Rising Job Stability in the 1990s: the Impact of Compositional Change

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Abstract

This paper documents new job stability patterns in Canada and explores their causes. Using the Labour Force Survey master files, I find that what was previously seen as cyclical change is actually a secular increase in job stability. Since the early 1990s, job stability increased at the aggregate level, with stronger increases for women and workers with less than one year on the job. For the latter group, the change is particularly striking. Comparing the 1987-1989 and 1998-2000 periods, both strong expansionary periods, job stability for workers with less than one year of initial tenure increased by 23%. Results indicate that the ageing of the workforce, increased educational attainment, and increased labour force attachment of women play important roles in explaining the aggregate job stability patterns that emerge. However, only rising educational attainment matters for newer jobs—with a large part of the increase still unexplained.

JEL Classification: J63, J64

Key Words: employment, job stability, duration analysis

1 Introduction

It is widely acknowledged that technological change, combined with an increase in international trade, has had a significant impact on the economy. The 'New Economy' literature has emphasized how these forces have altered the employer-employee relationship, resulting in a breakdown of traditional job arrangements and a rise in non-standard work such as temporary work and self-employment (e.g., Autor (2003); Vosko, Zukewich, and Cranford (2003)). A perception exists that, in this new economy, workers have become as disposal as any other resource - implying that job stability has declined. However, researchers who directly examined this issue found no evidence of a long term decline in job stability (e.g. Bernhardt, Morris, Handcock, and Scott (1999) Gottschalk and Moffitt (1999), Heisz (2005), Neumark, Polsky, and Hansen (1999)). This mainly U.S. based research faces significant data limitations, which makes it difficult to differentiate between cyclical and secular change. Using a rich source of Canadian tenure data, I find that job stability has actually increased. The objective of this paper is to document the striking new Canadian job stability patterns and explore their causes.

Identifying changes in job stability is important for many reasons. Given that pensions are typically associated with long term employee-employer relationships, a decline in job stability would affect the efficient design of employer-based pension plans, and that of government sponsored saving plans, e.g. RRSPs in Canada and 401Ks in the United States. Understanding changes in job stability is also a necessary first step towards better labour market policies—even if job security is the object of interest.[1] There is often a fine line between a quit and a layoff, e.g. voluntary buy-out packages. As a result, focussing exclusively on layoffs (or quits) may lead to incomplete, or even incorrect, policy recommendations. Finally, economic theory does not typically make a distinction between quits and layoffs—there is a separation when the surplus is gone.[2] As a result, job stability is a natural focus. In

[1] Job security refers to involuntary job loss, while job stability does not make a distinction between voluntary and involuntary job separation.

[2] There are some exceptions. Within an efficient turnover model where only non-surplus produces matches

a world of incomplete contracts, for example, a decrease in job stability may lead to lower productivity and thus be detrimental to economic growth (e.g. Francois and Roberts (2003) and Ramey and Watson (1997)).

The job stability literature has relied on the retention rate, the probability that a job with a particular employer will last one more period, to proxy for job stability. In order to examine long term changes in job stability using retention rates, it is essential to have detailed and consistent tenure data that is available on a regular basis.

Commonly used panel data sets (in North America) fail to meet these stringent requirements in various ways. One cannot separate out the cohort effect from the period effect in both U.S. national longitudinal surveys.[3] The Panel Study of Income Dynamics (PSID) and the Survey of Income and Program Maintenance (SIPP), suffers from serious measurement error with respect to the job tenure data.[4] Finally, the two main Canadian Panels, the Survey of Income Dynamics (SLID) and the Labour Market Activities Survey (LMAS) have limited historical coverage. The SLID only dates back to 1993, while the LMAS has only two short panels, a 1986-1987 panel, and a 1988-1990 panel.

In this paper, I use the Labour Force Survey master files (1977-2004) as repeated cross sections. The Canadian LFS is the only North American data set that satisfies the stringent data requirements of the retention rate approach.[5] A consistent job tenure question has been part of the regular monthly LFS questionnaire since its inception. As a result, a full set of one-year retention rates can be constructed dating back to 1977.[6] Using this full set

are dissolved, McLaughlin (1991) labels a separation as a quit (layoff) if the worker (firm) initiates the unsuccessful wage change.

[3] i.e. the National Longitudinal Survey of Young Men (NLSYM) and the National Longitudinal Survey of Youth (NLSY79).

[4] The tenure question of the PSID has changed over time, with a significant change over the 1984-1987 period. The results have been found to vary, depending on how one deals with the measurement problem (see Jaeger and Stevens (1999)). Finally, the Bureau of Labor Statistics (BLS) has found some important inconsistencies with the job identification number across the waves of the SIPP (see Stinson (2003)). Using administrative data, the BLS was able to provide a revised public use version for 1990-1993, but not for the 1980s.

[5] See Brochu (2006) for a comprehensive discussion of the limitations of other North American datasets—both panel and repeated cross-sections.

[6] Some researchers (e.g. Neumark, Polsky, and Hansen (1999) and Swinnerton and Wial (1995)) have applied repeated cross sectional methods to the U.S. Current Population Survey (CPS). They also face

of retention rates one can identify new patterns and explore their causes. Due to the many similarities between the Canadian and U.S. labour markets, the LFS may shed light on the changes in job stability not only for Canada, but also for the United States.

This work contributes to the literature in the following ways: First, I show that recent changes, previously believed to be part of cyclical patterns, actually represent secular increases in job stability. Heisz (2005) is the only other researcher to have used the LFS master files to examine long term patterns in job stability in Canada—not the exploration of their causes. He did not find any evidence of any long term decline in job stability.[7] By extending the period of analysis to the mid-2000s, I can show that the job stability patterns have in fact changed. I identify important increases in Canadian job stability at the aggregate level, and in particular, for women and workers with low job tenure.

Second, this paper is the first to explore the source of changes in job stability. Using standard decomposition techniques I show that the ageing of the workforce, the increased labour force attachment of women, and the increased educational attainment of workers play important roles in the new aggregate job stability patterns.

The same decomposition techniques, when applied to more narrowly defined rates, will not address the counterfactual of interest. I propose an adjustment that can separate out compositional effects. Using the proposed adjustment, I find that ageing of the workforce cannot explain the large increase in job stability of newer jobs; the only compositional change that matters is education, and even then much remains unexplained.

data difficulties. Specifically, the tenure question is not part of the monthly CPS questionnaire, but is only included in select supplements. The irregularity of the data compromises the ability to identify job stability patterns—let alone their origins. I believe this to be a prime reason why the job stability literature in the U.S. never went much beyond a basic characterization of the job stability patterns.

[7] Green and Riddell (1997) also used the LFS to examine changes in job stability, but relied on the public access files for 1979-1989, and 1991. In the public access files, tenure is only available by broad categories, making it impossible to directly calculate retention rates. As a result, they had to examine the distribution of in-progress jobs, a method more sensitive to job inflows. More importantly, their data ended just prior to a period of important change in job stability.

2 Data and Empirical Approach

The main data used in this paper is from the LFS master files. The LFS is a large monthly household survey, of approximately 54,000 households per month, with a focus on gathering information about the labour market activities of Canadians. A unique strength of the LFS is the quality and consistency of tenure data. As part of the regular LFS questionnaire, dating back to 1976, employed respondents are asked, *"When did he/she start working for [name of employer]?"*.

My sample contains all individuals between the ages of 20 and 55 in the incoming rotation group over the 1977-2004 period.[8] The LFS follows a rotating panel design, where a household remains in the sample for six consecutive months, and every month one sixth of the sample is replaced. By restricting attention to the incoming group one can ensure a random sample. The upper age limit accounts for the falling retirement age. By excluding those above the age of 55, one can focus on quits and layoffs, and not have the results tainted by voluntary retirement. The lower age limit accounts for the small fraction of 15-19 year olds who work, with the majority still in school.

This paper uses a retention rate approach to identify the job stability patterns in Canada. A one year retention rate for workers with characteristics c in year j, R_j^c, is simply the probability that such a worker remains with the same employer for an additional year. There are two advantages to a retention rate approach. One advantage is the direct link between job stability and retention rates - a job with the same employer is less stable if it has a lower probability of lasting one more period. The second important advantage is that a well-conditioned retention rate will be less sensitive to job inflows than in-progress job measures.

[8] Although data is available as of January 1976, the first year was a ramping up year for the survey. As such, the 1976 files are much smaller than subsequent years; 35.7% smaller than in 1977 and 32.5% smaller than the 1977-1981 average sample size. The increase was not uniform across time or province. It started in urban areas (and PEI), probably because it was easier to do so. In early 1977, the sample size reached 55,730 households. It should be recognized that the 1976 weights were adjusted to reflect these changes. The start year is important in its role of determining the group proportions for the decomposition exercises. Considering the 29 years of available data, the benefits of starting the sample in 1977, outweigh the costs of discarding some information.

Canada has experienced a historically large increase in labour force participation of women and a significant demographic change brought about by the baby-boomers, indicating that job inflows are an important issue for Canada.

The retention rates are estimated non-parametrically using cross sectional data. This paper uses a cross sectional estimator commonly employed in the job stability literature (Brochu (2006), Heisz (2005), Neumark, Polsky, and Hansen (1999), Swinnerton and Wial (1995)). This approach has also been used outside of the job stability literature to estimate other continuation/transition probabilities (e.g. the probability of staying unemployed (Baker 1992)).

In its simplest and most intuitive form, the cross sectional estimator for period j requires that the period j and $j+1$ cross sections be drawn from a population cohort; that the two cross sections select from the same pool of individuals, but at different moments in time.[9] Like the cross sectional literature, this paper also uses a slight variation of the basic approach—one that allows for population changes due to immigration, emigration, or deaths. Brochu (2007) shows that this approach will be consistent if the population changes lead to breaks in tenure spells. This implies that the worker does not stay with the same employer when he migrates to/from Canada. In practice, the two estimation approaches provide very similar estimates. This illustrates the strength of the LFS. Even with different identifying assumptions, the frequency of the LFS tenure data ensures similar results.[10]

3 Job Stability Patterns

This section documents the Canadian job stability patterns for the 1977-2004 period. The retention rates are calculated in a forward manner, i.e. the one-year retention rate for year j

[9]The non-parametric panel estimator also requires that the samples be drawn from a population cohort. In this case, it implies that a sample of individuals is randomly selected, and that for each individual there are two years of data. As previously discussed, the lack of good panel data has led researchers to focus on the cross sectional approach.

[10]See Brochu (2007) for a more detailed discussion of the estimators, their identifying assumptions, and the approach to constructing standard errors.

estimates the proportion of jobs that continue into year $j+1$. As a result, a sample extending to 2004 generates one-year retention rates up to 2003.

Figure 1 shows the overall one-year retention rate for 1977-2003. The overall rate is contrasted with annual unemployment rate to clearly highlight the changing patterns.[11] In the early part of the sample, the overall retention rate was counter-cyclical; it almost perfectly mirrored the unemployment rate cycle.[12] But by the early 1990s the pattern had changed. The retention rate increased substantially in the 1990s, well above 80%, and stayed fairly constant at these historically high levels for the duration of the 1990s and into the 2000s—despite the fact that the unemployment rate was in decline. The narrow width of the 95 percent confidence interval shows that the break in the aggregate pattern in the 1990s was also statistically significant.[13]

Due to its straightforward mathematical representation, the aggregate retention rate, R_j, can be expressed as a weighted average of retention rates for any G sub-groups (sub-populations)

$$R_j = \sum_{g=1}^{G} \gamma_j^g R_j^g \tag{1}$$

where γ_j^g represents the proportion of the working population in year j that are in group g—as long as the G groups must be mutually exclusive and exhaust the conditioned population. Therefore, exploring for change along specific dimensions such as gender, age and education, to name just a few, can provide insight on the source of the new aggregate pattern. In the next section, I focus on the impact of compositional change in the workforce, i.e. on the impact of changing γ_j^g in equation (1).

[11] I used Canada's official (annual) unemployment rate for individuals 15 years and up. It should be noted that Statistics Canada, Canada's statistical agency, uses the Canadian LFS to derive their labour force statistics.

[12] This result is not sensitive to the choice of age group. I got a similar result using the unemployment rate for individuals 20 to 54 years of age.

[13] I also checked for a post- 1993 difference by regression the overall rate on the unemployment rate, a dummy that equals if 1993 onwards, and an interaction term. The unemployment rate effect becomes both economically and statistically insignificant in the post 1993 period.

Figure 2 shows differences in retention rates between men and women. Prior to the 1990s, the male retention rate exceeded the 80% mark on more than one occasion, but never remained above this threshold for long. For females it was a different story. The retention rates of the 1990s and 2000s are well above anything achieved prior to this period. As a robustness check, I estimated retention rates by birth cohorts, to better understand the transition to the new job stability patterns.[14] For the gender breakdown, there was one clear pattern. The increase in stability for women in the 1990s was not restricted to newer cohorts, but was present across birth cohorts. It is also important to note that for both sexes, retention rates stabilized in the latter part of the sample. This shows that an important part of the new patterns is not gender driven.

Figure 3 demonstrates that the positive male-female retention rate differential in the early part of the sample was both economically and statistically significant. In the latter part of the sample, however, the positive gap disappeared and in many cases turned negative (although in most cases was not statistically significant).

Figure 4 shows important differences across age groups—revealing that older workers have consistently higher job stability than younger workers. This figure also points to a possible concave relationship between age and stability. To further explore this possibility, I estimated retention rates for 5-year age intervals. The results support the claim that job stability increases with age, but at a decreasing rate, eventually peaking when the worker reaches his late forties. The gains in stability are still economically significant as the worker goes through his thirties; there remains a consistent 5 percentage point gap between 30-34 and 35-39 year olds throughout the sample period. These findings suggest that ageing of the workforce may have an important role to play in explaining the overall increase in stability—a point that is further explored in Section 4.

Figure 5 provides an education breakdown. Starting in 1990, the LFS introduced some important modifications to its education questions. The focus changed from measuring years

[14]To ensure more accurate estimates, 2-year cohorts were used (e.g., the retention rates for workers born in 1957 and 1958 were calculated for 1977, 1979, etc.). The results are available upon request.

of education to measuring education attainment. As a result, the construction of time consistent education groupings is problematic.[15] At best, the problem can only be attenuated. The three education attainment categories for Figure 5 are high school or less, post secondary diploma or certificate, and university degree (bachelor or more). The categories are self-explanatory, with one exception. Respondents with some post secondary, but who did not complete their program, were included in the high school or less group. A precise breakdown can be found in the appendix. This graph indicates that individuals with high school or less have systematically lower retention rates. A positive correlation between education and job stability exists for finer education breakdowns. For example, workers with very low levels of education, i.e. grade 10 or less, were the least stable. Although caution must be taken when comparing trends in the pre- and post-1990 periods, it also appears that the counter-cyclical patterns for both high and low levels of education, present in the first half of the sample, have disappeared. Interestingly, the results for the low education group are robust to the exclusion of post secondary dropouts. This finding supports the perception among labour economists that post secondary dropouts have more in common with high school graduates than those who successfully completed a post secondary program.

A major finding of this paper is that conditioning on initial tenure dramatically alters the job stability patterns. Figure 6 illustrates that for much of the first part of the sample, the retention rate for workers with less than one year of initial tenure hovered in the 44-49% range, but in the 1990s this changed dramatically. A steep 10 percentage point increase began in 1992. The confidence interval in Figure 6 points to a statistically significant change. For those with initial tenure of one year or more, see Figure 7, there is no break in the pattern, although the most recent decline that start in 1993 is not as steep as prior ones. The cyclical patterns are also present in medium term jobs (3 to 7 years of initial tenure), but there is no clear trend for longer term jobs.

The dramatic change along tenure lines demands more exploration. In Figures 8 and 9,

[15] The 1989 retention rate was excluded because the changes made the estimate unreliable: the estimate would be based on a combination of 1989 and 1990 data.

I break down the male and female retention rates by initial tenure. Figure 8 shows that the increase in stability for newer jobs is not gender driven. Both males and females experienced significant increases in stability starting in the early 1990s. Surprisingly, Figure 8 also shows the female retention rate for newer jobs is consistently higher than its male counterpart—even in the late 1970s and early 1980s. The decline in the male-female retention differential observed in Figure 3 must have occurred in longer tenure jobs—a conjecture confirmed in Figure 9. Figure 10 shows the age breakdown for workers with less than one year of tenure. As was the case for gender, age does not appear to be the key for newer jobs; the increase is present across all age groups.

By comparing retention rates at similar stages of the business cycle, one can put in perspective the importance of changes in job stability. This approach takes into account systematic changes in firm or employee behavior that are linked to the business cycle. For example, employees may be more reticent to leave jobs in recessions when outside job prospects are limited. It also addresses self-selection problems associated with systematic changes in the composition of the workforce. By comparing two periods one can also formally test for changes in job stability. Tables 1, 2 and 3 compare the 1987-1989 and 1998-2000 periods, both strong expansionary periods, which precede and follow dramatic changes in job stability. A weighted average of two consecutive years' retention rates was used to minimize the sensitivity of results to the choice of start and end years. For example, $R_{1987,1988}$ is the retention rate for a randomly chosen worker in year 1987 or 1988.

Table 1 summarizes the main findings such as the increase in aggregate job stability, and in particular, the marked increase in job stability for women and workers with less than one year of initial tenure. For the latter group, the change is particularly striking. After having controlled for the position of the business cycle, there still remains a 10.1 percentage point rise, representing a 22.7% increase from a decade ago.

Table 2 shows that the new job stability patterns are broadly based. Irrespective of whether one carries out an industry breakdown, or even compares private and public sectors, retention rates have tended to stabilize at high levels in the 1990s and 2000s. The one exception is the Agriculture, Forestry, Fishing and Hunting sector. Given the strong seasonal and environmental dependence of this sector, an insignificant result is not surprising. Table 2 also shows that the new job stability patterns are present across the country. These changes are not only economically significant, but statistically significant. In all but one case, one can strongly reject the null hypothesis of no change at the 5% significance level.

Finally, Table 3 shows that the new pattern job stability patterns for workers with initial tenure of less than one year are broadly based. In all but two cases (Agriculture, Forestry, Fishing and Hunting; and Mining Oil and Gas Extraction, Utilities and Construction being the exceptions), the increases are both economically and statistically significant.

4 Source of Change - Aggregate Patterns

In this section, I formally examine the potential causes of the new aggregate job stability patterns documented in Section 3. I start by examining the impact of compositional changes in the work - using standard decomposition techniques. I conclude by exploring some structural explanations which include: decline of unions, changes in industry structure, and decline in seasonal jobs.

4.1 Compositional Changes

Canadian workers have become more educated over time, and there is a positive correlation between education and job stability (recall Figure 5). Together, these findings suggest that rising education levels may play a role in the new aggregate patterns.

A counterfactual retention rate can be created by holding the proportion in each education group (i.e. the γ's) in equation (1) constant at year 1 levels. Plotting this counterfactual over time will show how the aggregate retention rate would have looked if education levels had not changed.

Figure 11 holds the proportion of workers with grade 10 or less of education constant at 1977 levels.[16] The results indicate that rising education levels can explain part of the aggregate increase in job stability. I carried out the same educational counterfactual, but for males and females separately. Controlling for education matters for both groups. The decline, in absolute terms, is similar across gender, albeit slightly larger for males.

Using standard decomposition techniques, one can quantify the impact of the compositional change - like a change in education levels. One can express the retention rates differential, $R_2 - R_1$, as

$$R_2 - R_1 = [\sum_{g=1}^{G}(\gamma_2^g - \gamma_1^g)R_2^g] + [\sum_{g=1}^{G}\gamma_1^g(R_2^g - R_1^g)] \qquad (2)$$

The first square bracket term in equation (2) represents the difference attributable to compositional changes in the workforce. The second reflects what remains to be explained, i.e. due to changes in sub-group retention rates. Assume the overall retention rate increased by .15 and that the first and second term in equation (2) equalled .1 and 0.05, respectively. One would conclude that the retention rate increased by 15 percentage points, 10 percentage points of which can be explained by compositional changes in the workforce. Said differently, changes in workforce composition would explain 66.6% of the increase in aggregate stability.

Table 4 quantifies the importance of rising education levels in explaining overall job stability patterns by comparing the 1987-1989 and 1998-2000 periods. The decomposition results are expressed in percentage terms. Table 4 shows that controlling for education composition can explain 25.7% of the increase for males, but only 8.8% for females. These results indicate that for females there are other factors at work; such as factors related to the important increases in labour force attachment of women also matter.

[16] For the 1977-1989 period, I held constant the proportion of workers with 10 or less years of education. Gower (1993) analyzed the impact of the 1990 changes to the education question and did not find any important discontinuity in the 0-10 grouping. As a robustness check, I repeated the decomposition exercise using the ELEMHS variable (instead of EDUCLEV). For the post- 1990 period, the variable records the highest grade of elementary or high school ever completed, and as such may be more comparable with the pre- 1990 entries. The results are essentially the same.

Interestingly, also controlling for the proportion of workers with university degrees barely impacted the counterfactual; it increased by less than one percentage point over the 1987-1989 and 1998-2000 periods. There are three reasons why this may be the case. One, the proportion of workers with university degrees has increased over time, but this highly educated group still remains a minority in the workforce. Two, differences in job stability between adjacent education groups are much less pronounced at the upper end of the education distribution. Three, it can easily be shown that also controlling for the proportion of workers with university degrees only imposes one additional cross group restriction—that the fraction of grade 11 or more educated workers with university degrees remains constant over time. The data does not find this restriction too onerous. Changes to the education question introduced in 1990 preclude any further breakdown of the middle group, i.e. those with at least grade 11, but less than a university degree. I believe that the same three reasons mentioned above also apply to the middle group. As such, controlling only for the proportion of low educated workers will be a good approximation of the true education effect.

The ageing of the workforce is another factor that merits attention. Some economisists/demographers, including David Foot as a leading proponent, have argued that the demographic composition of a society has strong economic implications. Foot and Stoffman (1996) maintain that the baby-boom cohort, those born between 1947 and 1966, through its sheer size has changed the economy and will continue to do so as it ages. One possible link between the demographic structure and job stability can be seen through the lens of a search model. Within the Burdett (1978) framework, jobs are inspection goods. Baby-boomers who are now in the latter stages of their careers will have a lower probability of receiving a better outside offer, and as a result, job stability will increase.

In addition, the labour force participation of women has increased dramatically over the last thirty years. More women now than ever are permanently attached to the workforce.

Figure 12 takes into account these two changes by holding both the age and gender of the workforce composition constant at 1977 level—where age was broken down into seven intervals of five years each. Starting in the mid- 1980s, the age-gender constant counterfactual is consistently lower than the overall rate, supporting the prediction of the theory. The differential becomes economically significant as of 1992, averaging 2.68 percentage points over the 1992-2003 interval.

To separate the baby-boom effect from the increase in women's participation, I carry out an age constant decomposition for males and females separately. By focussing on the male rate, one can more cleanly identify the effect of the demographic changes in the workforce. Starting in the mid 1980s, Figure 13 shows that the male age-constant rate is consistently lower than the age-varying one, with the gap averaging 2.12 percentage points over the 1992-2003 period. More importantly, there is still a break in the pattern in the early 1990s. The demographic changes cannot explain why the male retention rate has stabilized in the second half of the sample. For females, it is a similar story. The main difference is that for the 1992-2003 period the gap is larger, averaging 3.3 percentage points. The increased labour force participation of women appears to have re-enforced the baby-boom effect.

Table 4 quantifies the importance of ageing and gender in explaining overall job stability patterns by comparing the 1987-1989 and 1998-2000 periods. Controlling for age and gender composition can explain close to half of the increase in overall stability. Table 4 also shows that ageing has more explanatory power for men (54.7% for men versus 45.3% for women) indicating that holding the female age structure constant cannot account for the full impact of the increased labour force attachment of women. Finally, a gender differential counterfactual was also estimated; one where females are given the male retention rate. This gender counterfactual can explain 25% of the increase in aggregate job stability.

In a final decomposition, I control for both education and age. In doing so, one can also account for any multiplicative effect, i.e. that the ageing effect may not be constant across education groupings. Figure 14 shows that education and ageing can explain a very large part of the changes to male stability.

Table 4 shows that the combined effect can account for 86.1% of the increase in male job stability from the late 1980s to the late 1990s, with the multiplicative effect only accounting for 5.7% of the change.

4.2 Alternative Hypotheses

The long term decline in union coverage in Canada is well documented (e.g. Riddell and Riddell (2004)) This decline could account for the new patterns only if union covered jobs were less stable than non-union jobs. This presumption is counter-intuitive; it contradicts a fundamental goal of unions to safeguard jobs. Additionally, prior to 1997, a union question was not part of the regular LFS questionnaire. As a result one cannot comment on potential long term changes. But over the 1997-2004 period, jobs were more stable in the union sector, with a gap ranging from 12 to 14 percentage points.

Industry structure in Canada is another area that has undergone many changes over the last 30 years, both within and across industries. Table 2 shows that the changing job stability patterns were not restricted to individual sectors, but are economy-wide. However, as Table 2 illustrated, there are important level differences across sectors. As a result, a change in the relative importance of sectors, such as the well-documented decline of the primary sector, could have impacted the overall long term job stability patterns in Canada. A decomposition exercise can help judge the merits of this hypothesis. The LFS uses the NAICS industry classification system which divides the economy into twenty broad categories. Although there are further divisions, the decomposition was restricted to the 20 categories to ensure more accurate industry retention rates. Figure 15 indicates that holding the industry structure constant at 1977 proportions does not significantly alter the pattern in the data. Therefore, the changing industry structure, both within and across sectors, does not appear to be the source of the new patterns in job stability.

The possibility of Employment Insurance (EI) reforms in 1989 and the mid 1990s contributing to the new aggregate job stability patterns requires some attention; particularly the impact of reforms on seasonal work. Researchers (e.g., Green and Sargent (1998); and Shen

(2004)) found seasonal workers to be more responsive to changes than non-seasonal workers. Changes to the program rules could have limited the appeal of seasonal work, thereby encouraging workers to seek more stable forms of employment. That is simply not the case. Marshall (1999) identifies a long term decline in seasonal variation in employment starting in 1976, but that decline flattens in the 1990s. An industry decomposition also indicates that a possible movement towards less seasonal industries is not critical to job stability patterns. Furthermore, Table 2 shows that the changes in patterns are not restricted to regions historically dependent on seasonal jobs. The job stability patterns of Ontario, for example, the least seasonally dependent region, mirrors those of Canada as a whole. Finally, changes in job stability are not restricted to periods of the year where seasonal jobs are historically most prevalent, i.e. from May to October. The same patterns hold true if the analysis is restricted to January data, or that of any other month.

5 Source of Change - Newer Jobs

In this section I explore the source of the important change in job stability of workers with less than one year of tenure. I start by focussing on compositional changes—to see whether the driving forces behind the new aggregate rates - gender, ageing and education - can also explain the changes at low levels of tenure. I conclude by exploring some structural explanations: technological change, changing industry structure and the rise of non-standard work.

5.1 Compositional Changes

The one year retention rate for those with less than 12 months of tenure of initial tenure, $R_j^{1,11}$, can be decomposed by education groups

$$R_j^{1,11} = \sum_{g=1}^{G} \gamma_j^{g|1,11} R_j^{g;1,11} \tag{3}$$

where $\gamma^{g|1,11}$ now represents the proportion of low tenured workers that are in education group g. Holding the γ's constant at year 1 levels will control for the education level in low tenure jobs, and not of the workforce. As such, one cannot separate education from tenure effects. I propose an alternative representation that remedies this limitation. By Bayes' Law, one can write the group proportion as

$$\gamma_j^{g|1,11} = \frac{Prob_j(\text{“1 to 11 months of tenure”}|\text{“group } g''\text{)}Prob_j(\text{“group } g''\text{)}}{\sum_{l=1}^{G} Prob_j(\text{“1 to 11 months of tenure”}|\text{“group } l''\text{)}Prob_j(\text{“group } l''\text{)}} \tag{4}$$

The arguments can be generalized to control for other workforce characteristics. The proof is presented in the appendix. Equation (4) shows that holding the γ's constant at year 1 levels would confound education and tenure effects; it controls for a non-linear combination of the two. One can construct the education counterfactual by holding the unconditional probability of being in a particular education group in equation (4) constant at year 1 levels.

Figure 16 shows that holding the proportion of male workers with grade 10 or less constant at 1977 levels decreases the retention rate in subsequent years. Interestingly, this dampening effect starts to be significant in the mid 1980s—meaning that the dramatic increase in stability experienced in the 1990s is still very present.

Gender effects do not explain the striking increase in stability of newer jobs. Figure 8 shows that this increase in stability at low levels of tenure was present for both males and females, with the relative gap remaining fairly constant over the 1990s and early 2000s. As indicated in Figure 9, the decline in the male-female retention rate differential was observed over longer tenured jobs.

Using the proposed counterfactual approach, I can also control for the age structure of the workforce in the retention rate for workers with less than one year of initial tenure. I also construct age constant retention rates for workers with one or more years of tenure. Figures 17 and 18 show the age constant counterfactuals for the two tenure categories. In both cases, the analysis was restricted to males in order to more cleanly identify the effect of a demographic change. As Figure 17 indicates, ageing of the workforce has very little impact on newer jobs. For longer term jobs (see Figure 18), the impact is slightly stronger with an average drop of 1.1 percentage points over the 1992-2003 interval. Additional tenure breakdowns (i.e. one to three years, three to seven years, seven to twelve years, and twelve and up) reveal that this slight drop was limited to the one to three year group. Therefore, the ageing effect must have had a significant impact on the proportion of workers within each tenure group - a conclusion confirmed in the data.

5.2 Alternative Hypotheses

Since the changes in stability of newer jobs are economy wide, the potential source of change must also be wide in scope. Technological change is one such candidate. It has been offered as a determining factor for many changes and could also be at the root of the new patterns in job stability. However, the timing is wrong. The effects of technology would have occurred gradually, beginning well before the 1990s. By contrast, the rise in stability only started in the early 1990s, and the increase was dramatic.

Although not relevant to the aggregate level, changing industry structure could have mattered for low tenured jobs. Newer jobs account for less than 20% of the overall workforce, and as such, the impact of such a group could be lost in the aggregate. This is not the case. I controlled for industry decomposition and found its effect negligible.

Changes in the employer-employee relationship is another possible source of change. Vosko, Zukewich, and Cranford (2003) document that many Canadians are now engaged in non-standard/contingent work, i.e. not not full-time, permanent jobs. This would include self-employment, part-time work and also temporary work. Non-standard work accounted for 37% of all jobs in 2002, a rise of 4% point since 1989. The new economy literature argues that these types of jobs offer less security, implying that job stability has declined. Yet, this is not the case—job stability actually increased over the 1990s. The timing also precludes other potential links between the two. Since 1993, there has been little, if any, change in the proportion of Canadian workers in non-standard work arrangements. Yet during this same time period, job stability for newer jobs actually began its dramatic climb. Self-selection is one such link. The timing issue precludes the possibility that less stable workers moved into self-employment, thereby increasing the retention rate of the remaining paid workers. As a robustness check I also estimated retention rates which included the self-employed; the results were not materially different.

These findings indicate that technological change, changing industry structure and the rise of non-standard work do not appear to drive the results.

6 Conclusion

There are three main contributions to the literature found in this paper: First, using a rich source of tenure data, I differentiate between cyclical and secular changes, and find that aggregate job stability has increased since the early 1990s. The overall retention rate was cyclical, averaging 78.7% over the 1979-1989 period. But in the early 1990s it increased to well above 80%, and stayed fairly constant at these historically high levels into the 2000s. Changes are economy-wide, with a more significant increase for women and workers with initial tenure of less than one year.

Second, compositional changes in the workforce matter for the aggregate rate. Using standard decomposition techniques, I show that the changing age structure of the workforce can explain approximately half of the increase in job stability in Canada. I also find that both the increase in labour force attachment of women and the rising educational levels have a role to play. For the latter, it is the decreasing importance of low levels of education, and not the rising proportion of workers with university degrees, that matter most.

Third, compositional changes in the workforce do not drive the new patterns for low tenured jobs. Using decomposition tools developed in this paper, I show that ageing of the workforce is not a key; neither are gender differences. I do find that controlling for low levels of education does impact the rate for newer jobs, but cannot explain the dramatic increase in the 1990s.

A Appendix

A.1

The following rules were applied to determine the three mutually exclusive educational categories

- High school - Individuals with 13 or less years of schooling. This education category also includes individuals with some post secondary education as defined by the LFS. This refers to individuals who attended a post secondary institution, but did not complete the required program.
- Post secondary certificate or diploma - Individuals who completed a post secondary program below a university degree. For the 1977-1989 sample, only formal post secondary institutions where included. For the post 1990 sample, the category was expanded to include trade certificates which do not require high school graduation.
- University degree - Individuals with a university degree or more.

A.2

Proposition 1 *Given G groups, i.e. $1, \ldots, G$, that are mutually exclusive and exhaust the conditioned population, one can write the retention rate that conditions on the worker having t to t' months of initial tenure, $R_j^{t,t'}$, as*

$$R_j^{t,t'} = \sum_{g=1}^{G} \left(\frac{Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } g'') Prob_j(\text{“group } g'')}{\sum_{l=1}^{G} Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } l'') Prob_j(\text{“group } l'')} \right) R_j^{g;t,t'}$$

proof: The retention rate can be expressed as

$$\begin{aligned} R_j^{t,t'} &= \sum_{g=1}^{G} \gamma_j^{g|t,t'} R_j^{g;t,t'} \\ &\equiv \sum_{g=1}^{G} Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } g'') R_j^{g;t,t'} \end{aligned}$$

and by Bayes' Law

$$\begin{aligned} & Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } g'') \\ &= \frac{Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } g'') Prob_j(\text{“group } g'')}{\sum_{l=1}^{G} Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } l'') Prob_j(\text{“group } l'')} \quad \blacksquare \end{aligned}$$

To control for group composition, one holds the unconditional probability of being in each group constant at year 1 levels. As such, the counterfactual, $RC_j^{t,t'}$, takes the form

$$RC_j^{t,t'} = \sum_{g=1}^{G} \left(\frac{Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } g'') Prob_1(\text{“group } g'')}{\sum_{l=1}^{G} Prob_j(\text{“}t \text{ to } t' \text{ months of tenure”} | \text{“group } l'') Prob_1(\text{“group } l'')} \right) R_j^{g;t,t'}$$

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Table 1: Comparison Across Business Cycles

Specification	$R_{1987,1988}$	$R_{1998,1999}$	$(R_{1998,1999} - R_{1987,1988})$
Overall	0.777	0.821	0.045
	(0.002)	(0.002)	(0.002)
Male	0.786	0.819	0.033
	(0.003)	(0.003)	(0.004)
Female	0.767	0.822	0.055
	(0.003)	(0.003)	(0.004)
Tenure $<$ 1 year	0.444	0.545	0.101
	(0.004)	(0.005)	(0.006)

Table 2: Comparison Across Business Cycles, by Sector and Region

Specification	$R_{1987,1988}$	$R_{1998,1999}$	$(R_{1998,1999} - R_{1987,1988})$
Sector			
Goods	0.784	0.826	0.042
	(0.004)	(0.004)	(0.006)
Services	0.774	0.819	0.045
	(0.002)	(0.002)	(0.003)
Agriculture, Forestry, Fishing and Hunting	0.641	0.639	-0.001
	(0.016)	(0.016)	(0.023)
Mining, Oil and Gas Extraction, Utilities and Construction	0.740	0.770	0.029
	(0.007)	(0.009)	(0.011)
Manufacturing	0.816	0.862	0.046
	(0.005)	(0.005)	(0.007)
Public	0.868	0.922	0.054
	(0.004)	(0.005)	(0.006)
Private	0.745	0.790	0.045
	(0.002)	(0.002)	(0.003)
Region			
Atlantic	0.752	0.770	0.018
	(0.008)	(0.008)	(0.011)
Quebec	0.775	0.836	0.061
	(0.004)	(0.004)	(0.006)
Ontario	0.795	0.832	0.037
	(0.003)	(0.003)	(0.005)
Prairies	0.749	0.798	0.049
	(0.005)	(0.005)	(0.007)
British Columbia	0.775	0.817	0.042
	(0.007)	(0.006)	(0.009)

Table 3: Comparison Across Business Cycles - Conditioning on Initial Tenure Less than 1 Year

Specification	$R_{1987,1988}$	$R_{1998,1999}$	$(R_{1998,1999} - R_{1987,1988})$
Sector			
Goods	0.402	0.506	0.104
	(0.007)	(0.010)	(0.012)
Services	0.462	0.559	0.098
	(0.005)	(0.006)	(0.008)
Agriculture, Forestry, Fishing and Hunting	0.184	0.230	0.046
	(0.015)	(0.019)	(0.024)
Mining, Oil and Gas Extraction, Utilities and Construction	0.345	0.344	-0.001
	(0.011)	(0.014)	(0.018)
Manufacturing	0.475	0.638	0.163
	(0.011)	(0.0148)	(0.018)
Public	0.520	0.628	0.109
	(0.012)	(0.016)	(0.020)
Private	0.430	0.532	0.102
	(0.004)	(0.005)	(0.007)
Region			
Atlantic	0.338	0.386	0.048
	(0.012)	(0.014)	(0.018)
Quebec	0.415	0.539	0.125
	(0.008)	(0.011)	(0.013)
Ontario	0.513	0.590	0.077
	(0.007)	(0.009)	(0.011)
Prairies	0.415	0.523	0.108
	(0.010)	(0.012)	(0.015)
British Columbia	0.396	0.564	0.167
	(0.011)	(0.015)	(0.019)

Table 4: Decomposition Across Business Cycles: 1987-88 and 1998-99

Specification	Compositional effect (%)	Remaining effect (%)
Education Decomposition		
Male	25.7	74.3
Female	8.8	91.2
Overall	16.0	84.0
Age/Gender Decomposition	46.8	53.2
Age Decomposition		
Male	54.7	45.3
Female	40.8	59.2
Gender Differential Decomposition	25.0	75.0
Education and Age Decomposition		
Male	86.1	13.9

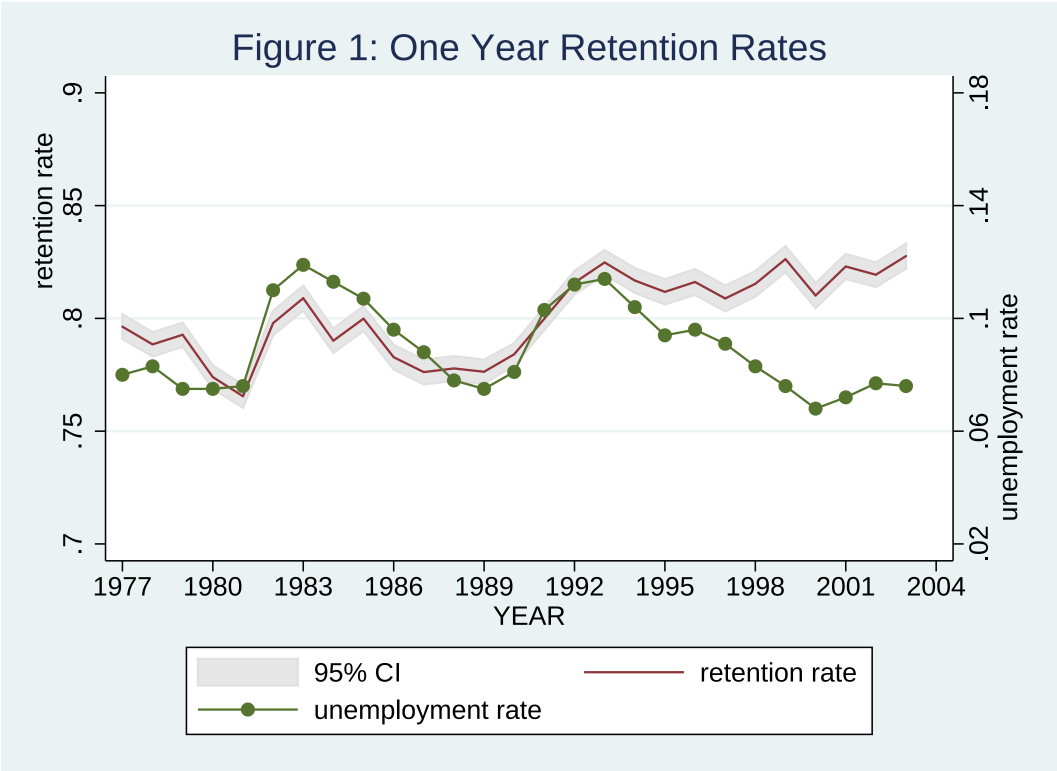


Figure 1: One Year Retention Rates
retention rate
.7
.75
.8
.85
.9
unemployment rate
.02
.06
.1
.14
.18
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
95% CI
retention rate
unemployment rate

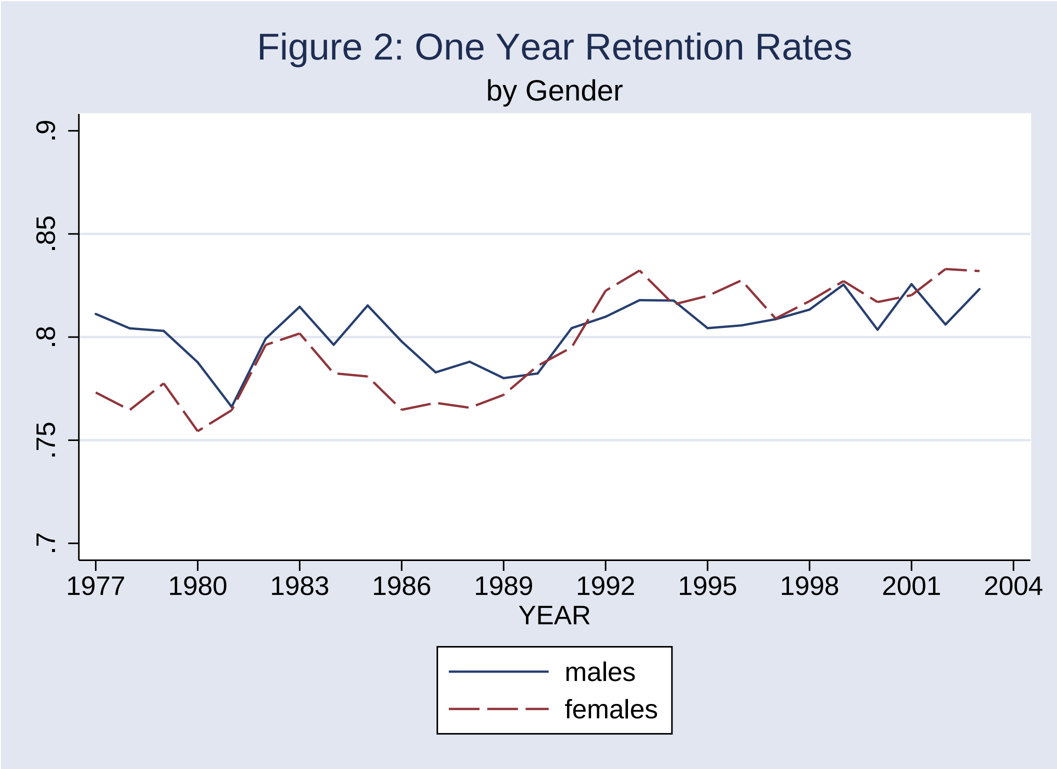


Figure 2: One Year Retention Rates
by Gender
.7
.75
.8
.85
.9
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
males
females

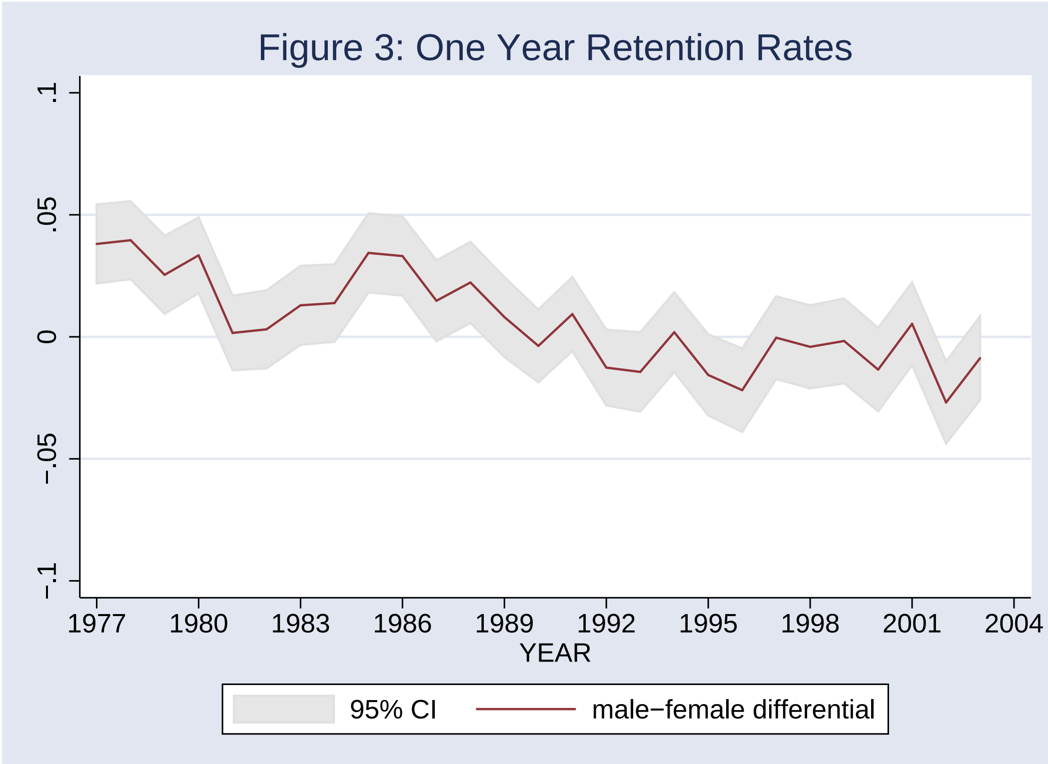


Figure 3: One Year Retention Rates
.1
.05
0
−.05
−.1
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
95% CI
male−female differential

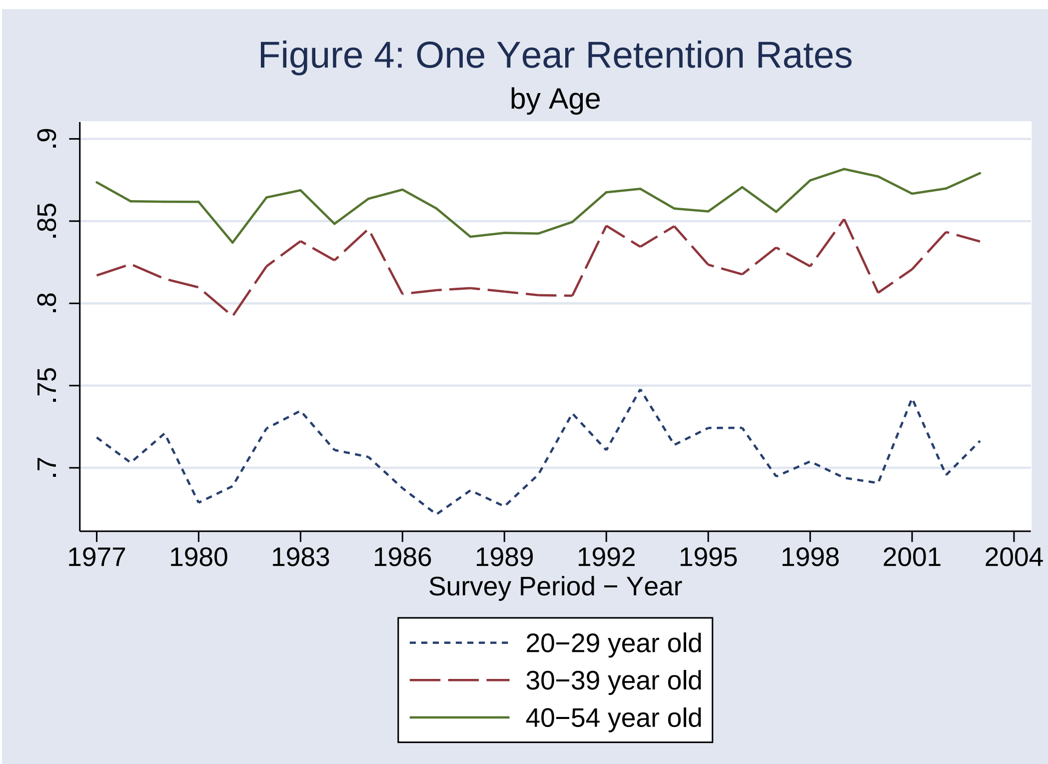


Figure 4: One Year Retention Rates
by Age
.9
.85
.8
.75
.7
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
Survey Period − Year
20−29 year old
30−39 year old
40−54 year old

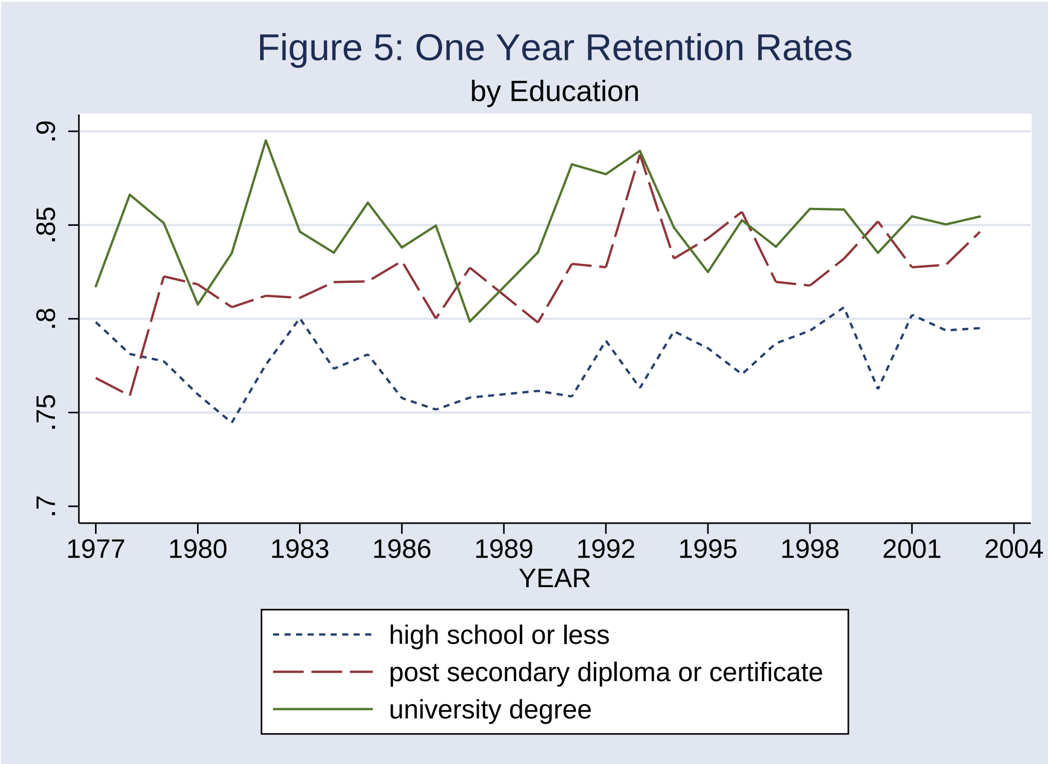


Figure 5: One Year Retention Rates
by Education
.7
.75
.8
.85
.9
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
high school or less
post secondary diploma or certificate
university degree

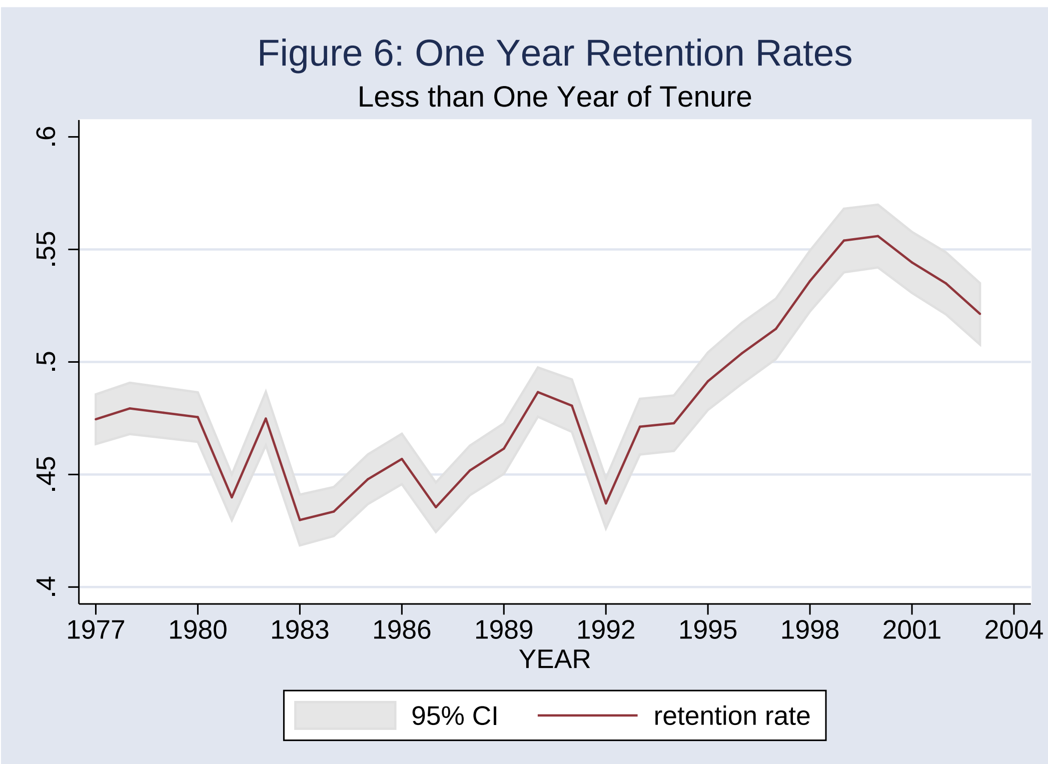


Figure 6: One Year Retention Rates
Less than One Year of Tenure
.4
.45
.5
.55
.6
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
95% CI
retention rate

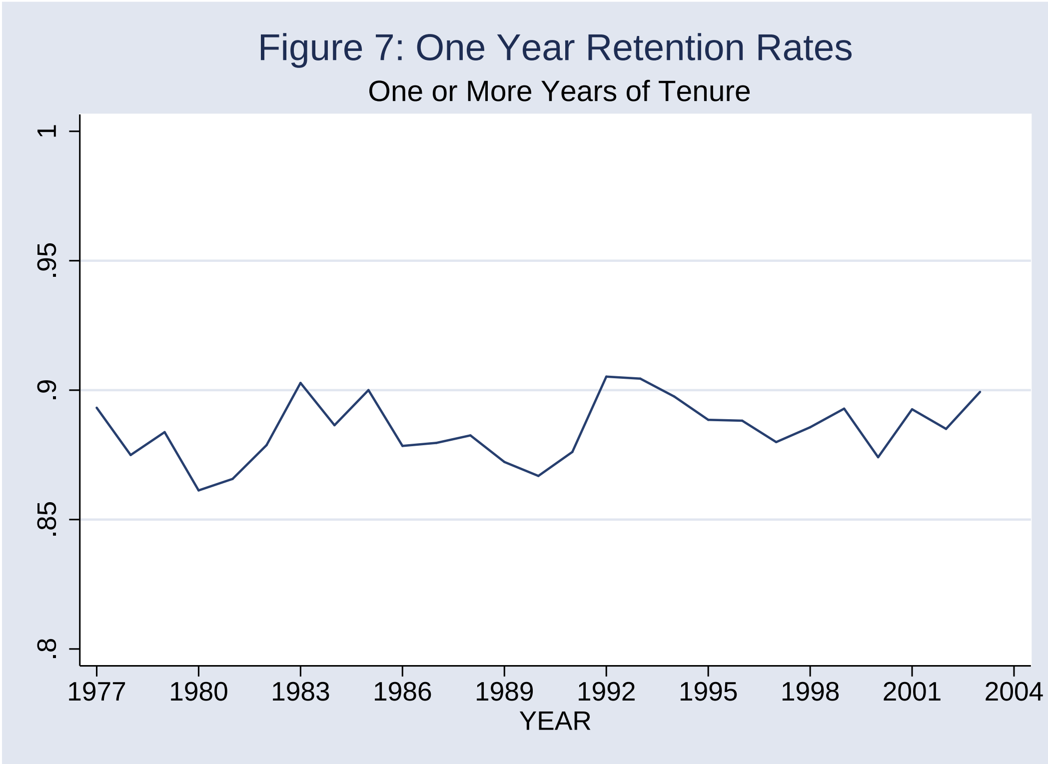


Figure 7: One Year Retention Rates
One or More Years of Tenure
.8
.85
.9
.95
.1
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR

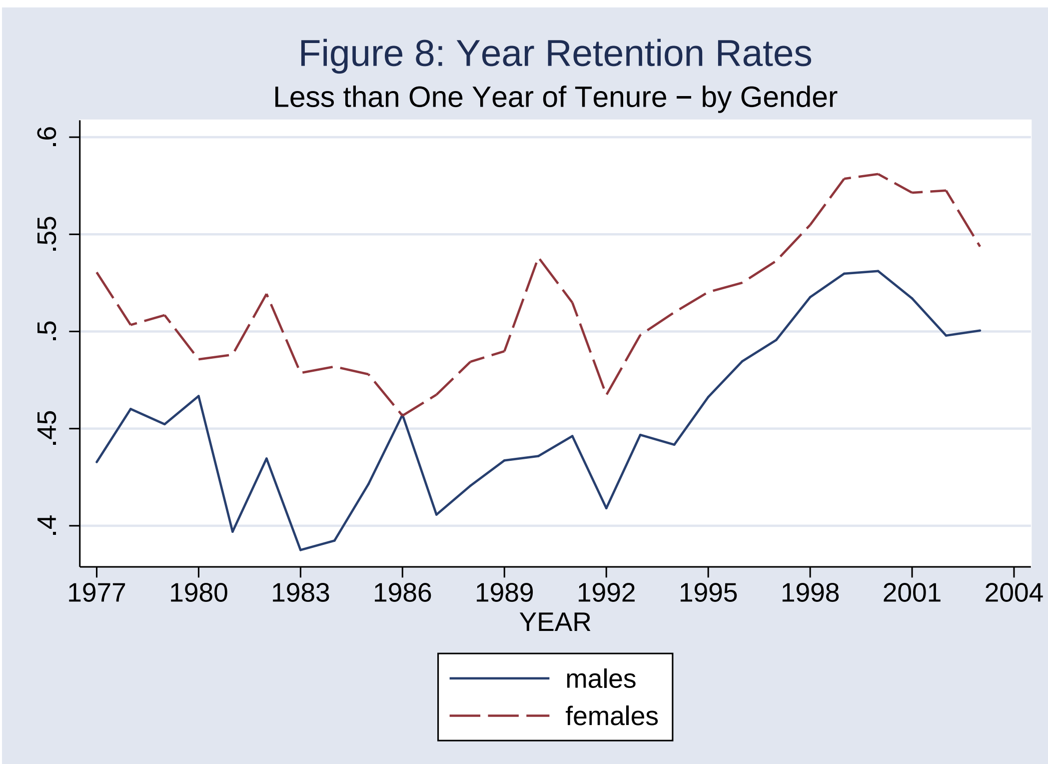


Figure 8: Year Retention Rates
Less than One Year of Tenure − by Gender
.4
.45
.5
.55
.6
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
males
females

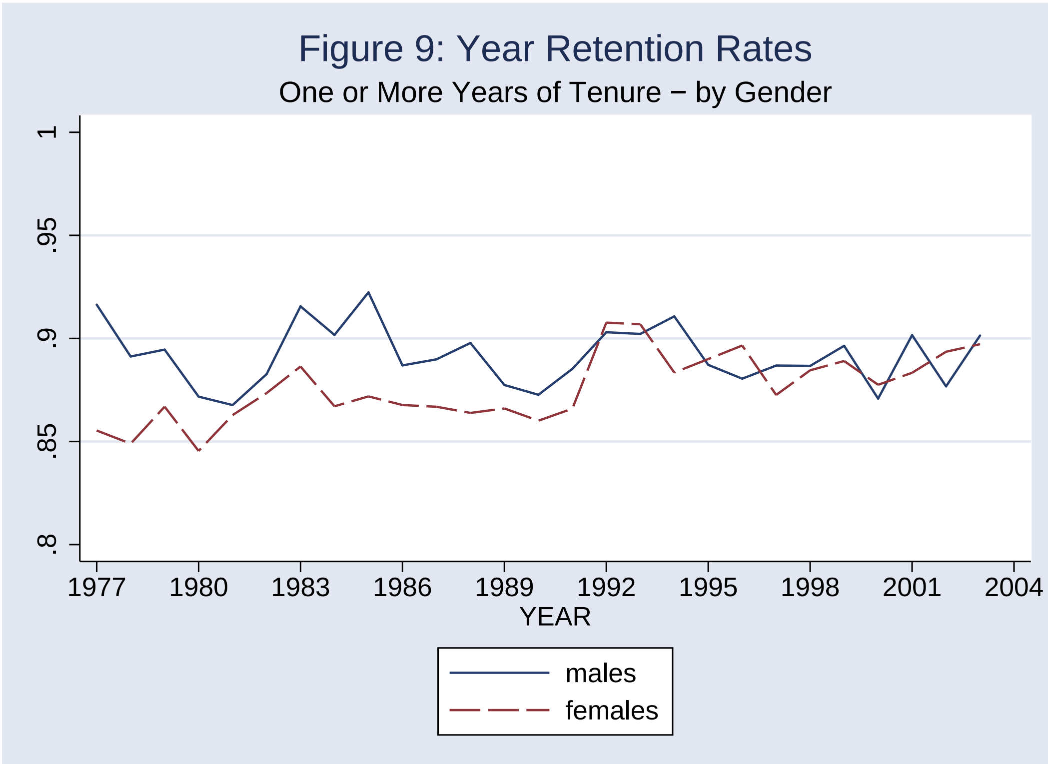


Figure 9: Year Retention Rates
One or More Years of Tenure − by Gender
.8
.85
.9
.95
1
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
males
females

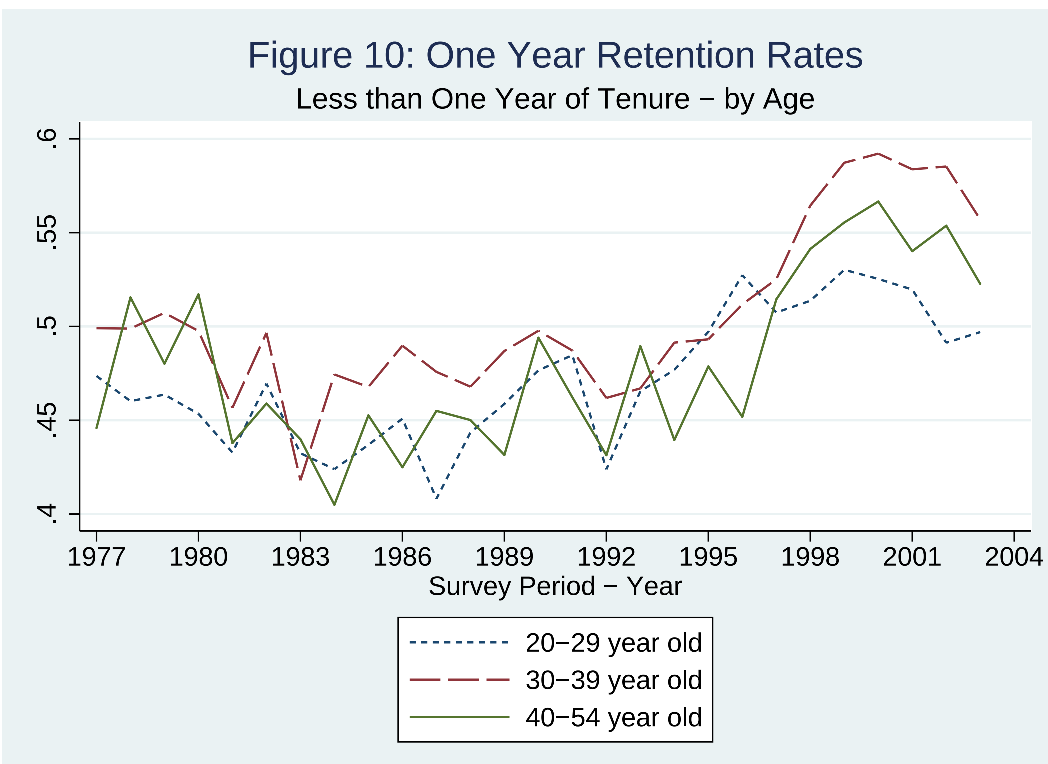


Figure 10: One Year Retention Rates
Less than One Year of Tenure − by Age
.4
.45
.5
.55
.6
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
Survey Period − Year
20−29 year old
30−39 year old
40−54 year old

Figure 11: One Year Retention Rates

Education Decomposition − low education

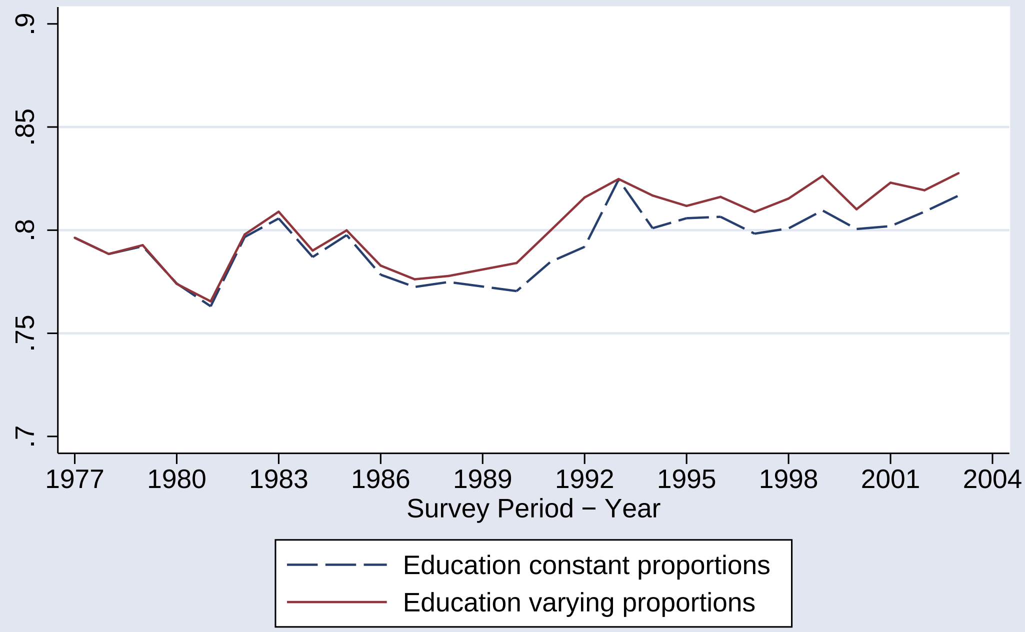


Figure 12: One Year Retention Rates

Age and Gender Decomposition

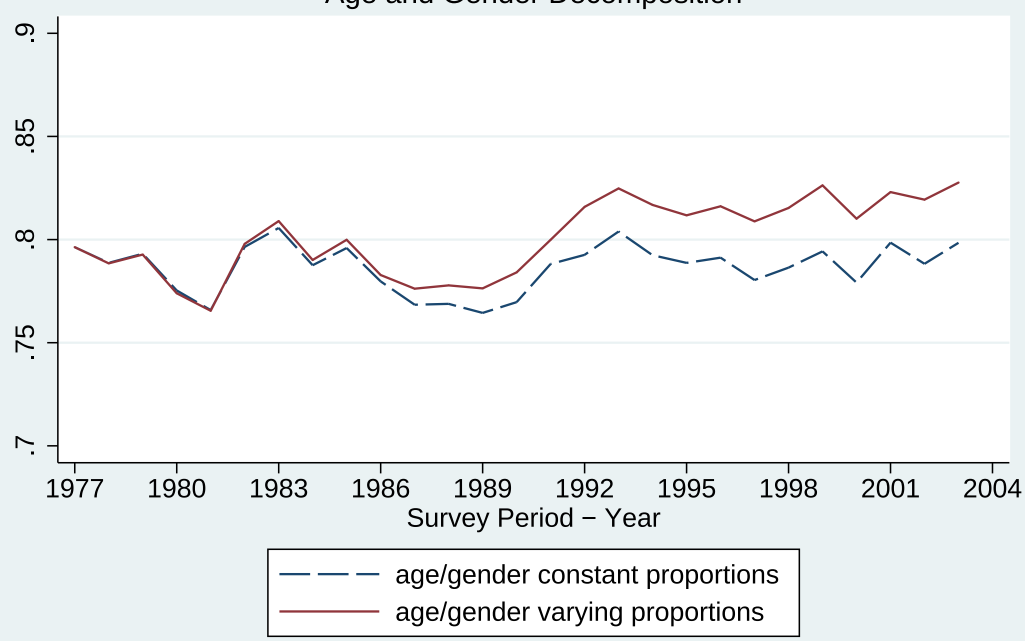


Figure 13: One Year Retention Rates

Age Decomposition − Males

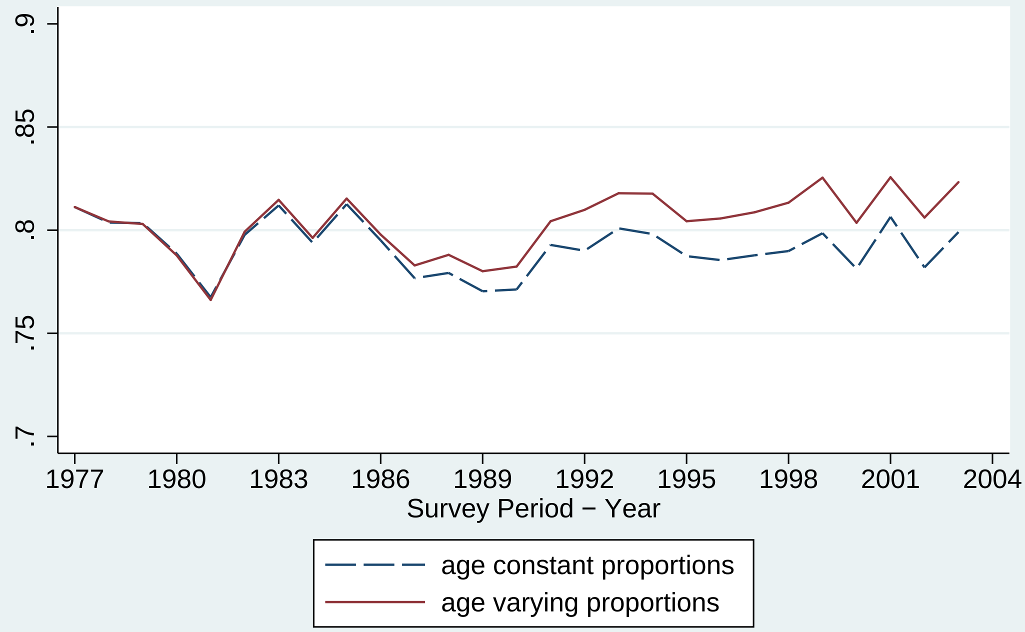
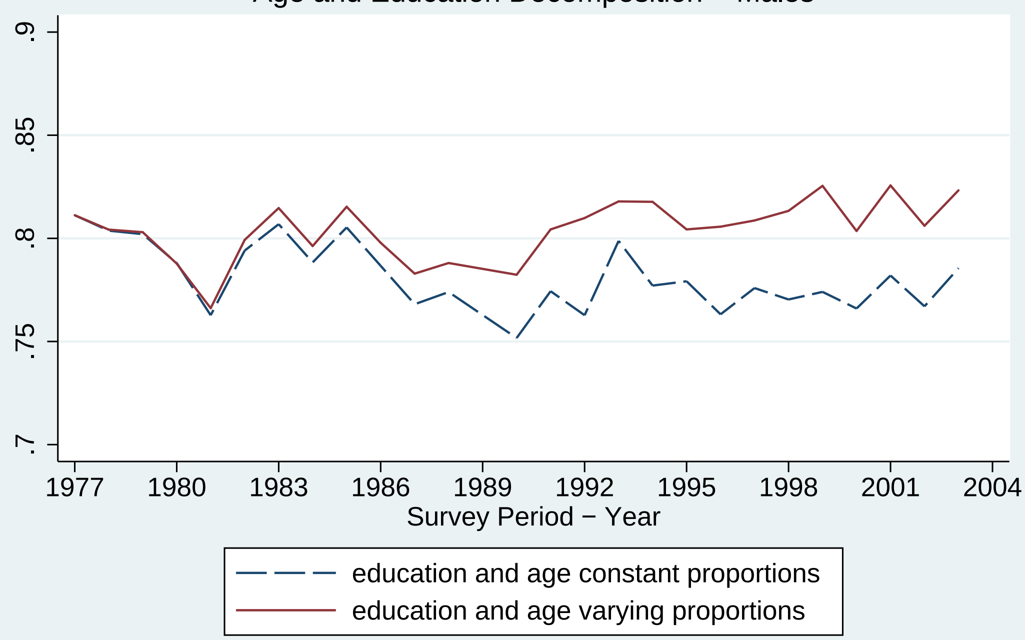


Figure 14: One Year Retention Rates

Age and Education Decomposition − Males



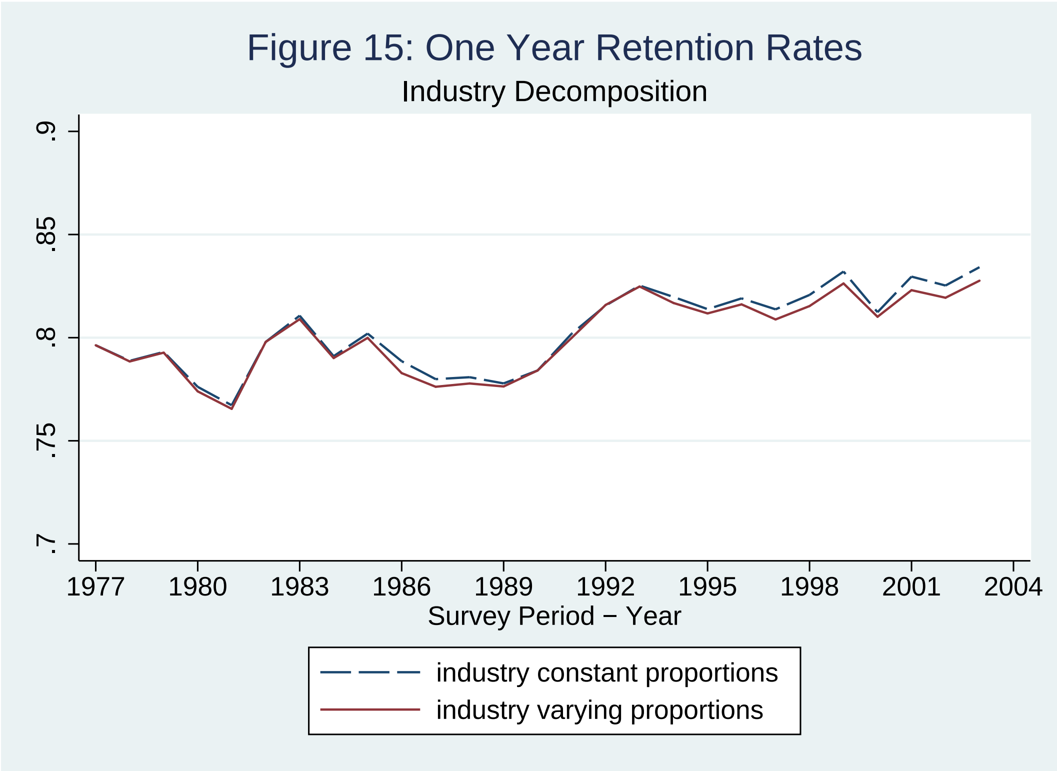


Figure 15: One Year Retention Rates
Industry Decomposition
.7
.75
.8
.85
.9
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
Survey Period − Year
industry constant proportions
industry varying proportions

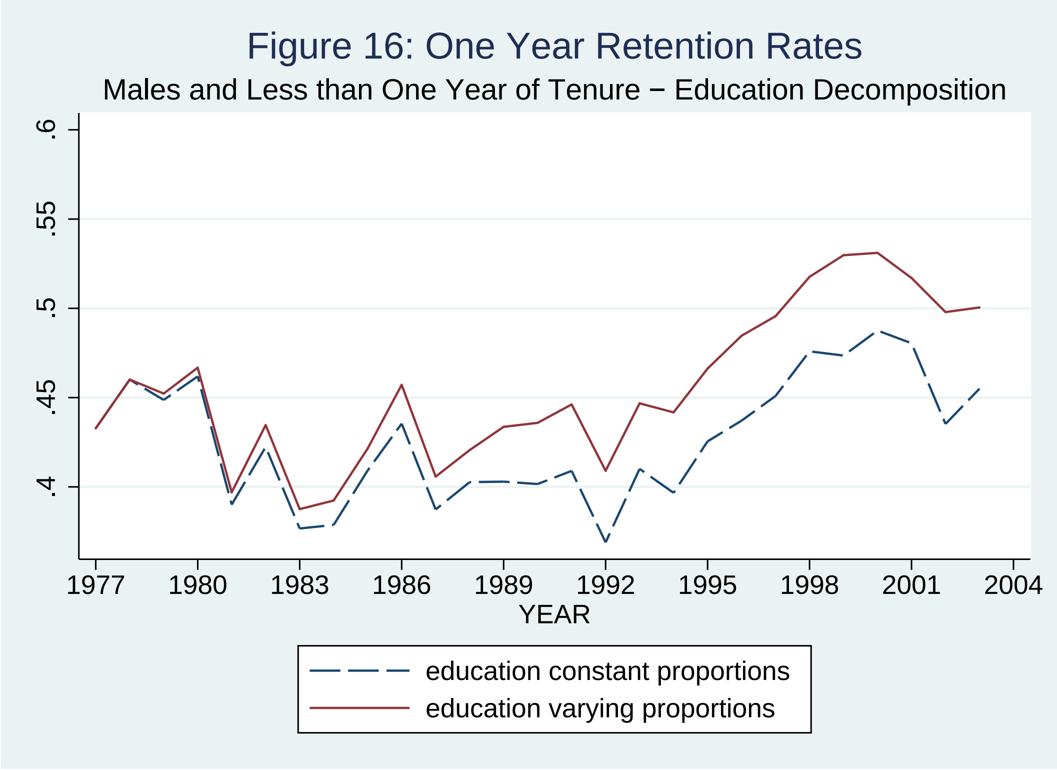


Figure 16: One Year Retention Rates
Males and Less than One Year of Tenure − Education Decomposition
.4
.45
.5
.55
.6
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
education constant proportions
education varying proportions

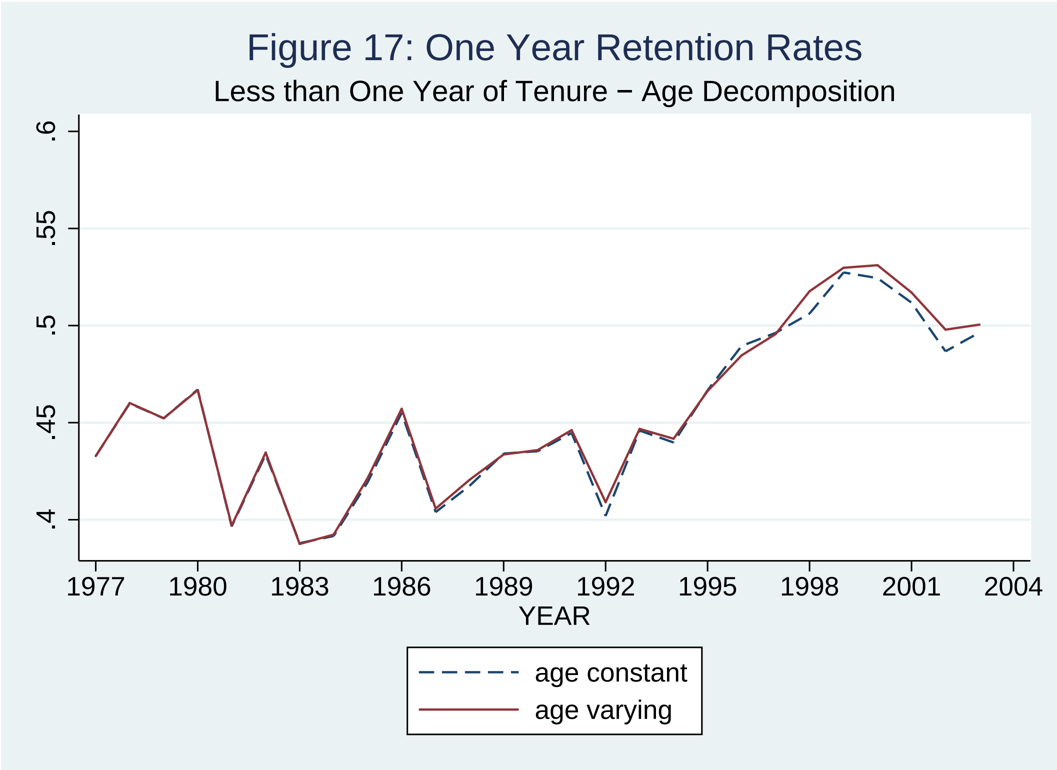


Figure 17: One Year Retention Rates
Less than One Year of Tenure − Age Decomposition
.4
.45
.5
.55
.6
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
age constant
age varying

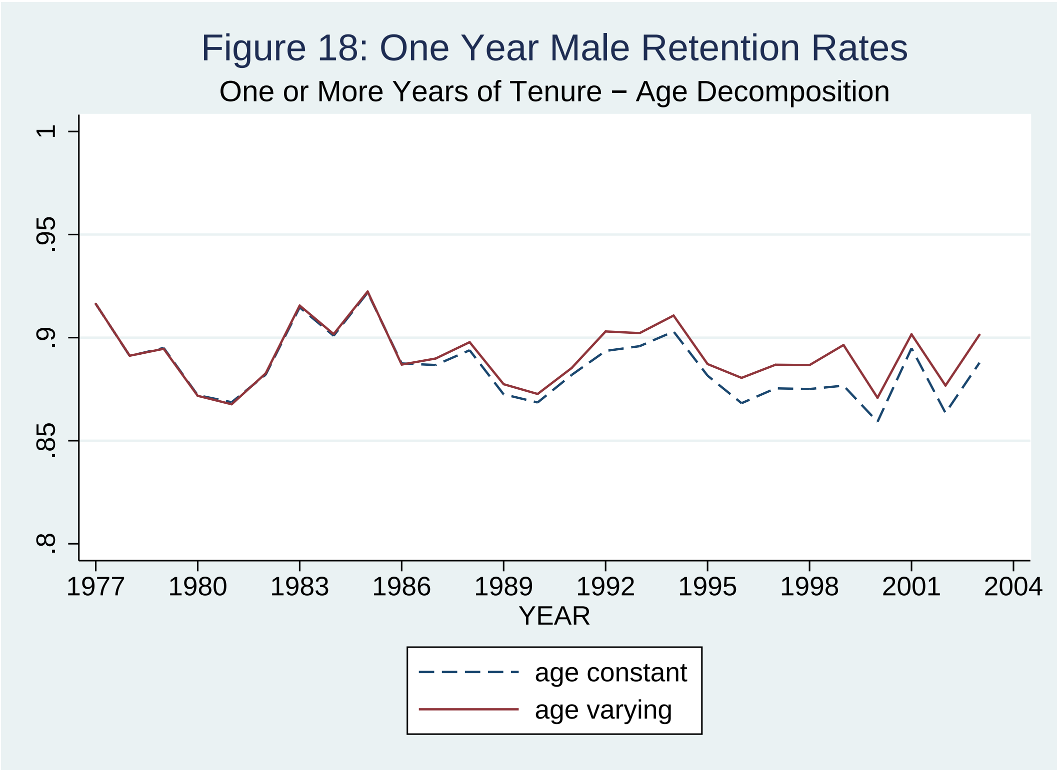


Figure 18: One Year Male Retention Rates
One or More Years of Tenure − Age Decomposition
.8
.85
.9
.95
1
1977
1980
1983
1986
1989
1992
1995
1998
2001
2004
YEAR
age constant
age varying