

Job stability and unemployment duration in manufacturing

André Bernard

The Canadian manufacturing sector has experienced significant job losses over the past few years. From 2004 to 2008, employment fell by 322,000, a decline of 14%. In relative terms, manufacturing's share of total employment fell from 14% in 2004 to 12% in 2008.¹ Until late 2008, the manufacturing decline occurred in the context of robust growth elsewhere in the economy. While trends in manufacturing employment are informative, they do not provide information on the dynamics of the manufacturing labour market. This paper addresses some of these issues by investigating job stability and the duration of new unemployment spells across the business cycle.

Job losses, like those recently experienced in manufacturing, will translate into less job stability for workers unless declines in voluntary quits totally offset increases in the number of layoffs. Jobs of shorter duration are less likely to provide promotions, increases in pay and opportunities for training, which are correlated to tenure in the firm (Heisz 1996). Workers changing jobs often are also less likely to accumulate pensionable service² or qualify for Employment Insurance (EI) benefits. If a decline in job stability were driven by voluntary quits, it would still have consequences for firms, since hiring and retention costs could rise.

Job losses also normally translate into higher unemployment. There are two important dimensions to unemployment: incidence and duration. The duration of unemployment spells can significantly affect an individual's well-being (Corak 1993). Since the probability

of finding a job decreases as the unemployment spell lengthens, other negative outcomes—such as social exclusion, loss of self esteem and health problems—may emerge (Dubé 2004). Moreover, long unemployment spells may increase the number of individuals who exhaust their EI benefits.

In this paper, job stability is measured using retention rates (see *Retention rates*). The extent to which the retention rates of certain groups have been affected by the recent turmoil in manufacturing is examined. In particular, whether workers with lower or higher tenure in the firm have been more affected is studied. Recent trends in very short-term retention rates are also investigated to determine potential implications on qualification for EI benefits. Finally, trends in the duration of unemployment in manufacturing and in the rest of the economy are presented.

This study uses Labour Force Survey (LFS) data from 1976 to 2008, corresponding to the full period of available annual data at the time of writing (see *Data sources and definitions*). This long time span allows for a comparison between the recent period of job losses in manufacturing and previous downturns like the 1991/92 recession.

Table 1 Four-year job retention rate

	1982	1992	2000	2004	2008
	%				
All of the economy	52.3	51.8	57.2	57.8	56.0
Manufacturing, unadjusted	56.9	53.0	65.4	62.4	52.5
Manufacturing, adjusted for age and sex	51.8	47.9	61.6	57.4	48.1
Non-manufacturing	51.3	51.5	55.8	57.0	56.6

Note: Differences between manufacturing (unadjusted) and non-manufacturing are significant at the 5% level or better.
Source: Statistics Canada, Labour Force Survey.

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Retention rates

This paper uses synthetic cohort analysis techniques. These techniques use duration variables found in cross-sectional surveys to make inferences on entry and exit dynamics. For example, it is possible to compute the probability that an individual with one year of tenure in a firm will remain in the same job another year by dividing the number of people with two years of tenure in a survey for a given month by the number of people with one year of experience in the survey for the corresponding month one year earlier. Since the survey is not longitudinal, the assumption is that workers with one year of experience and who were in the survey from the previous year are representative of workers with two years of experience and who are in the current survey. Therefore, it is possible to calculate retention rates for various groups of workers, according to initial tenure in the firm or other personal characteristics.

This methodology has been used in a number of studies to look at the evolution of job stability in Canada and the United States (for example, see Heisz 1996 and 2002, Swinnerton and Wial 1996, and Neumark et al. 1999). These papers found very little empirical evidence of a decrease in job stability in either Canada or the United States, although there was a general impression that workers were becoming less likely than previous generations to remain in the same job for long periods of time. Heisz and Côté (1999) looked at job stability in the service sector and showed that there was great heterogeneity in particular industries.

Specifically, following Heisz (2002), the retention rate for a group of workers with initial tenure of t -i is

$$(1) R_{t,c} = N_{t,c} / N_{t-i,c-i}$$

where $N_{t,c}$ is the number of people during survey period c with a tenure of t and $N_{t-i,c-i}$ is the number of people during survey period $c-i$ with a tenure of $t-i$.

Using retention rates for all possible groups of initial tenure, by using (1) the average retention rate can be computed:

$$R_c = y_1 R_{1,c} + y_2 R_{2,c} + y_3 R_{3,c} + y_4 R_{4,c} + y_5 R_{5,c} + \dots$$

where y_i corresponds to the proportion of individuals with tenure i during survey period $c-i$, so that

$$y_1 + y_2 + y_3 + y_4 + y_5 + \dots = 1.$$

Retention rates can be computed for any given interval between current and initial tenure. In this study, four-year retention rates are computed and the tenure variable is grouped into two-year intervals (the variable in the LFS is expressed in months).³ For example, $R_{1,c}$ is equal to the number of workers with a tenure of between four and six years in survey (c) divided by the number of workers with a tenure of between 0 and 2 years in the corresponding survey four years earlier ($c-48$). Four-year retention rates were selected to focus on workers' odds of remaining in their jobs over the longer term, and two-year intervals were chosen to provide better sample size. In addition, LFS respondents tend to give approximate answers when asked how long they have been working in their current jobs. For example, workers with an actual tenure of four or six years may respond five years. If that happens often, the hypothesis that workers with tenure of five years in the current survey are representative of workers with tenure of four years in the corresponding survey one year earlier will not be as realistic, especially with lower sample sizes. Using four-year retention rates and grouping the tenure into intervals of two years circumvents this problem.

Retention rates are computed for each month and then converted to annual averages.

Job stability in manufacturing close to its lowest level in 32 years

Between 1980 and 2008, the four-year retention rate for the economy as a whole varied from 52% to 58%. Averaged over the past three decades, there was a 55% probability that workers would remain in their jobs for four years. Although the retention rate exhibits a cyclical pattern (retention rates tend to be lower in times of economic downturn), there has been no clear upward or downward trend in overall job stability over this period. In 2008, the four-year retention rate for the economy as a whole was 56% (Table 1).

The situation is quite different in manufacturing. Manufacturing workers were significantly less likely to hold onto their jobs for four years than workers in the rest of the economy. In 2008, the adjusted four-year retention rate in manufacturing was 48% (Chart A).

Without adjusting for age and sex, the retention rate in manufacturing is higher, at 53%, indicating that men and women of different age groups tend to experience different patterns of job stability. In contrast, in 2008 the retention rate in non-manufacturing was 57%, which is significantly higher than both the adjusted and unadjusted manufacturing retention rate.⁴ Manufacturing workers were therefore 15% less likely than other workers to stay in their jobs in the long term, even though manufacturing jobs are almost exclusively full-time and are much more likely to be unionized.⁵

Retention rates in manufacturing have not been consistently lower than in the rest of the economy. In fact, manufacturing retention rates were higher, sometimes by a significant margin, than those in non-manufacturing for most of the 1980s and 1990s. Manufacturing retention rates exhibit a strong cyclical pattern. Reten-

Data sources and definitions

This paper uses the Canadian Labour Force Survey (LFS), a monthly survey of about 54,000 households whose objective is to provide timely information on the labour market including estimates of employment and unemployment by personal characteristics. It is representative of the civilian non-institutionalized population 15 years of age and over. The LFS measures employment by number of workers, which can differ from the actual number of jobs since some workers hold multiple jobs. The LFS is primarily a cross-sectional survey but, for employed individuals, contains information on tenure for the main job and, for unemployed individuals, information on the in-progress duration of the unemployment spell and the industry of the last job held, thus allowing for inferences on employment and unemployment dynamics. The job tenure variable in the LFS is available for all employees and is given in months. The duration of the unemployment variable is available for all previously employed individuals who are unemployed at the time of the survey. Information is not provided for individuals out of, or entering, the labour force.

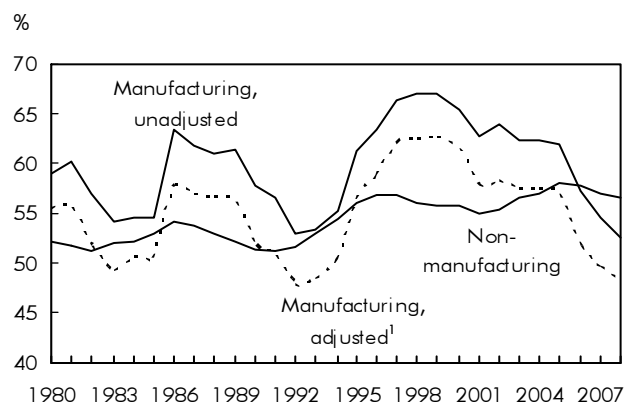
Throughout the paper, the manufacturing sector is compared with the rest of the economy and identified using North American Industry Classification System (NAICS) industries 31 to 33. Self-employed individuals are excluded.

Most of the statistics on the manufacturing sector were adjusted to control for age and sex, in particular to account for the fact that women are under-represented in manufacturing. To do so, weights of individuals in manufacturing workers would be the same as that of non-manufacturing workers. Five age groups (15 to 24, 25 to 34, 35 to 44, 45 to 54, and 55 and over) were used to calculate separate adjustment factors for men and women.

tion rates in the rest of the economy are much more stable, but also follow the business cycle. Even then, the recent drop in the manufacturing retention rate is somewhat more pronounced than the drop that occurred during the period leading up to the 1991/92 recession: the manufacturing retention rate fell by 17% from 1986 to 1992, and by 22% from 2000 to 2008.

In absolute terms, the manufacturing retention rate, recorded since 1981, is at its second-lowest level ever, only marginally higher than in 1992. It has followed a steady downward trend in recent years, going from a peak of 62% in 1998 to 48% in 2008. Thus the recent job losses in manufacturing have been accompanied by a significant decrease in job stability for manufacturing workers. Because voluntary quits tend to go down in times of economic slowdown (Morissette 2004), this decrease in job stability was likely driven by layoffs.

Chart A Job retention rates follow the business cycle



1. For age and sex.

Source: Statistics Canada, Labour Force Survey.

Workers with 10 to 19 years of initial tenure hit harder by declining job stability

While the manufacturing retention rate has decreased in recent years, rates are likely to vary according to the tenure of workers. Accordingly, manufacturing and non-manufacturing retention rates were computed for five categories of initial tenure: less than 2 years, 2 to 5 years, 6 to 9 years, 10 to 19 years, and 20 years or more (Table 2).

Table 2 Number of workers by years of job tenure

	Manufacturing		Non-manufacturing	
	'000	%	'000	%
Total	1,759	100.0	13,625	100.0
Less than 2 years	465	26.4	4,734	34.7
2 to 5 years	408	23.2	3,316	24.3
6 to 9 years	267	15.2	1,807	13.3
10 to 19 years	339	19.3	2,127	15.6
20 years or more	280	15.9	1,641	12.0

Source: Statistics Canada, Labour Force Survey, 2008.

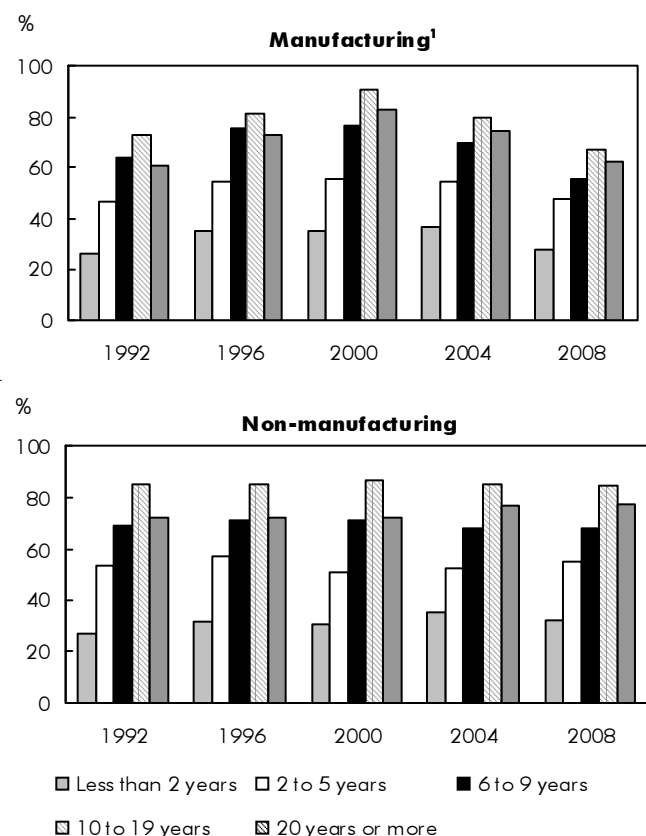
Retention rates in both manufacturing and non-manufacturing tend to be higher for groups of workers with higher initial tenure. The exception is workers with 20 years or more of tenure, a result that can be attributed to their higher probability of retirement (Chart B).

Nonetheless, the pattern of the overall manufacturing retention rate is reflected in all five groups of initial tenure. Manufacturing retention rates for 2008 for all five groups were either at, or close to, their lowest levels over the 32-year period covered by this study. In all cases, there is a strong pro-cyclical pattern that is

more pronounced than in non-manufacturing. In addition, the decline in the manufacturing retention rate in the last 10 years is substantial for each group (a decline of between 19% and 28%).

Despite the overall similarities, the retention rates fell somewhat more for workers with intermediate tenure between 1998 and 2008. The rates fell by 28% and 25% for workers with 6 to 9 and 10 to 19 years of initial tenure respectively. By comparison, they fell by 22%, 19% and 23% for workers with less than 2, 2 to 5, and 20 years or more of initial tenure respectively. Variations in retention rates for workers with intermediate tenure are more likely to be driven by variations in layoffs, since these workers are less likely to quit than new entrants in a firm. The average age of workers with 6 to 9 and 10 to 19 years of tenure was 41 and 45 respectively. The loss of a long-term job at this stage in life is accompanied by particular adjustment difficulties. These workers are less mobile and have fewer job opportunities than younger laid-off workers, but are likely to have children at home and are too young to retire (Gray and Finnie 2009). In most cases, they have not attended school for many years, making a radical career change more difficult, and they may have acquired a set of firm-specific skills over the years that are of limited value in other industries.

Chart B Manufacturing job stability declines at all tenure levels and non-manufacturing job stability changes little



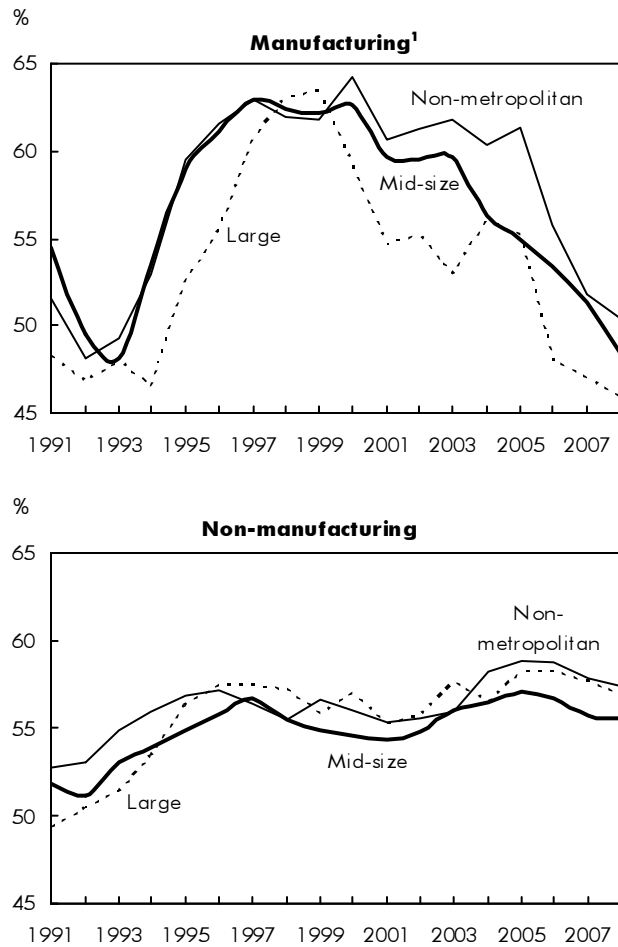
1. Adjusted for age and sex.
Source: Statistics Canada, Labour Force Survey.

Manufacturing job stability lower in large urban centres

Big-city economies are very different than the economies of smaller cities. The latter tend to be less diversified and more dependent on sectors like manufacturing. With fewer alternative employment opportunities, laid-off workers may be more likely to leave smaller centres, creating a downward spiral in their economies.

Despite their diverse economies, large urban centres were actually hit harder by declining manufacturing job stability than non-metropolitan areas (Chart C).^{6,7} In 2008, the adjusted manufacturing retention rate was 46% in large urban centres, compared with 50% in non-metropolitan areas. The difference between these rates and the rates for their respective non-manufacturing sectors is also greater in large urban centres than in non-metropolitan areas. In addition, the manufacturing retention rate has been on a downward trend in large urban centres since 2000, whereas it has only begun to drop in non-metropolitan areas since 2005.

Chart C Manufacturing and non-manufacturing job stability higher outside big cities



1. Adjusted for age and sex.
Source: Statistics Canada, Labour Force Survey.

Short-term job stability for newly employed individuals lower in manufacturing

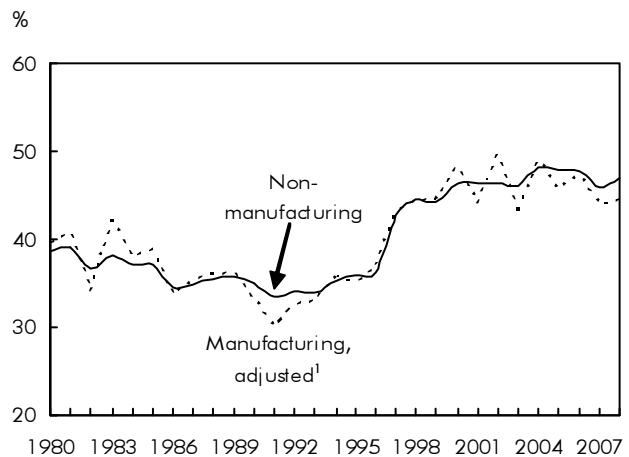
In Canada, most workers need to work between 420 and 700 insurable hours, depending on the regional unemployment rate, to qualify for Employment Insurance benefits (Service Canada 2009). If short-term job stability were to decline rapidly, this could mean that fewer people would qualify for EI. To investigate short-term job stability in manufacturing, four-month retention rates for workers with less than

two months of initial tenure were computed. The four-month interval was chosen because it roughly corresponds to 700 hours of work for an individual working full time. Estimates of the retention rate for groups of workers just starting their jobs are ideal, but because of sample size issues and the unprecise nature of the job tenure variable (see *Retention rates*), an initial interval of two months was selected.

Short-term job stability increased substantially for both manufacturing and non-manufacturing in the late 1990s (Chart D). In addition, both sectors followed very similar paths. The average retention rate between 1980 and 1996 was 36% for both adjusted manufacturing and non-manufacturing. Between 1997 and 2008, both averages increased to 46%. While this increase occurred during a period of strong employment growth, it was also a period in which legislated changes were made to the EI system (Lin 1998).⁸

Since 2005, short-term job stability has been lower in manufacturing than in non-manufacturing. In 2008, the adjusted manufacturing short-term retention rate was 45%, compared with 47% in non-manufacturing. However, this difference is lower than the difference observed for overall job stability. In addition, the short-term manufacturing retention rate represents a drop of 9% compared with the 2004 high point.

Chart D Initial job stability has increased in recent years



1. For age and sex.
Source: Statistics Canada, Labour Force Survey.

Ex-manufacturing workers tend to stay unemployed longer than ex-workers in other sectors

In 2008, the average expected duration of a new unemployment spell for manufacturing workers (11.8 weeks) was significantly higher than for non-manufacturing workers (9.7 weeks) (see *Expected complete duration of unemployment*).¹¹ Even after controlling for age and sex differences between the two sectors, there was still a difference. The adjusted average expected duration of a new unemployment spell was 10.9 weeks in manufacturing, versus 9.7 weeks in non-manufacturing (Table 3).

In absolute terms, the expected duration of a new manufacturing unemployment spell in 2008 was lower than it was during the 1980s and 1990s (Chart E).

Much of this can be explained by the downward trend in the overall unemployment rate in Canada. From the mid-1990s until the recent economic slowdown, the Canadian economy has been mainly characterized by strong economic and employment growth with labour shortages in some sectors. As a result, between 2006 and 2008, the national unemployment rate hovered around its lowest levels since 1976.

Although expected unemployment rate durations for manufacturing and non-manufacturing are not particularly high by historical standards, the difference has never been as great between the two as in recent years. Since 1977, the years with the largest difference in the expected unemployment duration between manufacturing and non-manufacturing were between 2006 and 2008, with manufacturing unemployment being longer

Expected complete duration of unemployment

Using the retention rate formula (see *Retention rates*, equation (1)) but looking instead at a sample of unemployed individuals and replacing the tenure variable with the duration of the in-progress unemployment spell, unemployment retention rates can be computed, and so can the average expected complete duration of unemployment spells:⁹

Average Expected Completed Duration of Unemployment

$$= 1 + R_{1,c} + R_{1,c} * R_{2,c} + R_{1,c} * R_{2,c} * R_{3,c} + R_{1,c} * R_{2,c} * R_{3,c} * R_{4,c} + \dots$$

This formula relates the duration of unemployment to the sum of the conditional probabilities of staying unemployed for each period of time (Sider 1985). Corak (1993) used a similar methodology to look at the duration of unemployment spells in the 1981/82 and the 1991/92 recessions in Canada and showed, among other things, that fluctuations in the duration of unemployment accounted for 65% of the fluctuations in the unemployment rate. The duration of the in-progress unemployment variable is grouped, following Corak (1993) into progressively larger intervals (monthly and quarterly intervals) because of sample size issues. Quarterly intervals are converted back into monthly equivalents by being raised to the 1/3 power, specifically

$$R_{1,c} = \frac{\text{Number of people unemployed for 5 to 8 weeks in survey } c}{\text{Number of people unemployed for 1 to 4 weeks in survey } c-1}$$

$$R_{2,c} = \frac{\text{Number of people unemployed for 9 to 12 weeks in survey } c}{\text{Number of people unemployed for 5 to 8 weeks in survey } c-1}$$

$$R_{3,c} = \frac{\text{Number of people unemployed for 13 to 16 weeks in survey } c}{\text{Number of people unemployed for 9 to 12 weeks in survey } c-1}$$

$$R_{4,c} = \frac{\text{Number of people unemployed for 17 to 20 weeks in survey } c}{\text{Number of people unemployed for 13 to 16 weeks in survey } c-1}$$

$$R_{5,c} = \frac{\text{Number of people unemployed for 21 to 24 weeks in survey } c}{\text{Number of people unemployed for 17 to 20 weeks in survey } c-1}$$

$$R_{6,c} = \frac{\text{Number of people unemployed for 25 to 28 weeks in survey } c}{\text{Number of people unemployed for 21 to 24 weeks in survey } c-1}$$

$$R_{7,c} = R_{8,c} = R_{9,c} = \left(\frac{\text{Number of people unemployed for 27 to 39 weeks in survey } c}{\text{Number of people unemployed for 13 to 26 weeks in survey } c-3} \right)^{1/3}$$

$$R_{10,c} = R_{11,c} = R_{12,c} = \left(\frac{\text{Number of people unemployed for 40 to 52 weeks in survey } c}{\text{Number of people unemployed for 27 to 39 weeks in survey } c-3} \right)^{1/3}$$

$$R_{13,c} = R_{14,c} = R_{15,c} = \left(\frac{\text{Number of people unemployed for 53 to 65 weeks in survey } c}{\text{Number of people unemployed for 40 to 52 weeks in survey } c-3} \right)^{1/3}$$

$$R_{16,c} = R_{17,c} = R_{18,c} = \left(\frac{\text{Number of people unemployed for 66 to 78 weeks in survey } c}{\text{Number of people unemployed for 53 to 65 weeks in survey } c-3} \right)^{1/3}$$

The variable indicating the industry of the last job is only available for individuals who have been unemployed for less than one year. Therefore, these estimates of the expected duration of completed unemployment spells by industry will be lower than could be obtained by taking the full sample of unemployed workers into account. To correct for this bias, the expected duration of completed unemployment was computed for each year for all individuals for a restricted sample of workers with incomplete unemployment duration of 52 weeks or less, and a larger sample of individuals with an incomplete duration of unemployment of 98 weeks or less. The difference between the two estimates was then used as an estimate of the bias resulting from the use of only spells of 52 weeks or less for the estimates by industry. For example, in 2008, the unrestricted (98 weeks or less) expected complete duration of unemployment was 9.9 weeks, compared with 9.4 weeks for the restricted (52 weeks or less) sample, a difference of 5.3%. The manufacturing and non-manufacturing estimates for 2008 were therefore multiplied by 1.053.

For most of the years, the unemployment duration is top-coded at 99 weeks in the LFS, so a 98-week restriction cannot be avoided. However, only a small fraction of unemployment spells last more than 98 weeks.¹⁰

Estimates of the expected duration of unemployment are computed for each month and then converted to annual averages.

Table 3 Expected complete duration of unemployment (weeks)

	1982	1992	2000	2004	2008
	%				
All of the economy (spells of 98 weeks or less)	18.2	18.8	12.4	11.0	10.5
Manufacturing, unadjusted	15.5	16.9	11.3	10.7	11.8
Manufacturing, adjusted for age and sex	15.6	16.2	10.8	10.7	10.9
Manufacturing, adjusted for education and sex	..	16.7	11.4	11.1	11.9
Manufacturing, layoffs only, adjusted for age and sex	15.3	16.5	11.7	11.3	12.0
Non-manufacturing	16.0	15.5	10.9	10.2	9.7
Non-manufacturing, layoffs only	16.3	16.0	11.3	10.8	10.4

Note: Differences between manufacturing (unadjusted) and non-manufacturing are significant at the 5% level or better.

Source: Statistics Canada, Labour Force Survey.

by 12% to 17%. Compared with previous periods of economic downturn, the difference was only 4% in 1992, and in 1982 ex-workers in manufacturing had expected unemployment spells 3% shorter than others. Overall then, the data indicate that while the labour market conditions for unemployed workers are generally better than in past downturns, the relative difficulties have increased for unemployed manufacturing workers.

Education doesn't explain the longer unemployment spells in manufacturing

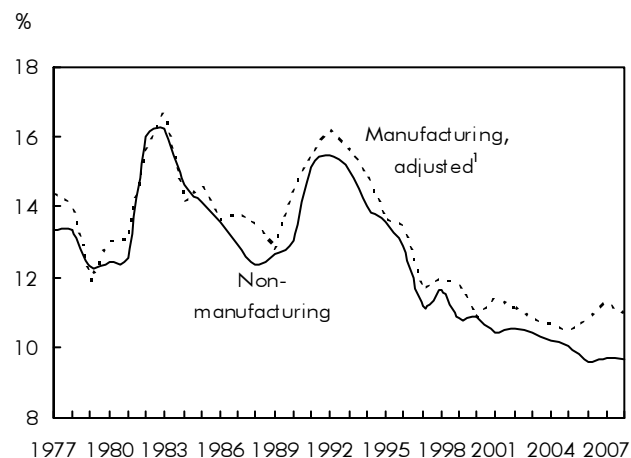
The level of education can have an impact on the duration of an individual unemployment spell.¹² Although the gap has narrowed in recent years, unemployed individuals whose last job was in manufacturing are, on average, less likely to hold a university degree and more likely to have at most a high school diploma.¹³ To verify that the gap between manufacturing and non-manufacturing is not merely due to differences in education attainment, the manufacturing unemployment duration was adjusted by sex and education level (Chart F).¹⁴ Interestingly, the gap between the manufacturing and non-manufacturing expected unemployment duration actually widens once education is controlled for. In 2008, the adjusted expected duration was 11.9 weeks in manufacturing, compared with 9.7 weeks in non-manufacturing, a 23% difference. Moreover, this larger gap with non-manufacturing once education is controlled for is observed for each year since 1991. These results suggest that education is

not a factor explaining the longer unemployment spells for ex-manufacturing workers.¹⁵

Laid-off manufacturing workers experience longer unemployment spells

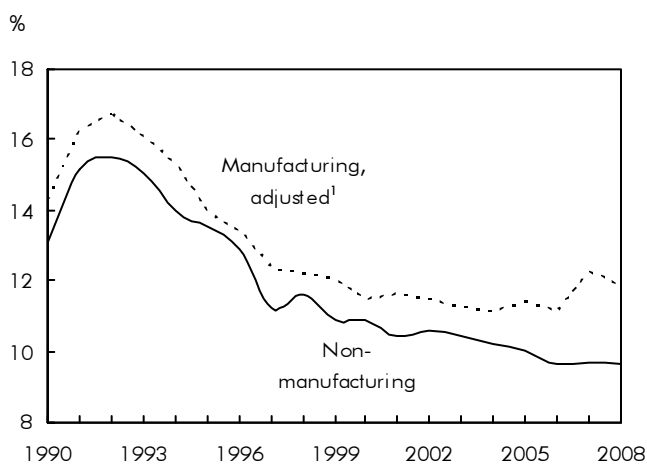
Workers can become unemployed as a result of a layoff or a voluntary quit. Given the increase in the number of layoffs in manufacturing in recent years, it is useful to verify how the unemployment duration of laid-off manufacturing workers compares with that of laid-off non-manufacturing workers. We find that the gap between manufacturing and non-manufacturing workers still holds even when the sample is restricted to laid-off individuals. In 2008, unemployment spells in manufacturing were 15% longer, on average, than in non-manufacturing, the largest gap during the 32 years covered in

Chart E Long-term decline in unemployment duration, but growing difference between manufacturing and non-manufacturing



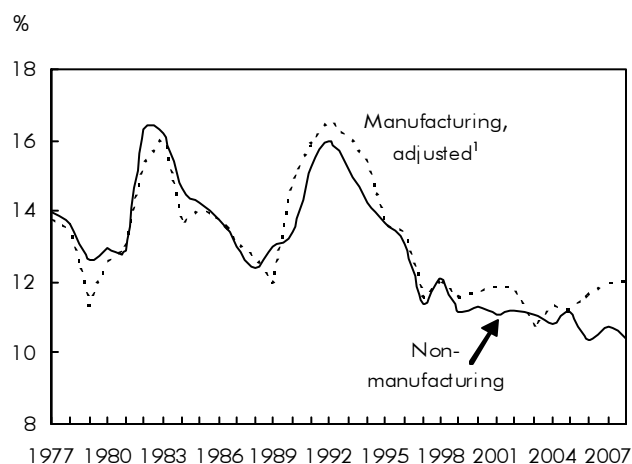
1. For age and sex.
Source: Statistics Canada, Labour Force Survey.

Chart F Education does not explain differing unemployment duration for manufacturing and non-manufacturing



1. For age and sex.
Source: Statistics Canada, Labour Force Survey.

Chart G Growing gap in expected duration of unemployment for workers laid off from manufacturing versus other jobs



1. Sample restricted to layoffs only, adjusted for age and sex.
Source: Statistics Canada, Labour Force Survey.

this study (Chart G). The duration patterns for laid-off workers are very similar to those for all unemployed individuals. This suggests that the rise in the duration of unemployment for manufacturing workers is not driven by voluntary quits.

Summary

This paper applied synthetic cohort analysis techniques to Labour Force Survey (LFS) data to document changes in job stability and the expected duration of unemployment spells in the Canadian manufacturing sector. The study was motivated by falling employment in this sector in recent years.

In 2008, job stability in manufacturing was at its second-lowest level in 29 years. Moreover, the difference in stability rates between manufacturing and non-manufacturing has never been so high. Job stability declined regardless of worker tenure, although workers with medium tenure were the most affected. Previous research documents large wage losses for high-tenure workers who lose their jobs (Morissette et al. 2007). Their situation is often also tenuous: they are

too young to retire, have firm-specific skills that may not transfer to other industries, and are still likely to have dependent children.

Manufacturing workers in large urban centres have seen a greater decrease in their job stability than workers in non-metropolitan areas, and the difference with non-manufacturing is also greater in large urban centres.

Although the expected duration of unemployment remains below levels experienced in previous recessions, the difference in duration between ex-workers in manufacturing and ex-workers in non-manufacturing has never been as high as in 2007 and 2008. The rise in the expected duration of new unemployment spells in manufacturing and the difference with non-manufacturing still holds when education is controlled for or when only a sample of laid-off individuals is considered.

The analysis provides evidence that the recent job losses in manufacturing have been accompanied by a significant drop in job stability and longer unemployment spells. Not only do manufacturing jobs tend to be shorter in duration, but their associated unemployment spells tend to last longer. These trends correspond to

business cycle patterns noted for previous downturns. The difference this time is the widening gap between manufacturing and non-manufacturing job stability. A full assessment of the resulting adjustment experiences for these two groups would require longitudinal data.

Perspectives

■ **Notes**

1. These figures are from the Labour Force Survey (Bernard 2009). Data from the Survey of Employment, Payrolls and Hours (SEPH) show a similar decline in employment, but over a longer period. See Kowaluk (2009) for a detailed analysis of the manufacturing sector using SEPH and other business survey data.
2. In Canada, single-employer, defined-benefit pension plans still predominate among covered workers, complicating the transfer of benefits when they change jobs (Gougeon 2009).
3. See Heisz (2002) for an economy-wide analysis of one-year retention rates in Canada. Overall trends in one-year retention rates and four-year retention rates are generally similar, although four-year retention rates are more variable.
4. The difference between the unadjusted manufacturing retention rate and the non-manufacturing retention rate in 2008 is significant at the 5% level. Throughout this paper, significance tests were performed using the jack-knife variance estimation technique (see Statistics Canada 2008 for details). Tests were only performed on unadjusted rates.
5. See Bernard 2009 for details about manufacturing job characteristics.
6. A census metropolitan area (CMA) is an urban area with a population of 100,000 or more.
7. The CMA variable has been in the LFS since 1987. Therefore, the four-year retention rates for large urban centres and non-metropolitan areas can only be computed since 1991.
8. Due to the nature of the retention rate calculations, attempting to isolate the specific effects of legislated changes to EI was beyond the scope of this study.
9. Another measure is the average duration of in-progress unemployment spells, corresponding to the average LFS duration variable. This measures how long individuals have been unemployed up to the point of the survey. See Tal (2009) for an analysis of unemployment duration using this measure. See Corak and Heisz (1995) for a discussion of alternative measures of unemployment duration.
10. See Dubé (2004) and Dubé and Dionne (2005) for a specific analysis of long unemployment spells.
11. The difference between manufacturing and non-manufacturing is significant at the 5% level.
12. Using the Survey of Labour and Income Dynamics (SLID), Dubé and Dionne (2005) find that holding a university degree is associated with higher odds of finding work. Also using SLID, Galarneau and Stratyckuk (2001) find that having less than a high school diploma is associated with lower odds of finding work, but that the association is not statistically significant.
13. On average during the period from 1990 to 2008, 9% of unemployed individuals whose last job was in manufacturing had a university degree and 57% had at most a high school diploma. In comparison, 13% of unemployed individuals whose last job was not in manufacturing had a university degree and 51% had at most a high school diploma (Statistics Canada 2008).
14. The adjustment by age group was dropped because adjusting by age, sex and education level would require calculations involving very low cell counts, and therefore would yield very imprecise weight adjustments. The age adjustment was dropped for the sex adjustment because the average age of manufacturing and non-manufacturing workers is similar, whereas women are clearly under-represented in manufacturing. Note that the definition of the education variable in the LFS changed in 1990 and therefore estimates pre- and post-1990 are inconsistent. As such, the adjusted expected duration is only presented for the period from 1990 to 2008.
15. A multivariate analysis with longitudinal microdata would be needed to fully assess the effect of education on the difference in unemployment duration between manufacturing and non-manufacturing.

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