or rebounding manufacturing industries during that time.

Examining the data on why workers left their previous job, we found that information from those workers who are not currently employed but were employed in the last 12 months paints a more nuanced picture. The ratio of workers who lost their job (rather than voluntarily leaving it) was significantly higher for wilting rather than rebounding industry workers during the 2003 to 2008 period, which suggests an increased rate of job loss in wilting manufacturing industries during this period.

The number of wilting manufacturing industry workers who have worked with their firm for less than a year fell from 159,500 in 2004 to 108,000 in 2008 (then down to 77,100 during the Great Recession). This indicates that a reduction in hiring explains much of the disemployment in those industries.

Between 2004 and 2008, the number of wilting manufacturing industry workers who had been with their firm for five or more years fell by 130,000, then fell by an additional 65,000 between 2008 and 2009. Similarly, the number of wilting manufacturing industry workers who had been with their firm for ten or more years fell by 60,000 from 2004 to 2008 and by an additional 30,000 from 2008 to 2009. This suggests that a reduction in hiring was not the sole cause of employment decline and that there were accelerated exits from the industry, leading to questions about where those individuals went.

Which demographics were particularly affected by the employment decline?

Younger workers who have not completed a post-secondary program or trades certificate were particularly affected, and there were significant declines in manufacturing employment among both men and women. One-third of the 2003-2008 wilting manufacturing industry disemployment was experienced by women, despite making up less than 30% of the wilting manufacturing industry workforce in 2003.

In wilting manufacturing industries, most of the net employment decline was experienced by individuals under the age of 45, suggesting that a wave of retirements was likely not the cause of the disemployment. The majority of the disemployment in both rebounding and wilting manufacturing industry workers was experienced by those without higher education credentials. This is consistent with the common belief that Canadian manufacturing is changing such that positions not requiring higher education are being either automated or offshored. Further research is needed to confirm or refute this hypothesis.

What were the employment outcomes for those demographic groups?

The decline in manufacturing employment has seen a reduction in employment rates for individuals without post-secondary credentials. Between 2003 and 2008, there was little change in the employment rate for either men or women under the age of 45 without post-secondary credentials, though employment rates had been rising for these groups in the past. For women under the age of 45 with post-secondary credentials, employment rates continued to rise.

During the Great Recession, employment rates declined sharply for all under-45 demographic groups, particularly for men. Employment rates have returned to their pre-recession highs for those under the age of 45 with post-secondary credentials but have not recovered for those without post-secondary credentials. For those under the age of 45 with no post-secondary completion, the Great Recession has had a permanent scarring effect on employment.

Did the affected demographic groups find employment in other industries? Which other industries?

To a certain extent, yes, particularly before the Great Recession. Between 2003 and 2008, 25 industries saw substantial increases in employment for those under 45 years of age with no post-secondary credentials, relative to increases between 1997 and 2003. This suggests that the type of workers who would have otherwise worked in manufacturing took positions in these industries.

From 2003 to 2008, employment in these 25 industries increased by 178,000 persons, with the largest gains in residential building construction, foundation, structure, and building exterior contractors, building equipment contractors, clothing stores, support activities for mining, and oil and gas extraction.

Employment for those under 45 years of age without post-secondary credentials fell in these 25 industries during the Great Recession and has been relatively flat since then. This could explain the permanent decline in the employment rate for this group. Unlike between 2003 and 2008, there was no employment growth in the industries that absorbed workers that traditionally would have worked in manufacturing.

How did the employment transition alter the weekly earnings of the affected groups?

There is little evidence to suggest that this employment transition affected weekly earnings growth in a significant way. The employment effects appear to be on employment levels, not the rates of compensation.

In the 25 industries that saw a boost in employment of those under 45 years of age with no post-secondary credentials, average weekly compensation was equivalent to that in manufacturing. Weekly compensation in those industries has risen slightly faster for this group than it has in manufacturing.

Additional insights into the labour market transitions of the 2003-2009 period may be found by examining the problem through the lens of occupation, rather than industry, which forms the basis of the next section.

SECTION 3:

Analysis by Occupation Type

Introduction

Although two million Canadians worked in manufacturing industries at the turn of the century, the number of workers in manufacturing occupations was only half that, as many of those employed by manufacturing firms perform administrative or other tasks (Statistics Canada, 2020b). Similar to the differences among manufacturing industries, some manufacturing occupations were hit harder by disemployment between 2003 and 2009 than others. Those hit hardest include industrial sewing machine operators, other labourers in processing manufacturing and utilities, as well as motor vehicle assemblers, inspectors, and testers. The manufacturing occupations that experienced the highest levels of decline were those requiring lower skill levels (based on the National Occupational Classification [NOC] taxonomy [Government of Canada, 2020]), suggesting that these tasks were the most likely to be automated or offshored.[8] The biggest net employment declines were experienced by young workers without post-secondary credentials. During the 2003-2009 period, there were high levels of decline in non-manufacturing occupations among workers employed by wilting manufacturing industries, so employment decline in these industries was not simply a case of assembly line work being automated. Since 2003, the percentage of manufacturing occupation workers with post-secondary credentials has increased substantially, suggesting upskilling is occurring in the sector.

Analysis

In this section, we seek to answer the same set of six questions from Section 2, but do so from an occupational, rather than an industry, viewpoint, along with a seventh question that combines insights from disemployment by industry and disemployment by occupation:

1. Which occupations went into an employment decline from which they did not recover, and when did the decline take place?

2. How much of the employment decline was due to a reduction in hiring rather than individuals exiting the occupation, voluntarily or involuntarily?

8 Further work is needed to establish a causal link between the decline in these positions and offshoring and automation.

3. Which demographic groups were particularly affected by the employment decline?
4. What were the employment outcomes for those demographic groups?
5. Did the affected demographic groups find employment in other occupations? If so, which other occupations?
6. How did the employment transition alter the weekly earnings of the affected groups?
7. What was the joint effect of occupational and industrial decline?

As in Section 2, we use the definition of manufacturing and unreversed decline described in the methodology section in Section 1,[9] and identify 43 occupations that experienced unreversed employment decline, 16 of which are in the manufacturing sector. In this section, we refer to the manufacturing occupations that experienced this decline as "deteriorating manufacturing occupations," as employment levels in these occupations have steadily deteriorated since 1997. We will refer to other occupations in decline as "non-manufacturing occupations in decline."

9 As defined in Section 1, an industry or occupation experienced an employment decline when it meets one of the following three conditions:

A net reduction in employment of 20,000 or more persons and 40% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

A net reduction in employment of 10,000 or more persons and 50% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

A net reduction in employment of 2,500 or more persons and 80% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

Because our interest is in industries and occupations that did not recover from decline, we also impose the condition that in 2018, employment must have remained 30% below the 1997-2018 peak.

This leaves us with another 55 occupations, which did not experience an unreversed decline, which we will refer to as "recovering manufacturing occupations," as their employment levels are continuing to recover from the employment decline of 2003-2009.

Employment Levels in Manufacturing and Other Occupations

Examining employment change by occupation provides a different perspective than an examination by industry. Using this analysis, there are only one million, not two million, workers associated with manufacturing occupations, as many of the workers employed by manufacturing companies are in sales, research and development, or administration, as opposed to the actual manufacturing of a product (similarly, some manufacturing occupations work for companies that are not classified as being in the manufacturing industry).[10]

The employment dynamics are substantially different, although the methodology for identifying employment decline among industries and occupations is identical. From an occupational perspective, we see a continual reduction in employment in deteriorating manufacturing occupations, with a brief respite between 2009 and 2012. Unlike the industry perspective, we see significant employment decline in these occupations in the 1997-2003 period.

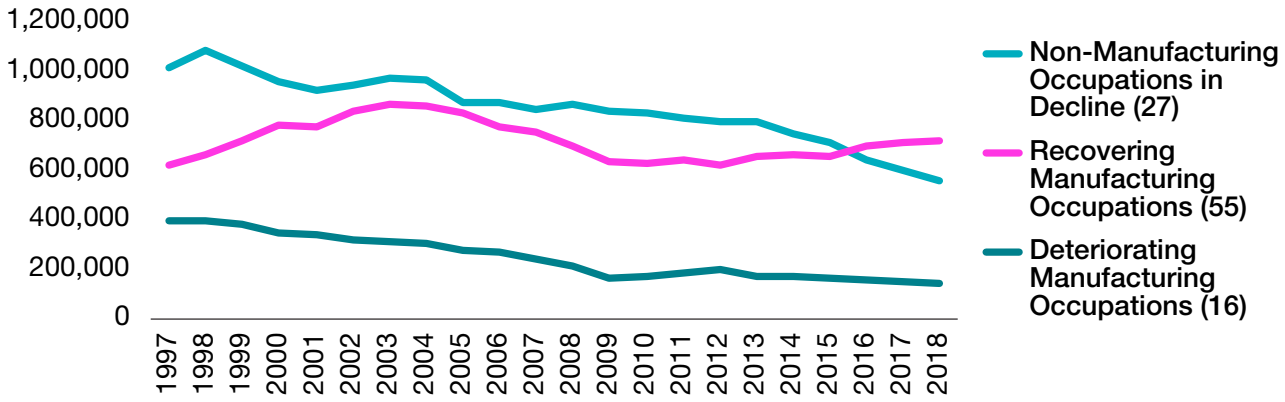
Although two million individuals worked in the manufacturing sector in 2003, only half of them were employed in manufacturing occupations, with the rest performing other duties. Our hypothesis was that manufacturing occupation workers may have been hit particularly hard by the decline in manufacturing employment, as their skills may not be as transferrable as those of, for example, a marketing director working for a manufacturing firm.

The remaining manufacturing occupations (the recovering manufacturing occupations) saw a tremendous rise and fall in employment, with employment levels in 2009 roughly in line with those of 1997. Since then, employment has increased by nearly 90,000 workers, though it has not fully returned to the level of the early 2000s, as shown by Figure 3.1.

10 All data in this section is from the Labour Force Survey (Statistics Canada, 2020b), which was accessed via Statistics Canada's Real Time Remote Access (RTRA) system (Statistics Canada, 2020c).

FIGURE 3.1

Manufacturing Employment Trajectories by Occupation Type: Employment Levels in Canada, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

As in Section 2, we take our employment time series and break it down into four periods, in order to gain a better understanding of how employment dynamics evolved over time:

1. Before the decline in manufacturing employment (1997-2003)
2. The pre-recession decline in manufacturing employment (2003-2008)
3. The Great Recession (2008-2009)
4. The post-recession recovery (2009-2018)

The dynamics of employment by occupation differ somewhat from those of industry. Our 16 deteriorating manufacturing occupations saw a decline in all four periods. Recovering manufacturing occupations saw substantial growth from 1997 to 2003 as well as modest growth from 2009 to 2018. Though it is important to note that the 2009-2018 growth only partly offsets the decline from the 2003-2008 and 2008-2009 periods, as shown in Table 3.1.

The 16 manufacturing occupations that meet our definition of occupational decline are shown in Table 3.2. Recall that in Section 2, we saw an unexpectedly high rate of disemployment among women in manufacturing. Two of our top five deteriorating manufacturing occupations from 2003 to 2009 are among industrial sewing machine operators, as well as textile fibre and yarn workers, which historically have employed more women than men.

Four Types of Occupations

Deteriorating manufacturing occupations:
Any manufacturing occupation that experienced an employment decline, with 2018 employment levels for that occupation at least 30% below the 1997-2018 peak. We found 16 manufacturing occupations that meet these criteria.

Recovering manufacturing occupations:
Any manufacturing occupation that did not "deteriorate" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both). In total, 55 manufacturing occupations meet these criteria.

Non-manufacturing occupations in decline:
Any non-manufacturing occupation that experienced an employment decline, and 2018 employment levels for that occupation were 30% or more below their 1997-2018 peak. We identified 16 non-manufacturing occupations that meet these criteria.

All other occupations:
Any non-manufacturing occupation that did not "deteriorate" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both). Over 400 non-manufacturing occupations meet these criteria.

TABLE 3.1

Employment Change by Occupation in Canada, 1997-2018

	1997-2003	2003-2008	2008-2009	2009-2018
Non-Manufacturing Occupations in Decline (27)	-37,000	-106,800	-30,200	-275,500
Recovering Manufacturing Occupations (55)	247,100	-172,500	-60,600	82,900
Deteriorating Manufacturing Occupations (16)	-83,300	-97,600	-49,300	-21,300
All Other Occupations	1,950,300	1,348,600	-282,500	1,917,400

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.2

Deteriorating Manufacturing Occupations Ordered by Job Loss, 2003-2009

NOC	Deteriorating Manufacturing Occupations	2003-2009 Total	2003-2008	2008-2009
9446	Industrial sewing machine operators	-29,300	-23,000	-6,300
9619	Other labourers in processing, manufacturing, and utilities	-24,100	-4,600	-19,500
9522	Motor vehicle assemblers, inspectors, and testers	-16,800	-8,900	-7,900
9523	Electronics assemblers, fabricators, inspectors, and testers	-12,000	-6,500	-5,500
9441	Textile fibre and yarn, hide and pelt processing machine operators and workers	-11,500	-9,400	-2,100
9417	Machining tool operators	-9,600	-7,700	-1,900
9431	Sawmill machine operators	-9,400	-7,200	-2,200
9437	Woodworking machine operators	-6,100	-5,000	-1,100
9442	Weavers, knitters, and other fabric making occupations	-5,100	-5,300	200
9474	Photographic and film processors	-5,000	-3,000	-2,000
9445	Fabric, fur and leather cutters	-4,600	-3,700	-900
9447	Inspectors and graders, textile, fabric, fur, and leather products manufacturing	-4,100	-3,800	-300
9611	Labourers in mineral and metal processing	-4,000	-3,600	-400
9536	Industrial painters, coaters, and metal finishing process operators	-3,700	-5,300	1,600
9415	Inspectors and testers, mineral and metal processing	-1,300	-1,100	-200
9527	Machine operators and inspectors, electrical apparatus manufacturing	-400	400	-800

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.3

Occupation Skill Level Codes

Skill Level	Skill Level (digit)
A: Occupations usually require university education.	0 or 1
B: Occupations usually require college or vocational education, or apprenticeship training.	2 or 3
C: Occupations usually require secondary school and/or occupation-specific training.	4 or 5
D: On-the-job training is usually provided for occupations.	6 or 7

Source: Government of Canada (2020).

Manufacturing Occupations by Skill Level: Is There a Connection Between Job Skills and Job Loss?

The National Occupational Classification (NOC) provides important context. The first digit, a 9, refers to "occupations in manufacturing and utilities." The second digit (on the above list, either a 4, 5, or 6) refers to the skill level of the occupation. Employment and Social Development Canada defines the skills of occupations as outlined in Table 3.3.

Note that every single occupation on our decline list is either in skill level C or D, which do not require post-secondary schooling, as shown in Table 3.4. If we divide these among occupations in employment decline and occupations not in unreversed employment decline, we see that the decline list is more heavily weighted to those occupations ranked lower on the skills dimension. It is particularly noteworthy that none of the 17 manufacturing occupations at skill level B experienced a substantial employment decline.

The 16 manufacturing occupations in steady employment decline since 1997 require disproportionately less education and likely faced enhanced competition from automation and labour from countries with lower wage practices.

If we take all our manufacturing occupations together (deteriorating and recovering), we see a real divergence by skill level. Employment in skill level B occupations has essentially fully recovered from the declines of 2003-2009, while skill level C and D occupations have not. During the 2003-2008 employment decline, employment in skill level C occupations fell by a quarter. The Great Recession hit all occupations hard, with employment declining by 9-15% in a single year, as shown by Tables 3.5, 3.6, and 3.7.

TABLE 3.4

Deteriorating and Recovering Manufacturing Occupations by Skill Level

Skill Level Type	Number of Deteriorating Manufacturing Occupations	Number of Recovering Manufacturing Occupations
Skill Level A	0	0
Skill Level B	0	17
Skill Level C	14	31
Skill Level D	2	7

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.5

Manufacturing Occupation Employment by Skill Level for Selected Years

	1997	2003	2008	2009	2018
Skill Level B	164,000	207,700	184,300	167,700	200,700
Skill Level C	626,800	770,800	558,000	490,200	513,300
Skill Level D	225,700	201,100	166,900	141,500	147,000

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.6

Manufacturing Occupation Employment Change by Skill Level, 1997-2018

	1997-2003	2003-2008	2008-2009	2009-2018	1997-2018
Skill Level B	43,700	-23,400	-16,600	33,000	36,700
Skill Level C	144,000	-212,800	-67,800	23,100	-113,500
Skill Level D	-24,600	-34,200	-25,400	5,500	-78,700

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.7

Manufacturing Occupation Employment Change: Percentage Employment Change by Skill Level, 1997-2018

	1997-2003	2003-2008	2008-2009	2009-2018	1997-2018
Skill Level B	26.6%	-11.3%	-9.0%	19.7%	22.4%
Skill Level C	23.0%	-27.6%	-12.2%	4.7%	-18.1%
Skill Level D	-10.9%	-17.0%	-15.2%	3.9%	-34.9%

Note: Percentage changes refer to the difference in employment levels between the start of a period and the end of the period. For example, a -9.0% change for skill level B in 2008-2009 indicates that employment levels for skill level B workers were 9% lower in 2009 than in 2008.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

To summarize, the number of manufacturing occupation workers declined by 380,000 from 2003 to 2009. Between 2009 and 2018, we saw a small increase of 82,900 workers in recovering manufacturing occupations. That still leaves hundreds of thousands of workers who lost manufacturing jobs unaccounted for. In order to identify the causes of these disappearing manufacturing occupation workers, we will follow the lead of Section 2 and begin our search by looking at unemployment, labour force, and "reason why left job" data.

Since 1997, the highest-skilled manufacturing occupations have experienced a 22% increase in employment, while the lowest-skilled occupations have declined by 35%, indicating an increase in the skills requirements of the sector.

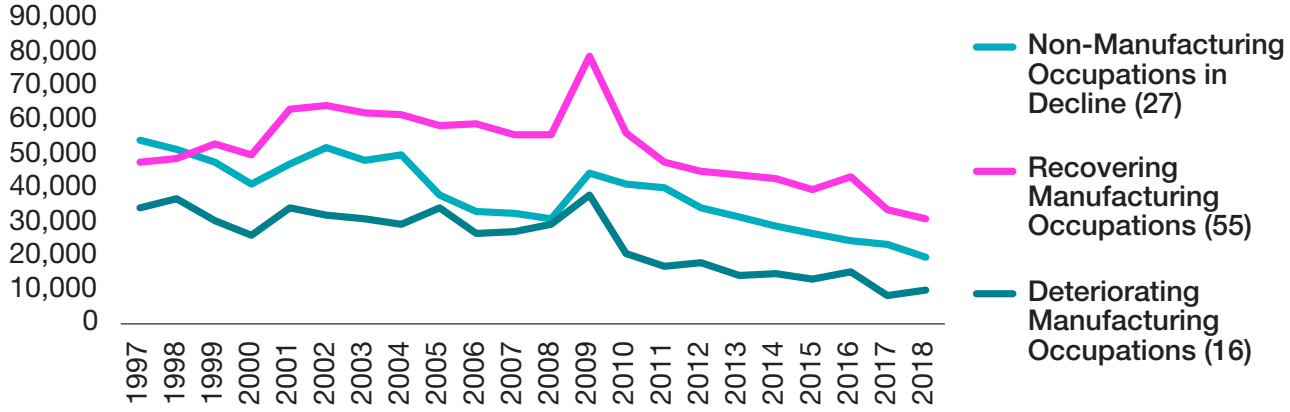
Scouring the Data to Find Missing Manufacturing Occupation Workers

The unemployment data is difficult to reconcile with the data on employment levels. The jump in unemployment for recovering manufacturing occupations between 2000 and 2001 does coincide with the flat employment growth during that period. However, as shown by Figure 3.2, we do not see an increase in the number of unemployed persons from 2003 to 2008, while employment levels were falling dramatically in recovering manufacturing occupations.

We can find little evidence that manufacturing workers were experiencing high levels of unemployment or dropping out of the labour force prior to the Great Recession. It would appear likely that the 2003-2008 employment decline in deteriorating manufacturing occupations was primarily due to attrition.

FIGURE 3.2

Employment Trajectories by Occupation Type: Unemployment Levels in Canada, 1997-2018

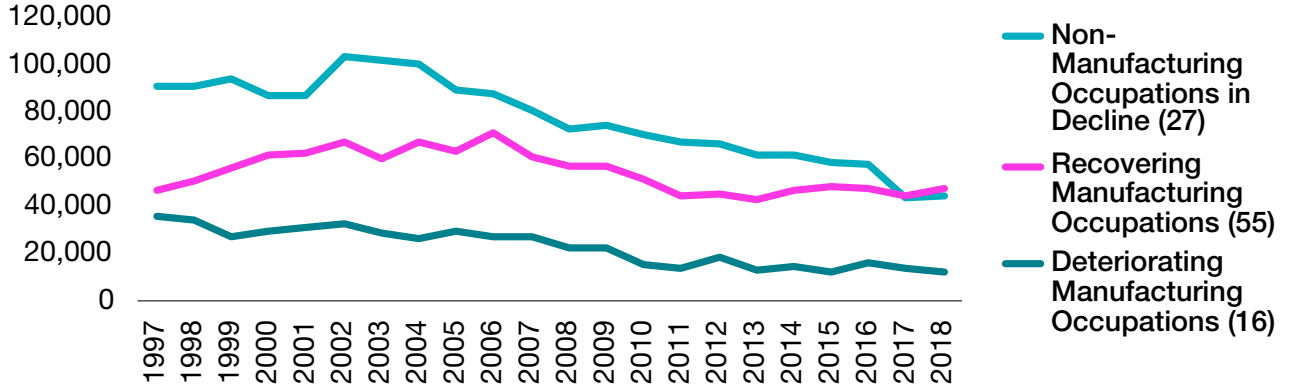


Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The not-in-the-labour-force data paints a similarly muddled picture. We saw a rise in deteriorating manufacturing occupation workers who were not in the labour force in the early 2000s, though this occured before the big employment declines of 2003-2008 (refer to Figure 3.3). This is difficult to reconcile with the employment decline between 2003 and 2008, though a post-recession decline in the number of recovering manufacturing occupation workers not in the labour force does align with the rise in employment during this period.

FIGURE 3.3

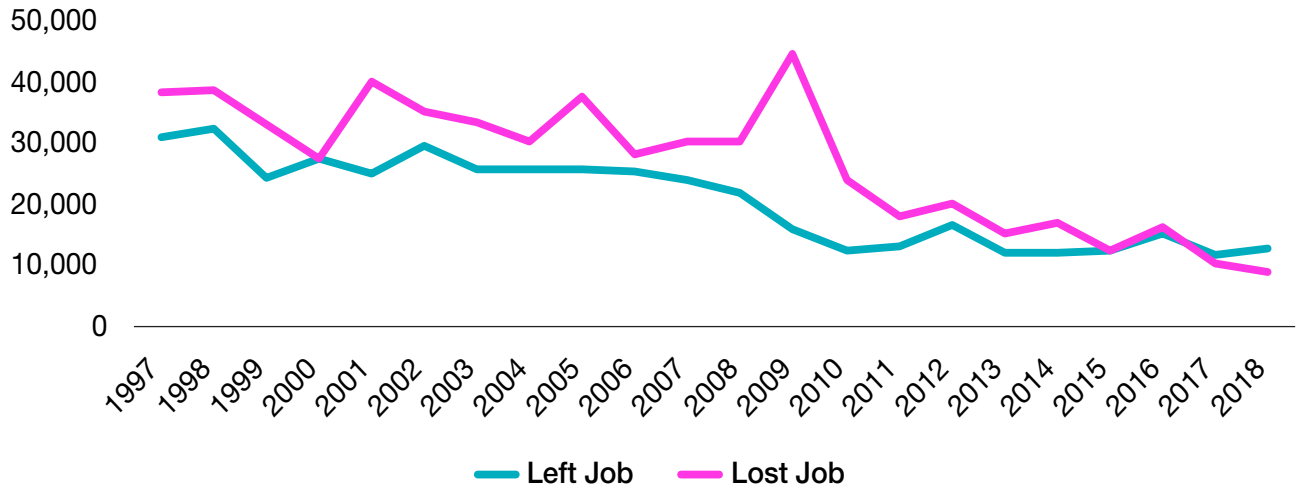
Employment Trajectories by Occupation Type: Not-in-the-Labour-Force Levels in Canada, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 3.4

Former Workers in Deteriorating Manufacturing Occupations: Why Left Last Job, 1997-2018



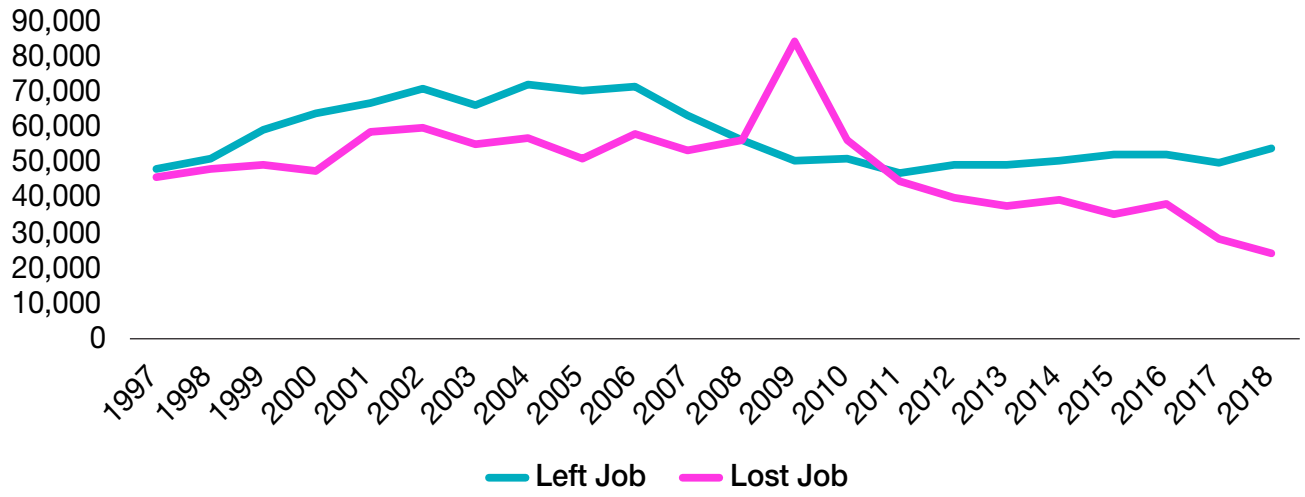
Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).0c).

Further insight can be provided by the "why left last position" variable in the Labour Force Survey, as shown in Figures 3.4 and 3.5. Not surprisingly, we see a higher proportion of workers who lost their job – rather than voluntarily left their job – in deteriorating manufacturing occupations, compared to in recovering manufacturing occupations. As with the industry employment data, we see a spike in lost jobs during the Great Recession, along with a decline in those voluntarily leaving jobs. This is typical: as the economy declines, people with positions are reluctant to leave them, as the likelihood of them finding a better position is diminished.

Overall, there do not appear to be particularly high or low levels of job losers or job leavers in deteriorating manufacturing occupation workers until 2007 or so. This is suggestive that attrition and a decline in the hiring rate played a role in the pre-recession decline in manufacturing occupation workers.

FIGURE 3.5

Former Workers in Recovering Manufacturing Occupation: Why Left Last Job, 1997-2018

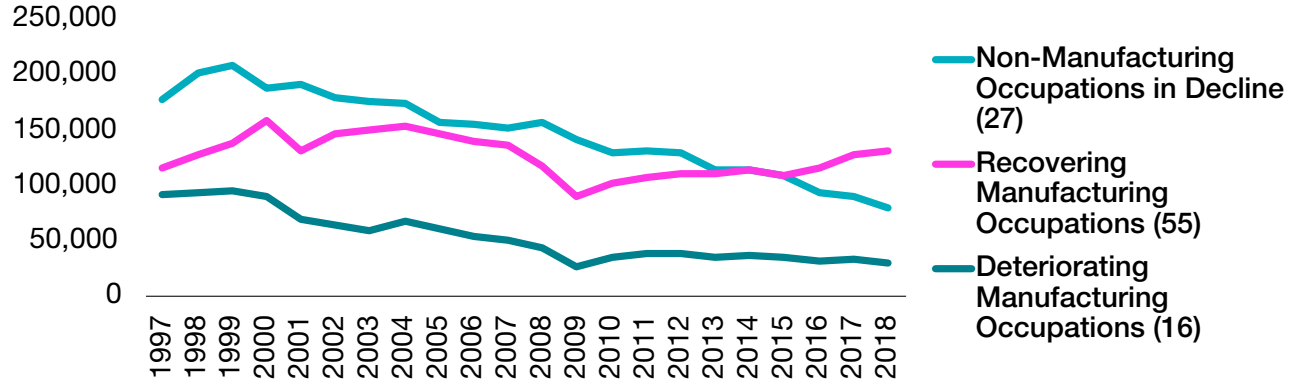


Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Trends around the number of employees who have been with an employer for 12 months or less can provide some insights into the question of whether there was a reduction in hiring (though the data is at a firm, not industry level). We do see a sustained reduction in the number of new employees in deteriorating manufacturing occupations, which is suggestive of job loss through attrition. Between 1999 and 2008, the number of deteriorating manufacturing occupations

FIGURE 3.6

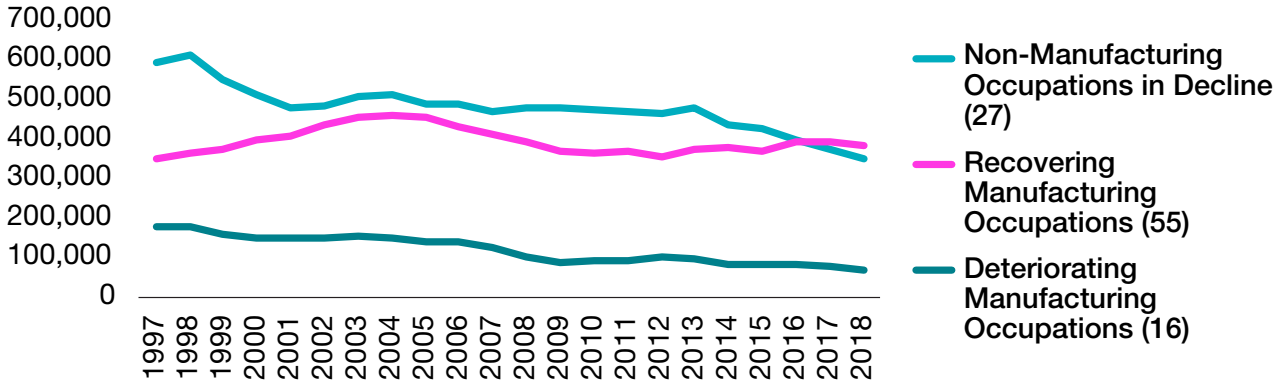
Number of Employees with Employer Less Than 12 Months, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 3.7

Number of Employees with Firm Five or More Years, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); ccessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

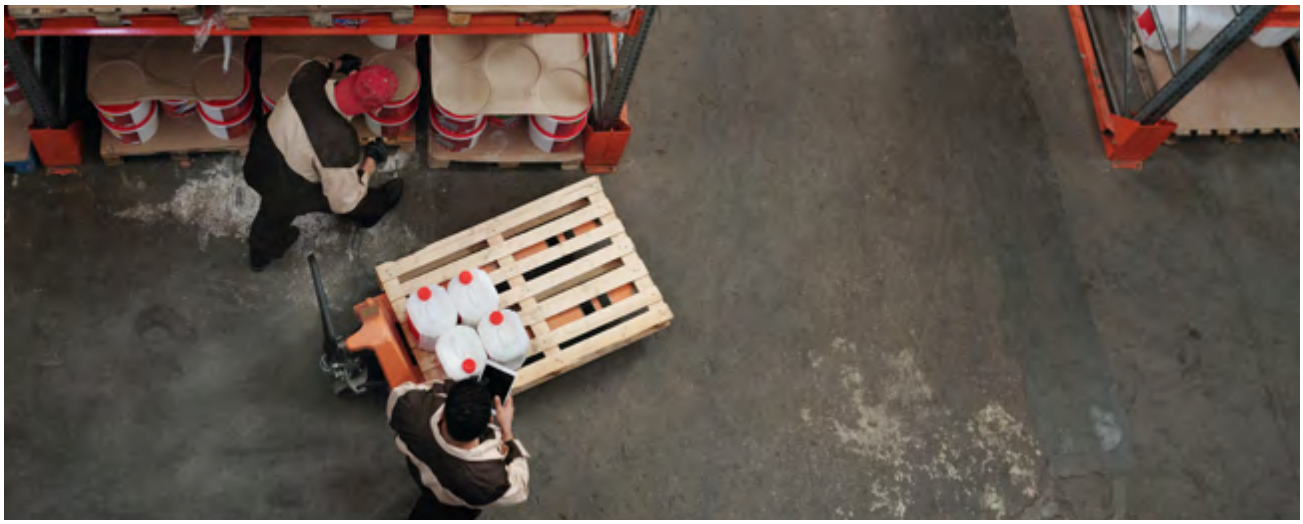
workers with their current firm for less than a year fell by over half, from over 90,000 to under 45,000 (refer to Figure 3.6). For recovering manufacturing occupation workers, we see a rebound in the number of new employees following the Great Recession.

It is also worth examining the number of long-tenured employees to help get an indication of the numbers of those leaving their jobs (either voluntarily or otherwise). This can be compared to employers simply experiencing a reduction in hiring to gain an understanding of the overall employment levels for the sector. As was seen with new hires, Figures 3.7 and Figure 3.8 show a decline in employment levels (outside

FIGURE 3.8

Number of Employees with Firm Ten or More Years, 1997-2018

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).



A reduction in hiring, retirements, and workers voluntarily exiting manufacturing occupations for employment opportunities elsewhere were all contributing factors in the pre-recession decline in employment.

of a small post-recession rebound from 2009-2013) for long-tenured workers in deteriorating manufacturing occupations, suggesting that exits played a significant role in disemployment in these occupations.

Put together, this series of data would suggest that at least some of the occupational disemployment was caused by those exiting the industry. To answer the question of where they went, we will follow the lead of Section 2, and first establish which groups were most affected by occupational disemployment. By knowing more about who they were, we can determine where they might have gone.

Demographic Groups Affected by the Decline in Manufacturing Occupation Employment

As in our industry analysis from Section 2, we learned that the groups facing the largest disemployment were younger workers who have not obtained post-secondary credentials. Despite manufacturing being seen by many as a male occupation, nearly half of the disemployment between 2003 and 2009 in deteriorating manufacturing occupations was experienced by women, who made up just over 40% of the workforce in deteriorating manufacturing occupations in 2003, as illustrated by Tables 3.8 and 3.9.

TABLE 3.8

Deteriorating Manufacturing Occupations: 2003-2009 Net Employment Change for Male Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-7,300	-8,100	-1,900	-1,200	-200	0	**-18,700**
25-34	-6,400	-6,000	-1,600	-2,500	-1,500	-200	**-18,200**
35-44	-9,800	-10,400	-4,400	-900	-700	-1,300	**-27,500**
45-54	-6,300	-8,700	-1,900	300	600	-400	**-16,400**
55-64	-1,300	2,700	200	300	700	400	**3,000**
65-74	-300	100	-300	200	0	100	**-200**
75+	0	0	0	0	0	0	**0**
Total	**-31,400**	**-30,400**	**-9,900**	**-3,800**	**-1,100**	**-1,400**	**-78,000**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Given the high levels of disemployment experienced by recovering manufacturing occupations between 2003 and 2009, it is instructive to see which demographic groups experienced disemployment in these occupations as well. As with deteriorating manufacturing occupations, the net reductions were disproportionately felt by younger workers without post-secondary credentials. For men, however, there were higher levels of disemployment for older workers and those with post-secondary credentials than we have seen in our other analyses, as shown by Table 3.10. The overall disemployment in our recovering manufacturing occupations (as well as in deteriorating ones) saw job declines for men across the educational spectrum during this period.

TABLE 3.9

Deteriorating Manufacturing Occupations: 2003-2009 Net Employment Change for Female Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-2,400	-5,100	-800	-1,300	-300	0	**-9,900**
25-34	-3,400	-3,800	-1,100	-1,500	-700	-1,000	**-11,500**
35-44	-10,000	-10,500	-1,300	-1,600	200	-1,000	**-24,200**
45-54	-8,600	-7,400	-400	-900	-500	200	**-17,600**
55-64	-5,500	1,200	-200	-900	0	200	**-5,200**
65-74	-100	0	0	100	-300	0	**-300**
75+	0	0	0	0	0	0	**0**
Total	**-30,000**	**-25,600**	**-3,800**	**-6,100**	**-1,600**	**-1,600**	**-68,700**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.10

Recovering Manufacturing Occupations: 2003-2009 Net Employment Change for Male Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-13,800	-19,000	-4,800	-1,500	200	-100	**-39,000**
25-34	-9,500	-25,300	-5,100	-6,700	-4,000	-1,800	**-52,400**
35-44	-24,900	-31,900	-17,900	-6,600	-100	-1,200	**-82,600**
45-54	-6,400	2,300	3,800	-600	-1,600	-800	**-3,300**
55-64	-5,600	500	2,200	-1,700	2,400	-100	**-2,300**
65-74	-500	700	1,200	100	600	500	**2,600**
75+	0	0	0	0	0	200	**200**
Total	**-60,700**	**-72,700**	**-20,600**	**-17,000**	**-2,500**	**-3,300**	**-176,800**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Women experienced almost half of the 2003-2009 disemployment in deteriorating manufacturing occupations.

TABLE 3.11

Recovering Manufacturing Occupations: 2003-2009 Net Employment Change for Female Workers

Age	No HS	HS	Trades	Certif	Bach	Above	Total
15-24	-3,200	-7,100	300	-1,800	-1,000	0	**-12,800**
25-34	-4,500	-9,000	1,100	-3,700	-2,900	100	**-18,900**
35-44	-12,000	-14,000	100	-200	-1,200	0	**-27,300**
45-54	-4,800	-2,400	1,200	2,400	1,200	-100	**-2,500**
55-64	0	-200	1,300	1,500	1,700	100	**4,400**
65-74	100	200	400	100	0	0	**800**
75+	0	0	0	0	0	0	**0**
Total	**-24,400**	**-32,500**	**4,400**	**-1,700**	**-2,200**	**100**	**-56,300**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Non-Manufacturing Occupations That May Have Gained from the Decline in Manufacturing Occupation Employment

As with Section 2, we identify occupations that may have benefited from the reduced demand for workers aged 15 to 44 without post-secondary credentials from 2003 to 2008. To identify occupations that may have absorbed these workers, we identified all occupations that met the following conditions:

> Net employment for this demographic group rose by at least 2,000 persons from 2003 to 2008.

> The increase in net employment for this demographic group between 2003 and 2008 was larger than the increase experienced from 1997 to 2003. We impose this condition because we want to isolate occupations that may have seen an increase in workers because of the manufacturing job decline and exclude occupations that were naturally increasing in size.

There are 27 different occupations that meet these conditions, which we refer to as the 2003-2008 gainers (occupations), all of which are listed in Table 3.12.

TABLE 3.12

2003-2008 Gainers (Occupations)

NOC	Occupations
0631	Restaurant and food service managers
0712	Home building and renovation managers
1221	Administrative officers
1523	Production logistics co-ordinators
1526	Transportation route and crew schedulers
2225	Landscape and horticulture technicians and specialists
2231	Civil engineering technologists and technicians
2282	User support technicians
4012	Post-secondary teaching and research assistants
6314	Customer and information services supervisors
6321	Chefs
6511	Maîtres d'hôtel and hosts/hostesses
6711	Food counter attendants, kitchen helpers, and related support occupations
7204	Contractors and supervisors, carpentry trades
7205	Contractors and supervisors, other construction trades, installers, repairers and servicers
7241	Electricians (except industrial and power system)
7271	Carpenters
7291	Roofers and shinglers
7441	Residential and commercial installers and servicers
7452	Material handlers
7521	Heavy equipment operators (except crane)
7522	Public works maintenance equipment operators and related workers
7611	Construction trades helpers and labourers
8222	Contractors and supervisors, oil and gas drilling and services
8232	Oil and gas well drillers, servicers, testers, and related workers
8612	Landscaping and grounds maintenance labourers
8615	Oil and gas drilling, servicing and related labourers

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Before the Great Recession, there was a substantial fall in the number of young men without post-secondary completion in manufacturing occupations and a simultaneous rise in their employment in construction and oil and gas occupations.

Despite limiting our analysis to workers without post-secondary credentials, many of these occupations do have skill level indicators between 0 and 3, indicating that they typically require post-secondary credentials. There are many possible explanations for this, from students working while earning those credentials, to employers reducing the qualifications needed due to skills shortages. Given the overlap between occupations, it is not surprising to see trades, transport, equipment operators, and related occupations (NOCs starting with the digit 7) as well as natural resources, agriculture, and related production occupations (NOCs starting with the digit 8) as potential employment replacements for occupations in manufacturing and utilities (NOCs starting with the digit 9).

TABLE 3.13

Net Employment Change by Occupation Type for 15- to 44-Year-Olds Without Post-Secondary Certification, 1997-2018

Occupation Types	1997-2003	2003-2008	2008-2009	2009-2018
Non-Manufacturing Occupations in Decline (27)	-20,900	-68,500	-4,300	-59,000
All Other Occupations	-118,900	-108,100	-105,500	-108,600
Deteriorating Manufacturing Occupations (16)	-70,500	-48,600	-22,200	-16,700
Recovering Manufacturing Occupations (55)	59,500	-110,300	-29,100	-2,500
2003-2008 Gainers (Occupations) (27)	-3,300	137,000	-82,200	-4,500

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Employment Prospects of Young Workers Without Post-Secondary Credentials

If we add this fifth category, the 2003-2008 gainers (occupations), aggregating our 27 occupations that saw big increases in the number of young workers without post-secondary credentials to our list of occupations, we see that the gains for this group were isolated to the 2003-2008 period (refer to Table 3.13), and outside of this period there has been no net employment increases in these occupations. These gainer occupations include a disproportionate number of oil and gas and construction-related occupations. This is suggestive that the 2003-2008 period saw a transition of employment out of manufacturing and into oil and gas and construction jobs. It is also worth noting that there has been an absolute employment decline among young workers without post-secondary credentials in all five types of occupations in the post-recession period, indicating that the gains for this group were isolated to the pre-recession period.

Contrast this with the change in employment for all other demographics, which saw gains rather than losses in all other occupations, outside of the Great Recession.

TABLE 3.14

Employment Levels by Occupation and Industry in 1997, All Workers

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	13,708,200	921,500	9,180,200	1,009,000	1,012,200	1,585,300
Non-Manufacturing Occupations in Decline (27)	1,011,200	302,300	608,500	50,500	26,100	23,800
All Other Occupations	10,357,300	584,200	7,605,100	417,500	528,300	1,222,200
Deteriorating Manufacturing Occupations (16)	396,300	6,000	35,900	264,400	85,300	4,700
Recovering Manufacturing Occupations (55)	619,900	4,800	57,700	225,300	320,600	11,500
2003-2008 Gainers (Occupations) (27)	1,323,500	24,200	873,000	51,400	51,900	323,100

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Additional Insights Gained by Simultaneously Considering Occupation and Industry

Further insights into the transition can be gained by looking at employment by occupation and industry simultaneously. If we turn our attention back to all workers, we can obtain employment counts for each occupation/industry paring. Note that in 1997, deteriorating manufacturing occupations were highly associated with wilting manufacturing industries, as two-thirds (264,400 of 396,300 – refer to Table 3.14) of deteriorating manufacturing occupation jobs were found in wilting manufacturing industries. The same relationship holds between recovering manufacturing occupations and rebounding manufacturing industries, with over half of recovering manufacturing occupation workers (320,600 of 619,900) working in rebounding manufacturing industries. Note that most workers in both types of manufacturing industries were not employed in manufacturing occupations, since manufacturing firms employ many other types of workers.

Although our focus has been on the manufacturing decline between 2003 and 2008, the occupation/industry pairs suggest that there was significant employment

TABLE 3.15

Percentage Change in Total Employment Levels, All Workers, 1997-2003

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	12.47%	-0.87%	9.86%	0.52%	1.12%	1.84%
Non-Manufacturing Occupations in Decline (27)	-0.23%	-0.45%	0.22%	0.00%	-0.02%	0.02%
All Other Occupations	10.63%	-0.35%	9.32%	0.07%	0.40%	1.19%
Deteriorating Manufacturing Occupations (16)	-0.53%	-0.01%	-0.06%	-0.33%	-0.12%	-0.02%
Recovering Manufacturing Occupations (55)	1.57%	-0.02%	-0.06%	0.78%	0.88%	-0.01%
2003-2008 Gainers (Occupations) (27)	1.03%	-0.06%	0.45%	-0.01%	-0.02%	0.67%

Note: Percentage increase/decrease is relative to the number of workers as a whole. So the denominator for the 0.67% in 2003-2008 Gainer Occupations in 2003-2008 Gainer Industries is all workers in 1997.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

transition occurring in manufacturing before 2003. While employment was increasing in both types of manufacturing industries during the 1997-2003 period, it was decreasing for some manufacturing occupations, as shown by Table 3.15. Given that the deteriorating manufacturing occupation group is disproportionately represented by lower-skilled manufacturing occupations, it may indicate that some lower-skilled positions were lost through automation. In other words, although manufacturing employment decline (from either an industry or occupation perspective) began in earnest in 2003, automation-related job loss had occurred prior to this date as well (Roser, 2016).[11] The decline in the size of the workforce in deteriorating manufacturing occupations is consistent with automation-related job loss, but these observations are far from conclusive.

Fast-forward to 2003. Given the small samples of some of the groups, there was significant statistical noise for 2008-2009. As such, we have combined pre-recession and Great Recession manufacturing employment decline. The decline in manufacturing industry employment did not just affect workers in manufacturing occupations; we also saw disemployment among other types of workers who worked in the industry. This is suggestive of an overall sector in decline shedding workers of all types.

11 Roser (2016) provides an extensive history of automation and job loss in the manufacturing sector.

TABLE 3.16

Percentage Change in Total Employment Levels, All Workers, 2003-2009

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	6.81%	-0.76%	7.18%	-2.60%	-0.80%	3.79%
Non-Manufacturing Occupations in Decline (27)	-0.87%	-0.19%	-0.57%	-0.07%	-0.03%	-0.01%
All Other Occupations	7.21%	-0.59%	6.41%	-0.76%	-0.15%	2.31%
Deteriorating Manufacturing Occupations (16)	-0.94%	-0.01%	-0.09%	-0.70%	-0.14%	0.00%
Recovering Manufacturing Occupations (55)	-1.49%	0.01%	-0.02%	-1.01%	-0.51%	0.03%
2003-2008 Gainers (Occupations) (27)	2.89%	0.01%	1.45%	-0.06%	0.03%	1.46%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Also noteworthy is the lack of increase in the employment of those in manufacturing occupations in 2003-2008 gainers (industries), as shown in Table 3.16. This suggests that if those employed in manufacturing occupations in the manufacturing industry were leaving their jobs to move to other industries (such as oil and gas or constructions), they were changing their occupation as well as their industry. That is, the transitions were more complicated than a welder switching from working for a manufacturing firm to an oil and gas company, as those workers may have taken positions not considered manufacturing occupations, such as inspectors.

TABLE 3.17

Percentage Change in Total Employment Levels, All Workers, 2009-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	12.32%	-1.31%	10.35%	-0.81%	0.70%	3.39%
Non-Manufacturing Occupations in Decline (27)	-1.76%	-0.44%	-1.03%	-0.16%	-0.08%	-0.05%
All Other Occupations	11.99%	-0.79%	10.53%	-0.48%	0.17%	2.57%
Deteriorating Manufacturing Occupations (16)	-0.14%	-0.02%	-0.05%	-0.13%	0.06%	0.00%
Recovering Manufacturing Occupations (55)	0.53%	-0.01%	-0.02%	0.03%	**0.55%**	-0.01%
2003-2008 Gainers (Occupations) (27)	1.69%	-0.04%	0.91%	-0.07%	0.01%	0.89%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Post-recession, we see that only manufacturing workers in recovering manufacturing occupations working in rebounding manufacturing industries are seeing a substantive increase in employment, as shown by the cell highlighted in dark purple in Table 3.17. All other manufacturing pairs are essentially flat.

Since the end of the Great Recession, we have seen growth in recovering manufacturing occupations working in rebounding manufacturing industries.

TABLE 3.18

Percentage of Workers Without Post-Secondary Credentials in 2003

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	35.1%	49.3%	32.4%	46.0%	42.0%	33.4%
Non-Manufacturing Occupations in Decline (27)	36.5%	58.0%	29.4%	37.7%	31.3%	21.6%
All Other Occupations	31.0%	45.3%	30.5%	27.8%	28.1%	30.7%
Deteriorating Manufacturing Occupations (16)	**62.9%**	N/A SS	55.4%	64.4%	61.2%	NA/SS
Recovering Manufacturing Occupations (55)	**54.9%**	N/A SS	28.8%	57.0%	56.5%	30.5%
2003-2008 Gainers (Occupations) (27)	49.9%	50.3%	52.6%	56.2%	51.1%	43.2%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Further insights are provided by looking at the overall percentage of workers with no post-secondary credentials for each industry/occupation pair. We have seen a reduction across the board in the percentage of workers in each industry/occupation pairing that do not have post-secondary credentials. In 2003, over half of all workers in manufacturing occupations did not have post-secondary credentials, as shown by the highlighted cells in Table 3.18.

By 2018, most workers in manufacturing occupations did have post-secondary credentials; refer to the highlighted cells in Table 3.19.

The overall percentage of the workforce without post-secondary credentials dropped by 8 points between 2003 and 2018 (from 35.1% to 26.9%). This decline has been roughly evenly distributed across industry/occupation pairs, as shown by Table 3.20.

TABLE 3.19

Percentage of Workers Without Post-Secondary Credentials in 2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	26.9%	43.5%	24.7%	38.3%	34.1%	29.1%
Non-Manufacturing Occupations in Decline (27)	31.2%	49.1%	24.8%	40.5%	26.8%	30.3%
All Other Occupations	23.7%	40.9%	22.8%	22.0%	21.9%	26.5%
Deteriorating Manufacturing Occupations (16)	**49.6%**	N/A SS	39.7%	49.8%	50.6%	NA/SS
Recovering Manufacturing Occupations (55)	**45.7%**	N/A SS	21.3%	50.6%	46.5%	23.7%
2003-2008 Gainers (Occupations) (27)	39.8%	47.2%	41.2%	52.7%	45.0%	36.4%

Note: “N/A SS” indicates data is not available due to issues related to small sample size.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

TABLE 3.20

Change in Percentage of Workforce Without Post-Secondary Credentials, 2003-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	-8.2%	-5.8%	-7.7%	-7.7%	-7.9%	-4.3%
Non-Manufacturing Occupations in Decline (27)	-5.2%	-8.8%	-4.6%	2.8%	-4.5%	8.7%
All Other Occupations	-7.3%	-4.4%	-7.7%	-5.7%	-6.2%	-4.2%
Deteriorating Manufacturing Occupations (16)	-13.4%	N/A SS	-15.7%	-14.6%	-10.6%	NA/SS
Recovering Manufacturing Occupations (55)	-9.1%	N/A SS	-7.5%	-6.4%	-10.0%	-6.9%
2003-2008 Gainers (Occupations) (27)	-10.2%	-3.1%	-11.4%	-3.6%	-6.2%	-6.8%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Finally, we should consider the impact that disemployment in manufacturing had on women, given that earlier in this section we saw that a surprising number of women had jobs in deteriorating manufacturing occupations, with nearly half of all net 2003-2009 job loss in deteriorating manufacturing occupations being experienced by women.

There has been a dramatic shift in the skills profile of manufacturing occupations over the last 15 years, with the majority of manufacturing workers now possessing either a post-secondary credential or a trades certificate.

TABLE 3.21

Female Workers as a Percentage of the Total Manufacturing Workforce in 2003

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	46.7%	49.2%	52.6%	22.4%	28.7%	33.2%
Non-Manufacturing Occupations in Decline (27)	45.2%	41.2%	49.5%	28.8%	N/A SS	37.1%
All Other Occupations	50.1%	52.6%	54.0%	45.2%	27.2%	39.7%
Deteriorating Manufacturing Occupations (16)	41.8%	N/A SS	**47.6%**	22.9%	26.8%	N/A SS
Recovering Manufacturing Occupations (55)	26.1%	N/A SS	10.9%	20.2%	30.5%	5.3%
2003-2008 Gainers (Occupations) (27)	33.4%	N/A SS	43.4%	22.4%	N/A SS	12.4%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Table 3.21 shows that women made up 46.7% of employed persons in 2003. Despite the high number of women working in deteriorating manufacturing occupations, their numbers were rather low in both types of manufacturing industries. There was a high proportion of women (47.6%) among deteriorating manufacturing workers employed in all other industries. Many of these workers were employed in occupations related to clothing manufacturing but were not employed by firms traditionally considered manufacturing firms.

Furthermore, it is noteworthy that women make up only one-third of workers in 2003-2008 gainer industries and 2003-2008 gainer occupations and just 12.4% of the workers in the gainers occupation/industry combination. When determining our list of industries and occupations, our criteria were based solely on industries and occupations that saw a rise in employment by young workers without post-secondary; we did not apply any form of gender test. This provides further support to the theory that the young men who traditionally would have held manufacturing occupations at manufacturing firms instead migrated to these gainer industries and occupations.

TABLE 3.22

Female Workers as a Percentage of Total Manufacturing Workforce in 2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	47.7%	46.2%	53.8%	26.0%	28.2%	32.1%
Non-Manufacturing Occupations in Decline (27)	44.7%	40.4%	47.4%	26.7%	N/A SS	29.8%
All Other Occupations	51.1%	49.3%	55.2%	24.9%	27.5%	38.8%
Deteriorating Manufacturing Occupations (16)	38.7%	N/A SS	46.0%	42.0%	32.6%	N/A SS
Recovering Manufacturing Occupations (55)	25.7%	N/A SS	18.6%	21.2%	28.9%	5.5%
2003-2008 Gainers (Occupations) (27)	33.0%	N/A SS	45.2%	21.7%	N/A SS	**14.0%**

Note: “N/A SS” indicates data is not available due to issues related to small sample size.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

If we fast-forward to 2018 (refer to Table 3.22), we see that women now make up 47.7% of all manufacturing workers. Employment in manufacturing industries and manufacturing occupations continues to employ a higher proportion of men than women. We still see a very small proportion of women in gainer occupations and industries, as highlighted in Table 3.22.

TABLE 3.23

Change in Percentage of the Manufacturing Workforce that is Female, 2003-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	1.0%	-2.9%	1.2%	**-3.4%**	**-0.5%**	-1.1%
Non-Manufacturing Occupations in Decline (27)	-0.5%	-0.7%	-2.1%	4.3%	N/A SS	-7.2%
All Other Occupations	1.1%	-3.3%	1.2%	-3.9%	0.3%	-0.8%
Deteriorating Manufacturing Occupations (16)	**-3.1%**	N/A SS	-1.5%	-3.2%	5.8%	N/A SS
Recovering Manufacturing Occupations (55)	**-0.4%**	N/A SS	7.7%	-1.7%	-1.6%	0.1%
2003-2008 Gainers (Occupations) (27)	-0.4%	N/A SS	1.8%	1.5%	N/A SS	1.7%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

We can get a better idea of where job loss was disproportionately felt by comparing the proportion of women in each industry/occupation pair relative to 2018. If the percentage decreased between 2003 and 2018 for an industry/occupation pair in decline, it would suggest that women were disproportionately harmed by the reduction in employment.

In Table 3.23, we see that the proportion of women in each type of manufacturing industry has fallen, as well as the proportion of women in both types of manufacturing occupation (refer to the highlighted cells). This indicates that manufacturing industries and manufacturing occupations have become more male-dominated since 2003, and women faced a disproportionate share of manufacturing job loss. The losses were particularly significant for women in wilting manufacturing industries and women in deteriorating manufacturing occupations. The disproportionate impact of manufacturing job loss on women is worthy of further study.

TABLE 3.24

Weekly Earnings by Industry and Occupation: All Workers, 1997

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	$570	$440	$560	$660	$650	$610
Non-Manufacturing Occupations in Decline (27)	$630	$430	$640	$680	$820	$760
All Other Occupations	$580	$440	$560	$750	$730	$610
Deteriorating Manufacturing Occupations (16)	$500	$350	$420	$520	$500	$500
Recovering Manufacturing Occupations (55)	$610	$550	$720	$650	$550	$710
2003-2008 Gainers (Occupations) (27)	$490	$490	$440	$640	$570	$600

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Impact of Manufacturing Occupation and Industry Employment Decline on Wages

Employment rates and levels are not the only important economic indicators; it is also instructive to see how weekly earnings have changed during the 1997-2018 period. Table 3.24 provides average weekly earnings for workers by industry and occupation type in 1997.

The Real Time Remote Access (RTRA) system for Labour Force Survey rounds weekly earnings to the nearest 10 dollars, causing both absolute levels and growth rates to be slightly less precise. It is worth noting that while manufacturing industries paid well above the Canadian average in 1997, manufacturing occupations paid only slightly more than average in industries that would not experience unreversed employment decline. These occupations also paid significantly less than average in industries that would later face decline.

TABLE 3.25

Weekly Earnings Growth by Industry and Occupation: All Workers, 1997-2003

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	16%	14%	14%	17%	14%	18%
Non-Manufacturing Occupations in Decline (27)	8%	5%	8%	15%	7%	-1%
All Other Occupations	17%	16%	16%	21%	15%	18%
Deteriorating Manufacturing Occupations (16)	14%	N/A SS	-5%	13%	16%	N/A SS
Recovering Manufacturing Occupations (55)	10%	N/A SS	14%	8%	15%	41%
2003-2008 Gainers (Occupations) (27)	14%	8%	11%	19%	18%	18%

Note: Earnings growth is calculated in nominal dollars. “N/A SS” indicates data is not available due to issues related to small sample size.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

We begin our analysis by looking at the pre-decline period, 1997 to 2003. Inflation over this period was 13.6% (Bank of Canada, n.d.). Wages in manufacturing industries grew, on average, faster than wages in non-manufacturing occupations, as shown by Table 3.25. For our non-manufacturing occupations in decline, earnings grew substantially more slowly than inflation during this period. Note the high rate of earnings growth for recovering manufacturing occupation workers in 2003-2008 gainers (industries), which are largely comprised of construction and oil and gas industries. Overall, weekly compensation in manufacturing industries and manufacturing occupations grew at, or only slightly above, the rate of inflation.

Inflation during the 2003-2009 manufacturing decline years (which include both the pre-recession period of employment decline and the Great Recession) was 11.5%, so almost all industry/occupation pairs saw earnings growth substantially higher than inflation. Once again, we saw a massive rise in the earnings of recovering manufacturing occupation workers in 2003-2008 gainer industries, as shown by Table 3.26. Note that this occupation/industry pair was very small in terms of number of workers and experienced only modest growth in absolute terms. In 1997, an estimated 11,500 Canadians were employed in this occupation/industry pair, which fell to 9,500 by 2003. By 2009, this had risen to 14,900 Canadians. While nominal weekly earnings nearly doubled for this group, from $710 to $1380, it continued to employ very few Canadians.

TABLE 3.26

Weekly Earnings Growth by Industry and Occupation: All Workers, 2003-2009

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	21%	14%	22%	18%	19%	22%
Non-Manufacturing Occupations in Decline (27)	19%	7%	22%	6%	11%	17%
All Other Occupations	21%	14%	23%	16%	19%	22%
Deteriorating Manufacturing Occupations (16)	18%	N/A SS	20%	20%	14%	N/A SS
Recovering Manufacturing Occupations (55)	16%	N/A SS	23%	13%	14%	38%
2003-2008 Gainers (Occupations) (27)	21%	26%	20%	9%	18%	23%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Somewhat surprisingly, despite the manufacturing employment decline (from both an occupation and industry) perspective, we see above-inflation growth in weekly compensation among manufacturing occupations and industries. This could be due to manufacturing firms having to pay higher wages to retain workers. It also could be due to "composition effects," with lower-wage workers exiting the industry, causing the overall average compensation in the sector to increase.

Despite the dramatic decline in manufacturing employment from 2003 to 2009, average weekly compensation in the sector still grew faster than the rate of inflation.

TABLE 3.27

Weekly Earnings Growth by Industry and Occupation: All Workers, 2009-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	23%	25%	23%	15%	18%	24%
Non-Manufacturing Occupations in Decline (27)	22%	21%	24%	8%	13%	9%
All Other Occupations	23%	26%	23%	17%	21%	24%
Deteriorating Manufacturing Occupations (16)	19%	N/A SS	8%	17%	20%	N/A SS
Recovering Manufacturing Occupations (55)	19%	N/A SS	33%	19%	19%	31%
2003-2008 Gainers (Occupations) (27)	24%	-3%	22%	16%	18%	22%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Finally, consider the post-recession period, in which inflation was exactly 17%; earnings in manufacturing industries and occupations grew at roughly the rate of inflation, while other industries and occupations tended to see earning growth above the rate of inflation (refer to Table 3.27). So, while we are no longer experiencing the 2003-2009 decline in manufacturing employment, the data suggests that wage growth in the sector has been stagnant in real terms.

If we take the 2003-2018 period as a whole (2003 is chosen as it was the beginning of the disemployment in manufacturing), we see that almost every occupation/industry pair grew faster than the 30.4% total rate of inflation during the period, with manufacturing industries and occupations growing more slowly than average, as shown by Table 3.28.

If we apply the same analysis to workers without post-secondary credentials, the rates of earnings growth are nearly identical, as shown by Table 3.29.

TABLE 3.28

Weekly Earnings Growth by Industry and Occupation: All Workers, 2003-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	48%	42%	50%	36%	41%	51%
Non-Manufacturing Occupations in Decline (27)	46%	29%	51%	15%	26%	28%
All Other Occupations	49%	43%	51%	36%	44%	51%
Deteriorating Manufacturing Occupations (16)	40%	N/A SS	30%	41%	36%	N/A SS
Recovering Manufacturing Occupations (55)	39%	N/A SS	63%	34%	37%	81%
2003-2008 Gainers (Occupations) (27)	50%	23%	47%	26%	39%	49%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 3.29

Weekly Earnings Growth by Industry and Occupation: Workers Without Post-Secondary Credentials, 2003-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	44%	45%	44%	39%	37%	46%
Non-Manufacturing Occupations in Decline (27)	42%	30%	50%	29%	32%	24%
All Other Occupations	44%	50%	45%	43%	41%	47%
Deteriorating Manufacturing Occupations (16)	46%	N/A SS	42%	42%	39%	N/A SS
Recovering Manufacturing Occupations (55)	34%	N/A SS	52%	35%	36%	55%
2003-2008 Gainers (Occupations) (27)	49%	10%	44%	28%	38%	46%

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The similar wage growth data for workers without post-secondary credentials may suggest that labour market effects on these workers were felt through reduced employment rates rather than through changes in earnings. In Section 2, we saw that employment rates for those aged 15-44 without post-secondary credentials stayed flat before the Great Recession, declined substantially during the recession, and have yet to fully recover.

Did Workers Switch from Manufacturing to Other Industries and Occupations Because the Others Paid Better?

We still have to address the question of whether workers moved out of manufacturing industries/occupations and into others because the others paid better. A good indicator would be pay levels for manufacturing occupations and industries relative to 2003-2008 gainer occupations and industries, which are the occupations and industries into which these workers are most likely to have migrated. Table 3.30 contains the weekly earnings for all workers in each industry/occupation pair in 2018.

TABLE 3.30

Weekly Earnings by Industry and Occupation: All Workers, 2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	$980	$710	$960	$1,050	$1,040	$1,090
Non-Manufacturing Occupations in Decline (27)	$990	$580	$1,040	$900	$1,110	$960
All Other Occupations	$1,010	$730	$980	$1,240	$1,210	$1,090
Deteriorating Manufacturing Occupations (16)	$800	N/A SS	$520	$830	$790	N/A SS
Recovering Manufacturing Occupations (55)	$930	N/A SS	$1,340	$940	$860	$1,810
2003-2008 Gainers (Occupations) (27)	$840	$650	$720	$960	$930	$1,060

Note: "N/A SS" indicates data is not available due to issues related to small sample size.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

While the intersections of recovering manufacturing occupations and all other industries, and recovering manufacturing occupations and 2003-2008 gainers (industries) contain very high weekly earnings, they contain very few workers (42,800 and 13,100 respectively). As such, the number of workers that migrated there from manufacturing industries is likely to be small. Overall, 2003-2008 gainer industries do not pay substantially better than manufacturing industries (refer to the cells highlighted in turquoise), and 2003-2008 gainer occupations do not pay substantially better than manufacturing occupations (refer to the cells highlighted in green in Table 3.30)

The same relationship holds true if we limit our focus to workers without post-secondary credentials, as shown by Table 3.31. Once again, the intersections of recovering manufacturing occupations and all other industries and of recovering manufacturing occupations and 2003-2008 gainers (industries) contain very high weekly earnings and very few workers (9,100 and 3,100; highlighted in turquoise and green, respectively).

TABLE 3.31

Weekly Earnings by Industry and Occupation: Workers Without Post-Secondary Credentials, 2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Total	$750	$610	$690	$920	$860	$920
Non-Manufacturing Occupations in Decline (27)	$710	$480	$720	$900	$950	$870
All Other Occupations	$750	$630	$710	$1,060	$1,000	$880
Deteriorating Manufacturing Occupations (16)	$790	$330	$510	$810	$780	NA/SS
Recovering Manufacturing Occupations (55)	$830	$600	$1,080	$890	$790	$1,470
2003-2008 Gainers (Occupations) (27)	$730	$570	$590	$950	$880	$1,020

Note: “N/A SS” indicates data is not available due to issues related to small sample size.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

Summary: Our Questions Answered

At the beginning of the section, we posed seven questions, which we then attempted to answer. Our findings can be summarized as follows.

Which occupations went into an employment decline from which they did not recover, and when did the decline take place?

Our findings when focusing on occupations differ somewhat from the industry perspective. There were several manufacturing occupations that have been in steady decline since 1997. These occupations, on average, are of lower skill level than those that did not experience a similar decline. For example, there are 17 manufacturing occupations that have the skill level B, the highest level in manufacturing. None of those 17 occupations have been in steady decline since 1997.

There were 27 different occupations outside of the manufacturing sector that met our definition of employment decline. The list was largely made up of managerial, clerical, and teaching occupations. These occupations employed over one million Canadians in 1997; by 2018, the figure had fallen to just over 560,000. The decline in employment in these occupations was steady from 1997 to 2018 and was unrelated to the Great Recession.

The employment dynamics experienced by manufacturing occupations was somewhat different from those we saw for manufacturing industries. One set of manufacturing occupations, which we refer to as recovering manufacturing occupations, employed just over 600,000 Canadians in 1997. These occupations saw a spike in employment from 1997 to 2003, adding an additional 247,000 workers. These gains were erased, as these occupations saw a decline of 172,500 in the pre-recession period of 2003 to 2008, and another decline of 60,600 during the Great Recession of 2008-2009. Since then, this set of occupations has somewhat rebounded, adding a net 82,900 jobs from 2009 to 2018.

The other set of manufacturing occupations, which we refer to as deteriorating manufacturing occupations, employed nearly 400,000 Canadians in 1997. In each of our periods these occupations experienced employment decline, shedding 83,000, 97,600, 49,300, and 21,300 net positions in 1997-2003, 2003-2008, 2008-2009, and 2009-2018 respectively.

The manufacturing occupations that experienced employment decline tended to require lower levels of education than those that did not, but the gap was relatively modest. In 2003, 46% of manufacturing employment decline positions were filled by individuals without post-secondary credentials, as compared to 42% for occupations not experiencing employment decline.

There were significant differences in the nature of job loss between deteriorating and recovering manufacturing occupations. Deteriorating manufacturing occupations tended to have a higher proportion of workers without post-secondary credentials and a higher proportion of women, as shown by Table 3.32.

TABLE 3.32

By the Numbers: Deteriorating and Recovering Manufacturing Occupations, 2003-2018

	Deteriorating Manufacturing Occupations	Recovering Manufacturing Occupations
Total employment in 2003	312,700	866,800
Jobs gained/lost, 2003-2009	-146,900	-233,100
Jobs gained/lost 2009-2018	-21,300	82,900
Percentage of 2003 workforce without post-secondary credentials	71.8%	64.4%
Percentage of 2003-2009 job loss experienced by those without post-secondary credentials	80.0%	81.6%
Percentage of 2003 workforce who were women	41.9%	26.2%
Percentage of 2003-2009 job loss experienced by women	46.8%	24.2%
Percentage of workers over 55 in 2003	9.7%	10.4%
Five biggest occupations by employment in 2003	1. Other labourers in processing, manufacturing, and utilities. 2. Industrial sewing machine operators. 3. Motor vehicle assemblers, inspectors, and testers. 4. Electronics assemblers, fabricators, inspectors, and testers. 5. Labourers in mineral and metal processing.	1. Power engineers and power system operators. 2. Metalworking and forging machine operators. 3. Other product assemblers, finishers, and inspectors 4. Labourers in food and beverage processing. 5. Process control and machine operators, food and beverage processing.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

How much of the employment decline was due to a reduction in hiring rather than individuals exiting the industry, voluntarily or involuntarily?

The story is a complex one, with retirements, a reduction in hiring, and involuntary job loss all playing a role. Like the data for industry in the pre-recession period, the unemployment data does not suggest that the net employment reduction led to a rise in unemployment among workers previously employed in the sector – this held true for both recovering or deteriorating manufacturing occupations. However, a spike in unemployment does explain much of the accelerated disemployment for both types of occupations during the Great Recession.

The responses to the question "reason for leaving previous job" shows that a much higher proportion of workers in deteriorating manufacturing occupations left their job involuntarily as compared to those in recovering manufacturing occupations, which could be suggestive of employment decline through layoffs in deteriorating manufacturing occupation positions.

Similar to the unemployment data, during the 2003-2008 period, there does not appear to be a significant rise in the number of persons out of the labour force who had worked in recovering or deteriorating manufacturing occupations between 2003 and 2008, though the number of people out of the labour force in recovering manufacturing occupations is elevated between 2000 and 2009.

The number of employees with an employer for less than 12 months and the overall number of workers was strongly correlated for both recovering and deteriorating manufacturing occupations, suggesting a substantial portion of the disemployment in these occupations was due to reduced hiring. However, the same relationship also held true for the number of long-tenured employees and the overall employment levels in both recovering and deteriorating occupations, suggesting that occupational exits (people leaving the occupation either due to retirement or an occupational change) also played a role in declining employment levels from 2003 to 2009.

Which demographic groups were particularly affected by the employment decline?

As in the industry analysis, the largest declines were felt by young workers without post-secondary credentials. Between 2003 and 2009, in deteriorating manufacturing occupations, the vast majority of the net employment decline was in groups of individuals under the age of 45, suggesting that a wave of retirements was likely not the cause of the disemployment, though there were significant decreases among those aged 45 to 54 as well.

Although manufacturing occupations are traditionally seen as men's work, nearly half of the employment decline in deteriorating manufacturing occupations was experienced by women. Some of this is due to the rapid decline in the number of industrial sewing machine operators from 1997 to 2018, largely due to offshoring of these tasks.

For recovering manufacturing occupations, most of the net employment decline was experienced by individuals under the age of 45. Unlike in deteriorating manufacturing occupations, men experienced the lion's share of the net reduction in employment.

Finally, the majority of the disemployment in both recovering and deteriorating manufacturing occupation workers was experienced by those without higher education credentials. There was also a high level of disemployment among recovering manufacturing occupation workers with trades certificates or college diplomas, but only among men.

What were the employment outcomes for those demographic groups?

Overall, younger workers without post-secondary credentials have fared poorly since the start of the Great Recession. For those under 45 years of age with no post-secondary completion, that recession has had a permanent scarring effect on employment. Between 2003 and 2008, there was little change in the employment rate for both men and women under the age of 45 without post-secondary credentials, though employment rates had been rising for these groups in the past. For women under the age of 45 with post-secondary credentials, employment rates continued to rise.

During the Great Recession, employment rates declined sharply for all demographic groups less than 45 years of age, particularly for men. Employment rates have returned to their pre-recession highs for those under 45 with post-secondary credentials but have not recovered for those without post-secondary credentials.

Did the affected demographic groups find employment in other occupations? If so, which other occupations?

Affected workers found employment in other occupations prior to the Great Recession, but there were only modest gains after that recession. Between 2003 and 2008, 27 occupations saw a substantial increase in the employment of workers under 45 with no post-secondary credentials, relative to increases seen in 1997-2003, suggesting that the types of workers who would have otherwise worked in manufacturing took on these occupations.

Between 2003 and 2008, employment in these 27 occupations increased by 137,000 persons, with the largest gains found among food counter attendants, kitchen helpers, and related support occupations; carpenters; electricians (except industrial and power system); user support technicians; residential and commercial installers and servicers; maîtres d'hôtel and hosts/ hostesses; construction trades helpers and labourers; and heavy equipment operators (except crane).

Employment for those younger than 45 without post-secondary credentials fell in these 27 occupations during the Great Recession and has been relatively flat since then. This could explain the permanent decline in the employment rate for this group; unlike in the 2003-2008 period, there is no employment growth in the occupations that absorbed workers who would have traditionally worked in manufacturing.

How did the employment transition alter the weekly earnings of the affected groups?

The data is inconclusive but suggests that the transition was not a beneficial one for young workers without post-secondary credentials. From 2003 to 2018, weekly earnings grew by 48% for workers as a whole and by 44% for workers without post-secondary credentials. Given sample-size issues and rounding in the Labour Force Survey, we cannot conclude whether there was a significant difference in earnings growth for workers without post-secondary credentials relative to the rest of the population.

Between 2003 and 2018, average weekly earnings grew at a slightly slower rate for both types of manufacturing occupations (recovering and deteriorating) and both types of manufacturing industries (rebounding and wilting) relative to the Canadian average. Average weekly earnings in 2003-2008 gainer occupations were typically lower than in manufacturing occupations, so there is not a great deal of evidence that the types of workers who would have historically worked in manufacturing took these jobs because they paid better.

What was the joint effect of occupational and industrial decline?

When employment in manufacturing industries (both rebounding and wilting) declined between 2003 and 2009, we saw disemployment among all occupations, including non-manufacturing occupations, across this industry. This would suggest that the disemployment was not (solely) caused by the automation of some tasks within manufacturing firms, but were more indicative of an overall decline in the sector.

Since the Great Recession, there has been a rise in employment in recovering manufacturing occupations in rebounding manufacturing industries, but little change in other manufacturing industry/occupation pairs. Although, on net, manufacturing employment has been flat since the Great Recession, there is a subset of manufacturing industries and occupations that are creating net new jobs for manufacturing workers.

There has been an increasing proportion of workers with post-secondary credentials in both types of manufacturing industries and both types of manufacturing occupations, with roughly half of all manufacturing occupation workers who work in a manufacturing industry holding post-secondary credentials in 2018.

Workers in manufacturing occupations who work in the manufacturing industry have lower-than-average wages for Canadian workers. However, in manufacturing industries, workers in manufacturing occupations without post-secondary credentials have higher-than-average wages relative to non-manufacturing workers without those same post-secondary credentials.

SECTION 4:

Regional Analysis

Introduction

Manufacturing is not spread evenly through the country; rather, it is concentrated in a few dozen communities, mostly in Quebec and Ontario. As such, a decline in the sector's employment has a disproportionate impact on some communities. From 2003 to 2009, manufacturing communities saw significantly slower employment growth than communities with a small manufacturing footprint. There have been significant differences in employment adjustment between manufacturing communities proximate to the major metro CMAs of Toronto and Montreal and those that are more isolated. For connected manufacturing communities, integration into the fast-growing metro region has facilitated the creation of significant levels of replacement jobs in construction, trucking, and warehousing. Isolated communities, such as Windsor, London, and St. Catharines-Niagara, have experienced declining employment rates, particularly for individuals without post-secondary credentials. Wage growth has also been stagnant in manufacturing communities, particularly ones not proximate to a major metro. In short, manufacturing communities that are within commuting distance to Toronto and Montreal have mostly been able to adjust to the manufacturing employment decline of 2003-2009, while those that are not in commuting distance have been permanently scarred by the period.

Analysis

In Section 2, we examined the trajectory of manufacturing industry employment and the labour market impact it had on the types of workers likely to work in those industries. In Section 3, we prepared a similar analysis, but looked at manufacturing occupations instead of industries, as well as occupations and industry jointly. In this section, we examine the impacts that manufacturing employment changes have had on communities across Canada. We define communities as either census metropolitan areas (CMAs) or census agglomerations (CAs).

As we did with Sections 2 and 3, we begin this section with a series of questions to be answered:

1. Which CMAs/CAs saw a substantial decline in manufacturing employment (defined either by industry or occupation) from 2003 to 2009?

2. Did the CMAs/CAs that experienced a substantial decline in manufacturing employment experience an offsetting rise in employment in other industries or occupations in the 2003-2009 period?
3. Have there been any differences in post-recession recovery between CMAs/CAs that have experienced substantial manufacturing employment decline and those that have not?
4. Have economically connected manufacturing communities (ones that are, or are proximate to, a large CMA) that experienced manufacturing employment decline experienced more robust recoveries than economically isolated manufacturing communities did?
5. What happened to employment rates in communities experiencing substantial manufacturing employment decline?
6. What happened to workforce earnings in communities experiencing substantial manufacturing employment decline?

Identifying CMAs/CAs that Experienced Manufacturing Employment Decline

The Labour Force Survey has complete data for 65 CMAs and CAs which enables us to discern which CMAs/CAs saw a substantial decline in manufacturing employment. To set the foundation, we began by taking an industry perspective spanning the years of 2003 to 2009 (both the Great Recession and pre-recession period). It is instructive to examine both types of manufacturing industries (wilting and rebounding), to see if workers may have moved between the two.

We find that between 2003 and 2009, 24 of 65 CMAs and CAs experienced manufacturing employment decline (as a percentage of total employment in 2003) above the Canadian average. Those 24 CMAs/CAs are shown in Table 4.1, sorted by total employment growth (in percentage terms) between 2003 and 2009.

TABLE 4.1

Employment Change in CMAs/CAs with Manufacturing Industry Job Loss Above the Canadian Average (as a Percentage of All Jobs), 2003-2009

How to read this chart: Between 2003 and 2009, the number of jobs in Medicine Hat rose by 24.6%. "All Other Industries" are responsible for 16.8 percentage points of that 24.6% rise. The columns from "Non-Manufacturing Industries in Decline" to "2003-2008 Gainers (Industries)" will equal the "Total" figure, with small differences due to rounding.

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)	Total Manufacturing	120 km From a Big City?
Medicine Hat	24.6%	2.6%	16.8%	-2.6%	-4.2%	12.0%	-6.8%	No
Prince Albert	12.6%	0.0%	10.0%	-4.2%	0.5%	6.3%	-3.7%	No
Sarnia	8.2%	1.3%	13.4%	-9.8%	-0.8%	4.1%	-10.6%	No
Brantford	8.0%	-0.8%	11.5%	-2.8%	-2.1%	1.9%	-4.9%	Yes
All CMAs/ CAs	**7.7%**	**-0.6%**	**7.9%**	**-2.4%**	**-0.9%**	**3.7%**	**-3.3%**	**N/A**
Toronto	6.6%	-0.3%	9.1%	-3.4%	-1.9%	3.1%	-5.4%	Yes
Guelph	6.5%	-0.1%	9.2%	-7.3%	1.6%	2.9%	-5.6%	Yes
KCW	6.3%	-1.7%	7.9%	-3.1%	-2.5%	5.7%	-5.6%	Yes
Sherbrooke	5.8%	0.5%	13.5%	-6.8%	-4.8%	3.5%	-11.6%	No
Saint Jean sur Richelieu	4.4%	0.0%	7.3%	-0.4%	-4.9%	2.0%	-5.3%	Yes
Timmins	3.5%	-1.3%	6.6%	-2.2%	-1.3%	1.8%	-3.5%	No
Barrie	3.3%	-0.2%	6.5%	-3.2%	-2.2%	2.5%	-5.4%	Yes
Truro	2.7%	0.0%	0.5%	-2.7%	-1.4%	6.3%	-4.1%	No
Hamilton	2.2%	-1.0%	7.1%	-2.0%	-4.9%	3.0%	-6.9%	Yes
New Glasgow	1.2%	1.2%	6.1%	-4.3%	-4.3%	2.5%	-8.6%	No
Oshawa	0.9%	-0.4%	4.0%	-6.4%	-1.1%	4.7%	-7.5%	Yes
London	0.0%	-0.2%	2.7%	-3.8%	-1.3%	2.5%	-5.1%	No
St. Catharines-Niagara	-3.7%	-0.8%	1.1%	-2.8%	-2.2%	1.1%	-5.0%	No
Norfolk	-7.6%	2.4%	-6.4%	-1.5%	-6.1%	4.3%	-7.6%	No
Thunder Bay	-8.6%	-1.4%	-2.4%	-4.7%	-0.8%	0.8%	-5.5%	No
Leamington	-9.2%	-0.5%	0.5%	-7.2%	-5.6%	2.6%	-12.8%	No
Windsor	-10.2%	-0.2%	1.2%	-8.2%	-3.1%	-0.1%	-11.3%	No
Chatham-Kent	-12.7%	0.7%	0.6%	-9.0%	-5.3%	0.4%	-14.4%	No
Corner Brook	-14.2%	1.8%	-14.2%	-3.5%	-0.9%	2.7%	-4.4%	No
Edmunston	-21.6%	-0.7%	-13.4%	-8.2%	0.0%	0.7%	-8.2%	No
Miramichi	-38.0%	-5.5%	-19.0%	-12.9%	-1.2%	0.6%	**-14.1%**	No

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The percentages in each of the columns represent the percentage of jobs gained or lost in a category as a percentage of *total employment* in 2003, not employment in that category. For example, Miramichi's figure of -14.1% (highlighted in dark purple) under total manufacturing indicates that the employment decline in manufacturing represented 14.1% of all jobs in the CA in 2003. In other words, all jobs, not manufacturing jobs, is the denominator.

Because our literature review provided evidence that adjustment paths in other countries have differed between "big cities" (those with more than two million persons) and the areas proximate to them, as compared to communities not proximate to a big city, we have indicated on our list which CMAs/CAs are 120 kilometres or less from one of Canada's three biggest CMAs: Toronto, Montreal, or Vancouver.[12] Location matters, as mid-sized cities that are proximate to larger ones are able to integrate themselves into a larger regional economy in a way that more isolated centres cannot.

Around the developed world, we are seeing the growth of mega-city "innovation clusters." These regional economies are experiencing accelerated rates of economic and employment growth. This is leaving behind mid-sized cities that are too distant to be part of a larger regional innovation economy.

Alternatively, instead of looking at the level of manufacturing industry or occupation employment decline (in proportion to overall employment in CMAs/CAs) between 2003 and 2009, we could simply look at CMAs/CAs with the highest proportion of manufacturing employment in 2003 (in terms of either industry or occupation) to compile our list. But those methods provide a near identical list of communities as well. For a CMA/CA to see a decline in manufacturing employment larger than 3.3% of its total employment in 2003, it must have had a significant manufacturing employment to begin with.

12 Defining some CMAs/CAs as proximate to Toronto (or Vancouver or Montreal) and others as not requires a definition of proximity. Our mental model of proximity started with the question "could someone reasonably be expected to live there and commute into Toronto?" After examining commuting-level data, it appeared that 120 kilometres, or a 90-minute one-way commute, represents a boundary point. Kitchener-Cambridge-Waterloo, which is just inside the 120-kilometre boundary of Toronto, saw 5% of its workforce commute to Toronto each day in 2016, with another 12% commuting to CMAs/CAs inside the Golden Horseshoe area. London, on the other hand, sees very little commuting activity outside of the London CMA, though anecdotally this appears to be changing.

TABLE 4.2

CMAs/CAs Experiencing Significant Manufacturing Employment Decline from 2003 to 2009

Isolated Manufacturing Communities: Non-Proximate to Large CMAs	Connected Manufacturing Communities: Large CMAs and Proximate to Large CMAs
Chatham-Kent	Barrie
Corner Brook	Brantford
Edmunston	Guelph
Leamington	Hamilton
London	Kitchener-Cambridge-Waterloo
Medicine Hat	Oshawa
Miramichi	Saint Jean sur Richelieu
New Glasgow	Toronto
Norfolk	
Prince Albert	
Sarnia	
Sherbrooke	
St. Catharines-Niagara	
Thunder Bay	
Timmins	
Truro	
Windsor	

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Since we would like to test the idea that bigger CMAs and the CMAs/CAs that are proximate to them are likely to be more resilient to a shock in manufacturing employment, we will group our manufacturing list based on proximity to Canada's three largest CMAs (Toronto, Vancouver, Montreal), where CMAs/CAs less than 120 kilometres away are considered proximate, and those further away are considered non-proximate (refer to Table 4.2).

Our connected manufacturing group contains Toronto itself, six CMAs close to Toronto, and Saint Jean sur Richelieu, which is proximate to Montreal. Our isolated group of manufacturing communities contains places like London, Windsor, and Medicine Hat, which are further away from any of Canada's three big metros.

Five Types of Industries

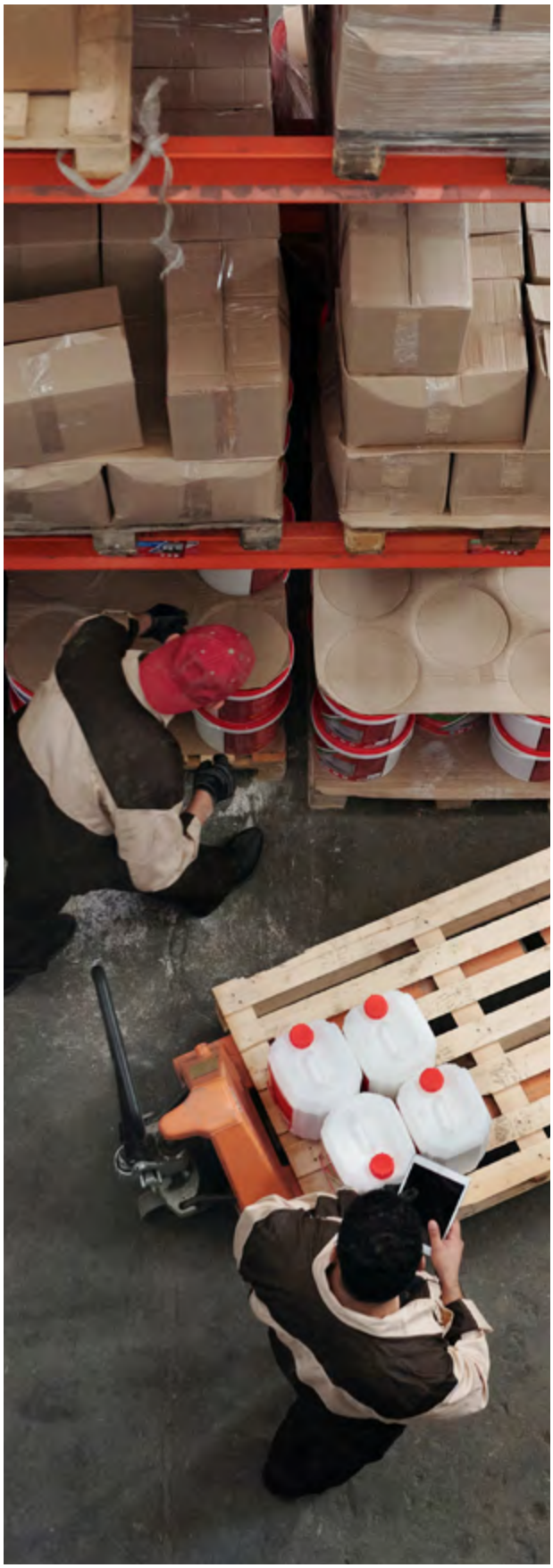
Wilting manufacturing industries:
Any industry in the manufacturing sector that experienced an employment decline, with 2018 employment levels in that industry 30% or more below the 1997-2018 peak.

Rebounding manufacturing industries:
Any industry in the manufacturing sector that did not "wilt" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both).

Non-manufacturing industries in decline:
Any industry outside the manufacturing sector that experienced an employment decline and that has 2018 employment levels at 30% or more below the 1997-2018 peak.

All other industries:
Any industry outside of the manufacturing sector that did not "wilt" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both).

2003-2008 gainers (industry):
25 industries that saw significant employment growth between 2003 and 2008 for males aged 15-44 without post-secondary credentials. These were industries that may have absorbed the types of workers displaced from the decline in manufacturing employment. They include industries in oil and gas, construction, retail, and a handful of other industries.



Employment Growth by Industry for Three CMA/CA types

We can compare our two types of manufacturing CMAs/CAs to all other CMAs/CAs to observe employment transitions since 1997. Again, it is instructive to break our analysis down into four periods:

> **1997-2003**
The period prior to manufacturing employment decline

> **2003-2008**
The pre-recession manufacturing employment decline period

> **2008-2009**
The Great Recession

> **2009-2018**
The post-recession recovery

We will also use our five industry groupings from Section 2.

Examining the pre-manufacturing decline period of 1997 to 2003, we see that isolated manufacturing centres were experiencing slower employment growth rates, as shown by Table 4.3. There was much stronger growth in the types of manufacturing industries that would not experience unreversed decline than the ones that did, though both types grew during this period.

TABLE 4.3

Components of Employment Growth, All Workers, 1997-2003

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	13.1%	-1.1%	9.0%	1.0%	2.3%	2.0%
Connected Manufacturing Communities	19.2%	-0.4%	14.0%	1.4%	1.9%	2.2%
Other CMAs/ CAs	14.9%	-0.1%	12.1%	-0.1%	0.7%	2.3%

Note: As before, the percentage growth is relative to the overall employment levels in 1997, not relative to employment in that sector.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Moving ahead to the 2003-2008 pre-recession decline period, manufacturing employment decline was significantly larger in isolated than connected manufacturing communities (refer to Table 4.4). In part this is due to those communities having larger manufacturing footprints at the start. It does not appear that other industries absorbed those workers at a greater rate in manufacturing centres than in non-manufacturing centres, with the all other industries and 2003-2008 gainers categories seeing higher growth in CMAs/CAs that did not experience manufacturing decline.

TABLE 4.4

Components of Employment Growth, All Workers, 2003-2008

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	2.9%	-0.1%	6.0%	-3.9%	-1.8%	2.6%
Connected Manufacturing Communities	7.7%	0.1%	7.3%	-2.2%	-1.4%	4.0%
Other CMAs/ CAs	11.1%	-0.7%	7.8%	-1.1%	0.2%	4.9%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.5

Components of Employment Growth, All Workers, 2008-2009

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	-5.1%	0.1%	-2.9%	-1.3%	-0.7%	-0.3%
Connected Manufacturing Communities	-1.7%	-0.5%	1.2%	-1.1%	-0.6%	-0.6%
Other CMAs/ CAs	-1.1%	-0.1%	0.3%	-0.4%	-0.2%	-0.7%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Overall, isolated manufacturing centres fared far worse in the Great Recession (in terms of disemployment) than other centres (refer to Table 4.5), though much of the decline came from outside the manufacturing sector. In connected manufacturing CMAs, job growth was effectively neutral outside of the manufacturing sector.

Isolated manufacturing centres fared worse before the Great Recession relative to other communities. This was because they saw a proportionately larger drop in manufacturing jobs and a proportionately smaller rise in fast-growing industries like construction.

TABLE 4.6

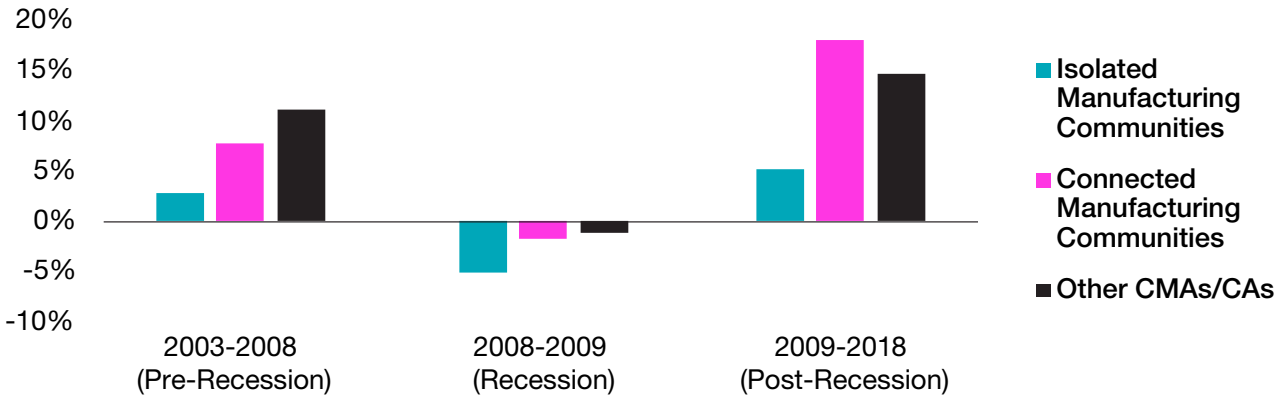
Components of Employment Growth, All Workers, 2009-2018

	Total	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	5.3%	-1.8%	3.3%	0.6%	1.2%	2.0%
Connected Manufacturing Communities	18.0%	-0.9%	14.8%	-1.1%	1.0%	4.0%
Other CMAs/ CAs	14.8%	-1.0%	11.9%	-0.6%	0.6%	3.9%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 4.1

Employment Growth by Era and Community Type, 2003-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

After the Great Recession, employment growth in isolated manufacturing CMAs/CAs remained less than half that found in other CMAs/CAs, as shown by Table 4.6. Employment growth in connected manufacturing CMAs/CAs has been above that of non-manufacturing CMAs/CAs, which could indicate that other industries in those CMAs/CAs absorbed the types of workers that historically would have worked in manufacturing. If that was the case, it does not appear to have occurred in the industries that had significant employment growth from 2003 to 2008.

Overall, we saw significant declines in manufacturing employment in both types of manufacturing communities, spread throughout both the pre-recession and Great Recession periods. However, our connected communities were able to create jobs in other industries at a significantly higher rate. Since the end of the Great Recession, these connected communities have been able to create jobs at a rate higher than the rest of the country. Interestingly, their rate of manufacturing job creation has been lower than in isolated manufacturing communities. In other words, connected manufacturing communities have been able to create jobs in other industries to offset lost manufacturing jobs, which isolated manufacturing communities have not been able to do.

These trends become particularly apparent when total employment growth is graphed for the three eras, as shown in Figure 4.1. While total employment growth in connected manufacturing communities was relatively slow before the Great Recession, these communities grew faster (in terms of employment growth) between 2009 and 2018. Between 2009 and 2018, Barrie and Oshawa, two connected manufacturing communities, had among the highest employment growth rates in the country. Interestingly, isolated manufacturing communities had much higher levels of manufacturing employment growth between 2009 and 2018 than connected communities, which transitioned into creating a large number of jobs in non-manufacturing sectors.

TABLE 4.7

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 1997-2003

	Total Employment Growth	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	5.0%	-2.3%	3.7%	-0.7%	2.1%	2.1%
Connected Manufacturing Communities	2.5%	-1.2%	0.5%	-1.4%	1.5%	3.2%
Other CMAs/ CAs	3.7%	-0.6%	4.6%	-0.8%	-0.4%	0.8%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Given that the largest overall decline in manufacturing industry employment was felt by men without post-secondary credentials, it is worth examining that group to see if those workers were absorbed by other sectors in connected manufacturing centres.

The analysis above was for the population as a whole. The reality is even more stark if we isolate our analysis to men without post-secondary credentials.

Isolated manufacturing communities experienced very little employment growth after the Great Recession but are creating manufacturing jobs at a faster rate than the rest of the country.

Employment Growth for Men Without Post-Secondary Credentials by Industry for Three CMA/CA types

Unlike in the population as a whole, 1997-2003 employment rates in isolated manufacturing centres saw the highest growth rate this period for men without post-secondary credentials, as shown by Table 4.7. This was a boom period for manufacturing employment, and isolated manufacturing communities particularly benefited from that boom.

TABLE 4.8

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2003-2008

	Total Employment Growth	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	-9.4%	-0.6%	-2.0%	-7.0%	-3.5%	3.7%
Connected Manufacturing Communities	-2.4%	-0.2%	1.2%	-3.3%	-4.1%	4.0%
Other CMAs/ CAs	7.4%	-0.9%	3.1%	-2.3%	0.0%	7.5%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Moving on to our manufacturing decline period of 2003-2008, we see that except for non-manufacturing industries in employment decline, our non-manufacturing CMAs/CAs saw substantially higher employment growth rates across the board (refer to Table 4.8). There is a much higher rate of job creation in 2003-2008 gainers (industries) outside of manufacturing communities than within them. This would suggest that if these men were shifting out of manufacturing work into work into a different sector, they were also migrating to a different CMA/CA.

During the Great Recession, men without post-secondary credentials were the hardest hit demographic group and experienced an across-the-board employment decline by industry and CMA/CA type, as shown in Table 4.9.

TABLE 4.9

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2008-2009

	Total Employment Growth	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	-7.8%	0.0%	-2.6%	-2.1%	-2.3%	-0.7%
Connected Manufacturing Communities	-6.5%	-0.3%	-0.6%	-1.5%	-1.0%	-3.1%
Other CMAs/ CAs	-4.4%	-0.1%	-1.2%	-0.4%	-0.5%	-2.2%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.10

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2009-2018

	Total Employment Growth	Non-Manufacturing Industries in Decline (20)	All Other Industries	Wilting Manufacturing Industries (35)	Rebounding Manufacturing Industries (51)	2003-2008 Gainers (Industries)
Isolated Manufacturing Communities	-0.4%	-1.0%	-1.9%	-0.6%	2.6%	0.6%
Connected Manufacturing Communities	3.2%	-0.7%	1.8%	-3.0%	1.0%	4.1%
Other CMAs/ CAs	0.5%	-0.8%	-0.2%	-1.4%	-0.4%	3.3%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Post-recession, as with the population in general, employment for men without post-secondary credentials grew fastest in connected manufacturing centres. As with our data for the population as a whole, this could indicate that the type of workers who would have otherwise been employed in manufacturing were absorbed by other sectors (refer to Table 4.10). Employment rebounded in manufacturing industries that did not experience an unreversed decline, particularly in isolated manufacturing communities.

Post-recession, as with the population in general, employment for men without post-secondary credentials grew fastest in connected manufacturing centres.

Which Occupations Grew After the Great Recession?

All together, the trends for men without post-secondary credentials mirror those for the population as a whole but are even more dramatic. It would appear that at least some jobs in connected manufacturing CMAs/CAs were created for men without post-secondary credentials to replace lost manufacturing jobs – but what were they? One way to examine this is to look at which industries in connected manufacturing CMAs/CAs grew the most between 2009 and 2018 as compared to other CMAs/CAs, as shown by Table 4.11.

TABLE 4.11

Occupational Growth for Male Workers Without Post-Secondary Credentials, 2009-2018

NAICS	Industry	Isolated Manufacturing Communities	Connected Manufacturing Communities	Other CMAs/ CAs	Difference Between Connected Manufacturing Communities and Other CMAs/CAs	Industry Type
	All	-0.4%	3.2%	0.5%	2.7%	
4841	General freight trucking	0.1%	1.7%	0.0%	1.7%	All other
5617	Services to buildings and dwellings	-0.1%	1.5%	-0.1%	1.6%	All other
4451	Grocery stores	1.4%	0.6%	-0.6%	1.2%	All other
2361	Residential building construction	1.2%	2.0%	0.9%	1.1%	2003-2008 gainers
3399	Other miscellaneous manufacturing	0.6%	0.9%	0.0%	0.9%	Rebounding manufacturing
4431	Electronics and appliance stores	-0.1%	0.4%	-0.3%	0.7%	All other
4853	Taxi and limousine service	0.0%	0.7%	0.0%	0.7%	All other
5415	Computer systems design and related services	0.1%	0.8%	0.1%	0.6%	All other
3371	Household and institutional furniture and kitchen cabinet manufacturing	0.5%	0.7%	0.2%	0.6%	Rebounding manufacturing
4931	Warehousing and storage	0.1%	0.9%	0.4%	0.4%	2003-2008 gainers
5418	Advertising, public relations, and related services	0.1%	0.4%	0.0%	0.4%	All other
2373	Highway, street and bridge construction	-0.1%	0.3%	-0.1%	0.4%	2003-2008 gainers
3327	Machine shops, turned product, and screw, nut and bolt manufacturing	0.3%	0.3%	-0.1%	0.4%	Rebounding Manufacturing
3219	Other wood product manufacturing	-0.3%	-0.1%	-0.5%	0.4%	Wilting manufacturing
5413	Architectural, engineering and related services	-0.1%	0.2%	-0.1%	0.4%	2003-2008 gainers

Note: Numbers calculated in the “Difference” column may differ slightly due to rounding.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

While three different manufacturing industries appear on our list, but the biggest gains are actually in the non-manufacturing trucking and construction industries. The increased economic activity in metro CMAs (and their surrounding areas) is creating jobs in construction and trucking for men without post-secondary credentials, in stark contrast to what is happening in other communities across Canada. These would appear to be the industries benefiting from the decline in manufacturing jobs.

Examining each of our manufacturing centres shows the relationship between connectivity, and the ability of those communities to offset reductions in manufacturing jobs with those in the construction and the transportation and warehousing sectors. Table 4.12 compares manufacturing job losses between 2003 and 2018 to employment gains in the construction, trucking, and warehousing sectors over the same time for isolated and connected manufacturing communities. Most of the communities on the list created about as many jobs in the growing sectors as they lost in manufacturing, with Barrie (proximate to Toronto) creating substantially more. However, 16 communities lost far more jobs in manufacturing than they gained in other sectors, of which 14 were isolated communities.

Since the end of the Great Recession, jobs have been created for men without post-secondary credentials in the trucking and construction industries. These jobs tend to be clustered in large, fast-growing cities, creating geographically uneven job growth for this group.

TABLE 4.12

Job Gains/Losses in Manufacturing Sector Versus Construction, and Transportation and Warehousing Sectors by CMA/CA, 2003-2018

CMA/CA	Manufacturing Job Gain/Loss	Transportation, Warehousing, and Construction Job Gain/ Loss	Ratio of Transportation, Warehousing, and Construction Job Gain to Manufacturing Job Loss	Community Type
Medicine Hat	-800	2,800	3.50	Isolated
Barrie	-2,000	6,000	3.00	Connected
Leamington	-800	2,000	2.50	Isolated
Brantford	-2,100	2,500	1.19	Connected
Kitchener-Cambridge-Waterloo	-8,400	8,500	1.01	Connected
Guelph	-1,900	1,900	1.00	Connected
Toronto	-146,300	143,700	0.98	Connected
Oshawa	-14,100	13,500	0.96	Connected
Sarnia	-3,000	1,600	0.53	Isolated
London	-10,000	5,300	0.53	Isolated
Norfolk	-200	100	0.50	Isolated
Hamilton	-27,300	12,500	0.46	Connected
Corner Brook	-500	200	0.40	Isolated
Sherbrooke	-6,800	2,200	0.32	Isolated
Saint Jean sur Richelieu	-3,100	1,000	0.32	Connected
Windsor	-8,600	2,300	0.27	Isolated
Timmins	-800	200	0.25	Isolated
Truro	-2,500	400	0.16	Isolated
Prince Albert	-1,000	100	0.10	Isolated
Thunder Bay	-3,500	300	0.09	Isolated
Miramichi	-2,300	-300	-0.13	Isolated
Chatham-Kent	-7,200	-1,000	-0.14	Isolated
New Glasgow	-2,100	-300	-0.14	Isolated
Edmunston	-1,600	-400	-0.25	Isolated

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

One way to confirm whether these are the industries to which workers historically employed in manufacturing migrated is to look at the population as a whole. If these industries are seeing increases in all types of workers, it is difficult to make a direct connection between the decline in manufacturing jobs and increased employment in these industries. However, if the employment gains in these industries is largely isolated to the types of workers who previously would have worked in manufacturing, then there is a stronger connection between the two.

As it turns out, if we examine which industries are growing in connected manufacturing CMAs/CAs for all workers, we get a much different list, as shown by Table 4.13. This indicates that there is likely a strong connection between the decline in manufacturing positions and the rise in positions in construction and trucking.

TABLE 4.13

Industry Growth, All Workers, 2009-2018

NAICS	Industry	Isolated Manufacturing Communities	Connected Manufacturing Communities	Other CMAs/CAs	Difference Between Connected Manufacturing Communities and Other CMAs/CAs*	Industry Type
0	All	5.3%	18.0%	14.8%	3.2%	
5415	Computer systems design and related services	0.1%	1.7%	0.9%	0.9%	All other
5221	Depository credit intermediation	-0.5%	0.7%	0.1%	0.6%	All other
5239	Other financial investment activities	0.0%	0.8%	0.2%	0.5%	All other
4539	Other miscellaneous store retailers	0.4%	0.7%	0.2%	0.5%	2003-2008 gainers
5418	Advertising, public relations, and related services	0.1%	0.6%	0.1%	0.5%	All other
6216	Home health care services	0.1%	0.5%	0.1%	0.5%	All other
5312	Offices of real estate agents and brokers	0.0%	0.4%	0.0%	0.4%	All other
3399	Other miscellaneous manufacturing	0.2%	0.5%	0.2%	0.4%	Rebounding manufacturing
6111	Elementary and secondary schools	0.4%	0.7%	0.3%	0.4%	All other
4841	General freight trucking	0.1%	0.6%	0.2%	0.3%	All other
2361	Residential building construction	0.9%	1.1%	0.8%	0.3%	2003-2008 gainers
5617	Services to buildings and dwellings	0.4%	0.6%	0.3%	0.3%	All other
4931	Warehousing and storage	0.0%	0.4%	0.1%	0.3%	2003-2008 gainers
5416	Management, scientific, and technical consulting services	0.1%	0.4%	0.1%	0.3%	All other
3371	Household and institutional furniture, and kitchen cabinet manufacturing	0.1%	0.4%	0.1%	0.3%	Rebounding manufacturing

Note: Numbers calculated in the “Difference” column may differ slightly due to rounding.

Source: Author’s calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada’s Real Time Remote Access (RTRA) system (2020c).

Five Types of Occupations

Deteriorating manufacturing occupations:
Any manufacturing occupation that experienced an employment decline, and 2018 employment levels for that occupation were at least 30% below the 1997-2018 peak.

Recovering manufacturing occupations:
Any manufacturing occupation that did not "deteriorate" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both).

Non-manufacturing occupations in decline:
Any non-manufacturing occupation that experienced an employment decline, and 2018 employment levels for that occupation were at least 30% below the 1997-2018 peak.

All other occupations:
Any non-manufacturing occupation that did not "deteriorate" – either it did not meet the criteria for decline, or 2018 employment levels were less than 30% below the 1997-2018 peak (or both).

2003-2008 gainers (occupations):
Occupations that saw significant employment growth for males aged 15-44 without post-secondary credentials between 2003 and 2008. These were industries that may have absorbed the types of workers displaced from the decline in manufacturing employment. They include industries in oil and gas, construction, retail, and a handful of other industries.

The overall growth list is heavy with white collar service industries, particularly those around computers and FIRE (finance, insurance, and real estate) industries. We can also examine this question through the lens of occupation, rather than industry. As we will see, doing so yields similar results.

Employment Growth by Occupation for Three CMA/CA types

We can perform a similar analysis using occupation, rather than industry, using our five occupation groups from Section 3.

Employment growth by occupation for all workers exhibits a nearly identical dynamic to employment growth by industry, as shown by Tables 4.14 through 4.17. From 2003 to 2008, we see substantially lower employment growth in every occupation in manufacturing centres relative to non-manufacturing centres, suggesting that manufacturing workers were not transitioning into other occupations at an accelerated rate when manufacturing employment went into decline. From 2009 to 2018, we see a small rebound in manufacturing occupation employment in isolated manufacturing centres but, overall, generally stagnant employment growth. We do, however, see significantly higher employment growth in all other occupations in connected manufacturing centres relative to all other CMAs/CAs, which could indicate that some occupations have been able to absorb a pool of workers who formerly would have been employed in manufacturing occupations. One other interesting thing to note is that from 2003 to 2008, there was a significant decline in employment in recovering manufacturing occupations.

Overall, we see the emergence of a "two-speed" economy after the Great Recession of 2008-2009. Connected manufacturing centres experienced total employment growth of 18% between 2009 and 2018, while isolated manufacturing centres grew a paltry 5.3%.

TABLE 4.14

Components of Employment Growth, All Workers, 1997-2003

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	13.1%	-1.0%	11.2%	-1.0%	2.7%	1.1%
Connected Manufacturing Communities	19.2%	0.4%	15.4%	-0.8%	2.6%	1.6%
Other CMAs/ CAs	14.9%	0.5%	12.9%	-0.6%	1.0%	1.0%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.15

Components of Employment Growth, All Workers, 2003-2008

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	2.9%	-0.5%	4.1%	-1.0%	-2.5%	2.9%
Connected Manufacturing Communities	7.7%	-0.4%	8.2%	-0.9%	-1.8%	2.5%
Other CMAs/ CAs	11.1%	-0.9%	8.7%	-0.4%	-0.4%	4.0%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.16

Components of Employment Growth, All Workers, 2008-2009

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	-5.1%	-0.2%	-2.5%	-0.7%	-0.8%	-1.0%
Connected Manufacturing Communities	-1.7%	-0.3%	-0.3%	-0.3%	-0.6%	-0.1%
Other CMAs/ CAs	-1.1%	-0.2%	0.1%	-0.2%	-0.1%	-0.7%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

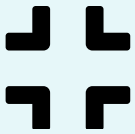
TABLE 4.17

Components of Employment Growth, All Workers, 2009-2018

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	5.3%	-1.4%	4.1%	0.3%	1.3%	0.9%
Connected Manufacturing Communities	18.0%	-1.7%	16.7%	-0.3%	0.8%	2.4%
Other CMAs/ CAs	14.8%	-1.4%	13.9%	-0.1%	0.4%	2.0%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The dynamics for men without post-secondary credentials are even more extreme, as illustrated by Tables 4.18 through 4.21. Between 2003 and 2008, the overall rate of net job loss was nearly four times higher in isolated manufacturing centres relative to connected ones (9.4% decline rather than 2.4%). Interestingly, much of the pre-recession drop for isolated communities was due to a decline in non-manufacturing jobs. After the Great Recession, we see a significant rebound in employment in recovering manufacturing occupations, particularly in isolated manufacturing communities. Connected manufacturing communities see the largest gains of any of the three types of communities, mainly through the "all other" category.



Between 2003 and 2008, the overall rate of net job loss was nearly four times higher in isolated manufacturing centres relative to connected ones (9.4% decline rather than 2.4%).

TABLE 4.18

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 1997-2003

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	5.0%	-2.4%	3.9%	-2.8%	5.6%	0.7%
Connected Manufacturing Communities	2.5%	-0.3%	0.0%	-1.9%	2.5%	2.3%
Other CMAs/ CAs	3.7%	-0.2%	3.1%	-1.2%	1.2%	0.7%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.19

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2003-2008

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	-9.4%	-0.8%	-4.8%	-1.9%	-5.4%	3.4%
Connected Manufacturing Communities	-2.4%	-0.3%	1.8%	-1.7%	-4.4%	2.2%
Other CMAs/ CAs	7.4%	-0.8%	2.3%	-0.9%	-0.8%	7.5%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.20

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2008-2009

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	-7.8%	-0.2%	-1.7%	-1.0%	-2.4%	-2.4%
Connected Manufacturing Communities	-6.5%	-0.4%	-2.9%	-0.6%	-0.8%	-1.7%
Other CMAs/ CAs	-4.4%	-0.3%	-0.3%	-0.2%	-0.5%	-3.1%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.21

Components of Employment Growth, Male Workers Without Post-Secondary Credentials, 2009-2018

	Total	Non-Manufacturing Occupations in Decline (27)	All Other Occupations	Deteriorating Manufacturing Occupations (16)	Recovering Manufacturing Occupations (55)	2003-2008 Gainers (Occupations) (27)
Isolated Manufacturing Communities	-0.4%	-1.8%	-1.6%	-0.6%	3.0%	0.7%
Connected Manufacturing Communities	3.2%	-1.7%	2.7%	-0.9%	1.2%	1.9%
Other CMAs/ CAs	0.5%	-1.1%	0.7%	-0.4%	-0.1%	1.5%

Note: Numbers calculated in the "Total" column may differ slightly due to rounding.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

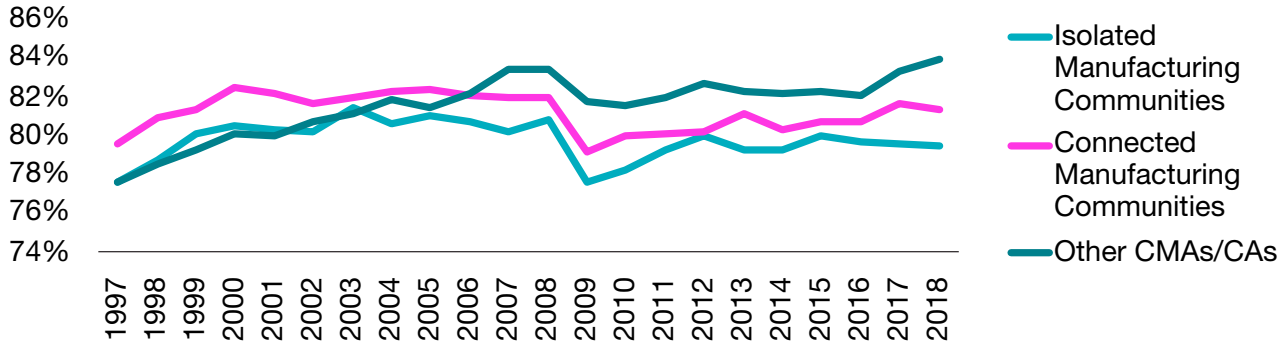
This divergence in employment growth between the three types of CMA/CA (in terms of both overall employment and employment for men without post-secondary credentials) could be due to a combination of two factors. First, it could be due to differences in working age population growth due to differences in demographics, immigration, or in-country migration. It could also be due to deviations in employment rates among the three types of communities. We can determine which effect is the primary driver by examining employment rates. If there is little difference in the trend of employment rates, then the overall decline is driven by differences in demographics, immigration, or in-country migration.

Overall Employment Trends by Type of Community

The data shows a clear divergence in employment rate growth trends between manufacturing and non-manufacturing communities. Both saw employment rate growth until the early 2000s, when the employment rate stalled out for manufacturing centres during the pre-recession period of manufacturing disemployment. Employment rates in manufacturing centres got hit harder by the Great Recession, as that recession disproportionately affected manufacturing jobs, as illustrated by Figure 4.2. The resulting recovery has been somewhat stronger in connected manufacturing centres relative to isolated ones, though the differences were not as extreme as we had expected.

FIGURE 4.2

Employment Rates by CMA/CA Type for Workers Aged 25-54, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

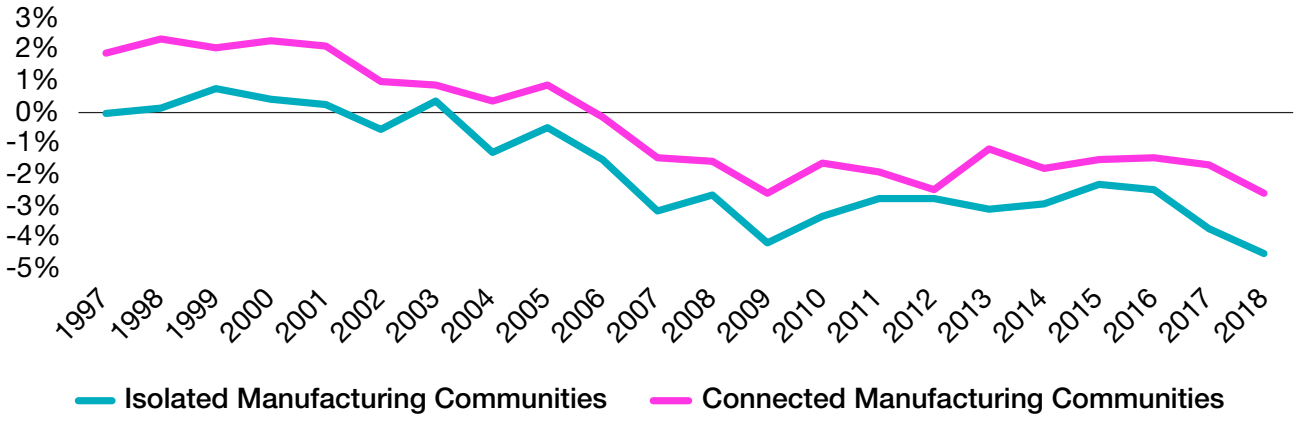
To put the employment rate gap in perspective, Figure 4.3 illustrates the percentage point difference between manufacturing and non-manufacturing centres, which illustrates the depth of the decline of employment rates in manufacturing centres. It also shows that isolated manufacturing centres historically have had employment rates 2 points lower than connected ones, and this gap has been little changed

If our two types of manufacturing communities had identical employment rates for 25- to 54-year-old workers compared to all other CMAs/CAs, there would be an additional 38,000 Canadians employed in isolated manufacturing centres and an additional 98,000 employed in connected manufacturing centres.

FIGURE 4.3

Employment Rates for Manufacturing Communities Relative to Other CMAs/CAs, 1997-2018

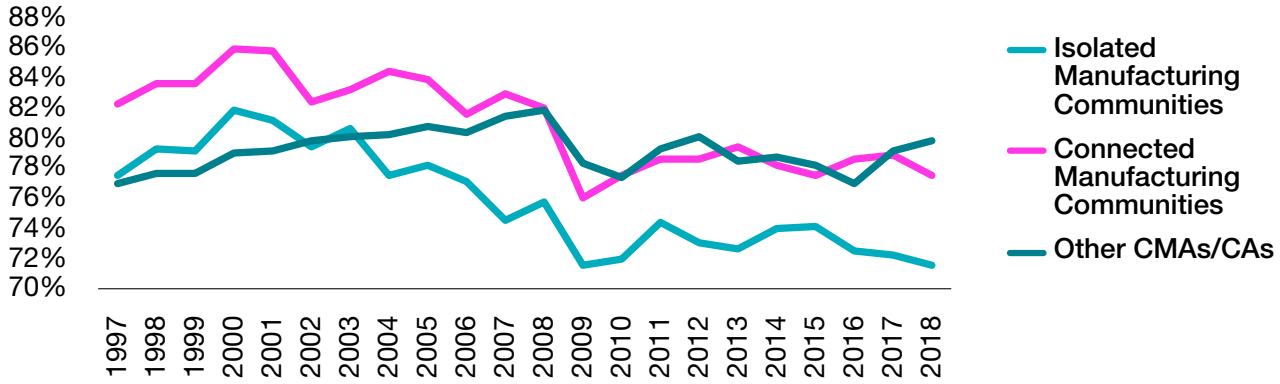
Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via



Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 4.4

Employment Rates by CMA/CA Type for Male Workers Aged 25-54 Without Post-Secondary Credentials, 1997-2018



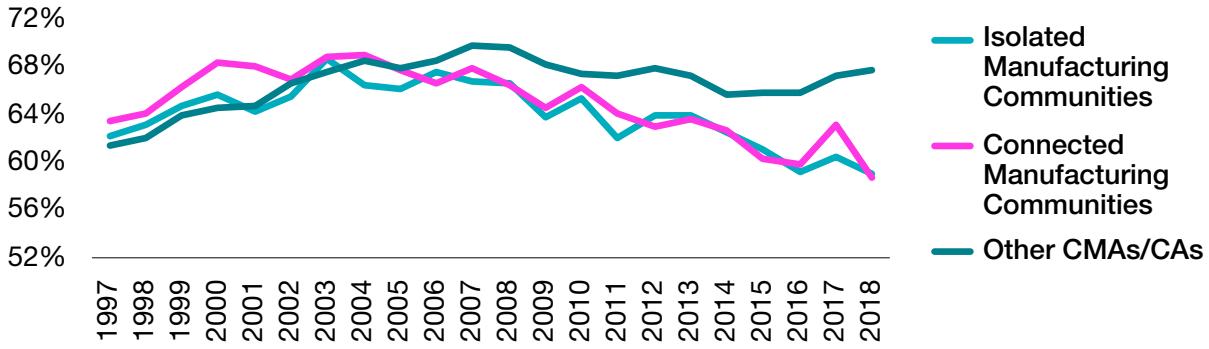
Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

over the past 20 years. In other words, there appears to be little difference in the employment rates between connected and isolated manufacturing communities for the population as a whole, so the absolute differences in the rate of job growth are driven by differences in demographics, immigration, or migration within the country.

Focusing our attention on men without post-secondary credentials paints a different picture. In the mid-1990s, employment rates were a full 5 points higher in connected manufacturing centres for this group of men, as shown by Figures 4.4 and 4.5. Between 2000 and 2007, this gap was eliminated due to rising employment rates in non-

FIGURE 4.5

Employment Rates in Manufacturing Centres Relative to Other CMAs/CAs for Male Workers Aged 25-54 Without Post-Secondary Credentials



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.22

Employment Rates by CMA/CA Type, Sex, and Education Level for Workers Aged 25-54, 2018

	All	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	79.5%	71.5%	86.8%	59.0%	82.4%
Connected Manufacturing Communities	81.4%	77.5%	89.2%	58.8%	80.9%
Other CMAs/ CAs	84.0%	79.9%	89.6%	67.8%	83.5%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

manufacturing centres and falling ones in connected manufacturing centres. Since then, employment rates in the two centres have largely been aligned. Contrast this with isolated manufacturing centres, which were initially closely aligned with non-manufacturing centres, but over time an 8-point gap has emerged.

If employment rates for 25- to 54-year-old men without post-secondary credentials in manufacturing centres could grow to match those in non-manufacturing centres, there would be 11,000 more Canadians employed in isolated manufacturing centres and an additional 11,000 in connected manufacturing centres.

To summarize, we do not see significant differences in employment rate trends for the population as a whole between connected and isolated manufacturing communities. However, we do see significant (and substantial) differences in employment rates for men without post-secondary education between connected and isolated manufacturing centres.

In 2018, we saw lower employment rates in manufacturing centres than in non-manufacturing centres across every combination of sex and education level. Somewhat surprisingly, women are employed at higher rates in isolated manufacturing centres than in connected manufacturing centres, as shown by Table 4.22.

Although we have focused our attention on men without post-secondary credentials, the biggest decline in overall employment rates between 2003 and 2018 has been felt by women without post-secondary credentials. While there has been almost no change in non-manufacturing centres, there has been a near 10-point decline in manufacturing centres (refer to Table 4.23). This substantial drop of 10 percentage points is worthy of future study.

While there has been almost no change in non-manufacturing centres, there has been a near 10-point decline in manufacturing centres. This substantial drop of 10 percentage points is worthy of future study.

TABLE 4.23

Change in Employment Rates in Percentage Points Between 2003 and 2018

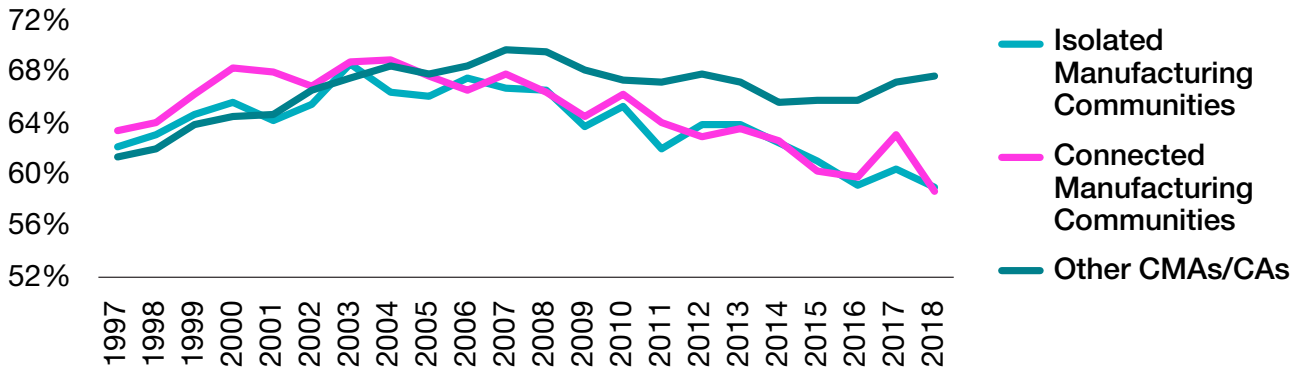
	All	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	-2.0%	-9.0%	-1.9%	-9.8%	0.2%
Connected Manufacturing Communities	-0.6%	-5.7%	-0.7%	-10.2%	1.2%
Other CMAs/ CAs	2.9%	-0.3%	2.0%	0.2%	2.7%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

The trend for women without post-secondary credentials has been somewhat different than that for men, with much of the decline occurring after the Great Recession. Unlike for men without post-secondary completion, we saw little deviation in employment rates during the 2003-2008 period in our three types of communities, as shown by Figures 4.6 and 4.7. At first glance this would suggest that the employment rate decline for women was not caused by the decline in manufacturing jobs. However, since 2009 the decline in the employment rate for women without post-secondary credentials has largely occurred in manufacturing communities. This is puzzling and warrants further study.

FIGURE 4.6

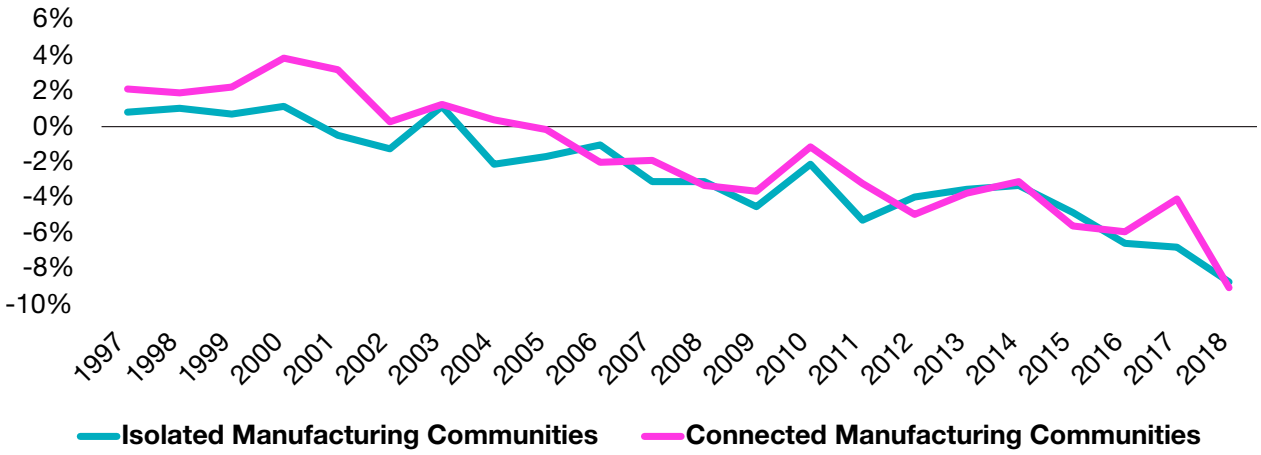
Employment Rates by CMA/CA Type for Female Workers Aged 25-54 Without Post-Secondary Credentials, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 4.7

Employment Rates in Manufacturing Centres Relative to Other CMAs/CAs for Female Workers Aged 25-54 Without Post-Secondary Credentials, 1997-2018



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Impact of Manufacturing Disemployment in Canadian Communities

There remains the question of the growth of nominal weekly earnings. For the 1997-2018 period, all those aged 25 to 54 saw an increase in (pre-tax) weekly earnings above the 48% total rate of inflation during the period, except for one demographic category: men without post-secondary credentials living in isolated manufacturing centres, highlighted in dark purple on Table 4.24.

Given the decline in employment for those without post-secondary credentials in both types of manufacturing centres, it is surprising to see such strong gains in nominal weekly earnings for women. These gains may be due to a composition effect, where lower-earning women leave the workforce, raising the overall average earning levels for the group.

We can glean further insight into the path of earnings by examining growth over four different periods. In the period before employment decline in manufacturing, there was very little difference in earnings growth between communities. The gender wage gap shrunk slightly as earnings growth for women outpaced that for men, as illustrated by Table 4.25.

Moving to the 2003-2009 period, other than earnings growth for women with post-secondary credentials, weekly earnings were near the rate of inflation in isolated manufacturing centres, and only slightly better in connected manufacturing centres. Earnings growth in other CMAs/CAs grew substantially during this period as shown by Table 4.26.

Earnings growth between 2009 and 2018 has barely been above the rate of inflation, and for men without post-secondary credentials living in a manufacturing centre (of either type), it has been significantly below the rate

TABLE 4.24

Nominal Weekly Earnings Increase from 1997 to 2018 for Workers Aged 25-54

	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	41%	51%	75%	74%
Connected Manufacturing Communities	50%	52%	63%	63%
Other CMAs/CAs	63%	63%	70%	80%

Note: Over the course of this period, the cumulative rate of inflation totaled 48%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.25

Nominal Weekly Earnings Increase from 1997 to 2003 for Workers Aged 25-54

	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	14%	16%	18%	20%
Connected Manufacturing Communities	15%	13%	17%	14%
Other CMAs/CAs	13%	15%	14%	21%

Note: Over the course of this period, the cumulative rate of inflation totaled 14%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.26

Nominal Weekly Earnings Increase from 2003 to 2009 for Workers Aged 25-54

	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	11%	13%	13%	22%
Connected Manufacturing Communities	16%	14%	17%	22%
Other CMAs/CAs	23%	21%	27%	24%

Note: Over the course of this period, the cumulative rate of inflation totaled 11%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 4.27

Nominal Weekly Earnings Increase from 2009 to 2018 for Workers Aged 25-54

	Male Workers without Post-Secondary	Male Workers with Post-Secondary	Female Workers without Post-Secondary	Female Workers with Post-Secondary
Isolated Manufacturing Communities	12%	15%	32%	19%
Connected Manufacturing Communities	13%	18%	19%	17%
Other CMAs/CAs	18%	17%	18%	20%

Note: Over the course of this period, the cumulative rate of inflation totaled 17%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

of inflation (refer to Table 4.27). The earnings growth for women without post-secondary education in isolated manufacturing centres is an outlier and appears to either be a sample-size issue or a result of composition effects of lower-earning women exiting the labour force. In summary, the manufacturing decline of 2003-2009 has had a scarring effect on men without post-secondary credentials in manufacturing communities.

Summary: Our Questions Answered

At the beginning of the section, we posed six questions, which we have attempted to answer. Our findings can be summarized as follows.

Which CMAs/CAs saw a substantial decline in manufacturing employment (defined either by industry or occupation) from 2003 to 2009?

Using the metric of net change in manufacturing industry employment as a percentage of all industry employment from 2003 to 2009, we found 25 of 65 CMAs had a net decline higher than the Canadian average. Sixteen of the 25 were in Ontario, two were in Quebec, five were in Atlantic Canada, and two were in Western Canada. We used this as our definition of CMAs/CAs experiencing manufacturing employment decline.

Did the CMAs/CAs that experienced a substantial decline in manufacturing employment experience an offsetting rise in employment in other industries or occupations in the 2003-2009 period?

Manufacturing CMAs/CAs saw significant employment declines from 2003 to 2009 relative to other centres. This appears to be a permanent shift in employment, particularly in isolated manufacturing centres, from which they have not fully recovered.

During the 2003-2008 period, employment growth in manufacturing centres was consistently slower than in non-manufacturing centres across almost all industries. This would suggest that those who would have been employed in manufacturing were not transitioning to other industries within the same community. Furthermore, the decline in manufacturing employment could have been acting as a drag on employment in other sectors in those communities.

During the pre-recession period of 2003-2008, employment grew by only 2.9% in isolated manufacturing centres, 7.8% in connected manufacturing communities, and 11.1% in all other CMAs/CAs. If we exclude manufacturing employment, the employment growth rates were 6.4%, 10.4%, and 11.9% respectively.

During the Great Recession of 2008-2009, employment fell in all three types of communities, but isolated manufacturing communities were hit particularly hard, experiencing an employment loss of 5.1%. Employment fell by 1.7% in connected manufacturing communities and by 1.1% in all other CMAs/CAs. If we exclude manufacturing employment, the employment declined by 3.6%, 0.8%, and 0.8% respectively.

Examining labour market outcomes for men without post-secondary credentials provides a similar picture. During the pre-recession period of 2003-2008, employment for this demographic fell by 9.4% in isolated manufacturing communities and by 2.4% in connected manufacturing communities. In all other CMAs/CAs, employment for this group grew by 7.4%. If we exclude manufacturing employment, the growth rates were 1.1%, 5.0%, and 9.7% respectively. In isolated manufacturing communities, net manufacturing job loss represented over 10% of *total employment* for this demographic.

During the Great Recession, employment for men without post-secondary credentials fell in all three types of communities, and once again, isolated manufacturing communities were hit particularly hard, experiencing an employment loss of 7.8% for this demographic group. Employment fell by 6.5% in connected manufacturing communities, and by 4.4% in all other CMAs/CAs. If we exclude manufacturing employment, the declines were 3.4%, 4.0%, and 3.5% respectively.

Have there been any differences in post-recession recovery between CMAs/CAs that have experienced substantial manufacturing employment decline and those that have not?

Connected manufacturing centres have experienced more robust employment growth than non-manufacturing CMAs/CAs. For all workers, connected manufacturing CMAs/CAs have experienced employment gains of 18.0%, as compared to 14.8% for non-manufacturing CMAs/CAs. For men without post-secondary credentials, employment has increased by 3.2% in connected manufacturing communities as compared to 0.5% in non-manufacturing CMAs/CAs. Although the difference is stark, it should not be surprising. Across North America and Europe, we are seeing that large cities (and the cities close to them) are growing at a much faster rate than isolated mid-sized cities and smaller communities, thanks to agglomeration effects.

For all workers, the biggest differences in employment growth by industry between the two types of communities between 2009 and 2018 were in the FIRE sectors (e.g., depository credit intermediation, other financial investment activities, offices of

real estate agents and brokers, agencies, brokerages, and other insurance related activities) and in computer system design.

For men without post-secondary credentials, the biggest differences in employment growth by industry between the two types of communities between 2009 and 2018 were in trucking, building services, and residential home construction. This may indicate that these sectors were able to absorb some of the types of workers who traditionally would have worked in manufacturing industries.

Have economically connected manufacturing communities (ones that are, or are proximate to, a large CMA) that experienced manufacturing employment decline experienced more robust recoveries than economically isolated manufacturing communities?

Overall employment growth in isolated manufacturing CMAs has been stagnant since the Great Recession and has experienced absolute decline for men without post-secondary credentials. Furthermore, we have seen substantially slower growth in employment in non-manufacturing industries among these communities relative to their counterparts. There have been slightly higher levels of growth in manufacturing employment in isolated manufacturing communities than in connected manufacturing communities.

What happened to employment rates in communities experiencing substantial manufacturing employment decline?

For all core-aged workers (those between the ages of 25 to 54), employment rates plateaued in manufacturing communities from 2001 to 2008, while they increased by almost 4 points (from 80% to nearly 84%) in non-manufacturing CMAs/CAs during this period. All communities saw an employment rate decline during the Great Recession, with a larger decline being felt by manufacturing communities. Employment rates have fully recovered in non-manufacturing communities since the Great Recession, and mostly recovered in manufacturing communities, with connected manufacturing communities faring somewhat better.

From 1997 to 2008, there has been a 4.5-point swing between the employment rates of non-manufacturing communities and manufacturing communities. In 1997, the employment rates of connected manufacturing centres were 2 points higher than in non-manufacturing CMAs/CAs, with isolated manufacturing centres and non-manufacturing centres having identical employment rates. In 2018, non-manufacturing centres had employment rates 2.5 points higher than connected manufacturing centres and 4.5 points higher than isolated manufacturing centres.

The trend has been far more dramatic for men aged 25 to 54 without post-secondary credentials. In isolated manufacturing CMAs/CAs, the manufacturing employment rate fell by 10 points between 2001 and 2018,

dropping from 82% to 72%. The decline was also substantial in connected manufacturing communities, falling from 86% to 78%. For all other communities, there was an increase in employment rates from 2001 to 2008, a fall during the Great Recession, and a substantial (but not complete) recovery since then. There was little net change in employment rates between 2001 and 2018 – in both years they were near 80%.

Finally, women without post-secondary credentials in manufacturing communities have seen dramatic declines in employment rates, which do not appear to be wholly related to the decline in manufacturing employment.

What happened to workforce earnings in communities experiencing substantial manufacturing employment decline?

Men, regardless of education level, in both types of manufacturing centres saw significantly slower earnings growth than their peers in non-manufacturing centres between 1997 and 2018. For men without post-secondary credentials, the rate of earnings growth was below the rate of inflation. In the manufacturing employment decline period of 2003-2009, weekly earnings grew substantially slower in manufacturing centres than in non-manufacturing centres for all groups except women with post-secondary credentials.

Overall, the CMA/CA data suggests that manufacturing centres have not been able to fully replace manufacturing employment with other forms of employment, particularly for males aged 25 to 54 without post-secondary education. This has led to reduced employment outcomes for these individuals and put downward pressure on their earnings.

SECTION 5:

Job Growth, Job Transitions, Skills, and the Recovery

Introduction

The post-recession employment recovery has been uneven across the country, with Barrie CMA in Ontario experiencing a 26.9% increase in the number of employed persons and St. John, New Brunswick's figures declining by 5.1%. By breaking total employment growth out into two components, population growth and growth in the employment rate, we find that population growth is the primary determinant of employment growth in Canadian CMAs/CAs. The fastest-growing CMAs/CAs in terms of population are large cities, which attract high levels of immigrants, and CMAs/CAs proximate to large cities, which experience an influx of residents from other parts of the country. In these fast-growing CMAs/CAs, the types of workers who traditionally worked in manufacturing found employment in the booming construction, warehousing, and trucking industries. As well, although the number of manufacturing jobs in Canada has changed little since 2009, there is a shift to higher-skilled occupations within the industry. Skills training is crucial to ensure workers are qualified for those jobs in construction and manufacturing. Finally, since proximity plays such a crucial role in employment growth, policy makers can reduce commuting times and stresses through infrastructure investments to increase the interconnectedness between large and medium-sized cities.

Analysis

In this section, we seek to answer four questions to help us understand why some CMAs experienced much higher rates of employment growth than others after the Great Recession of 2008-2009 and to explore how this should inform public policy. Our four questions are as follows:

1. Which CMAs experienced faster rates of total employment growth between 2009 and 2018 than other CMAs, and how much of that difference had to do with differences in population growth?

2. Which CMAs experienced an increase in their employment rate between 2009 and 2018, and what might have caused that increase?

3. Which CMAs experienced the largest increases in population growth between 2009 and 2018, and what might have caused those differences?

4. How do our answers from the first three questions, and the transition from manufacturing to other forms of employment identified in Section 4, inform public policy discussions on how to create jobs and prosperity across the country?

Relevant Findings from Section 4 on Post-Recession Employment Recovery

Before answering the above questions, there are a few points to recall from Section 4:

> For men without post-secondary credentials in manufacturing centres, the significant increases in employment between 2009 and 2018 were in trucking, building services, and residential home construction. The gains were substantially larger in CMAs and CAs proximate to Toronto CMA. This may indicate that these sectors were able to absorb some of the types of workers that traditionally would have worked in manufacturing industries.

> Overall employment growth in isolated manufacturing CMAs/CAs has been stagnant since the Great Recession and experienced absolute decline for men without post-secondary credentials. Furthermore, we have seen substantially slower growth in employment in non-manufacturing industries in isolated communities relative to other communities.

> Employment rates have fully recovered in non-manufacturing communities since the Great Recession and mostly recovered in manufacturing communities, with connected manufacturing communities faring somewhat better than isolated manufacturing communities.

Understanding the Limitations of the Labour Force Survey

Before continuing to our analysis, it is important to note what the data from the Labour Force Survey can and cannot tell us. The Labour Force Survey is a survey of individual households over a six-month period. As such, it has limited ability to directly answer questions such as "how many people who worked in manufacturing in Oshawa CMA ten years ago now work there in construction?" Although we can discuss the employment changes in each occupation over the last ten years, we cannot directly measure the transition at an individual level for the following reasons:

> Lack of individual tracking: The LFS is a survey, so it does not track individuals over time.

> Demographics: Every year, some portion of the labour force retires or passes away and a cohort of individuals take their first jobs, so the set of people employed today is different than those employed a decade ago.

> Migration, both international and within Canada: People move in and out of CMAs, and over 300,000 people immigrate to Canada every year. As such, there is substantial turnover of a

CMA's population each year. Migration explains (in a statistical sense) the majority of employment growth within a CMA, though the causal relationship is not obvious: do people migrate to a CMA because there are jobs available, or does population growth due to migration create employment opportunities due to an increased need for services?

> Geographical definitions: The LFS examines employment at a CMA level based on where a person lives, not where they work. Take a worker who has lived in Oshawa for the last 20 years. Ten years ago, they worked in an automotive plant in Oshawa. Today, they work in a warehousing job in Toronto CMA, but still live in Oshawa. In both cases, they would count toward Oshawa's employment statistics, despite the worker being no longer employed in Oshawa CMA.

We need to be mindful of these limitations when analyzing Labour Force Survey data over time, though much can still be learned through careful examination of the data.

Answering the Four Questions

For this section, we limit our analysis to census metropolitan areas (CMAs), as the relatively small sizes of the Labour Force Survey cause dramatic year-to-year swings in the reported employment rates of census agglomerations (CAs), due to their smaller populations. The 32 CMAs in the sample represent 78% of all Canadian employment in 2018. The growth rate of total employment between 2009 and 2018 (the post-recession period) is broken down into the component parts of employment growth by the following formula:

*(1 + Employment Growth) = (1 + Population Growth) * (1 + Employment Rate Growth).*

Where employment rate growth is defined by the following ratio:

Employment Rate Growth = (2018 Employment Rate – 2009 Employment Rate) / (2009 Employment Rate).

Across Canada, the employment rate fell slightly, from 62.7% to 62.5% between 2009 and 2018, with population aging more than offsetting a strengthening economy. The number of persons over the age of 15 with a job, however, increased by nearly two million in that time due to a growing population. Although population growth across Canada is entirely responsible for the growth in the number of employed persons, at the CMA level there were a number of communities, such as Barrie, Oshawa and Vancouver, that saw significant increases in their employment rates.

TABLE 5.1

Employment Growth by CMA, Workers Aged 15+, 2009-2018

CMA	Employment Growth	Population Growth	Employment Rate Growth (in Percentage Point Terms)
Barrie, Ontario	26.9%	16.4%	9.0ppt
Oshawa, Ontario	26.0%	18.0%	6.7ppt
Edmonton, Alberta	21.7%	23.2%	-1.2ppt
Regina, Saskatchewan	20.9%	22.2%	-1.0ppt
Vancouver, British Columbia	20.2%	16.2%	3.4ppt
Toronto, Ontario	19.0%	18.8%	0.2ppt
Saskatoon, Saskatchewan	18.8%	29.9%	-8.5ppt
Calgary, Alberta	18.0%	25.7%	-6.1ppt
Kelowna, British Columbia	16.9%	14.7%	1.8ppt
Kitchener-Cambridge-Waterloo, Ontario	16.6%	12.6%	3.5ppt
Montreal, Quebec	15.5%	10.6%	4.4ppt
Québec, Quebec	13.4%	8.5%	4.5ppt
Abbotsford-Mission, British Columbia	12.9%	13.5%	-0.5ppt
Windsor, Ontario	12.4%	8.7%	3.4ppt
Guelph, Ontario	12.3%	16.3%	-3.5ppt
Average (Non-Weighted)	**12.2%**	**12.8%**	**-0.5ppt**
Hamilton, Ontario	11.9%	11.7%	0.1ppt
Sherbrooke, Quebec	11.5%	12.0%	-0.5ppt
Winnipeg, Manitoba	11.1%	15.4%	-3.7ppt
Ottawa-Gatineau, Ontario/Quebec	10.6%	14.7%	-3.6ppt
Moncton, New Brunswick	10.3%	15.4%	-4.4ppt
St. John's, Newfoundland and Labrador	10.0%	14.9%	-4.3ppt
Halifax, Nova Scotia	9.1%	13.2%	-3.6ppt
Kingston, Ontario	9.1%	10.8%	-1.5ppt
Trois-Rivières, Quebec	8.6%	5.6%	2.9ppt
St. Catharines-Niagara, Ontario	8.3%	5.5%	2.6ppt
Victoria, British Columbia	8.2%	9.3%	-0.9ppt
Thunder Bay, Ontario	6.2%	0.9%	5.3ppt
London, Ontario	5.9%	10.6%	-4.2ppt
Brantford, Ontario	2.0%	9.3%	-6.6ppt
Greater Sudbury, Ontario	2.0%	2.3%	-0.3ppt
Saguenay, Quebec	-0.7%	1.2%	-1.9ppt
Saint John, New Brunswick	-5.1%	1.2%	-6.3ppt

Note: To aid understanding, employment rate growth here is shown in the more standard percentage point terms. This means that an increase in the employment rate from 61% to 70% is shown as 9ppt (9 percentage points).

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 5.2

Employment Growth, Population Growth, and Employment Rate Growth Correlations for 32 CMAs, 2009-2018

Pair of Variables	Correlation Coefficient
Employment Growth and Population Growth	0.767
Employment Growth and Employment Rate Growth	0.431
Population Growth and Employment Rate Growth	-0.246

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

To understand why some CMAs experienced faster employment growth than others, we need to understand why some had growing employment rates while others did not. We also need to understand the differences in growth rates of the working age populations across CMAs. Not surprisingly, the correlation between population growth and employment growth is particularly strong. More surprisingly, the correlation between population growth and employment rate growth is negative (but small), as shown in Table 5.2.

In Section 4, manufacturing CMAs/CAs were split into those that are proximate to a major metro CMA and those that are not, as studies from other countries suggests that mid-sized (and smaller) communities that are part of a large economic region are better positioned to weather sectoral shifts than more isolated communities. If true, proximity could explain the differences in employment growth rates after the manufacturing disemployment of 2003-2009. In Section 4, we used a somewhat arbitrary cut-off of 120 kilometres to define proximity. To test the relationship between employment growth and proximity, a measure of degree of proximity is needed. We were unable to find a measure in the literature at the CMA level, so we designed one which we call a "proximity score."

Calculating Proximity Scores

A proximity score is a crude measure of how interconnected a local labour force is with surrounding communities. The value of being connected to another community is assumed to be proportional to the size of that community, so having high integration with Toronto is judged as particularly valuable, whereas a connection with Leamington is less so, for example. By using data on commuting to work from the 2016 Census, the two components of proximity score can be obtained:

> **Level of Integration:**
The percentage of a CMA's workforce that works in a neighbouring CMA. For example, according to the 2016 Census, 43.15% of workers that live in Oshawa commute to Toronto CMA daily for work. The 0.5% of Toronto CMA's workers that commute to Oshawa each day would count toward Toronto's proximity score.

TABLE 5.3

Example Proximity Score Calculation: Oshawa

Place of Work	Location of Work as a % of All Local Workers	Local Workforce	Proximity Score
Oshawa	54.44%	N/A	0
Toronto	43.15%	2,393,135	1,032,632
Peterborough	0.65%	43,215	281
All others	1.76%		2,819
Total	**100.00%**		**1,035,732**

Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

> **Value of Integration:**
> Being proximate to a larger CMA is more valuable than being proximate to a smaller CMA. As a proxy, the size of the local workforce of the neighbouring CMA is used (as determined by the 2016 Census commuting data). Toronto's local workforce numbered 2,393,135 in 2016, so that value is used (Statistics Canada, 2018a).

For each CMA, the proximity score is calculated by multiplying the level of integration with the value of integration for every centre to which those workers commute, then summing those values together. Workers that live and work in the same CMA are omitted from the calculation as, for the purposes of this score, CMAs are not considered to be proximate to themselves. This decision to omit same-CMA commuters from the calculation was to allow us to differentiate between large CMAs and CMAs close to large CMAs. For example, Table 5.3 contains the proximity score calculation for Oshawa.

Five communities have proximity scores over 300,000, of which four are in close geographic proximity to Toronto, and the fifth, Abbotsford-Mission, is proximate to Vancouver. Winnipeg is the most isolated CMA by this measure, with a proximity score of 2,398. As shown in Table 5.4, Toronto receives a proximity score near the middle of the pack, as it does have a number of commuters working in Oshawa, Barrie, Hamilton, and Kitchener-Cambridge-Waterloo CMAs.

This is a crude measure of workforce proximity, and, due to limitations of the Census, does not capture international commuting (so Windsor's geographic proximity to Detroit is assigned a zero value). However, it does allow us to test the theory that proximity may influence the rate of employment growth, either through the employment rate or population growth rate.

TABLE 5.4

Proximity Scores for Canadian CMAs

CMA	Proximity Score	Population in 2009
Oshawa, Ontario	1,035,732	357,274
Barrie, Ontario	731,584	189,558
Hamilton, Ontario	533,287	730,354
Guelph, Ontario	335,868	142,773
Abbotsford-Mission, British Columbia	318,910	170,762
Brantford, Ontario	166,831	137,724
Kitchener-Cambridge-Waterloo, Ontario	135,474	501,631
St. Catharines-Niagara, Ontario	114,333	401,517
Sherbrooke, Quebec	36,965	198,786
Trois-Rivières, Quebec	32,946	150,112
London, Ontario	29,795	483,908
Kingston, Ontario	25,416	161,564
Windsor, Ontario	14,830	329,634
Ottawa-Gatineau, Ontario/Quebec	12,934	1,246,116
Québec, Quebec	10,298	758,345
Victoria, British Columbia	10,266	348,064
Kelowna, British Columbia	10,240	178,330
Saguenay, Quebec	9,637	158,938
Greater Sudbury, Ontario	7,397	168,148
Toronto, Ontario	6,509	5,588,312
Halifax, Nova Scotia	5,482	393,688
Calgary, Alberta	5,413	1,220,700
Moncton, New Brunswick	4,682	136,211
Thunder Bay, Ontario	3,809	125,043
Vancouver, British Columbia	3,783	2,301,469
Edmonton, Alberta	3,745	1,163,333
Saint John, New Brunswick	3,694	128,691
Montreal, Quebec	3,614	3,907,597
Saskatoon, Saskatchewan	3,434	257,960
St. John's, Newfoundland and Labrador	2,752	193,867
Regina, Saskatchewan	2,412	210,464
Winnipeg, Manitoba	2,398	729,444

Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Factors Correlated with 2009-2018 CMA-Level Employment Rate Growth

To determine why some CMAs experienced faster employment growth than others, we will start by examining employment rate growth. There are any number of factors that could be related to changes in a CMA's employment rate, which lead to the following questions:

> **Momentum:**
Did CMAs that experienced growth in their employment rates between 2003 and 2009 continue to experience growth in their employment rates between 2009 and 2018?

> **Manufacturing rebound:**
Did CMAs that experienced substantial loss in their manufacturing jobs experience a rebound in their employment rates after the Great Recession?

> **Clustering:**
Did larger CMAs experience higher growth in their employment rate than smaller CMAs?

> **Proximity:**
Did CMAs proximate to larger CMAs experience higher growth in their employment rate than less-proximate CMAs?

We calculated the correlations between employment rate growth from 2009 to 2018 and the following variables:

- Proximity score
- Employment rate growth from 2003 to 2009
- Population growth from 2003 to 2009 and 2009 to 2018, where population is measured by the number of working age persons (that is, the number of persons 15 years of age or older)
- Employment rates in 2003, 2009, and 2018
- CMA population in 2003, 2009, and 2018
- Growth rate of manufacturing jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of oil and gas jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of construction jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of all other jobs, relative to all jobs, 2003-2009 and 2009-2018
- Employment growth 2003-2009 and 2009-2018

The correlation coefficients for these variables are as shown in Table 5.5.

TABLE 5.5

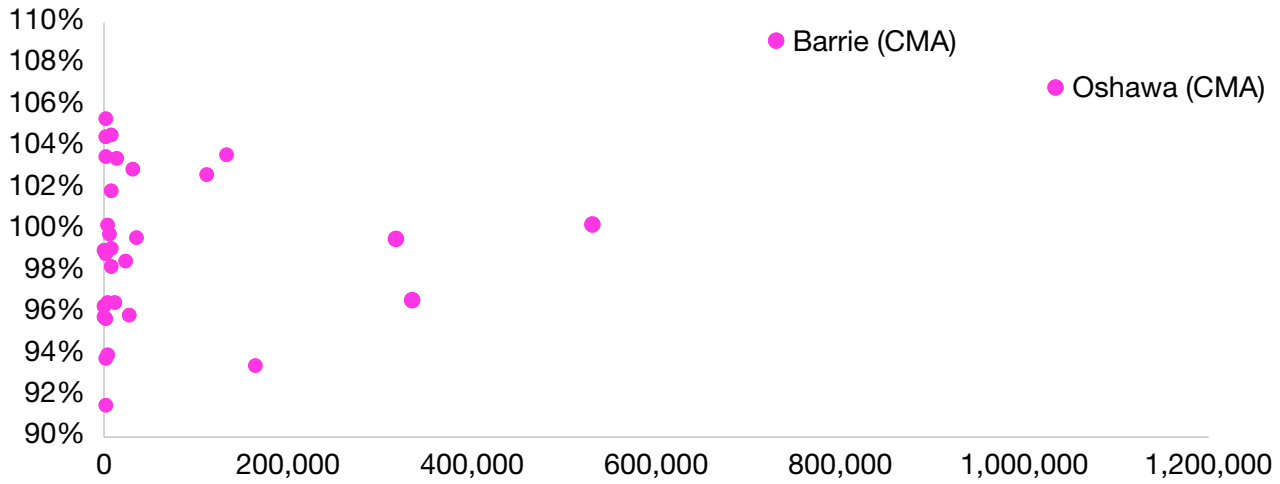
Correlations with 2009-2018 Employment Rate Growth

	Correlation with Employment Rate Growth 2009-2018
Proximity Score	0.434
Employment Growth 2009-2018	0.431
Other Job Growth Rate 2009-2018	0.377
Manufacturing Job Growth Rate 2009-2018	0.223
Construction Job Growth Rate 2009-2018	0.207
2003 Population	0.157
2009 Population	0.151
2018 Population	0.137
2018 Employment Rate	0.034
Population Growth 2003-2009	0.019
2003 Employment Rate	-0.077
Oil & Gas Job Growth Rate 2009-2018	-0.097
Construction Job Growth Rate 2003-2009	-0.173
Population Growth 2009-2018	-0.246
Other Job Growth Rate 2003-2009	-0.327
Oil & Gas Job Growth Rate 2003-2009	-0.408
Manufacturing Job Growth Rate 2003-2009	-0.447
Employment Growth 2003-2009	-0.493
2009 Employment Rate	-0.582
Employment Rate Growth 2003-2009	-0.635

Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 5.1

Proximity Score (X-Axis) vs. 2018 Employment Rate as a Percentage of 2009 Employment Rate (Y-Axis)



Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

As shown by Figure 5.1, two outliers – Barrie CMA and Oshawa CMA – appear to be largely responsible for the strong relationship between proximity score and changes in the employment rate between 2009 and 2018.

Many of these correlations are weak because our sample size is small at 32 CMAs, and the Labour Force Survey has a relatively modest sample size. While these correlations do not indicate causality, they do provide some insight into our four questions:

MOMENTUM:

Did CMAs that experienced growth in their employment rates between 2003 and 2009 continue to experience growth in their employment rates between 2009 and 2018?

Just the opposite. There was a significant and large negative correlation between employment rate growth from 2003 to 2009 and from 2009 to 2018, indicative of mean reversion. There are many reasons why this could occur, from sampling error in the Labour Force Survey to a rebound in employment in manufacturing centres after 2009, which we will examine below.

TABLE 5.6

Manufacturing Job Growth from 2003 to 2009 and Employment Rates

CMA	Manufacturing Job Growth 2003-2009	2009 Employment Rate	2018 Employment Rate	Percentage Point Change
Sherbrooke, Quebec	-11.4%	60.0%	59.7%	-0.3ppt
Windsor, Ontario	-11.4%	54.8%	56.7%	1.9ppt
Oshawa, Ontario	-7.6%	60.9%	65.1%	4.1ppt
Hamilton, Ontario	-6.9%	61.8%	61.9%	0.1ppt
Guelph, Ontario	-5.9%	67.8%	65.4%	-2.3ppt
Thunder Bay, Ontario	-5.8%	57.7%	60.8%	3.0ppt
Kitchener-Cambridge-Waterloo, Ontario	-5.6%	64.2%	66.4%	2.3ppt
Toronto, Ontario	-5.2%	61.7%	61.8%	0.1ppt
St. Catharines-Niagara, Ontario	-5.2%	55.8%	57.2%	1.4ppt
London, Ontario	-5.0%	60.1%	57.6%	-2.5ppt
Barrie, Ontario	-5.0%	59.6%	65.0%	5.4ppt

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

MANUFACTURING REBOUND:

Did CMAs that experienced substantial loss in their manufacturing jobs experience a rebound in their employment rates after the Great Recession?

Yes, somewhat. There was a negative correlation between manufacturing job growth from 2003 to 2009 and employment rate growth from 2009 to 2018, indicating that CMAs that experienced large declines (negative values) in manufacturing job growth before the Great Recession saw increases in their employment rates after the Great Recession.

Of our 11 CMAs that experienced a 2003-2009 manufacturing job loss of 5% or more of their 2003 employment levels, eight experienced increases in their employment rates between 2009 and 2018, as shown by Table 5.6.

It is noteworthy that the two CMAs on this list that experienced the highest percentage point growth in their employment rates are also the two CMAs in Canada with the highest proximity scores (Oshawa and Barrie). This is suggestive (but far from conclusive) that proximity aids in the economic transformation of a manufacturing centre, which is consistent with our results from previous sections.

Not surprisingly, the correlation between 2003-2009 employment growth and 2003-2009 manufacturing job growth for all 32 CMAs was a robust 0.726, as centres that experienced large manufacturing employment declines did not have that job loss offset by growth in other sectors.

CLUSTERING:

Did larger CMAs experience higher growth in their employment rate than smaller CMAs?

The relationship between 2009-2018 employment rate growth and 2009 population (of working age persons) is incredibly weak at 0.151, and the correlation between 2009-2018 employment rate growth and 2009-2018 population growth is slightly negative. Employment rates tend to be higher in larger CMAs, but there appears to be little relationship between employment rate growth and the population of a CMA, which suggests a linear relationship between population growth and employment growth.

Larger Canadian CMAs differ from smaller ones in many ways, most notably in terms of demographics (larger centres tend to have a population that is younger and better educated). Instead of examining the relationship between employment rate growth and population size, we can examine the relationship between employment rate growth and education/demographic indicators. That relationship is even weaker, in part because of the employment rate drop in London, Ontario, one of the CMAs in Canada with the highest levels of education.

TABLE 5.7

Correlations with 2009-2018 Employment Rate Growth, With and Without Barrie and Oshawa

Factor	All CMAs	Without Barrie and Oshawa
Proximity Score	0.434	0.012
Employment Growth 2009-2018	0.431	0.224
Other Job Growth Rate 2009-2018	0.377	0.164
Manufacturing Job Growth Rate 2009-2018	0.223	0.195
Construction Job Growth Rate 2009-2018	0.207	0.069
2003 Population	0.157	0.251
2009 Population	0.151	0.241
2018 Population	0.137	0.224
2018 Employment Rate	0.034	-0.093
Population Growth 2003-2009	0.019	-0.234
2003 Employment Rate	-0.077	-0.298
Oil & Gas Job Growth Rate 2009-2018	-0.097	-0.061
Construction Job Growth Rate 2003-2009	-0.173	-0.209
Population Growth 2009-2018	-0.246	-0.395
Other Job Growth Rate 2003-2009	-0.327	-0.296
Oil & Gas Job Growth Rate 2003-2009	-0.408	-0.417
Manufacturing Job Growth Rate 2003-2009	-0.447	-0.392
Employment Growth 2003-2009	-0.493	-0.465
2009 Employment Rate	-0.582	-0.604
Employment Rate Growth 2003-2009	-0.635	-0.497

Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

PROXIMITY:

Did CMAs proximate to larger CMAs experience higher growth in their employment rate than less-proximate CMAs?

Yes. The strongest positive correlation was between proximity and employment rate growth at 0.434. That relationship appears to be particularly driven by Oshawa and Barrie, which have the two largest increases in employment rates and the two highest proximity scores. Removing those CMAs from the sample drops the correlation rate down all the way to 0.012.

IN SUMMARY:

There is some evidence that during the 2009-2018 period, there was a relationship between employment rate growth and proximity, as well as an employment rate recovery among manufacturing centres that lost employment between 2003 and 2009. However, much of this relationship is driven by two CMAs: Barrie and Oshawa. Removing them from the sample weakens these relationships considerably, as illustrated by Table 5.7.

A similar analysis can be performed for population growth, to identify factors that are correlated with a growing population of working-age persons.

Factors Correlated with 2009-2018 CMA-Level Population Growth

Unlike the previous section, this section only contains a single question: Why did some CMAs experience faster growth of their working age population? We can start by calculating the same set of correlations as in the previous section. We calculated the correlation between working age population growth from 2009 to 2018 and the following variables:

- Proximity score
- Employment rate growth from 2003 to 2009
- Population growth from 2003 to 2009 and 2009 to 2018, where population is measured by the number of working age persons (that is, the number of persons aged 15 years or older)
- Employment rates in 2003, 2009, and 2018
- CMA population in 2003, 2009, and 2018
- Growth rate of manufacturing jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of oil and gas jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of construction jobs, relative to all jobs, 2003-2009 and 2009-2018
- Growth rate of all other jobs, relative to all jobs, 2003-2009 and 2009-2018
- Employment growth 2003-2009 and 2009-2018

The correlation coefficients are shown in Table 5.8.

Unfortunately, this provides little insight on why some CMAs experience faster working age population growth than other CMAs. While population growth is highly associated with the growth of construction jobs, the causality is almost certainly that growing cities have a greater need for more infrastructure and housing to be built.

One factor that could cause an increase in population growth is the size of a city, as larger and more dynamic cities may attract workers. However, the correlations between 2009-2018 population growth and both 2009 population and proximity score are positive but rather low (0.225 and 0.136 respectively). The correlation between population growth and a combined population plus proximity score metric is somewhat higher at 0.261, but the overall relationship between how fast the working-age population is growing, and the size of the existing workforce is relatively weak. The scatterplot in Figure 5.2 shows that the weak correlation is, in part, due to fast-growing CMAs in Western Canada, which are not among Canada's largest CMAs, nor are they proximate to other CMAs.

TABLE 5.8

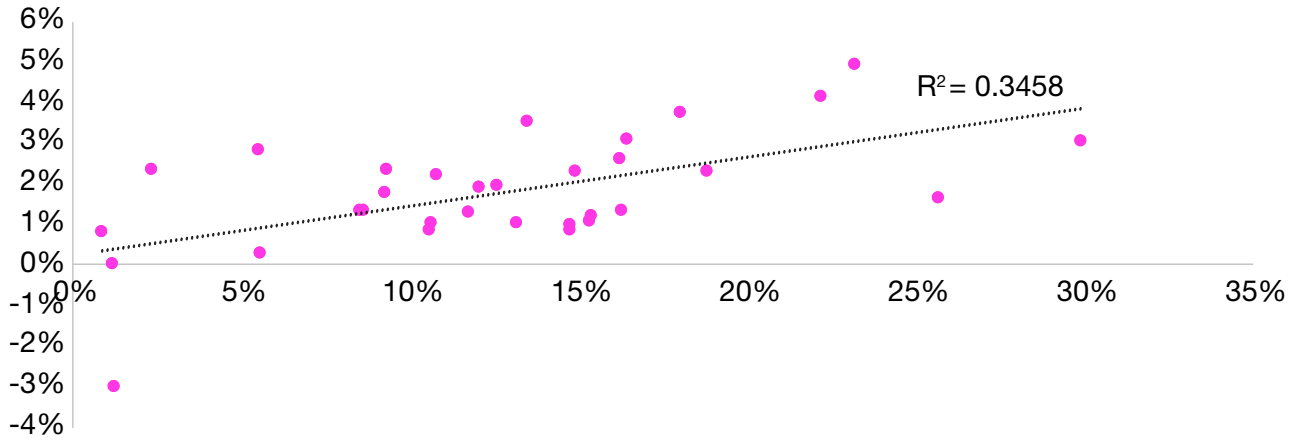
Correlations with 2009-2018 Population Growth

Factor	Population Growth 2009-2018
Population Growth 2003-2009	0.784
Employment Growth 2009-2018	0.767
2009 Employment Rate	0.751
Other Job Growth Rate 2009-2018	0.748
2018 Employment Rate	0.729
2003 Employment Rate	0.720
Construction Job Growth Rate 2009-2018	0.588
Employment Growth 2003-2009	0.533
Other Job Growth Rate 2003-2009	0.488
Construction Job Growth Rate 2003-2009	0.352
Oil & Gas Job Growth Rate 2003-2009	0.335
2018 Population	0.246
2009 Population	0.225
2003 Population	0.211
Manufacturing Job Growth Rate 2003-2009	0.195
Proximity Score	0.136
Employment Rate Growth 2003-2009	0.060
Manufacturing Job Growth Rate 2009-2018	0.025
Oil & Gas Job Growth Rate 2009-2018	-0.121
Employment Rate Growth 2009-2018	-0.246

Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

FIGURE 5.2

Proximity Score (X-Axis) vs. 2009-2018 Population Growth Rate (Y-Axis)



Source: Author's calculations using data from the 2016 Census (Statistics Canada, 2018a) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

We could examine the potential linkages between population growth and migration by looking to the sources of population growth. Statistics Canada tracks components of population change for CMAs and CAs, breaking them down into nine types (Statistics Canada, 2021c).

> Births

> Deaths

> Immigrants

> Emigrants

> Returning Emigrants

> Net Temporary Emigration

> Net Interprovincial Migration

> Net Intraprovincial Migration

> Net non-permanent residents

These are collected for the 2009-2018 period and compared to the working age population growth for 2009-2018 from the Labour Force Survey. Although they are from two different surveys measuring two different definitions of population (total population vs. population of working age persons), the correlation between the two total measures is incredibly high at 0.926, so collectively the components of population growth strongly explain the growth of the working age population.

Taking the components of population growth (where items, such as deaths and immigrants, that reduce population growth have negative values) and calculating the correlation with working age population growth gives us the figures in Table 5.9.

TABLE 5.9

Components of 2009-2018 CMA-Level Population Growth and Working Age Population Growth

Factor	LFS Population Growth (2009-2018)
Census Pop Growth	0.926
Births	0.822
Immigrants	0.717
Deaths	0.701
Returning emigrants	0.508
Net temporary emigration	0.277
Net intraprovincial migration	0.223
Net interprovincial migration	0.154
Net non-permanent residents	-0.033
Emigrants	-0.339

Source: Author's calculations using data from Statistics Canada (2021c) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Not surprisingly, CMAs with fewer deaths and more births have a faster-growing workforce, as their populations tend to skew younger. Immigration clearly plays an important role, though the causal mechanism cannot be implied from a simple correlation, as we do not know whether CMAs with employment needs attract more immigrants, or if an influx of immigrants creates employment growth.

At first glance, the low correlation between intraprovincial and interprovincial migration and working age population growth is surprising. One would expect CMAs that are rapidly growing to be bustling with opportunity and attracting working-age Canadians. Examining the fastest-growing CMAs (in terms of working age population) provides a more complete picture, as shown in Table 5.10.

TABLE 5.10

Components of Working Age Population Growth in Canada's Fastest-Growing CMAs

CMA	LFS Population Growth	Births	Deaths	Immigrants	Net Interprovincial Migration	Net Intraprovincial Migration
Saskatoon, Saskatchewan	29.9%	15.2%	-7.4%	16.9%	-1.9%	6.5%
Calgary, Alberta	25.7%	14.4%	-5.1%	14.4%	2.8%	1.4%
Edmonton, Alberta	23.2%	14.3%	-6.3%	11.5%	3.8%	3.3%
Regina, Saskatchewan	22.2%	14.5%	-8.1%	17.4%	-3.3%	3.0%
Toronto, Ontario	18.8%	11.6%	-5.6%	15.0%	0.0%	-4.7%
Oshawa, Ontario	18.0%	11.3%	-6.8%	2.5%	-1.5%	11.6%
Barrie, Ontario	16.4%	10.7%	-7.1%	2.2%	-1.8%	9.2%
Guelph, Ontario	16.3%	11.5%	-7.0%	4.8%	-0.6%	6.4%
Vancouver, British Columbia	16.2%	10.4%	-6.3%	13.8%	1.3%	-2.6%
CMA Average (Unweighted)	**12.8%**	**11.0%**	**-7.9%**	**6.5%**	**-0.1%**	**3.3%**

Source: Author's calculations using data from Statistics Canada (2021c) and the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

These CMAs can be broken into three categories:

> **CMAs that attract high levels of immigrants and within-Canada migrants:** Saskatoon, Calgary, Edmonton

> **CMAs that attract high levels of immigrants, but are shedding current residents:** Toronto, Vancouver

> **CMAs that attract low levels of immigrants and are gaining large numbers of within-Canada migrants:** Oshawa, Barrie, Guelph.

Given that Toronto and Vancouver are Canada's two most expensive CMAs for residential real estate, this phenomenon has a relatively straightforward explanation. While the Toronto economy is booming, many families cannot afford to live within the CMA, so they relocate to nearby CMAs in search of housing that they can afford. This phenomenon is known in real estate circles as "drive until you qualify" (that is, keep venturing further outside of the city core until house prices are low enough that the family will qualify for a mortgage). It helps explain the working-age population growth of CMAs and CAs proximate to Toronto and Vancouver. Many of those workers still work within Toronto or Vancouver CMA; recall that nearly half of Oshawa's workforce commutes to Toronto CMA for work each day. These workers are counted in Oshawa's employment counts by the Labour Force Survey, as the LFS measures employment by where a worker lives, not where they work. This helps explain the importance of proximity, as much of the employment growth attributed to Oshawa and Barrie is due to workers commuting to Toronto. However, the existence of these commuters creates jobs within the local communities, as those families send their children to local schools, eat at local restaurants, and purchase goods from local stores. By becoming a bedroom community of the larger CMAs, those centres generate local jobs.

While the Toronto economy is booming, many families cannot afford to live within the CMA, so they relocate to nearby CMAs in search of housing that they can afford. This phenomenon is known in real estate circles as "drive until you qualify".

Summary: Our Questions Answered

At the beginning of the section, we posed five questions, which we have attempted to answer. Our findings can be summarized as follows.

What Can We Conclude About Employment Growth from 2009 to 2018?

In short, we can conclude the following:

> There was a rebound in the employment rate for some centres that shed manufacturing jobs between 2003 and 2009, though that rebound was largely isolated to manufacturing centres near (or in) large CMAs.

> Most of the increase in employment at the CMA level from 2003 to 2009 was due to increases in the working age population of those CMAs.

> Some of a CMA's working age population growth is due to demographic factors, though much of it is due to attracting working-age persons from either within Canada or abroad.

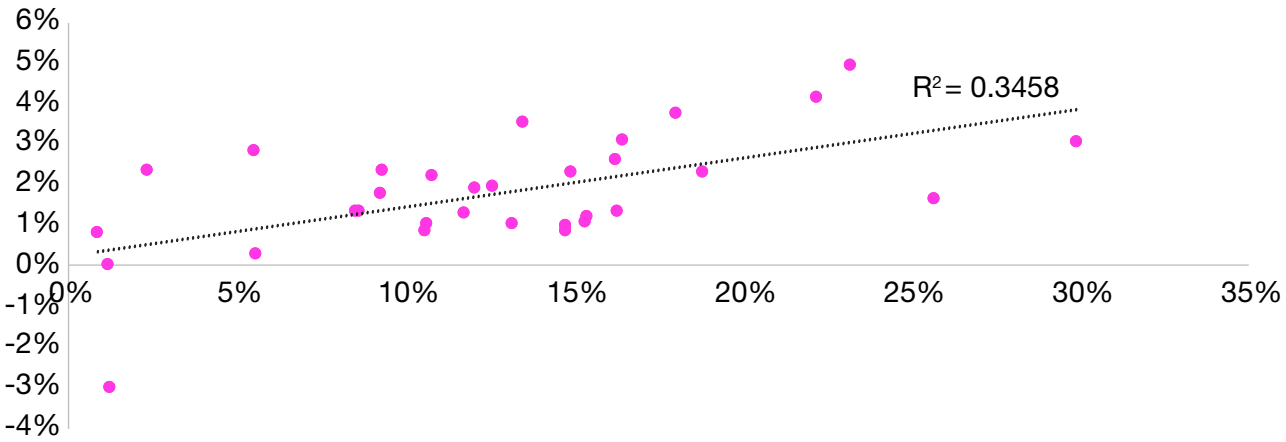
> Larger centres attract higher levels of international immigrants. Of the eight CMAs that attracted the highest proportion of international immigrants, six have a National Hockey League team. The remaining two are the fast-growing resource centres of Regina and Saskatoon.

> Despite strong economies, Toronto and Vancouver CMAs lost population to other parts of the country, on net, from 2009 to 2018. (Their overall populations increased due to gains from international migration, however.)

> Mid-sized CMAs geographically proximate to large CMAs experienced large increases in intraprovincial migration. Two CMAs, Barrie and Oshawa, saw population increases of over 8% during this period, solely due to intraprovincial migration.

FIGURE 5.3

2009-2018 Working-Age Population Growth (X-Axis) vs. 2009-2018 Construction Industry Employment Growth as a Percentage of 2009 Employment (Y-Axis)



Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

> Toronto's large loss of population to the rest of the province, and Barrie and Oshawa's gain, is almost certainly due to differences in real estate prices and the "drive until you qualify" phenomenon.

What Are the Skills Implications of the 2009-2018 Employment Transition?

In Section 4, we compiled the following list of occupations that saw significant employment increases for men without post-secondary education between 2009 and 2018 in three types of CMAs (shown in Table 5.11). We chose to examine men without post-secondary credentials because they were the group that faced the largest disemployment from the manufacturing decline of 2003-2009, though women without post-secondary credentials experienced significant declines as well and should not be overlooked. In fact, for women without post-secondary credentials, there have been almost no industries that have experienced employment growth at all outside of the hospitality sector.

The two important things to note from this are: 1) the much higher level of employment growth in connected manufacturing communities than in isolated ones, and 2) the large proportion of construction-related occupations on this list. Not surprisingly, there was a strong relationship between the population growth of a CMA between 2009 and 2018 and the growth in construction jobs for workers in that CMA, as shown by Figure 5.3.

TABLE 5.11

Industry Growth, Male Workers Without Post-Secondary Credentials, 2009-2018

NAICS	Industry	Isolated Manufacturing Communities	Connected Manufacturing Communities	Other CMAs/ CAs	Difference Between Connected and Other*
	All	-0.4%	3.2%	0.5%	2.7%
4841	General freight trucking	0.1%	1.7%	0.0%	1.7%
5617	Services to buildings and dwellings	-0.1%	1.5%	-0.1%	1.6%
4451	Grocery stores	1.4%	0.6%	-0.6%	1.2%
2361	Residential building construction	1.2%	2.0%	0.9%	1.1%
3399	Other miscellaneous manufacturing	0.6%	0.9%	0.0%	0.9%
4431	Electronics and appliance stores	-0.1%	0.4%	-0.3%	0.7%
4853	Taxi and limousine service	0.0%	0.7%	0.0%	0.7%
5415	Computer systems design and related services	0.1%	0.8%	0.1%	0.6%
3371	Household and institutional furniture, and kitchen cabinet manufacturing	0.5%	0.7%	0.2%	0.6%
4931	Warehousing and storage	0.1%	0.9%	0.4%	0.4%
5418	Advertising, public relations, and related services	0.1%	0.4%	0.0%	0.4%
2373	Highway, street and bridge construction	-0.1%	0.3%	-0.1%	0.4%
3327	Machine shops, turned product, and screw, nut, and bolt manufacturing	0.3%	0.3%	-0.1%	0.4%
3219	Other wood product manufacturing	-0.3%	-0.1%	-0.5%	0.4%
5413	Architectural, engineering and related services	-0.1%	0.2%	-0.1%	0.4%

Note: Numbers calculated in the final column may differ slightly due to rounding.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Since construction, warehousing, and trucking occupations employ workers of a similar demographic profile to manufacturing, it is absolutely vital to ensure there are robust training programs available to allow former manufacturing workers (and others) to obtain the skills needed to fill these positions. These programs must be made accessible to women (since they faced significant levels of manufacturing job decline as well), along with new Canadians, who disproportionately live in (or near) the CMAs with high levels of construction job growth. Inclusion must be a central focus of these efforts, to ensure workplaces and training programs are welcoming places for all those living in Canada, regardless of their sex or background.

Which CMAs experienced faster rates of total employment growth between 2009 and 2018 than others, and how much of that difference had to do with differences in population growth?

In order, the six fastest-growing CMAs in terms of employment growth from 2009 to 2018 were two CMAs proximate to Toronto CMA (Barrie, Oshawa), three fast-growing CMAs in Western Canada (Edmonton, Regina, and Vancouver) and Toronto CMA itself. The correlation between employment growth and population growth between the two was a robust 0.767. Outside of Barrie and Oshawa CMAs, changes in the employment rate are largely unrelated to employment growth for the period.

Which CMAs experienced an increase in their employment rate between 2009 and 2018, and what might have caused that increase?

Oshawa and Barrie CMAs experienced robust growth in their employment rate. The data suggests (but far from conclusively) that these centres were able to rebound from heavy manufacturing job losses between 2003 and 2009 due to their proximity to Toronto CMA, creating jobs and opportunity in other industries (such as construction, trucking, and warehousing) to offset manufacturing job losses during and prior to the Great Recession.

Which CMAs experienced the largest increases in population growth between 2009 and 2018, and what might have caused those differences?

Differences in working-age population growth is driven almost entirely by differences in migration patterns. Large cities receive the bulk of international immigrants. Between 2018 and 2019, there were nearly 500,000 immigrants and net new non-permanent residents that located to Canada, with 56% of those moving to one of Canada's three largest CMAs: Toronto, Montreal, or Vancouver. Mid-sized CMAs proximate to those CMAs, in particular Barrie and Oshawa, saw substantial population growth due to migration, despite having international immigration-based population growth rates significantly below the national average. Their migration population growth came primarily from families who seek to be within commuting distance to the economic

opportunities provided by those big cities while being able to afford housing, which is often not possible within Toronto CMA.

How do our answers from the first three questions, and the transition from manufacturing to other forms of employment identified in Section 4, inform public policy discussions on how to create jobs and prosperity across the country?

For mid-sized cities, proximity matters. The more a CMA can become integrated into a larger regional economy, the better it can transition from economic shocks. While CMAs cannot become geographically closer to each other, commuting times can be reduced through smart infrastructure projects, including intercity transit options.

For manufacturing CMAs where increased proximity (measured in commuting time, not distance) is not a realistic option, local development planners have a difficult decision to make: do they dig in and focus on manufacturing, or do they work on diversifying their sectoral mix? Both have significant drawbacks: there has been little growth in manufacturing employment over the last decade, so future growth potential may be limited. However, those cities may not have the economies of scale to compete in other industries. Is Tillsonburg large enough to support a tech cluster?

Telecommuting may be able to provide "virtual" proximity, which would give Canadians more employment options outside of large CMAs. Indeed, the massive shift to remote work occasioned by the COVID-19 pandemic has left many predicting that remote work, which had limited uptake in Canada prior to the pandemic, will have significant staying power. It is not possible to know to what extent ubiquitous remote work will continue once the threat of infection subsides. But federal and provincial governments have a role to play in ensuring that smaller communities have sufficient broadband access to allow their residents the ability to work from home if the option is available.

Further, the industries experiencing the highest levels of growth in the 21st century tend to cluster in large cities. Policymakers need to ensure an adequate supply of housing in those cities, so that Canadians who are qualified for those jobs do not have to face long commutes (or reject those jobs entirely).

Finally, skills policies are absolutely vital. Canada's fastest-growing cities continue to create high levels of jobs in the construction, warehousing, and trucking industries, which employ workers of a similar profile to manufacturing. High-quality programs can ensure a successful transition for laid-off manufacturing workers. In particular, it is vital that these training programs and professions be inclusive to women and new Canadians.

SECTION 6:

Conclusion

Summarizing the Project

Our questions for this research were straightforward: How did Canadian regions fare during the manufacturing employment decline of 2003-2009? Were manufacturing jobs replaced by comparable jobs or by different jobs, thus marking a permanent shift in the nature of employment?

In broad strokes, our answer to these questions are as follows:

In 2003, employment in manufacturing across Canada went into decline due to a combination of automation, enhanced overseas competition (the China Shock), and a rising Canadian dollar. Employment in manufacturing fell by 12% between 2003 and 2008, with Quebec and Ontario hit particularly hard. This trend accelerated during the Great Recession, but since then employment in the sector has been flat. While the sector has decreased by 16,700 workers since the end of the Great Recession, net employment in manufacturing occupations has increased by 61,600. Although jobs at skill level B (the highest levels for manufacturing occupations) make up less than one-quarter of employment in manufacturing occupations, they are responsible for most of the manufacturing occupational job growth since the end of the Great Recession. Although manufacturing is typically seen as a "male" occupation, 43% of job loss in the hardest hit occupations was experienced by women. Since the end of the Great Recession, the employment rate for women under 45 without post-secondary credentials has been stagnant, while it continues to rise for the cohort with post-secondary completion.

The Great Recession and pre-recession manufacturing disemployment disproportionately hit workers in manufacturing communities without post-secondary credentials. In big cities and communities close to big cities, these types of workers were able to adjust by finding new jobs in infrastructure construction, homebuilding, trucking, and warehousing. In other manufacturing communities not in proximity to large metropolitan centres, the supply of these jobs grew more slowly, and as a result, we saw reduced employment for these workers and earnings growth under the rate of inflation.

To conclude this project, we will consider the past, the present, and the future through the following four points of discussion:

1. What do we now know about the decline in manufacturing employment and the transition into other types of employment?

2. What are the lasting impacts from the 2003-2009 disemployment in manufacturing that could still be addressed by policymakers?

3. What do we still not know about the decline and lack of recovery in manufacturing employment, as well as the transition into other forms of employment?

4. What does the manufacturing labour market transition indicate about future employment transitions?

Findings About the Decline in Manufacturing Employment

We will take the lead from previous sections and break our findings out into three periods: before, during, and after the Great Recession.

What Happened to Manufacturing Employment Before the Great Recession?

In the early 2000s, roughly 2.2 million Canadians were employed in the manufacturing sector, with just over three-quarters of those jobs located in Quebec and Ontario. Around 2003, manufacturing sector employment went into decline, due to a combination of a rising Canadian dollar, enhanced competition from China (the China Shock) and other countries, and automation.

From 2003 to 2008, the period before the Great Recession, net employment in the manufacturing sector fell by 350,000 jobs, with 88% of that loss occurring in Quebec and Ontario. In percentage terms, this represented an 11.5% reduction in net employment in the sector. Quebec experienced the largest proportional drop at 16.2%, with Ontario following at 14.2%. During this period, a portion of the net decline in manufacturing sector employment was through attrition, as the number of workers who had been with their firms less than a year fell significantly during this period. The largest net employment declines were experienced by groups under the age of 45, likely due to a reduction in hiring.

Not every industry within the manufacturing sector saw the same rates of disemployment. We can break the sector down into two types of equal size: those that saw unreversed employment decline (wilting manufacturing employment industries), and those that did not (rebounding manufacturing employment industries). Wilting manufacturing employment industries shed 284,100 jobs between 2003 and 2008, a loss of 26% relative to 2003. These industries included motor vehicle parts manufacturing, cut and sew clothing manufacturing, and sawmills and wood preservation. Rebounding manufacturing employment industries saw a more modest decline of 65,300 jobs, for a 6% net decline

from 2003 and 2008. These industries were disproportionately in agri-food manufacturing, plastics and chemicals, and metals.

There were few obvious differences that explain why some manufacturing industries saw a large employment decline during this period and why others did not. The two industries had roughly equal wage rates, though the industries that declined had a slightly lower level of workers with a post-secondary education and a higher proportion of female workers. The disproportionate impact on women was due, in part, to substantial declines in industrial sewing machine operators.

Further research is needed to explore why some manufacturing industries were able to retain employment during this period and others were not. Our hypothesis is that we would find the decline in net employment to be highly correlated with the trade exposure of an industry, as well as highly correlated with the percentage of their costs denominated in Canadian dollars (such as labour). Future research could test these relationships.

From 2003 to 2008, there was a reduction of 270,100 workers in employment in manufacturing occupations. The decline in manufacturing occupation employment was felt across skill levels, with skill level C workers (the median skill level for manufacturing) experiencing the largest decline at 28% over the period. Skill level D (the lowest level) saw a decline of 17%, while the highest skill level in manufacturing occupations, skill level B, saw a decline of 11%.[13]

Manufacturing workers also experienced slow growth in wages. Weekly earnings for workers in manufacturing occupations in manufacturing industries rose at roughly the rate of inflation (14% for the period), whereas weekly earnings for all workers rose at 21%.

Before the Great Recession, there was also a substantial decline in employment in manufacturing industries of workers not in manufacturing occupations (everything from salespeople to janitors). This would indicate that the disemployment experienced was not wholly caused by automation of assembly line tasks, but rather also by an overall shrinking of the manufacturing sector's footprint, impacting all roles in a given firm.

Other industries absorbed the types of workers that would traditionally have worked in manufacturing, including oil and gas extraction, warehousing and storage,

13 Skill level A occupations are professional jobs that usually call for a degree from a university. Skill level B occupations are technical jobs and skilled trades that usually call for a college diploma or training as an apprentice. Skill level C occupations are intermediate jobs that usually call for high school and/or job-specific training. Skill level D occupations are labour jobs that usually give on-the-job training (Government of Canada, 2020).

and residential building construction. The absorption of these workers was less than complete; while employment rates for other demographic groups rose, employment rates for young men without post-secondary credentials remained relatively flat during the period, and only rose slightly for women without post-secondary credentials.

If we take an occupational perspective, we saw an employment increase in a handful of occupations for workers who would have historically worked in manufacturing. These include construction trades helpers, oil and gas labourers, and residential and commercial installers.

The decline in manufacturing employment had negative impacts on manufacturing communities. We identified 25 communities across Canada that saw substantial declines in manufacturing employment between 2003 and 2008. The majority of these were in Ontario, but others were in Quebec, Atlantic Canada, and the Prairie Provinces. A community's resilience to a decline in manufacturing employment appears to be a function of that community's proximity to a major metropolitan area (Toronto, Montreal, or Vancouver). Of our 25 communities, one was a major metropolitan area, six were less than 120 kilometres from Toronto (Barrie, Brantford, Guelph, Hamilton, Kitchener-Cambridge-Waterloo, and Oshawa), and one was less than 120 kilometres from Montreal. We refer to these 8 communities as "connected manufacturing communities." The other 17 (the isolated manufacturing communities) were not proximate to a major metropolitan area.

Between 2003 and 2008, the net manufacturing job loss in isolated manufacturing centres represented 5.7% of all (2003) employment. For connected manufacturing centres (which includes Toronto), the decline was 3.6%. For non-manufacturing cities, the decline was 0.9%. The manufacturing employment decline may have spilled over to other sectors. During this period, employment in other industries grew by 7.5% in isolated manufacturing centres, 11.4% in connected manufacturing centres, and 12.2% in other cities. Employment rates for core workers (those aged 25 to 54) stayed relatively flat in both types of manufacturing communities, but rose by 3 percentage points in other cities.

Weekly earning growth was also substantially higher in non-manufacturing communities, growing at nearly twice the rate of inflation, whereas in manufacturing communities, weekly earnings rose only slightly faster than inflation.

What Happened to Manufacturing Employment During the Great Recession?

During the Great Recession of 2008-2009, manufacturing employment across Canada fell another 8% from 2003 levels, for a decline in sector employment of 182,000 workers. Not surprisingly, there was a dramatic spike in unemployment of manufacturing workers during this period and a significant decline in output. There was also a reduction in workers voluntarily leaving jobs, which is typical during an economic downturn.

Manufacturing employment decreased in every single province, with Ontario alone losing 100,000 positions, a 10% reduction from 2003 levels in a single year. In percentage terms, the biggest losses were in Newfoundland and Labrador (15%), Manitoba (12%), Alberta (11%), and British Columbia (11%). A handful of manufacturing industries saw gains during this period, most notably aerospace product and parts manufacturing (a net increase of 4,900 jobs); ventilation, heating, air-condition and commercial refrigeration equipment manufacturing (3,500 jobs); and cement and concrete product manufacturing (2,600 jobs). Most others saw a decline, including motor vehicle parts manufacturing (a net decline of 26,900 jobs), printing and related support activities (10,200 jobs), and motor vehicle manufacturing (10,200 jobs).

While manufacturing shed 182,000 jobs during the Great Recession, all other sectors of the economy combined experienced a net decline in employment of 94,600 positions. While manufacturing made up just over 11% of the workforce in 2008, it experienced two-thirds of all net employment loss.

The employment rate for young men (aged 15 to 44) without post-secondary completion fell dramatically during the Great Recession, from 67% to 62%, and the rate for young women dropped from 59% to 55%. It has yet to recover for either group, marking what appears to be a permanent change in employment in Canada.

Young men with post-secondary credentials also saw a decline in employment rates from 85% to 82%. This group has mostly recovered since then. The employment rates for women with post-secondary education experienced only modest declines during the Great Recession and are currently at all-time highs.

From an occupational perspective, there was a net employment decline of 129,900 manufacturing positions during the Great Recession. While manufacturing occupation workers took the biggest hit in the recession-induced decline in the manufacturing sector, other workers in the sector were also impacted, from marketing professionals to janitors.

All skill levels of manufacturing occupation workers saw an employment decline during the Great Recession, with the highest-skilled manufacturing occupations (Level B) experiencing the smallest percentage decline at 9%, and the lowest-skilled occupations (Level D) experiencing the highest percentage declines at 15%.

During the Great Recession, isolated manufacturing communities saw a net employment decline of over 5%, while connected manufacturing communities and non-manufacturing communities saw declines of under 2%. Excluding employment in the manufacturing sector, isolated manufacturing communities still experienced a decline in employment of over 3%. This was relatively unchanged in the other two types of communities. It is unclear whether the disproportionately large disemployment in these communities was a spillover effect from their large manufacturing job losses, or if other factors were at play.

Finally, men without post-secondary credentials experienced disproportionate employment declines during this period, falling 8% in isolated manufacturing communities, 7% in connected manufacturing communities, and 4% in all other communities.

What Happened to Manufacturing Employment After the Great Recession?

Since 2009, employment in the manufacturing sector has been essentially flat, declining by 18,100 net jobs between 2009 and 2018. All other sectors have gained a net 1.9 million jobs during this period. Within the manufacturing sector, there has been substantial divergence, with rebounding manufacturing industries gaining 108,000 net jobs, and wilting ones shedding 126,300.

Since the end of the Great Recession, there has been a steady decline in the number of wilting manufacturing employment workers that have lost their jobs. The job losses in these industries appears to be largely, but not wholly, due to attrition.

While the manufacturing sector overall has seen a decline in employment, there was a net increase of 61,600 workers in manufacturing occupations from 2009 to 2018. Over half (33,000 of 61,600) of that increase has been in occupations classified as skill level B, the highest skill level for the manufacturing sector.

The post-recession growth in manufacturing employment has almost entirely been in recovering manufacturing occupations in rebounding manufacturing industries. In 2018, 53% of these workers had post-secondary credentials, up from 43% in 2003. The average weekly earnings for these workers are $860, significantly below the Canadian average of $980. In rebounding manufacturing employment industries, there has been an increase in the number of employees who have been with an employer for less than a year since 2015, indicative of an increase in hiring.

At a community level, isolated manufacturing centres have experienced only modest employment growth of 5%. Our connected manufacturing centres have seen their employment grow by 18%, and non-manufacturing communities have experienced growth of 15%. Despite the slow employment growth of isolated manufacturing centres, they have seen faster growth in manufacturing employment. Manufacturing jobs in these centres are responsible for 2 of the 5 percentage points of growth they have experienced, whereas manufacturing jobs have declined slightly in the rest of the country. However, this suggests that employment in other sectors is barely growing at all in isolated manufacturing communities, whereas they are experiencing significant growth across Canada.

In connected manufacturing centres, there have been large gains in white collar service industries, from computer programming to FIRE (finance, insurance, and real estate). There have also been gains in trucking,

warehousing, and construction. Outside of residential home construction, we have seen little growth in these industries in isolated manufacturing centres.

The differences in employment growth have caused gaps in the employment rate among community types. The employment rate for persons aged 25 to 54 in isolated manufacturing centres in 2018 was 79.5%. This figure rises to 81.4% in connected manufacturing centres, and to 84.0% for all other cities. This represents a 2-point decline from 2003 levels for isolated manufacturing centres, a 0.6-point decline for connected manufacturing centres, and a 3-point increase for all other cities.

Since 2009, average weekly earnings growth for men without post-secondary credentials has been significantly slower in both types of manufacturing communities than non-manufacturing communities. Otherwise, there has been little difference in earnings growth.

Lasting Impacts of Manufacturing Disemployment

In short: Lower rates of employment for workers without post-secondary credentials, and lower rates of employment and slow growing wages in manufacturing communities, particularly those not proximate to Toronto, Montreal, or Vancouver.

Instead of simply re-stating the findings from Sections 2 to 4, it is worth taking one final look at that data and breaking down employment by highest education level attained.

At an individual level, the decline in manufacturing employment, particularly the disproportionate decline of lower-skilled manufacturing occupations, led to reduced employment rates for workers with lower levels of formal education. Employment rates for those aged 25 to 54 have fallen for all groups without post-secondary completion or a trades certificate, and have increased for almost all groups with post-secondary completion or a trades certificate, as shown in Table 6.1.

TABLE 6.1

Employment Rates by Education Level for Workers in Canada Aged 25-54, 2003 and 2018

	2003	2018	Change (in Points)
Grade 8 or lower	51.7%	51.1%	-0.6ppt
Grade 9-10	66.7%	62.2%	-4.5ppt
Grade 11-13 non-graduate	72.9%	66.5%	-6.4ppt
Grade 11-13 graduate	79.8%	76.9%	-2.9ppt
Some post-secondary	78.1%	76.4%	-1.7ppt
Trades certificate or diploma	84.3%	85.7%	1.4ppt
Community college, CEGEP	86.1%	86.3%	0.1ppt
University certificate below Bachelors	85.7%	85.5%	-0.2ppt
Bachelor's degree	84.6%	86.8%	2.3ppt
Above Bachelor's degree	86.1%	87.3%	1.2ppt
Total	80.8%	82.7%	1.9ppt

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 6.2

CMAs/CAs with the Lowest Employment Rates for Workers Aged 25-54, 2003 and 2018

	2003	2018	Change (in Points)
Cape Breton	62.9%	69.7%	6.8ppt
London	82.4%	77.0%	-5.5ppt
North Bay	78.9%	77.1%	-1.8ppt
St. Catharines-Niagara	82.5%	77.2%	-5.3ppt
Bathurst	69.2%	78.6%	9.5ppt
Sarnia-Clearwater	79.9%	78.6%	-1.3ppt
Prince Albert	82.1%	78.8%	-3.3ppt
Chatham-Kent	83.4%	79.0%	-4.5ppt
New Glasgow	76.0%	79.4%	3.4ppt
St-John's	78.4%	79.8%	1.4ppt
Norfolk	86.0%	80.0%	-5.9ppt
Windsor	78.7%	80.0%	1.4ppt

Note: Canadian average was 80.8% in 2003 and 82.7% in 2018.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

At a regional level, the list of communities with the lowest employment rates (refer to Table 6.2) now has a heavy representation of isolated manufacturing communities, including London, St. Catharines-Niagara, Norfolk, and Windsor.

The list of CMAs/CAs that experienced the largest declines in employment rates for workers aged 25 to 54 is almost entirely made up of manufacturing communities, though Barrie and Guelph are proximate to Toronto CMA, as illustrated by Table 6.3.

TABLE 6.3

CMAs/CAs with the Biggest Declines in Employment Rates for Workers Aged 25-54, 2003 and 2018

	2003	2018	Change (in Points)
Norfolk	86.0%	80.0%	-5.9ppt
London	82.4%	77.0%	-5.5ppt
St. Catharines-Niagara	82.5%	77.2%	-5.3ppt
Chatham-Kent	83.4%	79.0%	-4.5ppt
Prince Albert	82.1%	78.8%	-3.3ppt
Lethbridge	84.7%	81.3%	-3.3ppt
Truro	84.7%	81.6%	-3.2ppt
Barrie	84.8%	82.0%	-2.8ppt
Brantford	83.7%	81.2%	-2.5ppt
Peterborough	86.5%	84.1%	-2.4ppt
Fredericton	84.3%	81.9%	-2.4ppt
Guelph	86.6%	84.6%	-2.0ppt

Note: Canadian average was 80.8% in 2003 and 82.7% in 2018, for a 1.9 percentage point increase.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Interestingly, weekly earnings growth has been higher for groups with lower levels of formal education, as shown by Table 6.4. This may be due to compositional effects, as lower-skilled workers within these groups have exited the labour force. It may also be due to increases in the minimum wage in Ontario and other provinces. This finding is worthy of future study.

TABLE 6.4

Average Weekly Earnings by Education Level for Workers in Canada Aged 25-54, 2003 and 2018

	2003	2018	Percentage Increase
Grade 8 or lower	$520	$790	51.9%
Grade 9-10	$570	$840	47.4%
Grade 11-13 non-graduate	$600	$880	46.7%
Grade 11-13 graduate	$640	$930	45.3%
Some post-secondary	$670	$910	35.8%
Trades certificate or diploma	$730	$1,100	50.7%
Community college, CEGEP	$730	$1,010	38.4%
University certificate below Bachelor's	$800	$1,100	37.5%
Bachelor's degree	$890	$1,220	37.1%
Above Bachelor's degree	$1,040	$1,390	33.7%
Total	**$740**	**$1,090**	**47.3%**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 6.5

CMAs/CAs with the Lowest Weekly Earnings for Workers Aged 25-54, 2003 and 2018

	2003	2018	Percentage Increase
Summerside	$590	$890	50.8%
Bathurst	$610	$910	49.2%
Cape Breton	$580	$910	56.9%
Edmundston	$590	$930	57.6%
Sherbrooke	$640	$940	46.9%
New Glasgow	$600	$940	56.7%
Charlottetown	$650	$950	46.2%
Truro	$580	$960	65.5%
St. Catharines-Niagara	$710	$970	36.6%
Trois-Rivières	$660	$980	48.5%

Note: Inflation for the period was 29.7%. Canada-wide average weekly earnings were $740 in 2003 and $1090 in 2018, for an increase of 47.3%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Unlike for employment rates, the list of lowest average weekly earnings has few traditional manufacturing centres, though St. Catharines-Niagara makes the list in Table 6.5.

However, our list of communities in Table 6.6 that have experienced the slowest growth in weekly earnings is made up almost entirely of manufacturing communities, though Oshawa, Guelph, and Hamilton are all proximate to Toronto CMA.

TABLE 6.6

CMAs/CAs with the Slowest (Estimated) Growth in Weekly Earnings for Workers Aged 25-54, 2003 and 2018

	2003	2018	Percentage Increase
Windsor	$830	$1,060	27.7%
London	$770	$1,010	31.2%
Sarnia-Clearwater	$750	$1,020	36.0%
Oshawa	$860	$1,170	36.0%
Chilliwack-Hope	$740	$1,010	36.5%
Nanaimo	$740	$1,010	36.5%
St. Catharines-Niagara	$710	$970	36.6%
Guelph	$790	$1,080	36.7%
Hamilton	$830	$1,150	38.6%
Abbotsford-Mission	$710	$990	39.4%

Note: Inflation for the period was 29.7%. Canada-wide average weekly earnings were $740 in 2003 and $1090 in 2018, for an increase of 47.3%.

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Unanswered Questions About The Decline and Lack of Recovery in Manufacturing Employment and the Transition to Other Forms of Employment

Every research project leaves unanswered questions. We believe these ones are worthy of further study:

1. Why did employment decline in Canada not begin until 2003, when American states bordering the Great Lakes saw a sharp decline starting in 2000?

2. How much of a role did the China Shock and the rising Canadian dollar play in the pre-recession disemployment in manufacturing? Were there other factors that played a contributing role?

3. How much did disemployment in the manufacturing sector (and the lack of an employment recovery) lead to changes in migration patterns, both in terms of immigration and in-country migration? To what extent did the types of workers who would typically work in the manufacturing sector migrate from manufacturing to non-manufacturing communities?

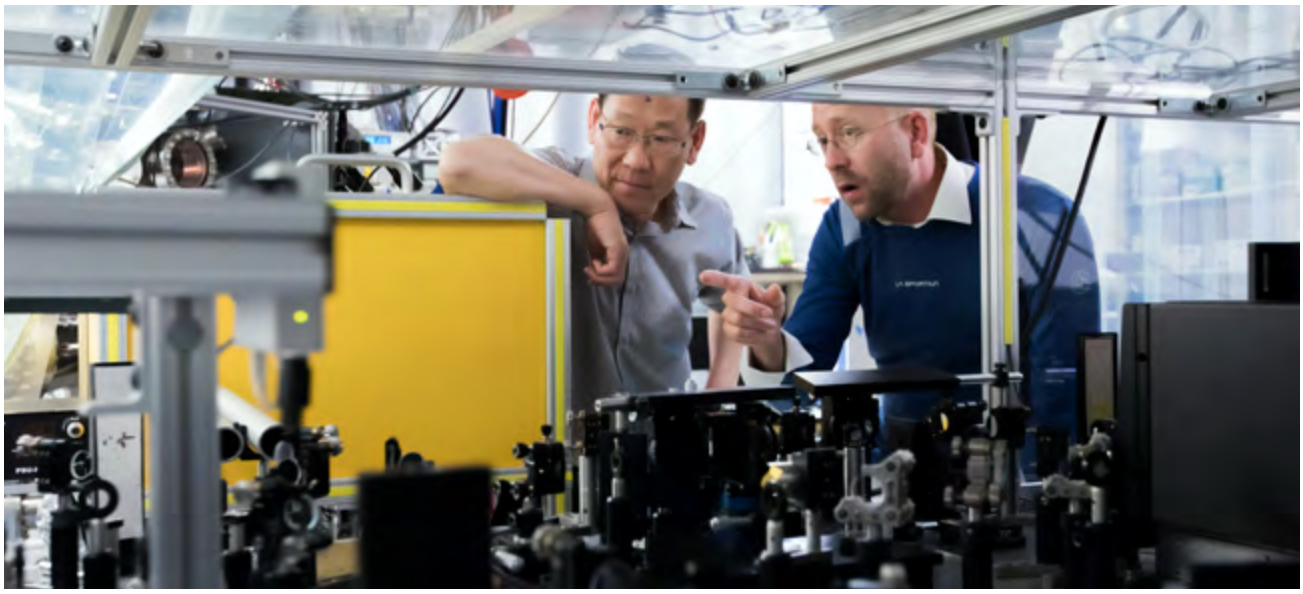
4. Why were some manufacturing industries able to exhibit stronger employment performance than others? There were only slight differences in wage levels and rates of post-secondary education between industries that experienced unreversed decline and those that did not. What were the other possible factors? How much did differences in trade exposure play a role?

5. Similarly, why was there such a steep decline in manufacturing employment in Quebec, relative to Ontario, prior to the Great Recession?

6. Conversely, why was the manufacturing employment decline during the Great Recession so much more severe in Ontario than in Quebec?

7. Why has there been no rebound in manufacturing employment in Ontario, Quebec, and Pennsylvania since the end of the Great Recession, while Michigan and Ohio have rebounded? What role, if any, did differences in public policy play? In electricity prices? Other factors?

8. While manufacturing employment has been steady, output has substantially increased since the Great Recession in both Ontario and Quebec. Which industries are responsible for this increase? To what extent, if any, is the demand for clean-tech and other green technologies playing a role in this rise?



Implications of the Manufacturing Labour Market Transition for Future Employment Transitions

Although this was a project on past labour market transitions involving the manufacturing industry, one cannot help but to think about future labour market transitions. Fortunately for the demographic groups most affected by the decline in employment manufacturing, the impact was softened by the increase in employment in infrastructure construction, homebuilding, trucking, and warehousing. This was true at least for those who lived close to Toronto or Montreal. But what will happen to those groups if those industries should experience another shock, such as a sudden decline in new homebuilding or a decline in demand for trucking due to technological change? Will new opportunities emerge for those workers? What will they be? What skills will the affected groups need in order to capitalize on those opportunities?

Furthermore, the experience of Windsor and St. Catharines-Niagara illustrate the risks that come with concentrating high employment levels in a single sector, particularly when a community is not proximate to a major metropolitan area. This level of sectoral employment density does not occur just in manufacturing; it is also particularly common in resource industries. What steps should Canada be taking now to protect ourselves against possible future reduction in demand for these resources and the impacts that would have on regional labour markets?

Finally, the underlying theme of this report is that place matters. However, the work-from-home revolution caused by the COVID-19 pandemic may weaken the importance of place. The concentration of high-skilled jobs in large cities could go into reverse if this shift to work-from-home becomes permanent. Further research is needed to determine what a transition to work-from-home means for employment demand across Canada.

Appendices

Appendix A: Data Appendix

TABLE 7.1

Biggest Employment Declines, Wilting Manufacturing Industries, 2003 to 2009

NAICS	Industry Name	2003-2009 Change in Number of Employed Persons	2003-2008 Change in Number of Employed Persons	2008-2009 Change in Number of Employed Persons
3363	Motor vehicle parts manufacturing	-66,600	-39,700	-26,900
3152	Cut and sew clothing manufacturing	-52,400	-43,400	-9,000
3211	Sawmills and wood preservation	-46,300	-38,100	-8,200
3361	Motor vehicle manufacturing	-34,800	-24,600	-10,200
3231	Printing and related support activities	-27,400	-17,200	-10,200
3221	Pulp, paper and paperboard mills	-25,700	-17,300	-8,400
3344	Semiconductor and other electronic component manufacturing	-17,300	-10,300	-7,000
3212	Veneer, plywood, and engineered wood product manufacturing	-12,700	-10,100	-2,600
3341	Computer and peripheral equipment manufacturing	-10,400	-8,100	-2,300
3219	Other wood product manufacturing	-10,200	-7,400	-2,800

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.2

Biggest Employment Declines, Rebounding Manufacturing Industries, 2003 to 2009

NAICS	Industry Name	2003-2009 Change in Number of Employed Persons	2003-2008 Change in Number of Employed Persons	2008-2009 Change in Number of Employed Persons
3261	Plastic product manufacturing	-22,700	-20,300	-2,400
3371	Household and institutional furniture, and kitchen cabinet manufacturing	-20,200	-16,000	-4,200
3311	Iron and steel mills, and ferro-alloy manufacturing	-17,500	-16,900	-600
3254	Pharmaceutical and medicine manufacturing	-12,200	-7,400	-4,800
3399	Other miscellaneous manufacturing	-11,100	-9,000	-2,100
3339	Other general-purpose machinery manufacturing	-9,200	-6,400	-2,800
3116	Meat product manufacturing	-8,100	-3,400	-4,700
3329	Other fabricated metal product manufacturing	-7,500	-3,900	-3,600
3327	Machine shops, turned product, and screw, nut, and bolt manufacturing	-5,900	8,600	-14,500
3362	Motor vehicle body and trailer manufacturing	-5,700	3,100	-8,800

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.3

Biggest Employment Gains, Rebounding Manufacturing Industries, 2003 to 2009

NAICS	Industry Name	2003-2009 Change in Number of Employed Persons	2003-2008 Change in Number of Employed Persons	2008-2009 Change in Number of Employed Persons
3364	Aerospace product and parts manufacturing	17,200	12,300	4,900
3273	Cement and concrete product manufacturing	5,900	3,300	2,600
3115	Dairy product manufacturing	5,100	4,900	200
3345	Navigational, measuring, medical, and control instruments manufacturing	4,800	6,500	-1,700
3279	Other non-metallic mineral product manufacturing	4,500	5,600	-1,100
3118	Bakeries and tortilla manufacturing	4,400	6,700	-2,300
3256	Soap, cleaning compound, and toilet preparation manufacturing	3,900	2,400	1,500
3331	Agricultural, construction, and mining machinery manufacturing	3,700	4,300	-600
3241	Petroleum and coal product manufacturing	2,900	2,400	500
3334	Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	2,900	-600	3,500

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.4

Non-Manufacturing Industries Experiencing Employment Decline, 1997 and 2018

NAICS	Industry Name	1997 Employment Levels	2018 Employment Levels
1100	Agriculture (Not Classified)	53,800	10,400
1111	Oilseed and grain farming	73,600	41,600
1121	Cattle ranching and farming	133,300	69,500
1122	Hog and pig farming	13,500	8,900
1133	Logging	57,700	25,100
1141	Fishing	29,200	16,100
4521	Department stores	179,600	103,500
4532	Office supplies, stationery, and gift stores	47,100	30,200
4832	Inland water transportation	3,800	800
5111	Newspaper, periodical, book, and directory publishers	81,300	35,500
5152	Pay and specialty television	600	2,200
5172	Wireless telecommunications carriers (except satellite)	16,000	2,400
5174	Satellite telecommunications	1,000	300
5179	Other telecommunications	31,400	5,800
5322	Consumer goods rental	34,300	11,500
5511	Management of companies and enterprises	3,600	400
5611	Office administrative services	700	400
6114	Business schools, and computer and management training	19,800	3,400
8114	Personal and household goods repair and maintenance	57,500	36,000
8141	Private households	82,500	54,600
	Total	**920,300**	**458,600**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

An industry or occupation experienced an employment decline when it meets one of the following three conditions:

> A net reduction in employment of 20,000 or more persons and 40% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

> A net reduction in employment of 10,000 or more persons and 50% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

> A net reduction in employment of 2,500 or more persons and 80% of the workforce in an industry/occupation during the 1997-2018 period, from peak to trough, where the trough occurs after the peak.

Because our interest is in industries and occupations that did not recover from decline, we also impose the condition that in 2018, employment must have remained 30% below the 1997-2018 peak.

Note that, due to this definition, it is possible for an industry to see an employment increase between 1997 and 2018 and still meet these conditions if that industry saw significant growth after 1997 before having an employment crash.

TABLE 7.5

Wilting Manufacturing Industries, 1997 and 2018

NAICS	Industry Name	1997 Employment Levels	2018 Employment Levels
3122	Tobacco manufacturing	3,500	800
3131	Fibre, yarn, and thread mills	7,200	800
3132	Fabric mills	6,800	2,500
3133	Textile and fabric finishing, and fabric coating	1,300	900
3141	Textile furnishings mills	12,400	4,000
3149	Other textile product mills	20,500	7,800
3151	Clothing knitting mills	5,900	1,600
3152	Cut and sew clothing manufacturing	97,900	22,800
3161	Leather and hide tanning and finishing	1,200	400
3162	Footwear manufacturing	9,800	2,200
3169	Other leather and allied product manufacturing	3,300	1,600
3211	Sawmills and wood preservation	74,000	38,000
3212	Veneer, plywood, and engineered wood product manufacturing	18,700	18,200
3219	Other wood product manufacturing	68,200	50,300
3221	Pulp, paper, and paperboard mills	87,800	40,100
3222	Converted paper product manufacturing	28,200	19,900
3231	Printing and related support activities	93,900	61,500
3251	Basic chemical manufacturing	22,600	12,400
3262	Rubber product manufacturing	24,300	19,300
3272	Glass and glass product manufacturing	13,900	4,800
3312	Steel product manufacturing from purchased steel	8,600	8,100
3315	Foundries	66,900	7,000
3322	Cutlery and hand tool manufacturing	14,000	4,200
3325	Hardware manufacturing	6,200	900
3326	Spring and wire product manufacturing	8,000	3,800
3335	Metalworking machinery manufacturing	11,500	18,300
3341	Computer and peripheral equipment manufacturing	34,000	4,100
3342	Communications equipment manufacturing	20,400	9,200
3343	Audio and video equipment manufacturing	3,100	2,100
3344	Semiconductor and other electronic component manufacturing	35,500	24,500
3346	Manufacturing and reproducing magnetic and optical media	1,600	2,100
3352	Household appliance manufacturing	13,100	4,000
3361	Motor vehicle manufacturing	76,500	54,200
3363	Motor vehicle parts manufacturing	98,500	91,500
3372	Office furniture (including fixtures) manufacturing	9,300	11,800
	Total	**1,008,600**	**555,700**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.6

Rebounding Manufacturing Industries, 1997 and 2018

NAICS Code	Industry Name	1997 Employment Levels	2018 Employment Levels
3111	Animal food manufacturing	7,100	9,500
3112	Grain and oilseed milling	10,500	8,500
3113	Sugar and confectionery product manufacturing	12,300	15,600
3114	Fruit and vegetable preserving, and specialty food manufacturing	18,500	20,400
3115	Dairy product manufacturing	23,500	32,800
3116	Meat product manufacturing	50,300	67,200
3117	Seafood product preparation and packaging	22,400	16,600
3118	Bakeries and tortilla manufacturing	45,900	49,000
3119	Other food manufacturing	35,400	47,000
3121	Beverage manufacturing	26,800	31,600
3159	Clothing accessories and other clothing manufacturing	3,000	5,000
3241	Petroleum and coal product manufacturing	21,100	14,200
3252	Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing	3,400	4,100
3253	Pesticide, fertilizer, and other agricultural chemical manufacturing	6,200	4,300
3254	Pharmaceutical and medicine manufacturing	33,000	45,300
3255	Paint, coating, and adhesive manufacturing	7,000	8,800
3256	Soap, cleaning compound, and toilet preparation manufacturing	16,500	16,200
3259	Other chemical product manufacturing	11,500	11,600
3261	Plastic product manufacturing	83,600	78,500
3271	Clay product and refractory manufacturing	3,700	1,200
3273	Cement and concrete product manufacturing	26,300	24,100
3274	Lime and gypsum product manufacturing	1,900	1,700
3279	Other non-metallic mineral product manufacturing	6,500	10,400
3311	Iron and steel mills and ferro-alloy manufacturing	2,700	26,900
3313	Alumina and aluminum production and processing	23,100	20,000
3314	Non-ferrous metal (except aluminum) production and processing	7,900	6,500
3321	Forging and stamping	7,100	4,000
3323	Architectural and structural metals manufacturing	27,500	51,500
3324	Boiler, tank, and shipping container manufacturing	11,600	11,500
3327	Machine shops, turned product, and screw, nut, and bolt manufacturing	33,300	37,800
3328	Coating, engraving, cold and heat treating, and allied activities	7,800	10,800
3329	Other fabricated metal product manufacturing	30,200	25,500
3331	Agricultural, construction, and mining machinery manufacturing	23,600	30,900

3332	Industrial machinery manufacturing	12,100	11,000
3333	Commercial and service industry machinery manufacturing	14,600	11,300
3334	Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	12,000	19,500
3336	Engine, turbine, and power transmission equipment manufacturing	5,800	3,600
3339	Other general-purpose machinery manufacturing	26,900	24,600
3345	Navigational, measuring, medical, and control instruments manufacturing	12,300	27,800
3351	Electric lighting equipment manufacturing	8,800	5,100
3353	Electrical equipment manufacturing	13,500	16,100
3359	Other electrical equipment and component manufacturing	18,600	16,200
3362	Motor vehicle body and trailer manufacturing	13,000	18,100
3364	Aerospace product and parts manufacturing	56,300	57,900
3365	Railroad rolling stock manufacturing	9,300	5,600
3366	Ship and boat building	12,400	12,900
3369	Other transportation equipment manufacturing	5,400	8,300
3371	Household and institutional furniture and kitchen cabinet manufacturing	45,200	61,800
3379	Other furniture-related product manufacturing	4,800	5,600
3391	Medical equipment and supplies manufacturing	24,000	20,600
3399	Other miscellaneous manufacturing	66,300	96,000
	Total	**1,012,500**	**1,171,000**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.7

Non-Manufacturing Occupations Experiencing Employment Decline, 1997 and 2018

NOC Code	Occupation Name	1997 Employment Levels	2018 Employment Levels
12	Senior government managers and officials	15,400	5,600
14	Senior managers - health, education, social and community services, and membership organizations	11,500	100
15	Senior managers - trade, broadcasting, and other services, n.e.c.	6,300	0
16	Senior managers - construction, transportation, production, and utilities	19,200	100
114	Other administrative services managers	25,600	5,600
821	Managers in agriculture	257,700	147,500
1113	Securities agents, investment dealers, and brokers	31,900	13,600
1252	Health information management occupations	13,800	2,300
1422	Data entry clerks	46,800	32,900
1423	Desktop publishing operators and related occupations	7,300	800
1434	Banking, insurance, and other financial clerks	40,400	25,900
1435	Collectors	15,200	11,300
1452	Correspondence, publication, and regulatory clerks	6,500	18,500
1454	Survey interviewers and statistical clerks	21,700	7,000
1513	Couriers, messengers, and door-to-door distributors	54,700	22,800
2242	Electronic service technicians (household and business equipment)	68,600	60,900
2275	Railway traffic controllers and marine traffic regulators	1,100	100
3124	Allied primary health practitioners	12,200	9,600
4031	Elementary school and kindergarten teachers	135,300	89,700
4215	Instructors of persons with disabilities	28,600	6,700
4411	Home child care providers	57,600	35,200
6331	Butchers, meat cutters, and fishmongers - retail and wholesale	18,100	22,800
6621	Service station attendants	33,700	11,900
7272	Cabinetmakers	19,900	4,600
7381	Printing press operators	33,700	14,800
8421	Chain saw and skidder operators	19,000	5,200
8611	Harvesting labourers	8,300	5,100
	Total	**1,010,100**	**560,600**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.8

Deteriorating Manufacturing Occupations, 1997 and 2018

NOC Code	Occupation Name	1997 Employment Levels	2018 Employment Levels
9415	Inspectors and testers, mineral and metal processing	4,800	500
9417	Machining tool operators	12,100	9,100
9431	Sawmill machine operators	11,300	9,300
9437	Woodworking machine operators	11,500	8,300
9441	Textile fibre and yarn, hide and pelt processing machine operators and workers	11,800	3,100
9442	Weavers, knitters, and other fabric making occupations	6,200	1,700
9445	Fabric, fur, and leather cutters	6,400	1,200
9446	Industrial sewing machine operators	60,300	21,700
9447	Inspectors and graders, textile, fabric, fur and leather products manufacturing	5,400	900
9474	Photographic and film processors	9,600	400
9522	Motor vehicle assemblers, inspectors, and testers	59,700	25,800
9523	Electronics assemblers, fabricators, inspectors, and testers	39,000	20,600
9527	Machine operators and inspectors, electrical apparatus manufacturing	4,800	500
9536	Industrial painters, coaters, and metal finishing process operators	11,300	10,000
9611	Labourers in mineral and metal processing	16,500	5,900
9619	Other labourers in processing, manufacturing, and utilities	125,300	25,500
	Total	**396,000**	**144,500**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.9

Recovering Manufacturing Occupations, 1997 and 2018

NOC Code	Occupation Name	1997 Employment Levels	2018 Employment Levels
9211	Supervisors, mineral and metal processing	9,700	8,800
9212	Supervisors, petroleum, gas and chemical processing and utilities	12,100	23,400
9213	Supervisors, food and beverage processing	12,400	26,000
9214	Supervisors, plastic and rubber products manufacturing	5,800	10,400
9215	Supervisors, forest products processing	12,100	14,100

9217	Supervisors, textile, fabric, fur and leather products processing and manufacturing	9,100	5,500
9221	Supervisors, motor vehicle assembling	4,800	8,400
9222	Supervisors, electronics manufacturing	3,800	3,500
9223	Supervisors, electrical products manufacturing	2,500	2,900
9224	Supervisors, furniture and fixtures manufacturing	4,500	7,500
9226	Supervisors, other mechanical and metal products manufacturing	12,900	29,900
9227	Supervisors, other products manufacturing and assembly	12,100	7,200
9231	Central control and process operators, mineral and metal processing	5,100	3,100
9232	Central control and process operators, petroleum, gas, and chemical processing	16,100	12,500
9235	Pulping, papermaking, and coating control operators	1,300	3,300
9241	Power engineers and power systems operators	36,000	26,400
9243	Water and waste treatment plant operators	3,500	7,800
9411	Machine operators, mineral and metal processing	10,100	11,400
9412	Foundry workers	10,600	2,400
9413	Glass forming and finishing machine operators and glass cutters	5,500	1,600
9414	Concrete, clay, and stone forming operators	5,800	4,500
9416	Metalworking and forging machine operators	35,600	32,200
9418	Other metal products machine operators	4,600	28,300
9421	Chemical plant machine operators	11,000	18,300
9422	Plastics processing machine operators	26,200	20,300
9423	Rubber processing machine operators and related workers	12,800	9,000
9432	Pulp mill machine operators	6,300	4,500
9433	Papermaking and finishing machine operators	8,900	4,600
9434	Other wood processing machine operators	6,100	5,300
9435	Paper converting machine operators	10,700	5,400
9436	Lumber graders and other wood processing inspectors and graders	7,300	3,400
9461	Process control and machine operators, food and beverage processing	30,200	58,600
9462	Industrial butchers and meat cutters, poultry preparers and related workers	19,200	22,400
9463	Fish and seafood plant workers	5,800	4,100
9465	Testers and graders, food and beverage processing	4,600	6,200
9471	Plateless printing equipment operators	6,700	10,000
9472	Camera, platemaking, and other prepress occupations	3,600	1,800
9473	Binding and finishing machine operators	10,900	4,500

9521	Aircraft assemblers and aircraft assembly inspectors	9,500	15,200
9524	Assemblers and inspectors, electrical appliance, apparatus, and equipment manufacturing	17,800	9,800
9525	Assemblers, fabricators and inspectors, industrial electrical motors, and transformers	2,800	6,600
9526	Mechanical assemblers and inspectors	20,300	15,900
9531	Boat assemblers and inspectors	1,800	2,800
9532	Furniture and fixture assemblers and inspectors	13,900	27,300
9533	Other wood products assemblers and inspectors	14,500	13,200
9534	Furniture finishers and refinishers	3,400	7,100
9535	Plastic products assemblers, finishers, and inspectors	13,500	8,200
9537	Other products assemblers, finishers, and inspectors	32,000	35,500
9612	Labourers in metal fabrication	10,100	23,600
9613	Labourers in chemical products processing and utilities	4,800	7,500
9614	Labourers in wood, pulp, and paper processing	19,500	21,400
9615	Labourers in rubber and plastic products manufacturing	4,400	8,800
9616	Labourers in textile processing	7,200	2,700
9617	Labourers in food and beverage processing	31,000	47,300
9618	Labourers in fish and seafood processing	6,900	4,200
	Total	**619,700**	**716,600**

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.10

Proportion of 2003 Employment Provided by Wilting Manufacturing Industries by CMA/CA

CMA/CA	Proportion of Wilting Manufacturing
Windsor	20.3%
Guelph	15.8%
Chatham-Kent	15.5%
Leamington	15.4%
Miramichi	13.5%
Granby	13.1%
Oshawa	13.0%
KCW	12.8%
Edmunston	12.7%
Sherbrooke	12.6%
Sarnia	12.4%
Truro	10.8%

Cornwall	10.6%
New Glasgow	10.4%
Prince George	10.4%
London	9.6%
Barrie	9.4%
Brantford	8.6%
Toronto	8.5%
Norfolk	7.9%
Hamilton	7.8%
Trois-Rivières	7.6%
Montreal	7.1%
St. Catharines-Niagara	7.0%
Belleville	7.0%
Thunder Bay	6.9%
All CMAs/CAs	**6.5%**
Saint-Jean-sur-Richelieu	6.4%
Abbotsford	5.4%
Prince Albert	5.3%
Winnipeg	4.9%
Sault Ste. Marie	4.7%
Corner Brook	4.4%
Saguenay	4.4%
Bathurst	4.3%
Nanaimo	4.1%
Ottawa	4.0%
Vancouver	4.0%
Lethbridge	4.0%
Saint John	3.8%
Quebec	3.7%
Kelowna	3.6%
Chilliwack	3.5%
Calgary	3.5%
Rouyn-Noranda	3.4%
Medicine Hat	3.2%
North Bay	3.2%
Edmonton	3.2%
Timmins	3.1%
Gatineau	3.0%

Moncton	2.7%
Kingston	2.5%
Summerside	2.5%
Red Deer	2.3%
Saskatoon	2.3%
Brandon	2.3%
Cape Breton	2.2%
Victoria	1.8%
Sudbury	1.8%
Regina	1.7%
Fredericton	1.7%
Halifax	1.7%
Charlottetown	1.6%
Moose Jaw	1.3%
St. John's	1.0%
Wood Buffalo	1.0%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.11

Employment Growth by CMA/CA and Industry Type, 2003 to 2009

	Total	Non-Manufacturing Industries in Decline	All Other Industries	Wilting Manufacturing Industries	Rebounding Manufacturing Industries	2003-2008 Gainers (Industries)
Cornwall	52.0%	-0.4%	43.6%	-2.6%	2.6%	8.4%
Wood Buffalo	35.2%	1.0%	12.8%	-0.3%	1.0%	21.5%
Moose Jaw	32.7%	-2.6%	28.8%	0.6%	1.3%	5.1%
Medicine Hat	24.6%	2.6%	16.8%	-2.6%	-4.2%	12.0%
Granby	24.4%	-0.6%	12.2%	1.9%	5.3%	5.3%
Kelowna	23.3%	-0.4%	18.8%	-0.1%	-1.9%	7.0%
Saskatoon	21.8%	-1.0%	14.3%	0.1%	1.5%	6.8%
Calgary	20.2%	-1.3%	13.7%	-0.8%	-1.1%	9.6%
Edmonton	18.0%	0.8%	11.0%	-1.2%	0.1%	7.4%
Gatineau	16.1%	-1.0%	14.9%	-0.8%	0.5%	2.5%
Red Deer	15.2%	0.2%	6.6%	0.0%	0.0%	8.7%
Abbotsford	13.8%	-0.7%	13.6%	-1.1%	-0.4%	2.6%
Victoria	13.7%	-0.8%	11.3%	-1.0%	-0.3%	4.4%
Belleville	13.0%	0.4%	7.6%	-4.2%	1.2%	8.0%
Prince Albert	12.6%	0.0%	10.0%	-4.2%	0.5%	6.3%

Saint John	11.9%	-0.5%	7.5%	-1.2%	1.7%	4.5%
St. John's	11.4%	-3.0%	7.4%	-0.2%	1.4%	5.9%
Quebec	10.7%	-0.7%	8.7%	-1.0%	0.8%	2.9%
Halifax	9.6%	-0.6%	6.5%	0.5%	0.2%	3.1%
Fredericton	9.5%	0.4%	5.7%	-0.2%	0.6%	3.0%
Kingston	9.3%	-0.3%	7.1%	-0.6%	-2.1%	5.2%
Vancouver	9.1%	-0.7%	7.0%	-1.3%	-1.2%	5.3%
Ottawa	8.9%	-0.9%	8.7%	-0.6%	0.8%	1.0%
Regina	8.7%	-2.3%	5.9%	0.4%	1.4%	3.4%
Cape Breton	8.4%	-3.0%	10.3%	-1.1%	-1.1%	3.0%
Sarnia	8.2%	1.3%	13.4%	-9.8%	-0.8%	4.1%
Brantford	8.0%	-0.8%	11.5%	-2.8%	-2.1%	1.9%
Bathurst	7.8%	0.0%	7.8%	-2.1%	-0.7%	2.1%
All CMAs/CAs	**7.7%**	**-0.6%**	**7.9%**	**-2.4%**	**-0.9%**	**3.7%**
Moncton	7.6%	-2.3%	7.3%	0.0%	1.2%	1.4%
Toronto	6.6%	-0.3%	9.1%	-3.4%	-1.9%	3.1%
Guelph	6.5%	-0.1%	9.2%	-7.3%	1.6%	2.9%
Trois-Rivières	6.4%	-0.6%	7.8%	-2.0%	-0.2%	1.6%
KCW	6.3%	-1.7%	7.9%	-3.1%	-2.5%	5.7%
Winnipeg	6.2%	-0.7%	5.4%	-1.2%	-0.4%	3.3%
Sherbrooke	5.8%	0.5%	13.5%	-6.8%	-4.8%	3.5%
Sudbury	5.8%	-0.7%	1.9%	-1.0%	-0.1%	5.5%
Montreal	5.1%	-0.8%	6.7%	-3.1%	0.5%	1.8%
Nanaimo	4.9%	0.0%	0.3%	-1.5%	0.8%	5.4%
Saint-Jean-sur-Richelieu	4.4%	0.0%	7.3%	-0.4%	-4.9%	2.0%
Saguenay	4.2%	-2.8%	6.9%	-1.3%	-0.3%	1.8%
Lethbridge	3.8%	-4.4%	5.0%	-1.0%	-1.3%	5.4%
Charlottetown	3.6%	-1.3%	5.6%	-0.3%	-0.7%	0.3%
Timmins	3.5%	-1.3%	6.6%	-2.2%	-1.3%	1.8%
Barrie	3.3%	-0.2%	6.5%	-3.2%	-2.2%	2.5%
Brandon	3.0%	-2.3%	1.9%	-0.4%	0.8%	2.7%
Truro	2.7%	0.0%	0.5%	-2.7%	-1.4%	6.3%
Hamilton	2.2%	-1.0%	7.1%	-2.0%	-4.9%	3.0%
New Glasgow	1.2%	1.2%	6.1%	-4.3%	-4.3%	2.5%
North Bay	1.0%	-1.0%	0.6%	-2.3%	0.3%	3.2%
Oshawa	0.9%	-0.4%	4.0%	-6.4%	-1.1%	4.7%
Chilliwack	0.3%	-2.4%	4.3%	-0.8%	-1.1%	0.5%
London	0.0%	-0.2%	2.7%	-3.8%	-1.3%	2.5%
Prince George	-1.2%	-4.6%	-0.2%	-1.4%	-0.9%	6.2%

Summerside	-1.3%	-1.3%	-5.1%	0.0%	2.5%	1.3%
Sault Ste. Marie	-1.9%	-2.2%	-3.0%	-0.3%	-1.4%	5.3%
St. Catharines-Niagara	-3.7%	-0.8%	1.1%	-2.8%	-2.2%	1.1%
Rouyn-Noranda	-4.5%	-1.4%	-1.4%	-1.4%	-1.7%	1.0%
Norfolk	-7.6%	2.4%	-6.4%	-1.5%	-6.1%	4.3%
Thunder Bay	-8.6%	-1.4%	-2.4%	-4.7%	-0.8%	0.8%
Leamington	-9.2%	-0.5%	0.5%	-7.2%	-5.6%	2.6%
Windsor	-10.2%	-0.2%	1.2%	-8.2%	-3.1%	-0.1%
Chatham-Kent	-12.7%	0.7%	0.6%	-9.0%	-5.3%	0.4%
Corner Brook	-14.2%	1.8%	-14.2%	-3.5%	-0.9%	2.7%
Edmunston	-21.6%	-0.7%	-13.4%	-8.2%	0.0%	0.7%
Miramichi	-38.0%	-5.5%	-19.0%	-12.9%	-1.2%	0.6%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

TABLE 7.12

Manufacturing CMAs/CAs with 2003-2009 Manufacturing Occupation Job Loss Above the Canadian Average (as a Percentage of All Jobs)

	Total	Non-Manufacturing Occupations in Decline	All Other Occupations	Deteriorating Manufacturing Occupations	Recovering Manufacturing Occupations	2003-2008 Gainers (Occupations)	Total Manufacturing
Cornwall	52.0%	4.4%	41.4%	0.0%	-2.6%	8.4%	-2.6%
Medicine Hat	24.6%	-0.3%	18.8%	-1.0%	-1.3%	8.4%	-2.3%
Brantford	8.0%	0.3%	9.1%	-0.8%	-1.9%	1.1%	-2.8%
All CMAs/CAs	**7.7%**	**-1.0%**	**8.0%**	**-0.9%**	**-1.3%**	**2.9%**	**-2.2%**
Toronto	6.6%	-0.9%	9.1%	-1.4%	-2.4%	2.2%	-3.8%
Guelph	6.5%	1.5%	6.5%	-1.5%	-3.2%	2.9%	-4.7%
KCW	6.3%	-0.7%	5.0%	-0.7%	-3.3%	6.1%	-4.0%
Sherbrooke	5.8%	-1.2%	13.5%	-2.1%	-6.3%	2.1%	-8.3%
Montreal	5.1%	-0.8%	5.5%	-1.3%	-1.0%	2.7%	-2.3%
Saint-Jean-sur-Richelieu	4.4%	4.0%	2.7%	0.4%	-4.7%	1.8%	-4.2%
Timmins	3.5%	-0.4%	3.1%	-0.9%	-2.2%	3.5%	-3.1%
Barrie	3.3%	-0.1%	5.0%	-0.7%	-3.1%	2.1%	-3.8%
Truro	2.7%	-3.6%	5.0%	-0.5%	-2.7%	5.0%	-3.2%
Hamilton	2.2%	-0.5%	4.1%	-0.3%	-2.6%	1.4%	-2.9%
New Glasgow	1.2%	-1.8%	6.1%	-1.8%	-1.2%	0.0%	-3.1%
Oshawa	0.9%	-0.1%	4.0%	-2.1%	-3.0%	2.1%	-5.2%
London	0.0%	-0.4%	0.9%	-0.8%	-2.7%	3.1%	-3.5%

Sault Ste. Marie	-1.9%	-0.8%	-1.9%	-1.4%	-1.1%	3.9%	-2.5%
St. Catharines-Niagara	-3.7%	-0.4%	-1.9%	-1.6%	-1.6%	1.8%	-3.3%
Rouyn-Noranda	-4.5%	-0.7%	-1.7%	-0.7%	-1.7%	0.3%	-2.4%
Norfolk	-7.6%	-3.0%	-1.8%	-3.0%	-1.8%	2.4%	-4.9%
Thunder Bay	-8.6%	-2.0%	-3.6%	-0.6%	-3.1%	0.6%	-3.8%
Leamington	-9.2%	0.0%	-5.1%	-1.0%	-7.7%	4.6%	-8.7%
Windsor	-10.2%	-0.6%	-0.4%	-3.5%	-5.2%	-0.4%	-8.7%
Chatham-Kent	-12.7%	0.9%	-2.0%	-2.8%	-7.0%	-1.7%	-9.8%
Corner Brook	-14.2%	-0.9%	-8.0%	0.0%	-2.7%	-3.5%	-2.7%
Edmunston	-21.6%	0.0%	-9.0%	-3.7%	-3.0%	-6.0%	-6.7%
Miramichi	-38.0%	-3.7%	-21.5%	-1.2%	-9.2%	-1.8%	-10.4%

Source: Author's calculations using data from the Labour Force Survey (Statistics Canada, 2020b); accessed via Statistics Canada's Real Time Remote Access (RTRA) system (2020c).

Appendix B: Methodology Appendix

All data used in Sections 2 to 5 of this report were obtained from the Labour Force Survey (LFS) using Statistics Canada's Real Time Remote Access (RTRA) system, which is "an on-line remote access facility allowing users to run SAS programs, in real time, against microdata located in a central and secure location" (Statistics Canada, 2020b, para. 1).

The RTRA contains monthly Labour Force Survey data starting in January 1997. Statistics Canada describes the survey as follows:

The Labour Force Survey (LFS) is a household survey carried out monthly by Statistics Canada. Since its inception in 1945, the objectives of the LFS have been to divide the working age population into three mutually exclusive categories in relation to the labour market – employed, unemployed, and not in the labour force – and to provide descriptive and explanatory data on each of these groups. Data from the survey provide information on major labour market trends, such as shifts in employment across industrial sectors, hours worked, labour force participation and unemployment rates. (Statistics Canada, 2020b, para.1)

Statistics Canada has an existing methodology to construct estimates using Labour Force Survey data for questions such as "how many manufacturing workers were there in Ontario in 2017?" and "how many people were employed in London CMA in 2016?", which are publicly available on a variety of Statistics Canada CANSIM tables. This both allowed us to adopt an existing methodology and error check some of our results by comparing them to CANSIM tables.

Because the Labour Force Survey is a survey, results must be weighted to obtain population counts. Identically to CANSIM, we scale our numbers using the FINALWT parameter. To obtain yearly counts, we simply count the number of observations in a year and divide by 12, which produces identical results to CANSIM.

The biggest drawback of using the Labour Force Survey to construct estimates are issues around sample size. Roughly 58,000 households are interviewed each month for the survey, with households staying in the survey for a six-month rotation. Sample sizes get quite small at the CMA/CA level, with 2,837 families from Toronto CMA surveyed each month, compared to only 187 from Peterborough CMA. These small samples, coupled with the six-month rotation, create significant noise in the data, causing it to swing significantly over the period of a year or two. This is the primary driver behind our decision to aggregate CMAs/CAs into "types" in an effort to increase sample size.

The parameters we use in Sections 2 to 5 are below. In almost all instances, we use the data as-is, but in a few instances, we create new variables by aggregating data types together in order to increase the sample size.

Aggregated Variables Used in Sections 2 to 5

WORKSTAT

Detailed labour force status.

1	Employed, at work (LFSTAT 1) or Employed, absent from work (LFSTAT 2)
3	Unemployed, temporary layoff (LFSTAT 3), Unemployed, job searcher (LFSTAT 4), Unemployed, future start (LFSTAT 5)
6	Not in the labour force, able to work (LFSTAT 6), Not in the labour force, permanently unable to work (LFSTAT 7)

EDLEV

Respondents highest level of education ever completed.

0	
1	No Post Sec Completion: Grade 8 or lower (EDUCLEV 0), Grade 9 – 10 (EDUCLEV 1), Grade 11 - 13, non graduate (EDUCLEV 2), Grade 11 - 13, graduate (EDUCLEV 3), 1975 to present - Some post-secondary education (EDUCLEV 4)
5	Trades certificate or diploma (EDUCLEV 5)
6	College or Certif: Community college, CEGEP, etc. (EDUCLEV 6), University certificate below Bachelor's (EDUCLEV 7)
8	Degree: Bachelor's degree (EDUCLEV 8), Above Bachelor's degree (EDUCLEV 9)

WHYLEAVE

Reason left or lost last job.

00	Left job: other
01	Left job: (WHYLEFT 00-06, 15-18)
07	Lost job: (WHYLEFT 07-14)
Universe:	Not currently employed but worked within the previous twelve months

Unaggregated Variables Used in Sections 2 to 5

CMATAB

Position 1 Length 2

Census metropolitan areas (CMA) and census agglomerations (CA).

SYEAR

Position 29 Length 4

Survey year.

0000 9999

LFSSTAT

Position 62 Length 1

Detailed labour force status.

1	Employed, at work
2	Employed, absent from work
3	Unemployed, temporary layoff
4	Unemployed, job searcher
5	Unemployed, future start
6	Not in the labour force, able to work
7	Not in the labour force, permanently unable to work
BLANK	Out of scope

Universe: Respondents 15+

FINALWT

Position 63 Length 5

Final weight.

Universe: All respondents

Note: Stored as 99999.

From January 2000 to present, final weight is changed from a generalised regression to a composite estimate weight.

PROV

Position 117 Length 2

2-digit province code.

10 Newfoundland and Labrador

11 Prince Edward Island

12 Nova Scotia

13 New Brunswick

24 Québec

35 Ontario

46 Manitoba

47 Saskatchewan

48 Alberta

59 British Columbia

60 Yukon Territory

61 North West Territories

62 Nunavut Territory

Universe: All respondents

AGE

Position 119 Length 3

Age of respondent as of the end of LFS reference week.

SEX

Position 122 Length 1

Sex of respondent.

1 Male

2 Female

Universe: All respondents

EDUCLEV

Position 125 Length 1

Respondents highest level of education ever completed.

0 Grade 8 or lower

1 Grade 9 - 10

2 Grade 11 - 13, non graduate

3 Grade 11 - 13, graduate

4 1975 to present - Some post-secondary education

5 Trades certificate or diploma

6 Community college, CEGEP, etc.

7 University certificate below Bachelor's

8 Bachelor's degree

9 Above Bachelor's degree

Universe: All respondents

SIC5

Position 139 Length 5

North American Industry Classification System with a leading zero

01100 09191 NAICS 2012 code with a leading zero

BLANK Not applicable

Universe: Current job if employed or last job if worked within the previous twelve months (excludes not in the labour force, permanently unable to work)

SOC4

Position 144 Length 4

Standard occupational classification.

0011 9619 NOC-S 2011 code

BLANK Not applicable

Universe: Current job if employed or last job if worked within the previous twelve months (excludes not in the labour force, permanently unable to work)

FTPTMAIN

Position 170 Length 1

Full-time or part-time work schedule.

1 Full-time

2 Part-time

BLANK Not applicable

Universe: Currently employed

Note: Full-time employment consists of persons who usually work 30 or more hours per week at their main or only job i.e. 30.0+ hours.

Part-time employment consists of persons who usually work less than 30 hours per week at their main or only job i.e. 0.1 to 29.9 hours.

WHYPT

Position 189 Length 2

Main reason for part-time employment main job.

00 Other

01 Own illness or disability

02 Caring for own children

03 Caring for elder relative (60+ years)

04 Other personal or family responsibilities

05 Going to school

06 Personal preference

07 Economic - business conditions, looked for full-time, involuntary part-time

08 Economic - could not find full-time work, looked for full-time, involuntary part-time

09 Economic - business conditions, did not look

10 Economic - could not find full-time work, did not look

BLANK Not applicable

Universe: Currently employed, part-time usual work hours at their main or only job were below 30 per week

TENURE

Position 193 Length 3

Tenure of current job.

001 999 Months

BLANK Not applicable

Universe: Currently employed only

Note: 1 month equals 1 month or less.

WKLYEARN

Position 202 Length 7

Usual weekly earnings.

0000001 9999999 Weekly earnings, dollars and cents

BLANK Not applicable

Universe: Currently employed, employees

Note: Implied decimal, valid range $0.01 to $99999.99.

Includes tips and commissions.

PERMTEMP

Position 224 Length 1

Permanent or temporary job status

1 Permanent

2 Not permanent, seasonal job

3 Not permanent, temporary, term or contract job

4 Not permanent, casual job

5 Not permanent, work done through a temporary help agency

6 Not permanent, other - specify in notes

BLANK Not applicable

Universe: Currently employed, employees

Note: New variable phased in by birth rotation group between September and December 1996.

Beginning in January 2007 code 5 no longer exists.

ATOTHRS

Position 241 Length 4

Total actual hours worked in reference week at all jobs.

0000 1680 Hours and tenths of hours

BLANK/ Not applicable

Universe: Currently employed

Note: Implied decimal, valid range 0.0 to 168.0.

NLFDTAL

Position 250 Length 1

Persons not in the labour force recoded into 9 groups.

1 Wanted job (discouraged) - available; not available due to specified non-school activities

2 Full-time student looking for full-time work (available); full-time student not available due to specified non-school activities

3 Long-term future start

4 Temporary layoff; short-term future start; not available due to school or 'other' activities; wanted job (discouraged) but was not available due to school or 'other' activities

5 Lost casual job and wanted work (not discouraged)

6 Left any job or lost non-casual job and wanted work (not discouraged)

7 Other non-discouraged student who didn't want a job

8 Other non-student who didn't want a job

9 Permanently not able to work

BLANK Not applicable

Universe: Currently not in the labour force only

WHYLEFT

Position 251 Length 2

Reason left or lost last job.

00 Left job: other

01 Left job: own illness or disability

02 Left job: caring for own children

03 Left job: caring for elder relative (60+ years)

04 Left job: pregnancy

05 Left job: other personal or family responsibilities

06 Left job: going to school

07 Lost job: end of seasonal job

08 Lost job: end of temporary, term or contract job (non-seasonal)

09 Lost job: casual job

10 Lost job: company moved

11 Lost job: company went out of business

12 Lost job: business conditions

13 Lost job: dismissal by employer

14 Lost job: other reasons

15 Left job: business sold or closed down

16 Left job: changed residence

17 Left job: dissatisfied with job

18 Left job: retired

BLANK Not applicable

Universe: Not currently employed but worked within the previous twelve months

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