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Worker Reallocation in Canada

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...	not applicable
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0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published
*	significantly different from reference category ($p < 0.05$)

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Abstract

This study documents how hiring rates, separation rates, and worker reallocation rates evolved from the late 1970s to the late 2000s. It also examines how the pace of labour reallocation varied across industries, firm sizes, provinces, age groups, and education levels during the 2000s. The study shows that the amount of worker reallocation that took place in Canada during the 2000s was no higher than that which took place during the 1980s or 1990s. During the 2000s, worker reallocation varied substantially across industries and firm sizes, as small firms and low-wage industries exhibited both relatively high hiring rates and high separation rates. Worker reallocation also varied markedly across age groups, as young workers were hired and separated from employers much more frequently than their older counterparts. In contrast, the pace of worker reallocation varied to a lesser extent across provinces and education levels.

Executive summary

Every year, the Canadian economy experiences a substantial amount of labour reallocation. Thousands of workers leave firms in search of better job opportunities. Employers adjust the size of their workforce through hiring or downsizing in response to general economic developments, technological changes, changing trade patterns and consumer preferences, exchange rate movements, and numerous other factors. It is sometimes asserted that, as a result of increased economic turbulence, the magnitude of labour reallocation has increased.

This article examines this assertion using data from both Statistics Canada's Longitudinal Worker File (LWF) and Labour Force Survey (LFS).

The study shows that the pace of labour reallocation was no higher during the 2000s than it was during the 1980s or 1990s. This conclusion holds whether all workers are considered or whether attention is restricted to individuals aged 25 to 54.

The study also shows that, whether or not one controls for the aging of the workforce and/or for changes in unemployment, worker reallocation rates did not display any statistically significant trend during the period from 1976 to 2011.

During the 2000s, worker reallocation, defined as the sum of workers' hiring rates and separation rates, varied substantially across industries and firm sizes, as small firms and low-wage industries exhibited both relatively high hiring rates and high separation rates. Worker reallocation also varied markedly across age groups, as young workers were hired and separated from employers much more frequently than their older counterparts. In contrast, the pace of worker reallocation varied to a lesser extent across provinces and education levels. In the aggregate, the pace of worker reallocation observed during the 2000s was, at about 45% of paid employment, fairly similar to that observed in the United States and the United Kingdom.

Many of the aforementioned differences in the pace of worker reallocation are also found when focusing specifically on layoffs.

During the 2000s, permanent-layoff rates differed considerably across industries and firm sizes. They also varied to a large extent across provinces and job tenure. As expected, provinces that had higher-than-average unemployment rates displayed higher-than-average permanent-layoff rates. Consistent with the notion that layoffs are often implemented on a seniority basis, newly hired workers—those hired within the previous two years—were at least four times more likely to lose their jobs than those who had been employed in a firm for six to ten years.

In the aggregate, men's layoff rates were almost twice as high as women's, but the difference largely reflected the predominance of men in industries with higher-than-average layoff rates (e.g., construction, mining, quarrying, and oil and gas extraction) and the predominance of women in sectors with lower-than-average layoff rates (e.g., educational services, health care, and social assistance).

1 Introduction

Every year, the Canadian economy experiences a substantial amount of worker reallocation. Thousands of workers leave firms in search of better job opportunities. Employers adjust the size of their workforce through hiring or downsizing in response to general economic developments, technological changes, changing trade patterns and consumer preferences, exchange rate movements, and numerous other factors.

How many workers are hired each year in Canada? How many workers separate from their employers through quits, layoffs, or separations for other reasons? To what extent do hiring rates and layoff rates differ across industries and groups of workers? How much worker reallocation is there in the Canadian economy in a typical year? Has the amount of worker reallocation changed over the last few decades?

The answers to such questions are important for understanding the functioning of the Canadian labour market and inform discussions regarding the rate at which labour market adjustment takes place. They are also important to discussions regarding the potential link between labour reallocation and productivity.

Using data from Statistics Canada's Labour Force Survey (LFS) and Longitudinal Worker File (LWF), this study provides information on labour adjustment in Canada. It first documents the evolution of hiring rates, layoff rates, separation rates, and worker reallocation rates from the mid-1970s onwards, and then documents how these rates varied across groups of workers, provinces, industries, and firm sizes during the 2000s.

The study shows that the amount of worker reallocation that took place in Canada during the 2000s was no higher than that which took place during the 1980s or 1990s. This conclusion holds whether all workers are considered or whether attention is restricted to individuals aged 25 to 54.

During the 2000s, worker reallocation, defined as the sum of workers' hiring rates and separation rates, varied substantially across industries and firm sizes, as small firms and low-wage industries exhibited both relatively high hiring rates and high separation rates. Worker reallocation also varied markedly across age groups, as young workers were hired and separated from employers much more frequently than their older counterparts. In contrast, the pace of worker reallocation varied to a lesser extent across provinces and education levels. In the aggregate, the pace of worker reallocation observed during the 2000s was, at about 45% of paid employment, fairly similar to those observed in the United States and the United Kingdom.

Many of the aforementioned differences in the pace of worker reallocation are also found when focusing specifically on layoffs. During the 2000s, permanent-layoff rates differed considerably across industries and firm sizes. They also varied to a large extent across provinces and job tenure. As expected, provinces that had higher-than-average unemployment rates displayed higher-than-average permanent-layoff rates. Consistent with the notion that layoffs are often implemented on a seniority basis, newly hired workers—those hired within the previous two years—were at least four times more likely to lose their jobs than those who had been employed in a firm for six to ten years. In the aggregate, men's layoff rates were almost twice as high as women's, but the difference largely reflected the predominance of men in industries with higher-than-average layoff rates (e.g., construction, mining, quarrying, and oil and gas extraction) and the predominance of women in sectors with lower-than-average layoff rates (e.g., educational services, health care, and social assistance).

The study is organized as follows. Section 2 presents the data and concepts used in this study. Section 3 analyzes the evolution of hirings, layoffs, separations, and worker reallocation from the mid-1970s to 2011. Particular attention is paid to three important questions. The first is whether the risk of job loss—measured by permanent layoff rates—increased over the last three decades in Canada, as Canadian firms faced substantial changes in the domestic and global economic environment. The second question is whether workers' separation rates—the degree to which they separate from their employers through layoffs or separations for other reasons—changed significantly over the last three decades. The third question is whether the magnitude of worker reallocation in the Canadian labour market was higher in recent years than it was in the 1980s and 1990s. Section 4 documents how hiring rates, separation rates, and rates of worker reallocation varied across groups of workers, provinces, industries, and firm sizes during the 2000s. Section 5 examines how permanent layoffs, one key component of separations, varied across worker and firm characteristics rates during the 2000s. Concluding remarks follow in Section 6.

2 Data and concepts

Four important concepts related to worker flows are used in this study: hiring rates, layoff rates, separation rates, and worker reallocation rates. They are measured by using data from both the LWF and the LFS.

The LFS is a monthly cross-sectional household survey that has collected information on the labour force status of Canadians on a consistent basis since 1976. The LFS is a rotating panel survey in which households are interviewed for six consecutive months. The total sample consists of six representative sub-samples, one of which is replaced each month after it has completed the six-month stay in the survey. The LFS allows paid employment to be estimated for each month of the year. This information is used in this publication to compute hiring rates, permanent-layoff rates, and rates of worker reallocation.

The LWF is an administrative data set consisting of a 10% random sample of all Canadian workers. It is constructed from four separate data sources: the T4 and T1 files from Canada Revenue Agency (CRA), the Record of Employment (ROE) files from Human Resources and Skills Development Canada (HRSDC), and the Longitudinal Employment Analysis Program (LEAP) file constructed by Statistics Canada. The current version of the LWF provides longitudinal information on individuals over the period from 1983 to 2009;[1] in addition, an older, but comparable, version covers the period from 1978 to 1989. Both files are used in this study to examine trends over the last three decades.

The LWF allows the annual number of layoffs in the Canadian economy to be calculated. This is done through the ROE, which specifies the reason for the work interruption or separation.[2] Separations due to "shortage of work" (code "A" on the ROE) are identified as layoffs. The LWF also allows temporary and permanent layoffs to be distinguished. We define a layoff as temporary when the laid-off worker returns to his or her employer during the year of the layoff or in the following year. When such a return does not occur, the layoff is considered permanent. Our analysis is restricted to permanent layoffs, since job losses experienced by workers are of primary interest. *Permanent-layoff rates* are computed by dividing the number of jobs ending

1. The LWF is updated annually. At the time of writing, 2009 was the most recent year available.
2. The *Employment Insurance Act* and the associated *Employment Insurance Regulations* require every employer to issue a ROE when an employee working in insurable employment has an interruption in earnings. The information contained on the ROE is used to determine whether a person qualifies for Employment Insurance (EI) benefits, the benefit rate, and the duration of his or her claim. The ROE must be issued even when the worker does not intend to file a claim for EI benefits.

with a permanent layoff in a given year, as measured from the LWF, by average annual paid employment during that year, as measured from the LFS.

In addition to permanent layoffs, the LWF measures the number of individuals who start a job with (at least) one new employer in a given year, thereby providing annual estimates of hirings. The LFS also provides estimates of hirings, identified as workers who have less than one year of job tenure with their employer. This information is used to calculate annual estimates of hirings (see in Section 7 for details).

Hiring rates capture movements of workers into firms.[3] They are computed by dividing the number of individuals hired between January of year *t* and January of year *t+1*, by the average level of paid employment observed during those two months.

For any given group of workers, net changes in paid employment are related to hirings and separations, as shown in the following accounting identity:

$$Net\ changes\ in\ paid\ employment \equiv Hirings - Separations$$

Using estimates of hirings from the LWF or LFS and estimates of net changes in paid employment from the LFS, estimates of worker separations can be computed residually by subtracting net changes in paid employment from hirings. Separations then represent the number of workers who separated from (at least) one employer in a given year.

Separation rates capture movements of workers out of firms resulting from layoffs, quits, or separations for other reasons (e.g., going back to school, maternity).[4] *Separation rates* in year *t* measure the percentage of workers who separated from (at least) one employer during that year. They are computed by dividing the number of individuals who separated from (at least) one employer between January of year *t* and January of year *t+1*, by the average level of paid employment observed during those two months.

Worker reallocation captures the degree to which workers move into firms or separate from firms. Following Organization for Economic Cooperation and Development (OECD) (2009), *worker reallocation rates* can be calculated by summing hiring rates and separations rates. This measure of worker reallocation is used in this publication.

Unless otherwise noted, all estimates presented in this study refer to workers aged 15 to 64 living in one of the ten Canadian provinces.

3 Worker reallocation over the last three decades

Numerous changes over the last decades may have affected labour reallocation occurring in the Canadian labour market. Canadian workers are now older and perhaps less mobile than their counterparts were during the mid-1970s. However, they are also better educated and thus potentially better positioned to take advantage of new job opportunities. Technological change and growing international competition have modified the economic environment in which firms operate, potentially affecting the speed with which they must adjust employment levels in response to changing market conditions. Exchange rate movements and decreases in telecommunication costs have altered firms' incentives to offshore activities. As well, declines in

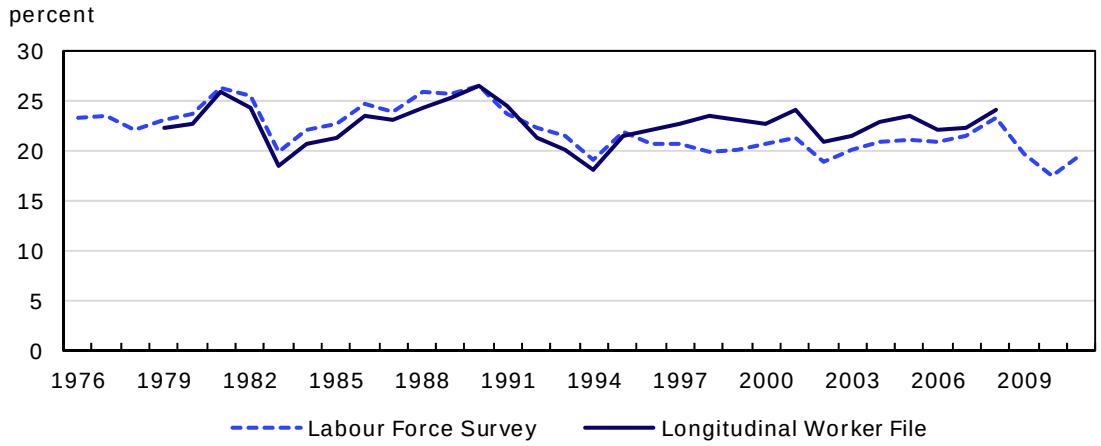
3. Hired individuals may have been previously employed with another firm or may have recently entered (or re-entered) the labour market.
4. After separating from their employer, these individuals may find a job with another firm or may make a transition from employment to non-employment.

unionization rates and pension coverage have modified workers' workplaces and compensation packages, with implications for the incentive to remain with the same employer.[5]

Despite numerous changes in the Canadian labour market over the last three decades, Canadian workers were no more likely to separate from their employers through quits, layoffs, or separations for other reasons in the 2000s than they were in the late 1970s.[6] The LFS and the LWF both show that, on an annual basis, about 24% of workers aged 15 to 64 left their employers as a result of quits, layoffs, or separations for other reasons between 1979 and 1981 (Chart 1 and Table 1), while the corresponding figures during the period from 2000 to 2008 were 21% (LFS) and 23% (LWF).

Chart 1

Percentage of workers aged 15 to 64 separating from their employers through quits, layoffs, or separations for other reasons, 1976 to 2011



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Separation rates fell during the recessions of 1981-to-1982, 1990-to-1992, and 2008-to-2009, as shrinking labour demand reduced workers' propensity to leave firms (as a result of quits or separations for other reasons) to a greater extent than it raised layoff rates. Yet neither data set indicates that separation rates trended upwards.

Hiring rates—the percentage of workers who started jobs with new employers in a given year—are also pro-cyclical, declining during recessions and increasing during expansionary periods (Chart 2 and Table 1). Some 26% to 27% of workers started a job during the expansionary periods of the late-1970s and the late-1980s, while the hiring rate was slightly lower, at about 23% to 24%, during the expansionary period of the mid-2000s. As with separation rates, hiring rates fell during recessions as labour demand slackened.

Worker reallocation rates—the percentage of workers who were hired or who separated from firms through quits, layoffs, or separations for other reasons in a given year—followed a cyclical pattern but did not trend upwards over the last three decades (Chart 3 and Table 1). Both the LFS and the LWF indicate that the magnitude of labour reallocation did not rise over the last three decades. The LWF indicates that worker reallocation rates were fairly similar over the last three decades: they averaged 47% during the 1980s, 45% during the 1990s, and 47% between 2000 and 2008, the last year for which data are currently available. The corresponding numbers

5. Morissette et al. (2005) documented changes in unionization rates in Canada from 1981 to 2004. Morissette and Drolet (2001) analyzed changes in pension coverage from the mid-1980s to the late 1990s.
6. As will be shown below, multivariate analyses confirm this finding.

from the LFS are 49%, 44%, and 43%, providing again no evidence that worker reallocation rates increased over the last three decades.[7] This conclusion also holds for workers aged 25 to 54.

Table 1

Worker flows, workers aged 15 to 64, 1979 to 2011

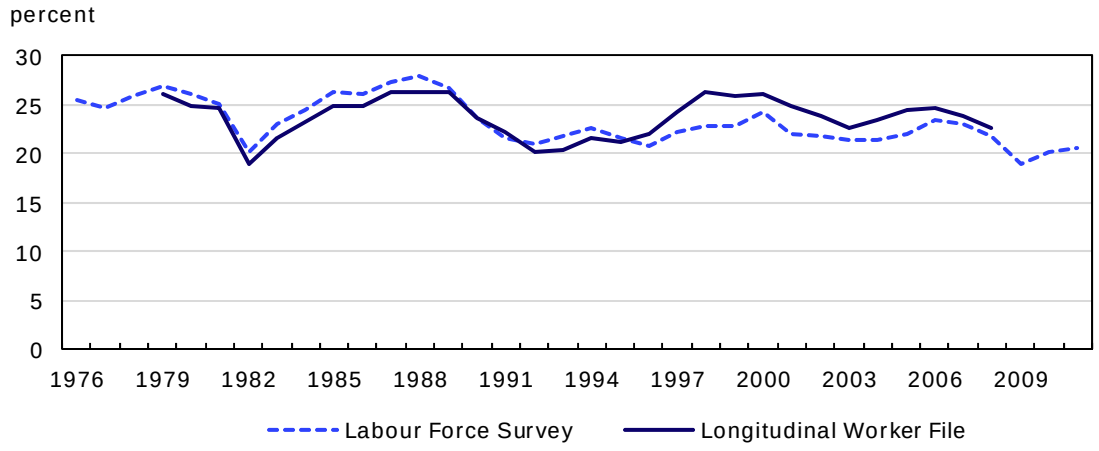
	Hiring rate		Separation rate		Worker reallocation rate		Permanent layoff rate
	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Longitudinal Worker File
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
				percent			
1979	26.9	26.1	23.1	22.2	50.1	48.3	9.3
1980	26.0	25.0	23.7	22.6	49.7	47.6	8.6
1981	25.1	24.6	26.2	25.7	51.3	50.4	9.9
1982	20.1	19.0	25.3	24.3	45.5	43.3	11.9
1983	23.0	21.6	19.9	18.4	42.9	40.0	10.6
1984	24.5	23.2	21.9	20.6	46.4	43.9	10.5
1985	26.3	24.9	22.5	21.1	48.8	46.1	10.1
1986	26.1	24.9	24.6	23.4	50.7	48.3	9.6
1987	27.4	26.4	23.9	22.9	51.2	49.4	9.4
1988	28.0	26.4	25.9	24.3	53.9	50.7	9.3
1989	26.8	26.4	25.7	25.2	52.5	51.6	8.9
1990	23.6	23.6	26.4	26.4	50.0	50.0	10.2
1991	21.6	22.3	23.7	24.4	45.3	46.6	10.3
1992	21.0	20.2	22.2	21.3	43.2	41.4	9.9
1993	21.8	20.3	21.4	20.0	43.2	40.3	9.4
1994	22.7	21.7	19.1	18.1	41.8	39.8	8.9
1995	21.6	21.2	21.8	21.4	43.4	42.6	8.9
1996	20.8	22.1	20.7	22.0	41.5	44.1	8.7
1997	22.2	24.2	20.6	22.7	42.7	46.9	9.2
1998	22.7	26.3	19.9	23.4	42.6	49.7	9.0
1999	22.8	25.9	20.0	23.1	42.8	49.0	8.4
2000	24.2	26.2	20.7	22.7	44.9	48.9	8.0
2001	22.0	24.8	21.2	24.0	43.2	48.8	8.3
2002	21.9	23.8	18.8	20.8	40.7	44.6	7.4
2003	21.4	22.7	20.0	21.4	41.4	44.1	7.5
2004	21.5	23.4	20.9	22.8	42.4	46.1	7.0
2005	22.0	24.4	21.1	23.4	43.1	47.8	6.7
2006	23.4	24.6	20.8	22.0	44.2	46.7	6.5
2007	23.1	23.9	21.3	22.2	44.4	46.1	6.4
2008	21.8	22.6	23.2	24.0	45.0	46.6	7.3
2009	18.9	..	19.6	..	38.5	..	..
2010	20.2	..	17.5	..	37.7	..	..
2011	20.5	..	19.6	..	40.2	..	..

Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

7. The worker reallocation estimates of 47% (from the LWF) and 43% (from the LFS) for the period from 2000 to 2008 are similar to those observed during the first half of the 2000s in the United Kingdom and the United States, which are as large as 45% (OECD 2009, p. 119).

Chart 2

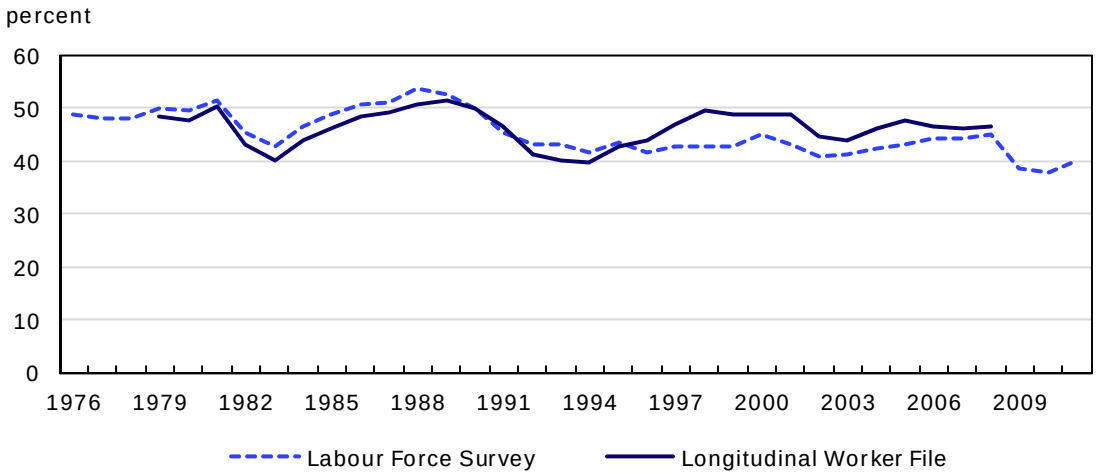
Percentage of workers aged 15 to 64 starting jobs with new employers, 1976 to 2011



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Chart 3

Worker reallocation rates among workers aged 15 to 64, 1976 to 2011



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

The findings above are based on simple comparisons of the period from 2000 to 2008 with the 1980s and the 1990s. They do not take account of the aging of the workforce—which, everything else being equal, should have decreased separation rates and worker reallocation rates—or changes in unemployment rates that took place during the three decades considered. Along with hiring rates, separation rates fall during recessions, as reductions in quit rates exceed increases in layoff rates. As a result, worker reallocation rates are lower during recessionary years than during periods of expansion. Hence, it is important to control for labour market conditions when examining changes in worker reallocation across decades. To assess whether the aforementioned findings hold in multivariate analyses, we estimate the following equation with LFS data:

$$Y_{at} = \theta_t + \beta_1 * D\_AGE_{at} + \varepsilon_{at} \qquad t = 1976, \ldots 2011 \qquad (1)$$

where *a* and *t* denote age categories and calendar years, respectively. Y_{at} measures a given worker flow (separation rate, hiring rate, reallocation rate) in year *t* for workers of age category *a* (15 to 24; 25 to 34; 35 to 44; 45 to 54; 55 to 64). D_AGE_{at} is a vector of binary indicators capturing workers' age categories, while ε_{at} is an error term. θ_t is a vector of year effects.[8] Once these year effects are estimated, their first-differenced values are regressed on a constant term and on the first-differenced values of Canada's unemployment rates for individuals aged 15 to 64:

$$\Delta\tilde{\theta}_t = \partial_0 + \partial_1 * \Delta Urate_t + u_t \quad (2)$$

A positive (negative) and statistically significant constant term ∂_0 indicates that, controlling for unemployment and the aging of the workforce, a given worker flow trended upwards (downwards) over the last three decades.

The results of this exercise are shown in Table 7 of Section 7. They indicate that—whether or not one controls for the aging of the workforce and/or for unemployment—separation rates, hiring rates, and worker reallocation rates did not display any statistically significant trend during the period from 1976 to 2011. Hence, the finding that worker flows did not trend upwards or downwards over the last three decades is robust to the inclusion of controls for changes in the age structure and in labour market tightness.

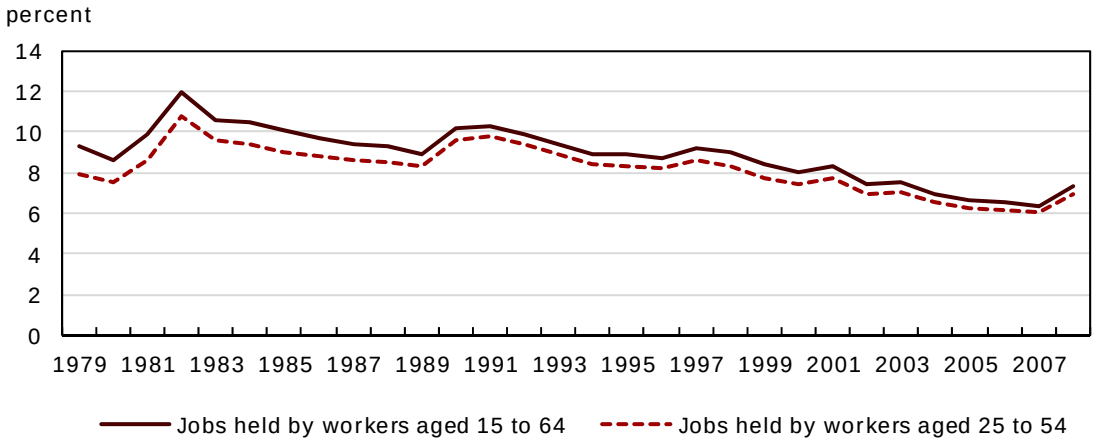
While the percentage of workers separating from firms through quits, layoffs, or separations for other reasons did not trend upwards over the last three decades, permanent layoff rates may well have risen over time. This could happen if, faced with growing domestic and foreign competition, firms adjusted employment levels in response to business conditions more quickly now than they did in the past, thereby increasing the risk of layoff among workers.

Did permanent layoff rates rise over the last three decades? The answer is: no. While the percentage of jobs ending with a permanent layoff—where the worker does not return to the firm during the current year or the following year—has increased during the last three recessions, layoff rates did not trend upwards over the last three decades (Chart 4). In fact, they displayed a downward trend. This conclusion holds in multivariate analyses that control for the aging of the workforce and for changes in the distribution of employment across provinces over the last three decades (Morissette et al. 2012).[9]

8. Since the period from 1976 to 2011 covers 36 years and since 5 age groups are considered, equation (1) is estimated on a sample of 180 observations.
9. As Chart 28 shows, the absence of an upward trend is also observed with both LFS data and LWF data when one computes the sum of permanent- and temporary-layoff rates.

Chart 4

Percentage of jobs ending with a permanent layoff, 1979 to 2008



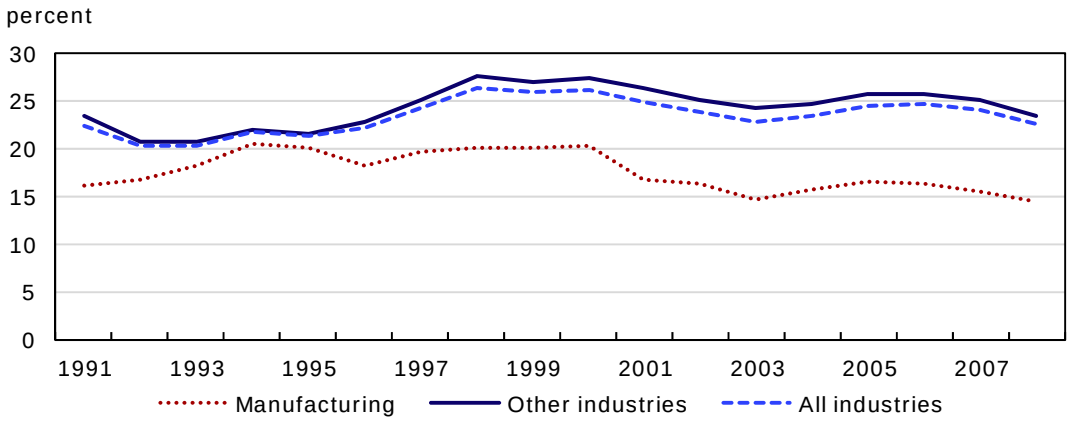
Source: Statistics Canada, Longitudinal Worker File.

Together, Charts 1 to 4 indicate that the magnitude of worker reallocation, the degree to which workers separate from employers for various reasons, and the risk of job loss did not increase over the last three decades. While separation rates, worker reallocation rates, and permanent-layoff rates may have been higher in recent years than they were during the 1960s or 1970s, they were no higher during the 2000s than they were during the 1980s or 1990s. As Table 2 shows, these conclusions hold when attention is restricted to workers aged 25 to 54.

Since manufacturing employment fell after 2004 (Bernard 2009), hiring patterns in manufacturing may well have followed a different path, compared to other industries, during the 2000s. LWF estimates of the number of hired workers divided by LFS employment confirm this: after being similar during the mid-1990s, hiring rates in manufacturing were considerably lower than those of other industries after 2004 (Chart 5). In addition, hiring rates in manufacturing started falling during the early 2000s, i.e., before 2004. This suggests that manufacturing firms started to adjust to a changing economic environment before the mid-2000s.

Chart 5

Percentage of workers aged 15 to 64 starting jobs with new employers, by industry, 1991 to 2008



Source: Statistics Canada, Longitudinal Worker File.

Table 2
Worker flows, workers aged 25 to 54, 1979 to 2011

	Hiring rate		Separation rate		Worker reallocation rate		Permanent layoff rate
	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Longitudinal Worker File
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
				percent			
1979	18.5	20.2	17.8	19.5	36.3	39.7	8.0
1980	18.0	19.2	18.0	19.2	36.0	38.4	7.5
1981	18.1	19.1	20.1	21.1	38.2	40.2	8.6
1982	14.3	15.0	20.2	20.8	34.5	35.8	10.8
1983	16.4	16.8	15.2	15.6	31.6	32.4	9.6
1984	17.3	17.9	16.8	17.5	34.0	35.4	9.4
1985	18.6	19.5	16.9	17.8	35.5	37.3	9.0
1986	18.7	19.5	18.0	18.9	36.7	38.5	8.8
1987	20.0	21.0	18.7	19.7	38.8	40.7	8.6
1988	20.5	21.3	19.5	20.4	40.0	41.6	8.5
1989	20.1	21.6	19.9	21.5	40.0	43.0	8.3
1990	18.1	19.3	21.1	22.3	39.2	41.6	9.6
1991	16.3	18.6	19.4	21.7	35.8	40.3	9.7
1992	16.0	16.5	18.1	18.6	34.1	35.2	9.4
1993	16.2	16.4	16.5	16.8	32.7	33.2	8.9
1994	16.7	17.4	15.0	15.7	31.6	33.2	8.4
1995	16.1	17.3	16.6	17.8	32.7	35.0	8.3
1996	15.4	17.7	16.5	18.7	31.9	36.4	8.2
1997	16.7	19.0	15.7	18.0	32.4	37.0	8.6
1998	16.4	20.9	16.3	20.8	32.6	41.7	8.3
1999	16.6	20.2	15.8	19.4	32.4	39.5	7.7
2000	17.5	20.5	16.0	18.9	33.5	39.4	7.4
2001	16.0	19.2	16.4	19.6	32.4	38.8	7.7
2002	16.2	18.5	15.0	17.2	31.2	35.7	6.9
2003	15.6	17.7	14.9	17.0	30.5	34.7	7.0
2004	15.5	18.2	16.3	19.0	31.8	37.2	6.5
2005	16.0	19.2	16.5	19.6	32.5	38.8	6.2
2006	17.5	19.4	16.1	18.0	33.5	37.3	6.1
2007	17.1	19.0	16.6	18.5	33.7	37.5	6.0
2008	16.4	18.6	18.2	20.4	34.6	38.9	6.9
2009	14.2	..	14.9	..	29.1	..	..
2010	15.1	..	13.2	..	28.4	..	..
2011	15.9	..	15.5	..	31.4	..	..

Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

4 Worker reallocation during the 2000s

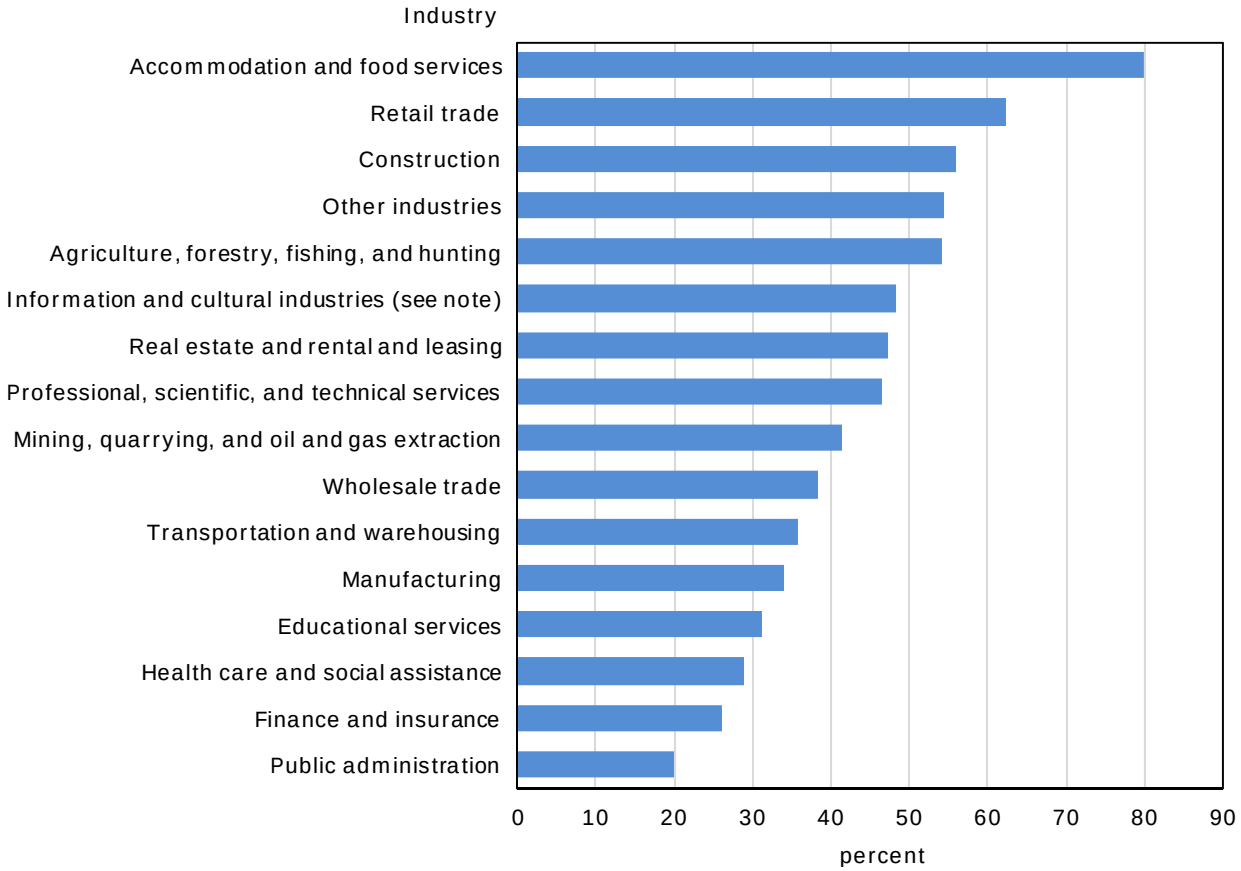
Even though worker reallocation rates were fairly stable over the last three decades—ranging from about 40% to about 50% depending on the years considered—the pace of labour reallocation may well have varied substantially across groups of workers, sectors of the economy, and provinces. To what extent did worker reallocation rates vary across these dimensions in recent years? The next section investigates this question.

4.1 Worker reallocation rates varied across industries, firm sizes, and provinces

Worker reallocation rates varied substantially across industries during the period from 2000 to 2008 (Charts 6 and 7). They were fairly high (about 80%) in accommodation and food services, as the annual number of workers hired in that industry or leaving firms operating in that industry amounted to four-fifths of paid employment (Table 3). In contrast, reallocation rates were no higher than 30% in finance and insurance, health care, social assistance, and public administration.

Chart 6

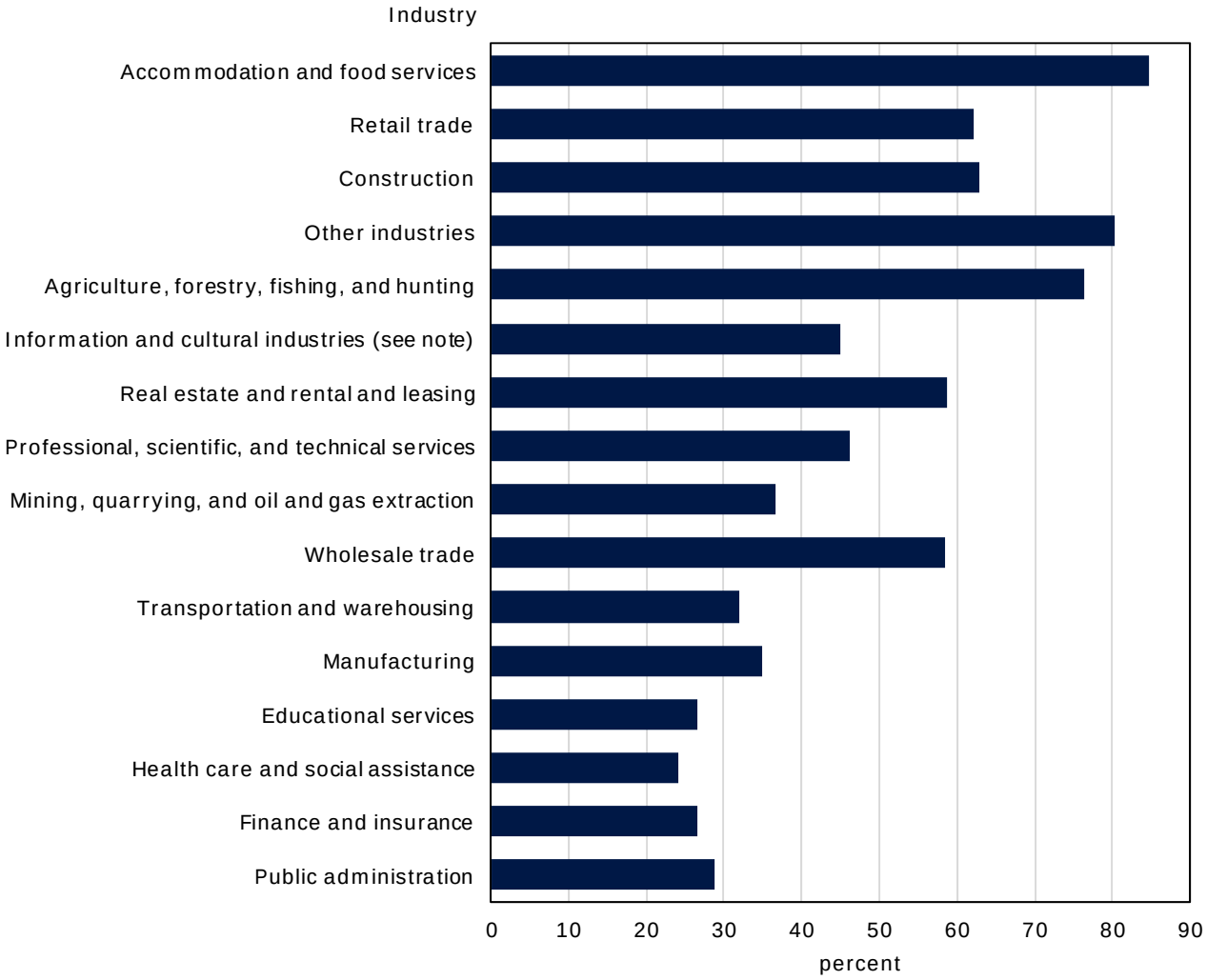
Worker reallocation rates by industry, average of 2000 to 2008 — Labour Force Survey data



Note: This category includes arts, entertainment, and recreation.
Source: Statistics Canada, Labour Force Survey.

Chart 7

Worker reallocation rates by industry, average of 2000 to 2008 — Longitudinal Worker File data



Note: This category includes arts, entertainement, and recreation.
Source: Statistics Canada, Longitudinal Worker File.

Table 3

Average worker reallocation rates by industry, 2000 to 2008

Industry	Hiring rate		Separation rate		Worker reallocation rate		Average hourly wages
	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	percent						2002 dollars
Public administration	10.9	15.3	9.0	13.4	19.9	28.7	23.61
Finance and insurance	14.5	14.7	11.6	11.8	26.1	26.5	20.79
Health care and social assistance	16.2	13.7	12.8	10.4	29.0	24.1	18.50
Educational services	16.6	14.2	14.7	12.3	31.3	26.5	22.42
Manufacturing	15.8	16.2	18.2	18.6	34.0	34.8	18.53
Transportation and warehousing	18.5	16.5	17.4	15.4	35.9	31.9	17.98
Wholesale trade	20.2	30.3	18.2	28.3	38.4	58.6	18.14
Mining, quarrying, and oil and gas extraction	23.8	21.5	17.6	15.2	41.4	36.7	24.38
Professional, scientific, and technical services	24.7	24.6	21.7	21.6	46.4	46.2	22.49
Real estate and rental and leasing	25.2	31.0	22.0	27.8	47.2	58.8	15.40
Information and cultural industries, arts, entertainment, and recreation	24.2	22.5	24.1	22.4	48.2	44.9	18.07
Agriculture, forestry, fishing, and hunting	24.9	36.0	29.2	40.3	54.1	76.3	14.53
Other industries	28.7	41.6	25.8	38.7	54.5	80.3	15.54
Construction	30.9	34.3	25.1	28.5	56.0	62.8	19.24
Retail trade	31.9	31.8	30.4	30.3	62.3	62.1	12.04
Accommodation and food services	39.4	41.9	40.5	42.9	79.9	84.8	10.03

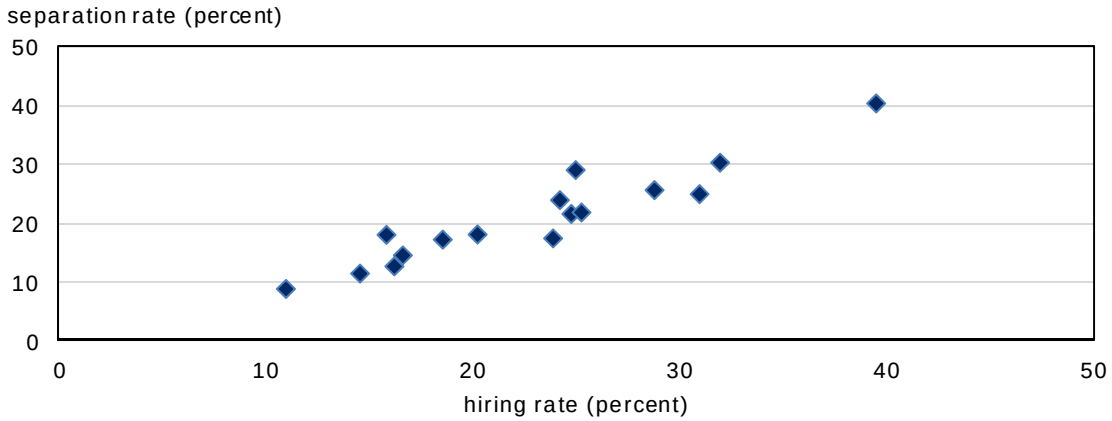
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Industries that displayed a higher degree of worker reallocation had both high hiring rates and high separation rates (Charts 8 and 9).[10] These patterns are consistent with the view that firms in these industries hire larger numbers of workers in order to maintain employment in a context of relatively larger worker turnover.

10. The correlation coefficient between industry-level hiring rates and industry-level separation rates equals 0.94 with LFS data and 0.97 with LWF data.

Chart 8

Hiring rates and separation rates by industry, average of 2000 to 2008 — Labour Force Survey data



Source: Statistics Canada, Labour Force Survey.

Chart 9

Hiring rates and separation rates by industry, average of 2000 to 2008 — Longitudinal Worker File data

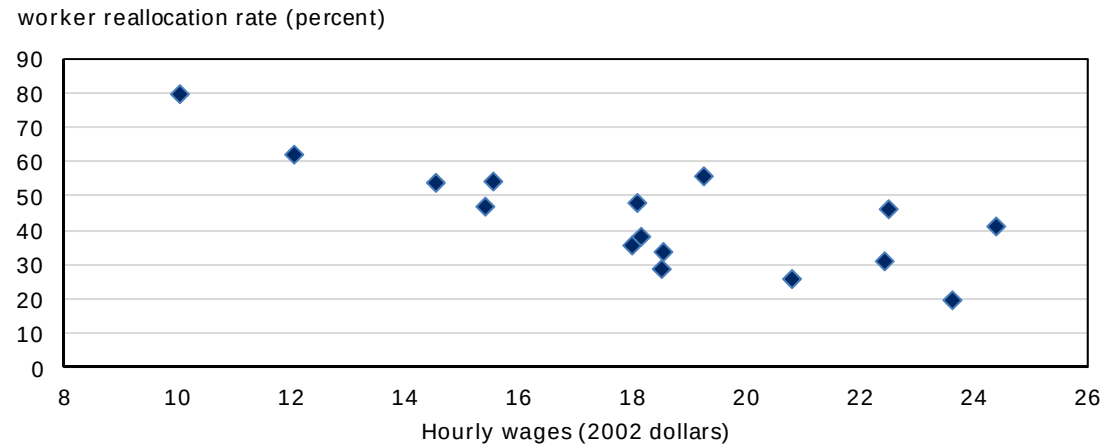
Source: Statistics Canada, Longitudinal Worker File.

Industry-specific reallocation rates were negatively correlated with hourly wages (Charts 10 and 11). For instance, labour reallocation in retail trade averaged about 60% between 2000 and 2008, more than twice the rate observed in public administration. Average hourly wages in retail trade were at $12.04 (in 2002 dollars), almost twice as low as those in public administration ($23.61).[11]

11. The correlation coefficient between worker reallocation rates and hourly wages equals -0.77 with LFS data and -0.75 with LWF data.

Chart 10

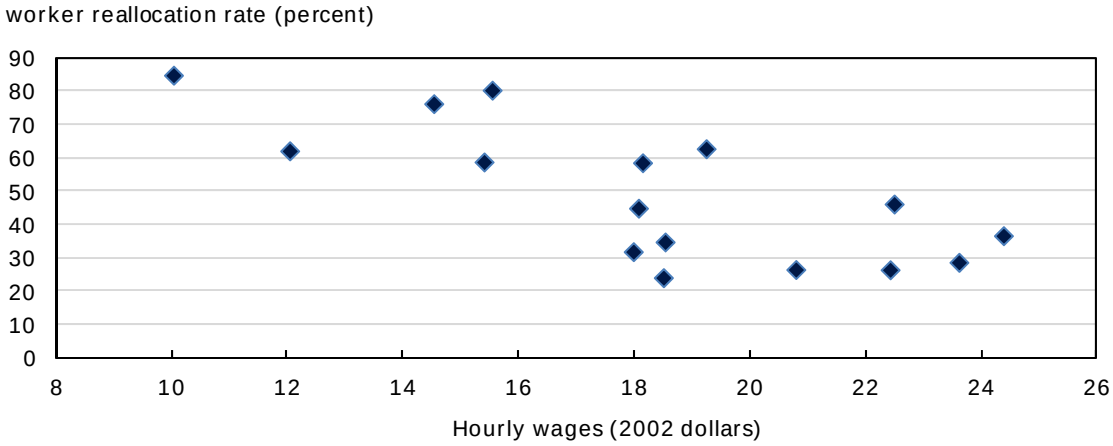
Worker reallocation rates and hourly wages by industry, average of 2000 to 2008 — Labour Force Survey data



Source: Statistics Canada, Labour Force Survey.

Chart 11

Worker reallocation rates and hourly wages by industry, average of 2000 to 2008 — Longitudinal Worker File data

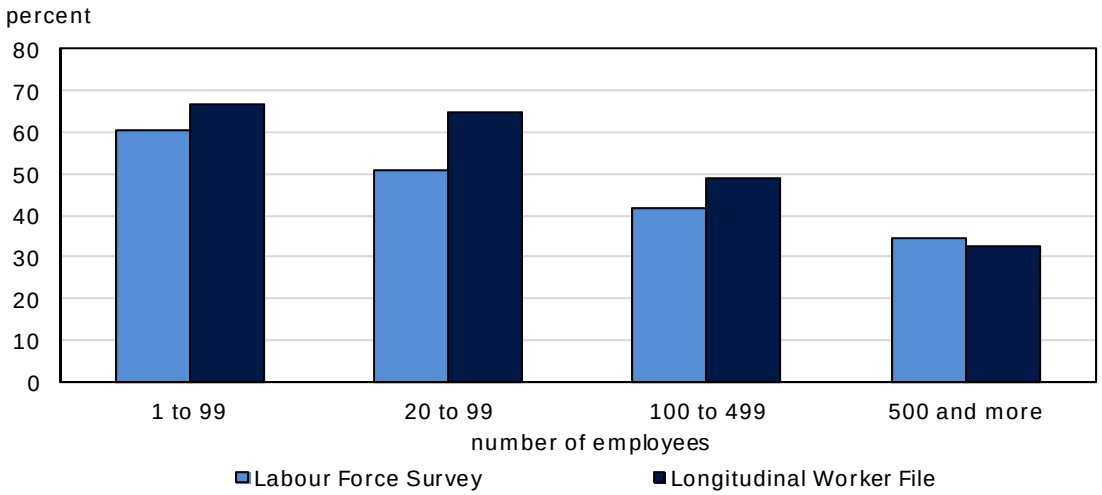


Source: Statistics Canada, Longitudinal Worker File.

Consistent with the notion that labour reallocation is negatively correlated with wages, worker reallocation rates were higher in small firms—those with fewer than 20 employees—than in larger firms (Chart 12). They were, on average, no lower than 60% in small firms, almost twice the magnitude of labour reallocation observed in large firms (firms with 500 or more employees). Hourly wages in small firms averaged $13.95 between 2000 and 2008, compared to $19.64 in large firms.

Chart 12

Worker reallocation rates by firm size, average of 2000 to 2008

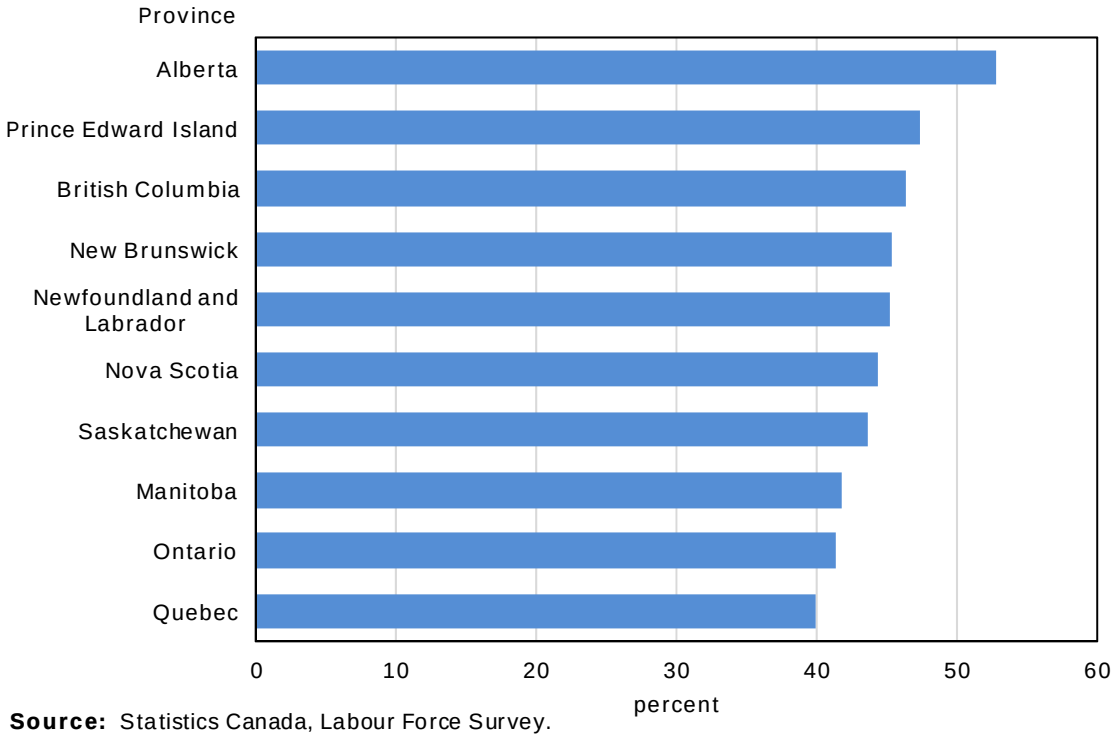


Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Worker reallocation varied moderately across provinces. Of all Canadian provinces, Alberta displayed the largest degree of labour reallocation between 2000 and 2008. Worker reallocation rates in that province averaged roughly 55% of paid employment, compared to 40%−44% in Quebec and Ontario (Charts 13 and 14). The difference was due to the fact that both hiring rates and separation rates were higher in Alberta, as job vacancies induced employers to hire a large number of workers and job opportunities allowed workers to switch employers relatively easily.

Chart 13

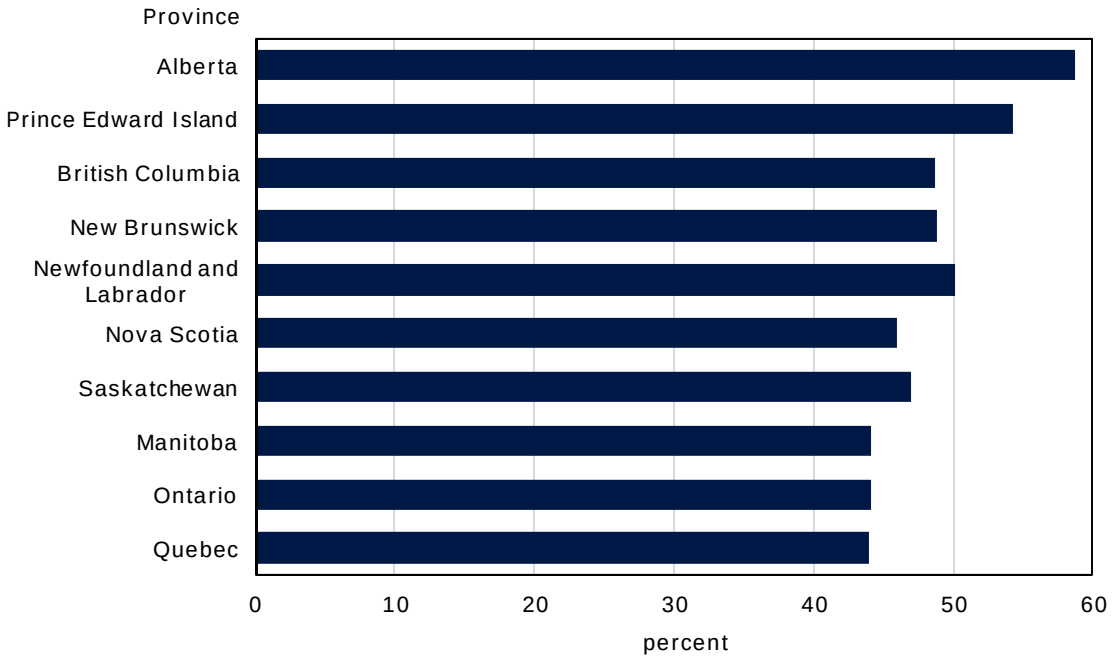
Worker reallocation rates by province, average of 2000 to 2008 — Labour Force Survey data



Source: Statistics Canada, Labour Force Survey.

Chart 14

Worker reallocation rates by province, average of 2000 to 2008 — Longitudinal Worker File data



Source: Statistics Canada, Longitudinal Worker File.

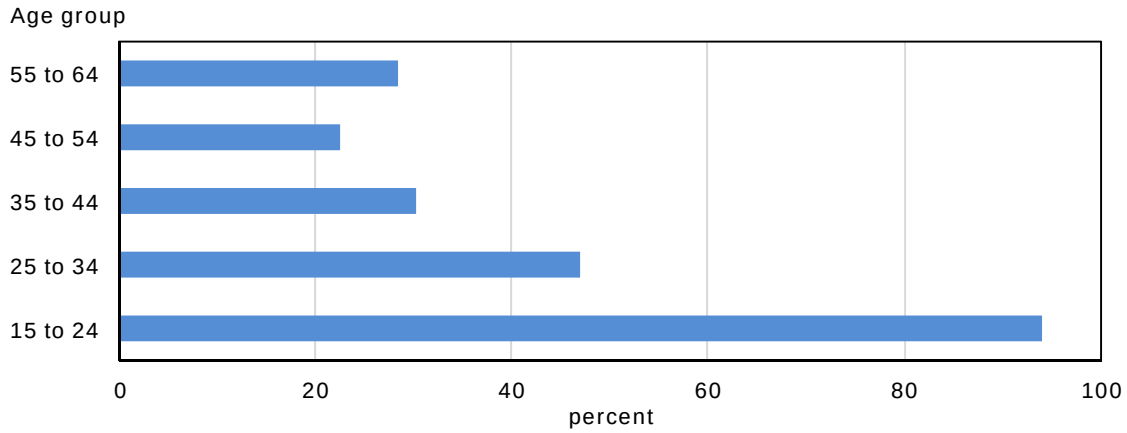
4.2 Worker reallocation rates varied across age groups and education levels

The pace of labour reallocation may vary not only with firm characteristics, but also with worker characteristics. For instance, young workers may exhibit relatively high rates of labour reallocation for a variety reasons. They may quit their jobs more often than older workers in search of a good match between their skills and jobs requirements. They may also face a higher risk of losing their jobs if firms lay off workers in part on the basis of seniority rules. Both scenarios would imply high separation rates and, all else equal, high worker reallocation rates for them. Likewise, if the quality of employer−employee matches and/or the risk of job loss depend on workers' educational attainment, worker reallocation rates may also vary across education levels.

Charts 15, 16, 17, 18, 19, 20, 21, and 22 confirm these hypotheses. Charts 15, 16, 17, and 18 show that young workers were more likely to be hired or to separate from employers than their older counterparts between 2000 and 2008. During that period, worker reallocation rates averaged roughly 90% for workers aged 15 to 24. Because many individuals in this age group attend school full-time, these high rates of labour reallocation reflect movements of students into and out of summer jobs or part-time jobs as well as job shopping early in one's career. However, important age differences remain even when the focus is on workers aged 25 to 64, a group that excludes most full-time students. Both the LFS and the LWF indicate that worker reallocation rates among men and women aged 25 to 34 averaged roughly 50% between 2000 and 2008, twice the rate of about 25% observed among their counterparts aged 45 to 54. As Table 4 indicates, these age differences result from the fact that workers aged 25 to 34 exhibit both higher hiring rates and higher separation rates than their counterparts aged 45 to 54.

Chart 15

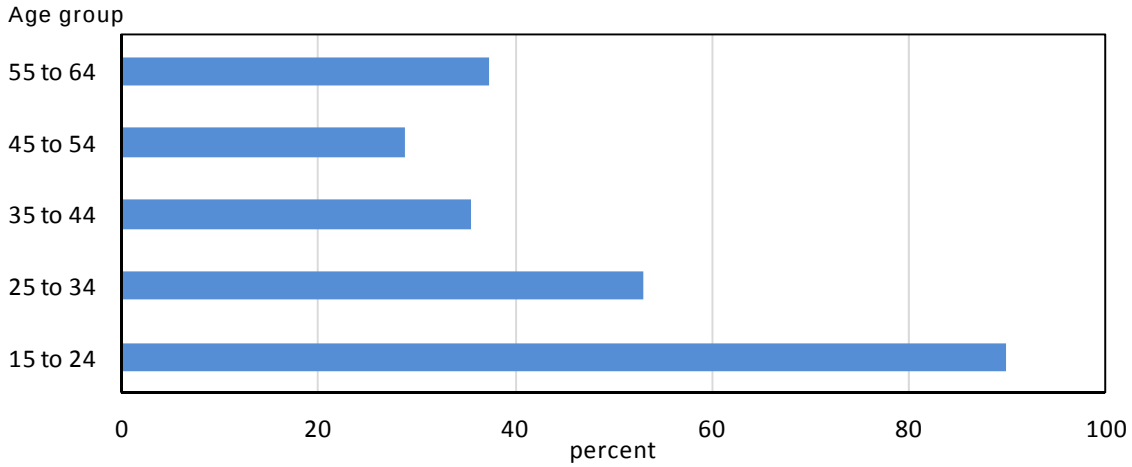
Worker reallocation rates by age, average of 2000 to 2008 — Labour Force Survey data – Men



Source: Statistics Canada, Labour Force Survey.

Chart 16

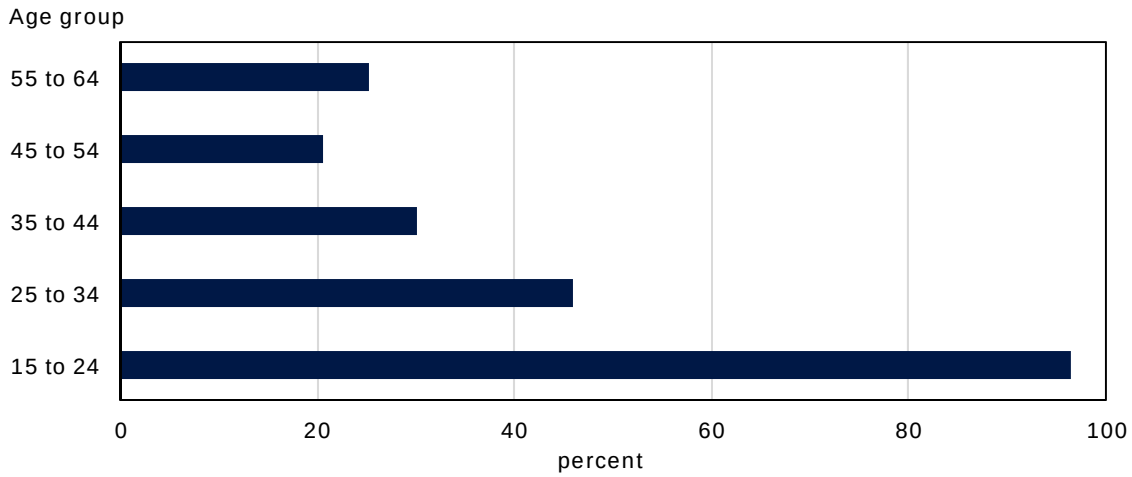
Worker reallocation rates by age, average of 2000 to 2008 — Labour Force Survey data – Women



Source: Statistics Canada, Labour Force Survey.

Chart 17

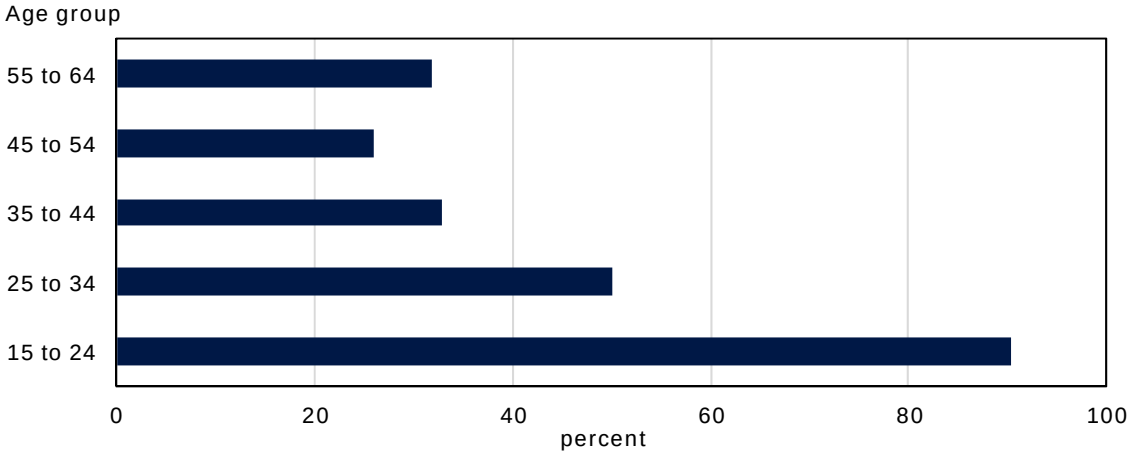
Worker reallocation rates by age, average of 2000 to 2008 — Longitudinal Worker File data – Men



Source: Statistics Canada, Longitudinal Worker File.

Chart 18

Worker reallocation rates by age, average of 2000 to 2008 — Longitudinal Worker File data – Women

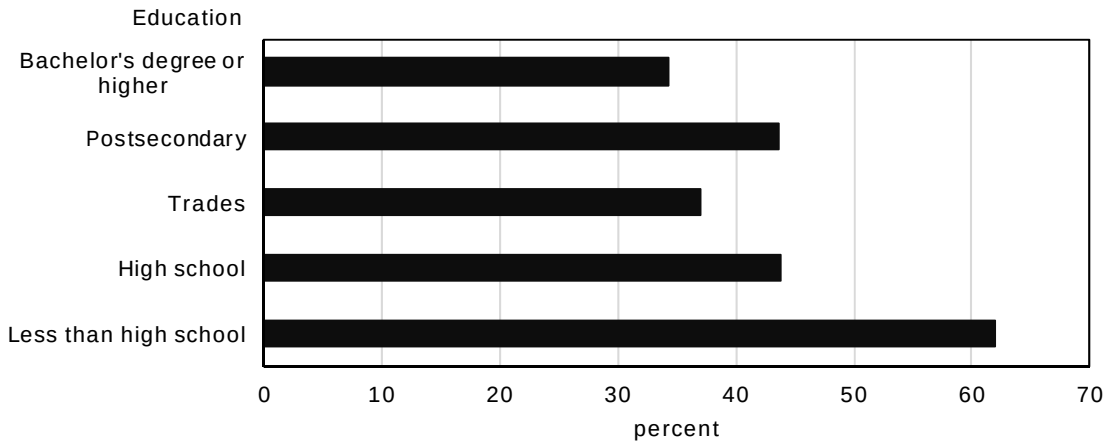


Source: Statistics Canada, Longitudinal Worker File.

Charts 19, 20, 21, and 22 show that worker reallocation also varies across education levels. LFS data indicate that both male and female high school dropouts aged 15 to 64 tend to separate from employers or start new jobs much more frequently than their better educated counterparts. Their rates of reallocation averaged about 65% between 2000 and 2008, compared to 34% for workers with a university degree. However, the difference is due largely to the inclusion of individuals under age 25 in the analysis. After restricting attention to workers aged 25 to 64, high school dropouts still exhibit higher reallocation rates than individuals with a university degree, but the difference now amounts to less than 10 percentage points: it essentially reflects the relatively high separation rates of high school dropouts (Table 4).

Chart 19

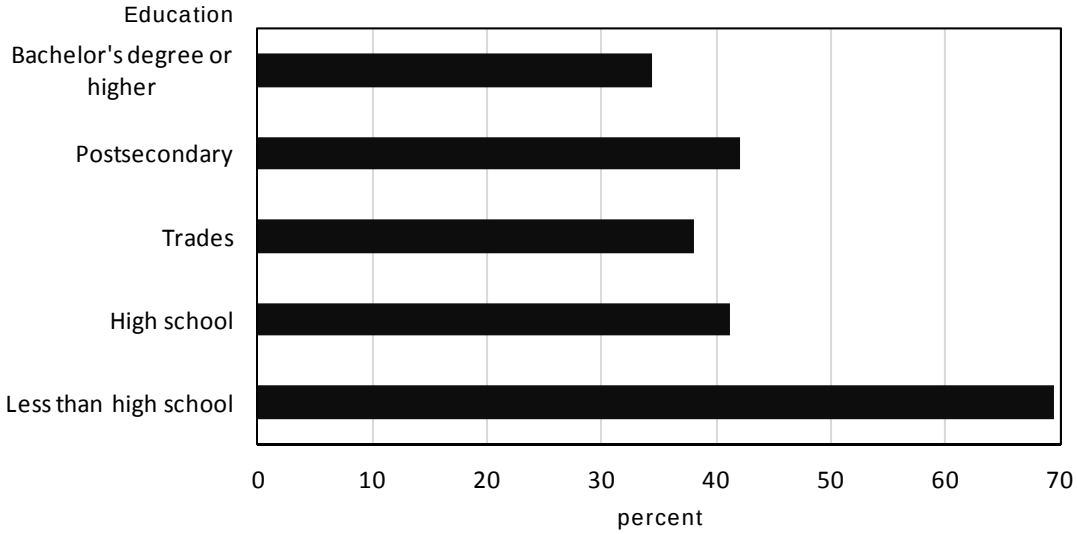
Worker reallocation rates by education, average of 2000 to 2008 — Men aged 15 to 64



Source: Statistics Canada, Labour Force Survey.

Chart 20

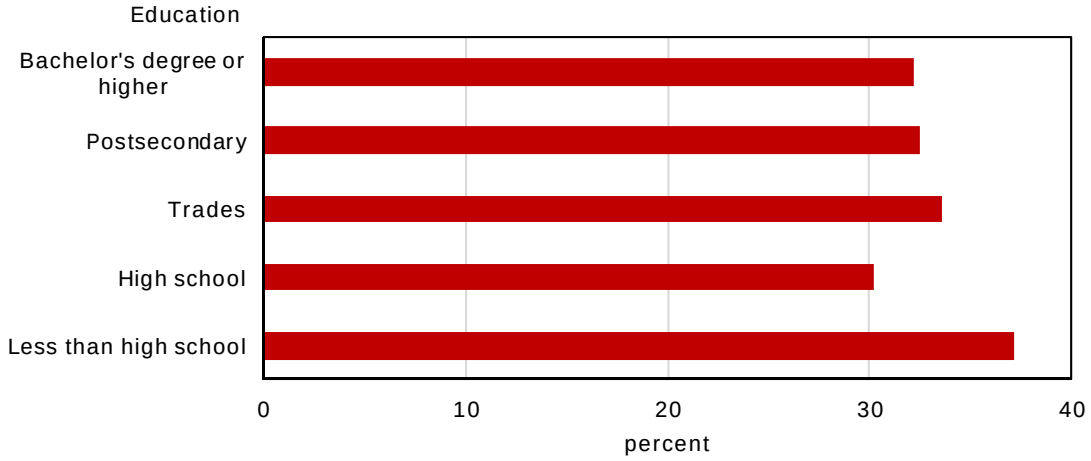
Worker reallocation rates by education, average of 2000 to 2008 — Women aged 15 to 64



Source: Statistics Canada, Labour Force Survey.

Chart 21

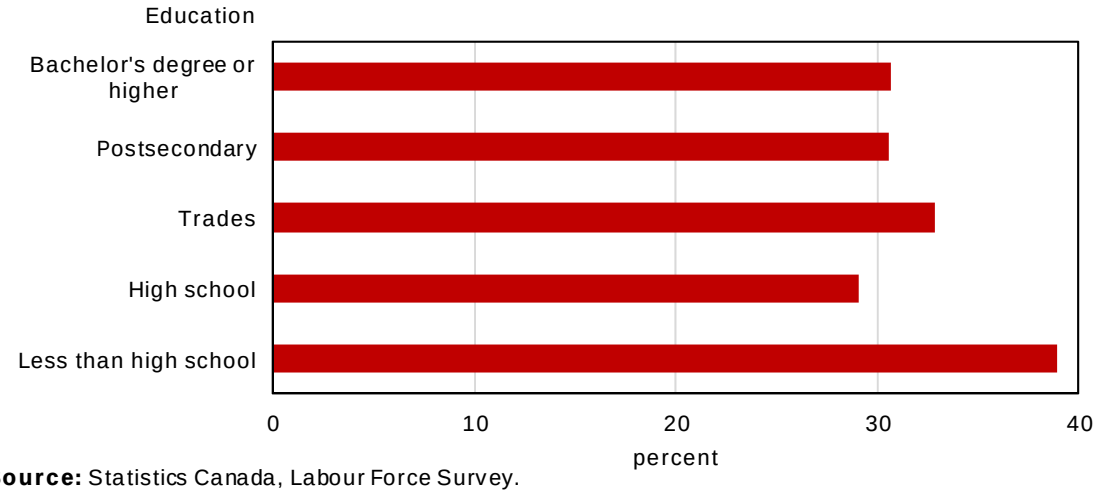
Worker reallocation rates by education, average of 2000 to 2008 — Men aged 25 to 64



Source: Statistics Canada, Labour Force Survey.

Chart 22

Worker reallocation rates by education, average of 2000 to 2008 — Women aged 25 to 64



Source: Statistics Canada, Labour Force Survey.

Table 4
Average worker reallocation rates by selected characteristics, 2000 to 2008

	Hiring rates		Separation rates		Worker reallocation rates	
	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File
	percent					
Province						
Quebec	20.7	22.8	19.2	21.2	40.0	44.0
Ontario	21.3	22.7	20.1	21.4	41.4	44.1
Manitoba	21.5	22.6	20.3	21.5	41.8	44.1
Saskatchewan	22.6	24.3	21.1	22.8	43.7	47.0
Nova Scotia	22.8	23.6	21.6	22.4	44.4	46.0
Newfoundland and Labrador	23.2	25.6	22.0	24.4	45.2	50.1
New Brunswick	23.2	25.0	22.1	23.9	45.3	48.8
British Columbia	23.8	25.0	22.5	23.7	46.3	48.7
Prince Edward Island	24.1	27.6	23.1	26.6	47.3	54.2
Alberta	27.7	30.7	25.1	28.0	52.8	58.7
Firm size						
1 to 19 employees	30.6	33.7	30.1	33.2	60.7	66.8
20 to 99 employees	25.8	32.9	24.9	31.9	50.7	64.8
100 to 499 employees	21.4	25.0	20.5	24.1	42.0	49.1
500 or more employees	18.5	17.3	16.3	15.2	34.8	32.5
Men aged						
15 to 24	53.0	51.0	40.9	38.9	94.0	89.9
25 to 34	23.8	26.8	23.2	26.2	47.1	53.0
35 to 44	15.0	17.7	15.1	17.8	30.2	35.6
45 to 54	10.4	13.6	12.1	15.3	22.5	28.9
55 to 64	9.8	14.2	18.7	23.1	28.5	37.3
Women aged						
15 to 24	54.2	51.1	42.3	39.2	96.5	90.3
25 to 34	23.5	25.6	22.4	24.4	45.9	50.0
35 to 44	15.8	17.2	14.3	15.6	30.1	32.8
45 to 54	10.1	12.7	10.6	13.2	20.6	26.0
55 to 64	8.1	11.4	17.2	20.5	25.3	31.9
Education - men aged 15 to 64						
Less than high school	28.5	.	33.5	.	62.0	.
High school	22.4	.	21.5	.	43.9	.
Trades	19.1	.	18.0	.	37.1	.
Postsecondary education	23.0	.	20.7	.	43.7	.
Bachelor's degree or higher	19.0	.	15.2	.	34.3	.

See note at end of table.

Table 4

Average worker reallocation rates by selected characteristics, 2000 to 2008 (concluded)

	Hiring rates		Separation rates		Worker reallocation rates	
	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File	Labour Force Survey	Longitudinal Worker File
	percent					
Education - women aged 15 to 64						
Less than high school	31.6	.	37.8	.	69.4	.
High school	21.2	.	20.0	.	41.2	.
Trades	20.0	.	18.0	.	38.1	.
Postsecondary education	22.5	.	19.6	.	42.1	.
Bachelor's degree or higher	19.6	.	14.8	.	34.3	.
Education - men aged 25 to 64						
Less than high school	16.4	.	20.8	.	37.1	.
High school	13.8	.	16.4	.	30.2	.
Trades	16.2	.	17.4	.	33.6	.
Postsecondary education	15.5	.	16.9	.	32.5	.
Bachelor's degree or higher	16.8	.	15.4	.	32.2	.
Education - women aged 25 to 64						
Less than high school	17.0	.	21.9	.	38.9	.
High school	14.0	.	15.1	.	29.1	.
Trades	16.2	.	16.6	.	32.9	.
Postsecondary education	15.3	.	15.2	.	30.5	.
Bachelor's degree or higher	16.0	.	14.7	.	30.7	.

Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

5 Layoffs during the 2000s

Because permanent layoffs are a key component of separations and have important implications for workers' well-being, this section investigates how they varied across worker and firm characteristics during the 2000s.[12]

Over the period from 2000 to 2008, 7.2% of jobs held by workers aged 15 to 64 ended with a permanent layoff, on average (Table 5). Permanent-layoff rates varied markedly across levels of job tenure. Newly hired males—those observed with a given employer during at most two consecutive years—had an average layoff rate of 18.7%, about six times the 3.2% rate observed for their counterparts who had been employed between 6 and 10 years with a given

12. There is now compelling evidence that layoffs cause substantial short-term and longer-term earnings losses (Jacobson et al. 1993; Stevens 1997; Couch and Placzek 2010; Eliason and Storrie 2006; Hijzen et al. 2010; Morissette et al. 2012).

employer. Newly hired women were about four times more likely to be laid-off than women with 6 to 10 years of seniority. Men and women who had been employed for 11 years or more had a fairly small risk of job loss that amounted to less than 1%. These patterns are consistent with the notion that layoffs are often implemented on the basis of seniority rules, with employment terminations concentrated on workers most recently hired.

Table 5

Average permanent-layoff rates by selected characteristics, 2000 to 2008

	Both sexes	Men	Women
		percent	
Canada	7.2	9.5	4.8
Age			
15 to 24	9.1	11.8	6.3
25 to 34	8.0	10.4	5.4
35 to 44	6.4	8.5	4.3
45 to 54	5.9	8.0	3.8
55 to 64	7.2	9.7	4.4
Job tenure (number of years observed with an employer)			
1 to 2	13.6	18.7	8.3
3 to 5	6.7	8.3	5.1
6 to 10	2.7	3.2	2.1
11 or more	0.8	0.9	0.7
Province			
Newfoundland and Labrador	17.7	22.9	12.5
Prince Edward Island	18.5	23.5	13.9
Nova Scotia	9.9	13.5	6.4
New Brunswick	13.5	18.9	8.2
Quebec	8.2	10.6	5.7
Ontario	5.5	7.2	3.7
Manitoba	5.0	6.6	3.4
Saskatchewan	6.2	8.8	3.6
Alberta	7.5	10.7	4.0
British Columbia	8.2	10.5	5.7

Note: Paid workers aged 15 to 64.
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

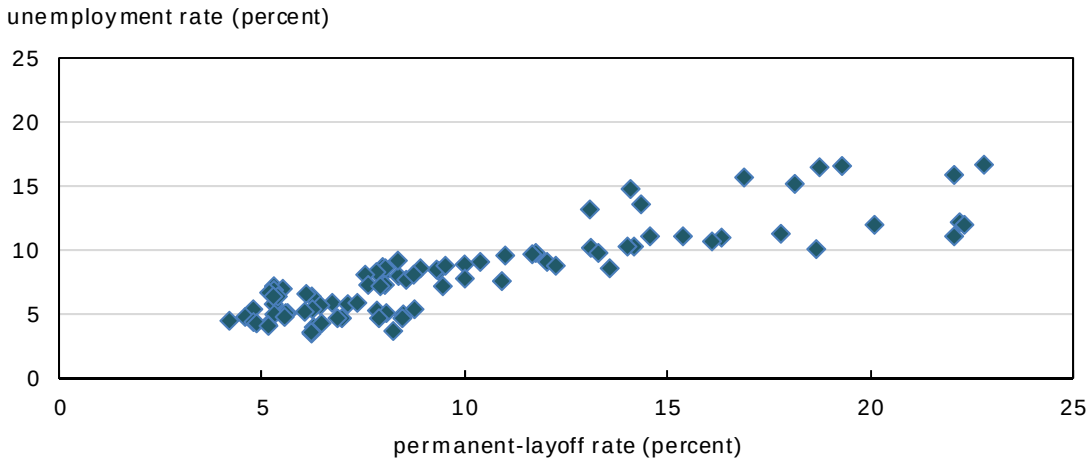
Permanent-layoff rates varied across age groups to a lesser extent than they did across seniority levels. Men and women aged 45 to 54 had lower layoff rates than those aged 25 to 34, but this difference was moderate: it amounted to at most 2.4 percentage points.

Provinces that typically display high unemployment rates had higher-than-average permanent-layoff rates during the 2000s. Layoff rates averaged roughly 18% in Newfoundland and Labrador as well as Prince Edward Island, more than three times the rates of 5.5% and 5.0% observed in Ontario and Manitoba, respectively. As charts 23 and 24 indicate, these cross-

provincial differences in layoff rates were highly correlated with cross-provincial differences in unemployment rates.[13]

Chart 23

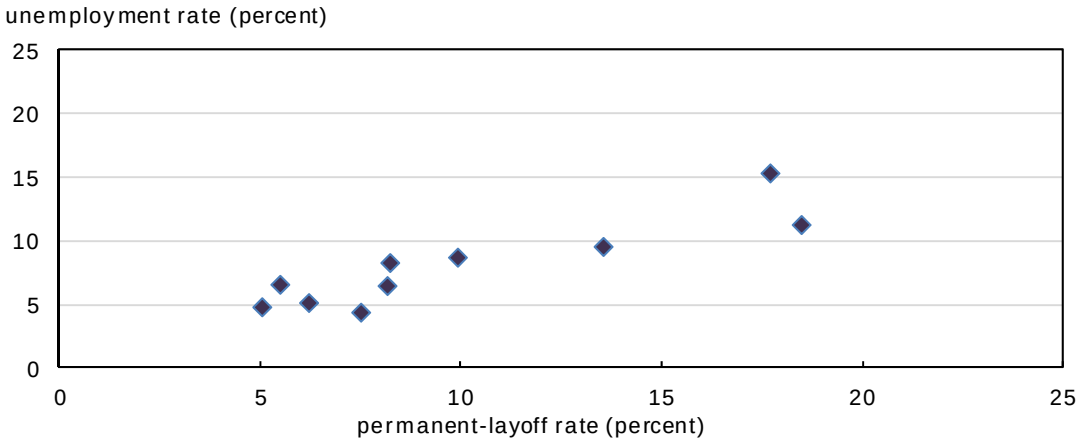
Unemployment rate and permanent-layoff rate by province and year, 2000 to 2008



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Chart 24

Unemployment rate and permanent-layoff rate by province, average of 2000 to 2008



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

In line with previous studies (Picot 1992; Picot et al. 1998; Morissette 2004), Table 6 shows that permanent-layoff rates varied across firm sizes. Men and women employed in small firms (those with fewer than 20 employees) were, in the aggregate, at least three times more likely to be permanently laid-off than their counterparts employed in large firms (firms with 500 or more employees).[14]

13. Assessing the degree to which cross-provincial differences in permanent-layoff rates account for cross-provincial differences in unemployment rates requires taking into account numerous factors and is beyond the scope of this study.
14. Picot (1992) showed that workers' likelihood of being permanently laid-off remains higher in small firms after controlling for industry of employment, age, education, occupation, and wages.

Of all industries, those whose output has an important seasonal component—agriculture, forestry, fishing, and hunting as well as construction—displayed the highest permanent-layoff rates during the 2000s. Layoff rates in these sectors averaged roughly 30%. In contrast, layoff rates in finance and insurance and in health care and social assistance were no higher than 2%. Manufacturing, wholesale trade, information and cultural industries, real estate and rental and leasing, as well as professional, scientific, and technical services, had average layoff rates that were close to the national value of 7.2%. Low-wage sectors such as retail trade, and accommodation and food services, exhibited lower-than-average layoff rates; this suggests that the relatively high separation rates that these sectors display in Table 3 reflect higher-than-average quit rates or other types of separations.

For all levels of job tenure, age groups, provinces, and firm size categories, men's layoff rates exceeded those of women (Tables 5 and 6). However, relatively small gender differences are observed within industries. For instance, layoff rates of men and women in manufacturing averaged 6.6% and 6.5%, respectively, during the period from 2000 to 2008 (Table 6). Men and women employed in wholesale trade and educational services also had fairly similar layoff rates. The similarity of men's and women's layoff rates within industries suggests that the higher layoff rates observed for men at the aggregate level partly reflect the predominance of men in industries with higher-than-average layoff rates (e.g., construction, mining, quarrying, and oil and gas extraction) and the predominance of women in sectors with lower-than-average layoff rates (e.g., educational services, health care, and social assistance). Multivariate analyses confirm this. Pooling all years of the period from 2000 to 2008 and adding a vector of four-digit industries to a probit model of layoff rates that initially includes only a constant term and a gender indicator allows one to account for most of the gender differences in layoff rates. Doing so reduces these differences by 83%. This finding indicates that male−female differences in layoff rates are driven largely by gender differences in industry of employment.

Table 6
Average permanent-layoff rates by industry and firm size, 2000 to 2008

	Both sexes	Men	Women
	percent		
All industries	7.2	9.5	4.8
Industry			
Agriculture, forestry, fishing, and hunting	29.2	30.2	26.9
Mining, quarrying, and oil and gas extraction	10.4	11.6	5.0
Construction	33.7	36.1	15.9
Manufacturing	6.6	6.6	6.5
Wholesale trade	8.2	8.2	8.4
Retail trade	3.4	4.0	3.0
Transportation and warehousing	4.8	5.1	4.1
Information and cultural industries, arts, entertainment, and recreation	7.0	7.6	6.4
Finance and insurance	2.0	2.7	1.7
Real estate and rental and leasing	7.0	8.8	5.2
Professional, scientific, and technical services	7.1	8.3	5.9
Educational services	4.0	4.1	4.0
Health care and social assistance	1.4	1.9	1.4
Accommodation and food services	5.7	6.0	5.5
Public administration	4.8	3.9	5.7
Other industries	11.9	13.7	9.8
Firm size			
1 to 19 employees	13.7	18.8	9.0
20 to 99 employees	10.8	14.2	6.5
100 to 499 employees	7.0	9.5	4.3
500 or more employees	3.5	4.3	2.7

Note: Paid workers aged 15 to 64.
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

6 Conclusion

Every year, the Canadian economy experiences a substantial amount of labour reallocation. Thousands of workers leave firms in search of better job opportunities. Employers adjust the size of their workforce through hiring or downsizing in response to general economic developments, technological changes, changing trade patterns and consumer preferences, exchange rate movements, and numerous other factors. It is sometimes asserted that, as a result of "increased economic turbulence," the magnitude of labour reallocation rose over the last decades in Canada. This article examined whether this is the case using data from two Statistics Canada data sets.

The study shows that, contrary to the aforementioned assertion, worker reallocation did not trend upwards over the last three decades. While separation rates, worker reallocation rates, and permanent-layoff rates may have been higher in recent years than they were during the 1960s or 1970s, they were no higher during the 2000s than during the 1980s or 1990s.

While the pace of worker reallocation has been fairly stable over the last three decades, it varied substantially across age groups, industries, and firm sizes over the period from 2000 to 2008. Small firms, low-wage industries, and young workers displayed both relatively high hiring rates and separation rates. Young workers and those employed in small firms also displayed higher-than-average permanent-layoff rates. Consistent with the existence of seniority rules, layoff rates differed markedly across job tenure. In the aggregate, the pace of worker reallocation that was observed during the 2000s was, at about 45% of paid employment, fairly similar to that observed in the United States and the United Kingdom.

Some limitations should be kept in mind. Worker reallocation rates may have evolved differently across industries, age groups, or education levels during the 2000s, in particular after the most recent recession, which led to employment declines starting in October 2008. Whether or not this is the case is a question for future research.

7 Appendix

7.1 Calculation of hiring rates, layoff rates, separation rates, and rates of worker reallocation

Following Morissette et al. (2012), *permanent-layoff rates* in year *t* are computed by dividing the number of permanent layoffs that occur in a given year, $Permanent\ layoffs\_t$ (as measured from the LWF), by average annual paid employment, E_t (as measured from the LFS): [15]

$$Permanent\ layoff\ \ rate\_t = Permanent\ layoffs\_t \,/\, E\_t \tag{3}$$

The information used to measure layoffs is drawn from the ROE, using "shortage of work" as a reason for job termination (code "A" on the ROE).

In addition to permanent layoffs, the LWF measures the number of individuals who start a job with (at least) one new employer in a given year, thereby providing annual estimates of hirings. The LFS can also provide estimates of hirings. The seniority variable in LFS allows the identification of workers who have been hired over the last 12 months. This in turn allows the calculation of annual estimates of hirings.

When using the LWF, the number of individuals hired between January of year *t* and January of year *t+1* is estimated by counting the number of workers who, in year *t+1*: *(a)* hold at least one job in which they have been observed for two consecutive years; and *(b)* hold no other job of longer duration. The corresponding hiring estimate from the LFS is obtained by counting the number of workers who, in January of year *t+1*, have 12 months of seniority or less with their current employer.

Considering any given group of workers, net changes in paid employment are related to hirings and separations by the following accounting identity:

$$Net\ changes\ in\ paid\ employment \equiv Hirings - Separations \tag{4}$$

Using the LFS to measure net changes in paid employment, and the LWF or the LFS to measure hirings, separations can be computed residually using equation (4). Separations then represent the number of workers who separated from (at least) one employer in a given year through quits, layoffs, or separations for other reasons.

15. A person experiencing two permanent layoffs in a given year will contribute two observations to equation (3).

Net changes in paid employment are calculated from the LFS by subtracting paid employment in January of year *t* ($E_{\_01\_t}$) from paid employment in January of year *t+1* ($E_{\_01\_t+1}$), i.e., as follows:

$$Net\ changes\ in\ paid\ employment = E_{\_01\_t+1} - E_{\_01\_t} \quad (5)$$

E_{01_t} measures paid employment of workers aged 15 to 64, while E_{01_t+1} measures paid employment of workers aged 16 to 65. *Hiring rates* in year *t* measure the percentage of workers who started a job with at least one new employer during that year. They are computed by dividing the number of individuals hired between January of year *t* and January of year *t+1*, $Hirings_{\_01\_t\_01\_t+1}$, by the average level of paid employment observed during these two months:

$$Hiring\_rate\_t = Hirings_{\_01\_t\_01\_t+1} / \left(\left[E_{01\_t} + E_{01\_t+1}\right] / 2\right) \quad (6)$$

Separation rates in year *t* measure the percentage of workers who separated from at least one employer during that year. They are computed by dividing the number of individuals who separated from (at least) one employer between January of year *t* and January of year *t+1*, $Separations_{\_01\_t\_01\_t+1}$, by the average level of paid employment observed during these two months:

$$Separation\_rate\_t = Separations_{\_01\_t\_01\_t+1} / \left(\left[E_{01\_t} + E_{01\_t+1}\right] / 2\right) \quad (7)$$

Following OECD (2009), *worker reallocation rates* are obtained by summing hiring rates and separations rates:

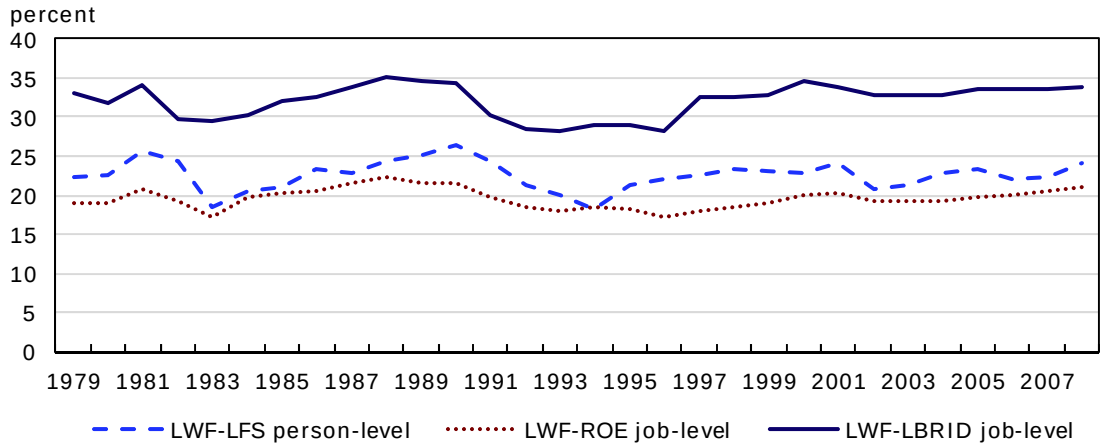
$$Rate\ of\ worker\ reallocation\_t = Hiring\_rate\_t + Separation\_rate\_t \quad (8)$$

It is important to understand that the hiring rates and separation rates derived from equations (6) and (7) are measured at the person level. Defining hiring rates and separation rates at the job level will yield different estimates.

The LWF can generate directly two measures of separation rates at the job level. One measure captures the percentage of jobs (i.e., employer−employee pairings) observed in year *t* but not observed in year *t+1*. This measure is labeled "LWF−LBRID (Longitudinal Business Register Identifier) job-level" in Chart 25. The second measure adds the restriction that a ROE is associated with these jobs. This measure is labeled "LWF-ROE job-level" in Chart 25. Both of these measures can be compared to the separations rate obtained from equation (7), which is labeled "LWF-LFS person-level" in Chart 25.

Chart 25

Various measures of separation rates, workers aged 15 to 64, 1979 to 2008

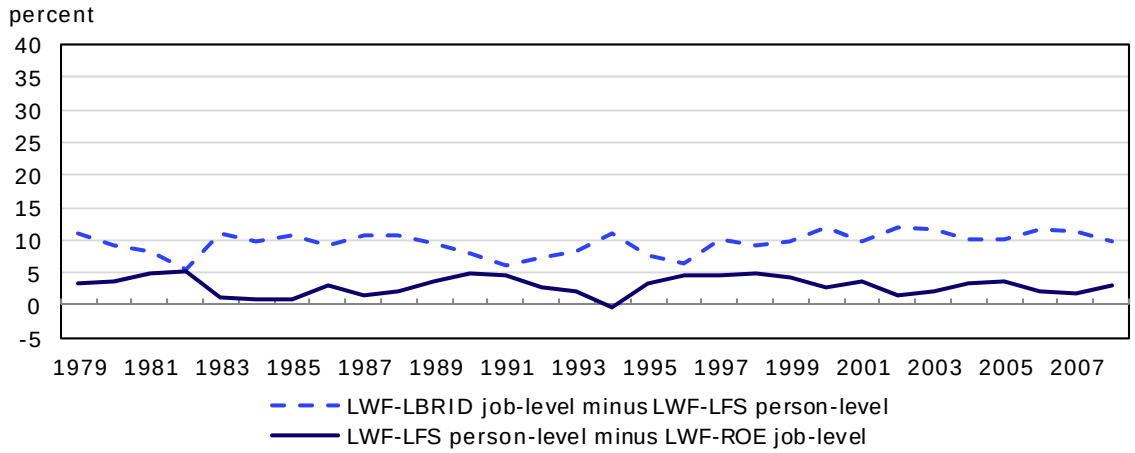


Note: LWF stands for *Longitudinal Worker File*; LFS stands for *Labour Force Survey*; ROE stands for *Record of Employment*; LBRID stands for *Longitudinal Business Register Identifier*.
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

As Chart 25 indicates, the job-level measure of separation rates labeled "LWF−LBRID job-level" yields higher estimates than the other two measures. The difference between "LWF−LBRID job-level" and "LWF−ROE job-level" is that not all job separations are associated with an ROE. The difference between "LWF−LBRID job-level" and "LWF−LFS person-level" reflects the fact that a given worker can separate from several jobs in a given year. More important, charts 25 and 26 indicate that all three measures of separation rates—as well as differences between various measures—display no trend over the period from 1979 to 2008. Hence, the conclusion that separation rates did not trend upwards over the last three decades is robust to the choice of metric considered.

Chart 26

Differences between various measures of separation rates, workers aged 15 to 64, 1979 to 2008

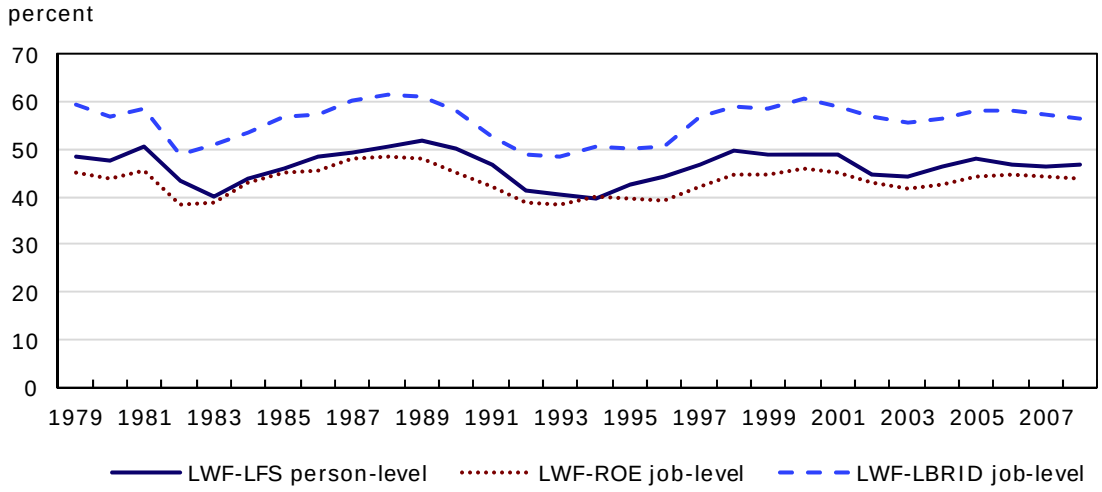


Note: LWF stands for *Longitudinal Worker File*; LFS stands for *Labour Force Survey*; ROE stands for *Record of Employment*; LBRID stands for *Longitudinal Business Register Identifier.*
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

The same point can be made regarding worker reallocation. Adding the hiring rates computed from equation (6) using LWF-based numbers of persons hired to these three measures of separation rates yields three measures of worker reallocation. As Chart 27 shows, none of these three measures trends upwards over the period from 1979 to 2008.

Chart 27

Various measures of worker reallocation rates, workers aged 15 to 64, 1979 to 2008

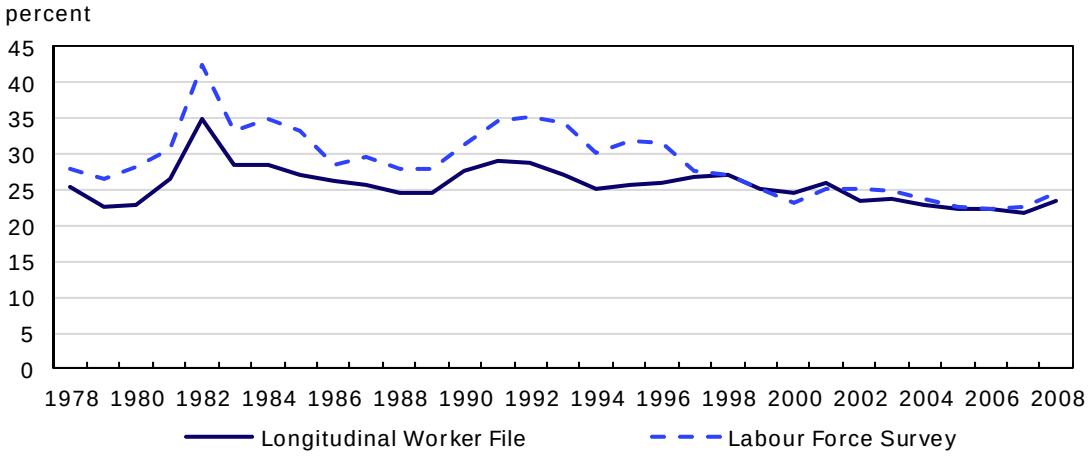


Note: LWF stands for *Longitudinal Worker* File; LFS stands for *Labour Force Survey*; ROE stands for *Record of Employment*; LBRID stands for *Longitudinal Business Register Identifier.*
Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

7.2 Other charts and tables

Chart 28

Layoff rates (permanent and temporary layoffs), workers aged 15 to 64, Longitudinal Worker File versus Labour Force Survey, 1978 to 2008



Sources: Statistics Canada, Longitudinal Worker File and Labour Force Survey.

Table 7
Trends in worker flows, 1976 to 2011

	Trends			
	Column 1	Column 2	Column 3	Column 4
Hiring rate				
Coefficient	-0.142	-0.133	0.006	0.014
T-value	-0.52	-0.65	0.02	0.07
Separation rate				
Coefficient	-0.106	-0.098	-0.012	-0.005
T-value	-0.34	-0.36	-0.04	-0.02
Reallocation rate				
Coefficient	-0.248	-0.231	-0.007	0.009
T-value	-0.63	-1.12	-0.02	0.04
Controls				
Population aging	No	No	Yes	Yes
Unemployment	No	Yes	No	Yes

Note: The numbers show the value of a constant term in a regression where the dependent variable equals the first-differenced values of the year effects defined in equation (3).
Source: Statistics Canada, authors' calculations from the Labour Force Survey.

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