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ABSTRACT

This paper investigates annual working hours in the United States and Canada over the period 1979 to 2000. The study finds that a working hours gap opened in the 1980s and expanded substantially in the 1990s. It investigates the possibility that labour supply differences, specifically (1) incentives resulting from wage inequality, or (2) differences in the employment engagement of women, youth or older men, explain this working hours gap. The study finds that the stylized facts do not lead one to a supply side explanation. In fact, the sluggish economic growth in Canada relative to the U.S. (reflected in the unemployment rate) during much of the 1990s provides the best explanation for the increase in the hours gap, suggesting that explanations for the divergence in hours worked between the U.S. and Canada should focus on the demand side of the labour market.

Keywords: Labour Supply, Hours per Person, Hours per Worker, Employment, Income, Inequality.

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1. Introduction

The Canadian labour market has developed differently in recent decades vis-à-vis that of its major trading partner, the United States. For example, a gap between average annual hours worked per capita in Canada and the United States emerged after 1983 and widened through the 1990s with the U.S. working more hours (Figure 1). Work hours in other countries like the United Kingdom and Sweden fared similarly to Canada remaining relatively steady, while Germany and France reduced working hours. While much has been said about diverging Canada-U.S. trends in other macro-economic indicators such as the unemployment and employment rates, GDP per capita, productivity, and income and earnings inequality, much less has been said about this divergence in work hours[1]. This paper investigates the annual working hours gap that has developed between the U.S. and Canada, emphasizing descriptive differences, and examining potential explanations of the Canada-U.S. working hours gap.

Investigation of international differences in work hours is interesting for several reasons. First, working time is closely related to GDP per capita, an often examined indicator of aggregate economic growth, and examining work hours gives a better understanding of why aggregate economic growth has differed in the U.S. and Canada (Armstrong, Harchaoui, Jackson and Tarkhani, 2002). Related to this, interest in the measurement of working hours has developed internationally for the purpose of generating comparable productivity estimates (for example OECD, 2001b; Van Ark, 1998). Second, there is some debate on the contribution of working time to time-crunch (Frederick and Fast, 2001) and well-being (Shields, 2000) emphasizing the fact that increases in GDP per capita driven by increases in working hours per capita may overstate increases in standards of living if one values non-work time (Osberg, 2001). Third, there was an increase in work hours polarization in some countries over the 1980s and 1990s (see for example, Sheridan, Sunter and Diverty (1996) and Rones, Ilg and Gardner (1997)) and for Canada, which has been shown to be an important contributor to rising earnings inequality (Morissette, Myles and Picot (1994), Picot (2001)). These links between work hours, productivity, income, inequality and well being suggest that a detailed examination of working time in the two countries is overdue.

Beyond describing relative trends, this paper also considers the causes of international differences in work hours which are suggested in the literature. Examination of the causes of international differences in work hours has mainly been concerned with explaining the differences in work hours that has developed between the U.S. and Germany. The focus of this literature has been on the incentives to work supplied by wage inequality. In a recent set of articles, Bell and Freeman (1996, 2000, 2001) outline the hypothesis that workers in a country with more wage inequality will have a higher incentive to work longer hours. The argument goes that workers select their current hours of work in order to gain future promotions and wage increases and advance in the distribution of wages. The more unequal this distribution, the bigger the potential payoff to working harder, yielding more hours worked. In countries with high inequality, such as the U.S., workers will have more incentive to work harder than in countries

[1] Several studies examine work hours within Canada and the U.S. separately. These include Sheridan, Sunter and Diverty (1996) in Canada and Rones, Ilg and Gardner (1997) in the United States. Fortin (2003) also conducts an analysis of Canada-U.S. differences in working hours.

with less inequality, such as (to use their example) Germany. The extreme case is a country with no inequality in wages where there is absolutely no incentive to work harder.

This hypothesis was criticized in Osberg (2001). Osberg shows that increases in U.S. working hours were concentrated at the extreme bottom of the hours per person distribution. The main difference in annual hours worked between the U.S. and Germany derives from employment participation of women and older men, and that among those that do work, there is little difference in average hours. According to the Bell-Freeman argument, inequality should have provided incentive for American prime age men to work more than German prime age men, however, prime aged German male workers do not supply fewer work hours than American men. Osberg concludes that work hour differences are better described by national differences in preferences and lifestyle such as the lower propensity for German mothers to work, and a tendency for German men to retire early, than due to the effect of inequality.

The difference between these two arguments is important. If wage inequality drives international differences in work hours then this implies a route through which higher wage inequality leads to faster economic growth. It follows that government tax and transfer policies which decrease inequality could lead to lower economic growth through depressing work effort[2]. This paper has two objectives. The first objective is to present stylized facts on differences in hours growth rates across Canada and the United States. Inter-country differences are examined in hours worked on a per person and per worker basis for the population aged 16 to 69 and for age and gender subgroups. The second objective in this study is to examine how these facts line up with the notion that labour supply, either driven by incentives derived from inequality, or resulting from differences in preferences or lifestyle may drive relative trends. The possibility that the hours gap reflects slow growth in the Canadian economy is then examined, and that the same macroeconomic factors responsible for divergences in other macroeconomic indicators such as the unemployment rate, also explain the divergence in hours. The study finds that the sluggish economic growth in Canada relative to the U.S. during much of the 1990s (reflected in the unemployment rate) provides the best explanation for the increase in the hours gap, suggesting that explanations for the divergence in hours worked between the U.S. and Canada should focus on the demand side of the labour market.

2. Methods, data sources and definitions

Figure 1 shows hours worked on a per person basis. Hours per person expresses the total number of hours worked in the country on a per capita basis, including those that supply zero hours. This measure reflects the total economic activity in the country, standardized for the population size (in the same way as in GDP per capita). Alternatively one could look at hours on a per worker basis. Hours per worker indicates labour supply in hours per year conditional upon being employed. These two concepts are linked by the annual employment rate, which expresses the propensity of people to work at some time during the year[3]:

[2] The long standing debate on the contribution of inequality to economic growth is summarized in Osberg (1995).

[3] The annual employment rate differs from the standard labour force concept used in Canada and the U.S., which refers to employment over a reference week.

Average Usual Hours per Person in Year Y	=	Average Usual Hours per Worker in Year Y	×	The fraction of the population that worked at some time during year Y.	(1)

It is useful to discriminate between these concepts. Changes in hours per person that are derived from changes in employment rates imply that increased labour supply was driven by the propensity to participate in employment, rather than an increase in work effort per worker. Thus, increases in labour supply that are associated only with changes in employment are not likely to have been driven by incentive effects associated with wage inequality. In what follows the paper examines work hours on a per person and per worker basis, as well as employment participation.

Working hours are defined using the annual usual hours worked concept. Annual hours refers to the number of hours worked per year and can vary both because of changes in the average length of the work week, and changes in the number of weeks worked per year. Hence, hours per year represents a more complete measure of labour supply over the year than hours per week. Indeed, hours per week and hours per year can show different trends. For example, Rones, Ilg and Gardner (1997) note that average weekly hours per worker remained stable in the U.S. over the 1976-1993 period, but annual hours rose because of a decline in part-year employment.

Furthermore, the study uses the usual hours concept as opposed to the actual hours concept. Estimates of annual actual hours are not readily available from the surveys that are employed. The disadvantage of using usual hours is that paid holidays, vacation and sick leave cannot be distinguished from working hours[4]. As shown below, the concept of usual hours worked per year is defined similarly in the two countries.

For the U.S. data from the March Supplement to the Current Population Survey (CPS or CPS-March[5]) for the reference years 1979 to 2000 is used. This annual survey, conducted in March, asks questions about work experience during the year preceding the survey. It includes the civilian non-institutional population. Information is collected about work hours and weeks worked over the previous year for all household members aged 15+. Usual hours is captured in the CPS using the question: **In the weeks that ... worked, how many hours did ... usually work?** Usual hours refer to hours worked (including time off due to illness, holidays, or slack work) 50% of the time or more. The instructions do not specifically mention what to do with overtime hours, but if the respondent stuck to the 50% rule, overtime hours would be included when the respondent worked a usual number of overtime hours at least 50% of the time.

[4] Actual hours includes unusual overtime, and excludes hours on holidays, paid vacation, and sick leave. Hall (1999) examines weekly actual hours in Canada using recent LFS data. Rowe, Nguyen and Wolfson (2002) examine weekly actual hours worked to determine if there is evidence of an increase in "time crunch", or, the lack of discretionary time. After controlling for compositional change in the workforce, and deheaping the hours data, they find that there was little evidence of an increasing time crunch. Bell and Freeman (2001) show that as much as half of the cross sectional difference in actual hours worked is rooted in more holiday and vacation time for Germans. What is important for our work on trends in hours is to note relative changes in holiday or vacation time taken in the U.S. and Canada. We are not aware of any evidence on this.

[5] Normally the abbreviation CPS is used when referring to the March Supplement to the CPS, but under some situations when there is a need to distinguish it from the Outgoing Rotations version of the CPS we refer to the March survey as the CPS-March).

Moreover, the hours provided corresponds to those worked at all jobs[6]. The question provides an estimate of hours worked per week, so to get an estimate of annual hours, the CPS estimate of weeks worked in the year was used. This information is extracted using the question: **How many weeks did ... work either full time or part time, even for a few hours? Include paid vacation and sick leave as work.** Thus weeks worked includes any time off with pay. Given an estimate of typical hours per week, and weeks worked, the estimate usual hours worked per year is computed as:

$$\text{Average Usual Hours per Person in Year Y} = \frac{\Sigma_i \left(\text{Hours Worked in a Typical Week During Year } Y_i \times \text{Weeks Worked in Year } Y_i \right)}{\text{Number of Persons in Year Y}} \quad . \qquad (2)$$

In Canada, the use of three surveys to estimate annual usual hours for the 1979 to 2000 period is required. The study uses weekly usual hours information from the Labour Force Survey (LFS) from 1979 to 1997, weeks worked obtained from the Survey of Consumer Finances (SCF) from 1979 to 1997 and weeks and hours worked from the Survey of Labour and Income Dynamics (SLID) for 1993 to 2000. The target population for these surveys does not differ substantially from one another, or from the CPS target population.

The SCF is an annual survey, which, until replaced by the SLID, was Canada's main source of information for annual earnings and income trends. The design of the survey was quite similar to the CPS-March Supplement, and the universe was also virtually identical. Also both surveys are supplements to the regular monthly labour force surveys in the respective countries. The SCF was conducted in April, and asked questions about income and work experience during the previous calendar year. In the SCF, respondents were asked: **During 19XX, how many weeks did ... do any work at a job or business?** (XX refers to the reference year.) The total of weeks was to include weeks worked full and part time, weeks absent with pay, weeks with a job but absent due to holidays, strike, lockout, illness or maternity leave, and weeks spent self-employed.

Unfortunately, the SCF did not question respondents on typical work hours during the year. However, since the SCF is asked as a supplement to the monthly Labour Force Survey (LFS), we can retrieve weekly hours usually worked for the reference week from that survey for each SCF respondent. In the LFS, usual hours was collected with the question**: How many hours does ... usually work at his/her (a) main job? (b) other jobs?** Similarly to the U.S., hours worked was defined as the number of hours usually worked in a typical week counting paid vacation, sick and maternity leave and overtime, regardless of whether they were paid.

In contrast to usual hours taken from the CPS-March Supplement, the hours estimate from the LFS refers to jobs held in a single reference week, and not to all jobs held over the year. To estimate annual work hours from these two data elements requires the assumption that weekly usual hours worked in the jobs held in April is a good estimate of weekly hours usually worked in a typical week last year. We make this assumption, and estimate annual hours as:

[6] This is in contrast to the CPS-outgoing rotations monthly survey where, up to 1994, only data on the primary job was covered.

$$\text{Average Usual Hours per Person in Year Y} = \frac{\Sigma_i \left(\text{Hours Worked in the Reference Week in April Y+1}_i \times \text{Weeks Worked in Year Y}_i \right)}{\text{Number of Persons}} \quad . \quad (3)$$

The appendix describes several tests we used to validate the results of our estimation procedures combining the SCF and LFS for Canada for 1979 to 1997[7].

For 1993 to 2000 we use data from SLID, a longitudinal survey conducted in Canada over this period, to estimate annual usual hours. Weeks worked and usual hours worked per week are conceptually similar to those used in the LFS and SCF in the earlier period, and are easily obtained from the microdata. In SLID, the number of weeks worked corresponds to the number of weeks during which the individual was employed (including self employed and unpaid family work), or was not at work due to illness or disability, personal or family responsibilities, vacation or labour dispute. SLID collects information on up to six job spells engaged in over the year, and the value for weeks worked is computed on this survey from an examination of the corresponding start and end dates.

Hours usually worked is collected in SLID from the questions: TO PAID WORKERS: **How many hours per week did you usually get paid?** and TO SELF-EMPLOYED AND UNPAID FAMILY WORKERS: **How many hours did you usually work?** Thus, the questions specifically refer to paid hours in the paid worker case and all hours in the self-employed case. Since the LFS collected usual paid and unpaid hours, this is one source of conceptual discrepancy

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[7] Since hours estimates and weeks worked estimates were not contemporaneous, a fraction of the sample reports positive weeks worked in the reference year t, but zero hours worked in the reference week of April year t+1. Examining the data, four categories of observations can be seen:

(A) Individuals with a strictly positive number of weeks and a strictly positive number of hours (corresponding to 63.4% of the population on average);
(B) Individuals with 0 weeks and a strictly positive number of usual hours (1.1% of the population);
(C) Individuals with 0 weeks and 0 hours (22.0% of the population);
(D) Individuals with a strictly positive number of weeks and 0 hours (13.5% of the population).

Estimating hours for individuals in category (A) is straight forward. Individuals in categories (B) and (C) were considered as not employed because they were not working during the reference year (0 weeks). This left us with individuals in the category (D) with no information on hours (because they were not working during the reference week) but who worked during the reference year. We imputed a number of weekly hours to these individuals using a regression model based on the characteristics of the individuals for whom we had information on hours, that is, people in category (A) and (B):

$$H_i = \beta_1 + \beta_2 x_i + \beta_3 x_i^2 + \beta_4 r_{1i} + \beta_5 r_{2i} + \beta_6 r_{3i} + \beta_7 r_{4i} + \beta_8 s_i + \beta_9 m_i + \beta_{10} ms_i + \beta_{11} e_{1i} + \beta_{12} e_{2i} + \beta_{13} e_{3i} + \mu_i$$

where,

H_i is the number of hours worked by individuals in category (A) and (B);
x represents the age of individuals in this category;
r are dummy variables related to the place of residence;
s is a dummy variable related to gender;
m is a dummy variable related to the marital status;
ms is a dummy variable to indicate whether the individual is a married woman;
e is a dummy variable related to the education level.

Imputing these observations did not affect the results in any important way.

between the two series. Notably, the concept is the same for self employed workers who, over the late 1990s, constituted about 16 percent of the employed workforce. In practice, Bartman and Garneau (1998) found that the SLID hours estimates are statistically identical to those from the LFS. Using SLID weeks worked and usual hours per week we can generate conceptually consistent estimates of annual usual hours worked per year.

Figure 2 shows average annual usual hours from each of the LFS/SCF (with hours taken from the April LFS), SLID and CPS surveys. Comparing LFS/SCF and SLID we see differences in levels. The SLID survey differs in design compared to the LFS/SCF and CPS-March Supplements. The collection of information on multiple job spells in SLID may tend to reduce retrospective recall biases. In fact, it tends to estimate higher weeks worked during the year than the SCF. We examine this and find that in most years about 75% of the difference between the LFS/SCF and SLID series is explained by higher weeks worked estimates in the SLID. Notably, for years in which we have data from both surveys (1993 to 1997), both tend to display highly similar year over year changes.

Differences within Canada across surveys for the same year emphasize the importance of survey design and methodology differences in generating work hours estimates. Although the SCF and CPS were similar surveys, it is possible that differences in level observed between these surveys arise in part from differences in the survey instruments, and comparisons of levels should be made cautiously. However, since the survey approaches remained stable over time in the two countries, relative estimates of the growth in work hours should be unbiased. Hence, in this paper we tend to focus on differences in the evolution of work hours over time rather than on differences in levels at a point in time.

While examining results from the LFS/SCF and SLID separately for Canada is informative, for many purposes it is also useful to examine a single uninterrupted time series. To make an uninterrupted time series for Canada, we compute estimates in the following way:

- For 1979 to 1995 we use estimates from SCF/LFS.
- For 1996 to 2000 we estimate hours using year over year changes derived from SLID[8]:

$$\text{Estimate}_{y} = \text{Estimate}_{y-1} \times \text{SLID growth rate over y-1 to y} \qquad (4)$$

[8] We begin using SLID data in 1996 since this is the first year that this longitudinal survey introduced its second cohort. This effectively raised the sample from about 25,000 to 50,000 observations per year in this survey. Additionally, in 1997 a new LFS questionnaire was introduced and the definition of usual hours changed slightly. Since then, usual hours worked by employees refer to their normal paid or contract hours, *not counting any overtime* (recall that unusual overtime hours were also excluded in the pre-1997 definition of usual hours). As a result, usual hours still include paid vacation, sick leave and maternity leave, but now exclude "usual" overtime hours. This change would affect LFS/SCF estimates beginning with the 1996 estimate of annual hours, but we have examined the data for any evidence of a change in the distribution of work hours and did not find any. In SLID, hours worked by paid workers refer to the hours for which pay is usually received, but no specific distinction is made between "contract" hours and "usual" overtime hours. Thus, paid overtime is included in this definition, but the possibility that some respondents include unpaid "usual" overtime hours cannot be entirely ruled out. Moreover, the SLID definition of usual hours worked by the self-employed and unpaid family workers is very comparable to the pre-1997 definition of usual hours in the LFS. Therefore, for an unbroken time series we prefer the 1996 and 1997 estimates of work hours from SLID.

This procedure assumes that growth rates derived from SLID approximate the post 1995 evolution of annual hours from the SCF/LFS. Figure 2 also shows the development of annual hours usually worked per person based upon this combined LFS/SCF/SLID series. The series shows strong pro-cyclical movements. For this reason, we look at decade-long trends by comparing years close to cyclical peaks. From 1979 to 1989 hours worked rose by 7.5% in Canada while from 1989 to 2000 hours fell by 1.6%. In the U.S., hours rose 7.9% in the 1980s and a further 5.4% in the 1990s. Considering the whole period, the average number of usual hours worked by Canadians rose 5.8% while in the U.S., it rose 13.8%[9].

3. Changes in hours per person by age and gender

In this section we provide a descriptive look at hours worked by demographic subgroup. It is important to subdivide the results by age for at least two reasons. First, three trends which will affect hours worked are increasing school attendance among young workers, early retirement among older workers, and a general increase in the employment engagement of women. Thus, it is useful to examine these groups separately from prime aged male workers. Second, we wish to discuss how these trends line up with competing explanations for international differences in working hours. If a general phenomenon such as inequality were driving international differences, then we would expect to see divergent trends among all groups. On the other hand, if differences such as employment of women or older men were driving trends, then a detailed descriptive analysis should reveal this. In this section developments in hours on a per person basis is examined, conducting a detailed decomposition of the contribution of hours worked per worker and annual unemployment rates on overall labour supply in the next section.

Annual hours estimates for men and women aged 16-24 are shown in Figure 3. Hours per person fell for Canadian men first during the 1980s recession, recovered partially, and then fell again during the 1990s recession, with no strong sign of recovery during the 1990s expansion. Hours estimates from SLID were typically about 50 to 100 hours per year higher than for the SCF. As noted above, SLID typically estimates higher numbers of weeks worked per year than the SCF. However, neither the SCF nor SLID series show significant recovery in the 1990s for Canada. Hours per person for young Canadian women did not decline across the 1980s business cycle, but declined during the 1990s cycle. This is in contrast to the case for young American men and women for whom hours per person remained comparatively stable in the 1990s. Hours per person changed little for young American workers in the 1980s, and, compared to their Canadian counterparts, declined less for young men, and not at all for young women.

[9] There has recently been substantial interest in the measurement of the level of working hours for the purposes of productivity estimation. Indeed, estimates of working time are a critical component to productivity estimates when they are expressed on a per hour basis rather than the traditional estimate which has been expressed on a per person employed basis. There are interesting differences in the way hours per worker are measured for the purposes of productivity estimation and the way we measure it here. It is standard for productivity estimates to divide the total number of hours in a year by the number of employed persons in an average month. In this paper we divide by the number of people employed at any time in the year. Van Ark (1998) demonstrates the difference between the two types of estimates for the U.S. He shows that the average hours per person working at any time trends up faster than the hours per person employed in an average month. The decline in part-year employment in the U.S. noted above explains the difference.

Examining the combined LFS/SCF/SLID series, young Canadian men ended the 1990s 16% lower than they started, marking a 22.1% drop from 1979 to 2000. American men also decreased labour supply over the period, but much less than Canadians, dropping 13.8% over the 1979 to 2000 period. Canadian women aged 16-24 decreased hours per worker by 12.4 percent over this same period, recovering hours late in the 1990s, while American women aged 16-24 increased hours by 4.7%.

Relative trends among young persons are affected by trends in school enrolment. The percent of the population aged 16-24 enrolled in school full-time in Canada rose from 32.5% to 44% between 1979 and 1989, and then to 51.4% in 2000. In the U.S. the corresponding percentages were 38.9%, 43.6% and 48.4% respectively[10]. Hence, young Canadians had lower enrolment rates in 1979, caught up to the Americans across the 1980s, and stayed on par with their American counterparts across the 1990s. If relative trends in labour supply were affected only by changes in enrolment, then one would expect relative trends to have favoured Americans in the 1980s and neither in the 1990s. However, we saw that hours per person diverged mostly in the 1990s, indicating that something other than relative enrolment rates were driving trends. School enrolment status is available for all years in the Canadian data, and after 1984 in U.S. data. Figure 4 shows changes in hours per person after excluding full and part time students in both countries. In Canada, hours supplied by young men fell 7.2% across the 1980s and 16% across the 1990s, but omitting students from this calculation, we see labour supply dropping 1% across the 1980s and 15% across the 1990s. Hours for young women fell across 1979 to 2000 by 11.4% but after excluding students, hours rose by 4.5%. For the U.S. we can only look at data after 1984, but from what data is available it appears that hours grow more for young Americans after removing students from the mix (especially for women). In all it appears from Figure 4 that diverging trends in the 1990s, and especially the decline of hours for young men, remain an important factor.

Trends in hours worked for prime aged men and women (aged 25-54) are shown in Figure 5. Among men, hours per person diverged first across the 1980s, related to a decline in Canadian hours, and then more across the 1990s. In both decades, most of the increase in the hours gap occurred during the recession years with Canadian hours failing to completely return to pre recession levels. As with younger workers, estimates of hours per worker from SLID are somewhat higher than they are from SCF (by about 50 hours), but as with the SCF, the SLID data show no substantial increase in hours in the 1990s recovery. In contrast, American workers' hours recovered quickly from the recession, and grew to period high levels by the end of the decade. In all, a gap in labour supply opened up clearly after 1983, and widened though the 1990s as American men gained hours, and Canadian men lost hours. Hours per person for Canadian prime aged men fell by 2.4% from 1979 to 1989 and 4.2% across 1989-2000 for a total drop of 6.5%. In the U.S., hours per prime aged men fell 0.6% across the 1979-2000 period.

The picture for prime aged women was quite different. Hours per person trended upward substantially for both Canadian and American prime aged women over the period. In all, American women aged 25-54 boosted their hours 33.7% while Canadian women in the same age group increased hours by 39.7%.

[10] U.S. rates have been computed using the school enrolment reports provided by the U.S. Bureau of the Census, which reports the results of the CPS October Survey. To ensure the comparability of estimates across both countries, Canadian enrolment rates are based on LFS October samples.

The evolution of labour supply for men and women aged 55-69 is shown in Figure 6. Hours worked per man aged 55-69 dropped in both countries, but much faster in Canada. Overall this represented a decrease in labour supply per man aged 55-69 of 4.4% in the U.S. and 23.8% in Canada. For Canadian women aged 55-69, hours per person showed no significant trends in the 1980s, and rose slightly later in the 1990s. Their U.S. counterparts increased hours in the second half of the 1980s, and then steadily across the 1990s. The end result was a period long increase in hours per person of 35.6% for U.S. women between 1979 and 2000, and 21.4% in Canada. In both cases the increases were highly concentrated in the 1990s.

4. Decomposing relative trends in hours

Inter-country differences in trends in work hours are driven by within group changes, such as those described above, weighted by the respective population shares in those groups. In Tables 1 and 2 we decompose total change in hours per worker, employment rates, and hours per person into components due to changes within groups, and changes in the size of the group within each country. This allows us to pinpoint how important within groups changes are for understanding the aggregate trend, in order to help us focus our search for explanations. Because changes were different across the 1980s and 1990s these decades are examined separately. The tables show changes across 1979, 1989 and 2000, which are three years near business cycle peaks[11].

The 1980s

Changes in labour supply across the 1980s are shown in Table 1. Each cell in the table shows the percentage point increase in total labour supply that would have happened had no other factors changed. For example, the top left cell shows that had nothing changed except employment rates for 16-24 year old men, then labour supply in the U.S. would have fallen 0.4 percent. Of the total 7.9% increase in U.S. labour supply over the decade, 3.5 percentage points due to changes in demographic shares. This reflects the aging of the population, and a shifting of the population from the 16-24 age group to the 25-54 age group. The remaining 4.5 percentage points of the increase in labour supply in the U.S. was associated with within group changes. Indeed it is clear from Table 1 that most of this increase was centered among prime aged women. Prime age women accounted for a 6.5 percent increase in hours per person, with roughly half of this associated with increases in hours per worker (3.1%) and half with increased employment (3.7%). Other changes are minor in comparison, with declines in labour supply of older men accounting for a one percentage point decrease in labour supply, rooted mostly with a 0.6 percentage point decrease attributed to falling employment.

In Canada, 2.7 percentage points of the 7.5% increase in hours per person was associated with changes in the population share, and the aging of the population into the prime age group. The

[11] Defining the share of the age 16-64 population in group i as γ_i, and hours per person in group i as H_i, the part of the total change in hours per person between 1979 and 1989 in the U.S. which is associated with hours changes of group i is $\frac{\gamma_{i89}^{US}(H_{i89}^{US} - H_{i79}^{US})}{H_{79}^{US}}$ and the part due to changes in group i shares is $\frac{H_{i79}^{US}(\gamma_{i89}^{US} - \gamma_{i79}^{US})}{H_{79}^{US}}$. Employment is decomposed similarly, and in decomposing hours per worker γ_i denoted the share of workers. Canada is decomposed analogously.

remaining 4.8 percentage points were associated with changes within groups. As with the U.S., changes in hours supplied by prime aged women accounts for most of this. Changes in hours supplied among prime aged women were associated with an 8.2 percentage point increase in labour supply. This was derived from a 6.2 percentage point increase due to higher employment, and a 2.5 percentage point increase due to higher hours per worker. Changes among other groups served to dampen the positive effect of increased labour supply among prime aged women. Changes among young Canadians in employment (up 1.4 percentage points) and hours per worker (down 1.3 percentage points) were offsetting, but decreased employment among men aged 55-69 reduced per capita labour supply by 1.2 percentage points and small decreases in labour supply for prime aged men are also noted.

The bottom panel of Table 1 expresses the differences between the U.S. and Canada growth rates allowing us to focus on trends which differed substantially between the countries. Overall, the hours per person gap rose by 0.4 percent in the U.S. favour, the factor tipping the balance in the U.S.'s favour was faster movement into the prime aged category. Holding composition constant, hours per person would have shifted 0.4 percentage points in Canada's favour. Several within group changes were also notable, but these largely offset one another with the end result that there was little net change in the hours gap over the 1980s. The within group changes which dominated this period were: (1) a relative increase in Canadian prime age women's employment[12]; (2) Canadian youth's offsetting trend towards increased employment and decreased hours[13], and (3) a slightly slower decline in labour supply of older men in the U.S.. In all, Americans increased hours per worker relative to Canadians who increased employment rates relative to Americans, with these changes offsetting.

The 1990s

A decomposition of the change in hours worked between 1989 and 2000 is shown in Table 2. In the 1990s, Americans increased labour supply per person by 5.4% with 4.6 percentage points of this associated with increases in within group labour supply. Nearly all of this increase (4.4 percentage points) was associated with higher hours per worker. This rose for men and women in all age groups, but especially among prime age workers which accounted for 3.2 percentage points of the increase. There was no net change in employment, but this masks an offsetting increase in women's employment and a decrease in men's employment in the U.S. over this period.

In Canada, hours per person fell by 1.5 percent over the decade, but it would have fallen more had it not been for an offsetting 0.8 percentage points associated with the aging of the population which brought a larger fraction into the prime aged category. Without this factor, Canadian labour supply would have fallen 2.3 percent. This was associated mainly with falling

[12] Relative trends for prime aged women can be related to changes in the employment rate, conventionally defined by the countries' labour force surveys. This data indicates that in 1979 monthly employment rates for prime aged women were 59% in the U.S. and 53.6% in Canada. By 1989, these were 70.4% and 68.8% respectively. Thus, Canadian prime aged women's employment rates caught up to their American counterparts over the decade. Monthly employment rates evolved at similar paces across the 1990s.

[13] As we noted above, differential in school enrolment growth rates likely play an important role in relative labour supply across the 1980s. Unfortunately, school status is unavailable on the CPS-March before 1985.

employment among men of all age groups. Other things equal, declining employment among men would have decreased hours per person by 2.8 percent.

The differences in differences panel at the bottom of the table summarizes relative trends across the 1990s clearly. Net of changes in population shares which developed the same way in both countries, the hours per person gap rose 6.9 percent in the 1990s, with 4.9 out of 7 percentage points associated with increases in U.S. hours per worker, and 2.0 out of 7 associated with decreased Canadian employment.

5. The influence of wage inequality on hours worked

We now turn our attention to understanding the potential factors underlying the development of the hours gap described above in more detail. We focus on the recent hypotheses by Bell and Freeman (1996, 2000, 2001), and the critique of this by Osberg (2001), which sought to explain the cross-sectional U.S.-German hours gap. Our approach is to present the arguments of these authors, and see how well the stylized facts we have developed line up. We then turn to the third possibility that other factors unique to Canada may, at least in part, explain the hours' gap.

In a recent set of articles Bell and Freeman (1996, 2000, 2001) outline the hypothesis that workers in a country with more wage inequality will have a higher incentive to work longer hours. Workers are "forward-looking" in that they respond to the present distribution of wages by working harder to obtain future raises and promotions. The potential payoff to working harder is greater the more unequal the wage distribution, which yields greater incentives. While Bell and Freeman examine this model in "levels", Osberg (2001) notes that it should also apply to "changes" (increases in wage inequality should also drive increases in hours) and also that Bell and Freeman's model suggests that the effects of inequality should be a general phenomenon. For it to be truly compelling, increases in hours should be seen among all groups, and would likely be stronger at the top of the hours distribution where returns to extra work are highest.

Table 3 shows changes in employment and average work hours per person where hours per person is additionally decomposed into the contributions from each quintile of the hours distribution. We focus on prime aged men here since this allows us to abstract from other trends such as the increasing educational attainment and labour force participation of women, the increased propensity for young persons to stay in school, and trends in retirement behaviour among men. Also, if wage inequality were driving differences in hours worked it would likely be seen most strongly among prime aged men. Data in the top row shows that prime aged American male workers decreased employment by 1.2%, and average hours per worker by 0.1% across the 1980s. Hours at the bottom quintile of the hours per worker distribution changed in such a way that, had no other changes taken place, average hours would have fallen by 0.1%. Hours in the second quintile changed in such a way as to increase hours by 0.5% and hours at the top of the distribution fell such that, other things equal, hours would have fallen at the average by 0.6%. Hence, across the 1980s American men at the bottom of the distribution worked more hours. Canadian prime aged men also reduced employment and saw hours fall at the top of the hours distribution and rise at the bottom, implying an increased concentration of hours in the low hours area of the distribution, just like prime-aged American men. The differences in differences row shows relative trends. Compared to the U.S., Canadian prime aged men reduced hours faster, but

most of this resulted from differences in hours per worker, as Canadian men worked relatively fewer hours at the top of the hours' distribution.

Across the 1990s, American prime aged men decreased employment and increased hours per worker by 2.6% with most of this increase at the top of the earnings distribution. Canadian prime aged men decreased employment by 3.5% and hours per worker by 1% with most of this at the top of the hours' distribution, continuing the trend towards concentration of work hours in the low end of the hours distribution observed in the 1980s.

How did wage inequality increase over this period? In Table 4 we replicate estimates of annual earnings inequality for full year full time American male workers reported in Card and Dinardo (2002). While this is not the best estimate for studying wage inequality, it is the only one that can be replicated for Canada using our data. Since the annual hours of full year full time workers do not vary much, the variation in annual earnings for this group approximates wage inequality. Using our data and the method outlined in Card and Dinardo (2002)[14], we find that the standard deviation of log earnings for male full year full time workers rose from 0.53 to 0.60 across the 1980s, but remained relatively steady across the 1990s, ending the period at 0.62 in 2000.

We replicate Card and Dinardo's methodology using Canadian data and find that for full-year full time men, earnings inequality developed quite similarly in Canada. Our estimates show that inequality rose across the 1980s from 0.47 in 1979 to 0.52 in 1989, and remained at 0.52 until 1997, the last year of the SCF survey. For more recent evidence we compute the same statistic from SLID, and found that, although at a higher level, inequality did not rise further across the 1996 to 2000 period.

A straightforward interpretation of the Bell and Freeman hypothesis says that we should have expected an increase in average hours in both countries in the 1980s, and no increase in the 1990s. However, we saw only an increase in average hours in the U.S. in the 1990s. Furthermore, if incentives were more keenly felt at the top of the hours distribution, then we would have expected to see the changes in hours at the top of the hours distribution. Again, this was only observed for American men in the 1990s. In fact, in the 1980s when wage inequality rose in both countries, hours growth was seen entirely at the bottom of the hours distribution, with hours up 0.4% in the U.S. and up 0.7% in Canada in the bottom two quintiles, and hours fell at the top of the hours distribution. At this aggregate level, differences in the growth rates on wage inequality do not help us to understand why average and long hours did not rise for prime aged male workers in the U.S. in the 1980s, or why they did rise in the 1990s. Given that wage inequality appears to have risen about the same way in both countries over this period (although at different levels), and hours of prime aged men diverged, this suggests we need to look elsewhere for explanations of relative differences in hours.

To explain the large increases in hours among prime aged women in terms of incentives drawn from wage inequality is equally difficult. Table 5 shows data for prime aged women. Prime aged women increased hours in both countries across the 1980s. Hours continued to increase substantially for American women, but increased much less for Canadian women in the 1990s.

[14] We add one additional restriction to the method of Card and Dinardo, which is to delete workers with non-zero farm self employment and more than $5000 in other self employment income. This produces a minor rise in inequality in the 1990s compared to Card and Dinardo's results.

We would have expected to see less increase in American women's working hours if all that was driving it were increases in wage inequality. Furthermore, in all cases hours increases were seen most concentrated in the fourth quintile—not the top quintile. While this may represent women responding to the prospect of higher wages, it is also plausible that this reflects part of a longer trend towards higher educational attainment for women (which increases wages) and a general trend towards greater involvement in paid work in both countries related to lifestyles, desire to work and changes in tastes. Altogether these results suggest that the data do not lend themselves to the explanation that inequality in wages drives inter-country differences in work hours.

6. The influence of preferences and differences in lifestyle on hours worked

In his examination of U.S.-German differences in hours worked, Osberg shows that the main difference in annual hours worked between the U.S. and Germany arises from the lower propensity of women and older men to be employed, and that among those that do work, there was little difference in average hours. Other German male workers were not less prone to supply work hours than American men. According to the Bell-Freeman hypothesis, inequality should have provided incentive for American prime age men to work more than German prime age men. Osberg concludes that work hours differences are better described by national differences in preferences and lifestyle such as the propensity for German mothers to work less, and a tendency for German men to retire early, than due to the effect of inequality.

As with Osberg, we found that relative differences in employment participation was an important contribution to inter-country differences. This was especially true in the 1980s when Canadian women increased employment much faster than American women, and in the 1990s when Canadian men decreased employment more than American men. Indeed, it is likely that changes in tastes and preferences for work underlie the large changes observed among prime aged women in both countries. However, we also noted important differences among young people, older workers and prime aged men, both in employment, and (especially in the 1990s) hours per worker.

Do differences in tastes and preferences in Canada and the U.S. account for the growing differences in work hours? Evidence suggest that Canadians and Americans are similar in their preferences for more work time. Surveys of work time referenced in Bell and Freeman (1996) show that Germans want to reduce their work time while Americans want to increase their time at work. Results from the Canadian Survey of Work Arrangements of 1995 indicated that two thirds of workers were satisfied with their working time while most of the rest want more hours (Morissette and Drolet, 1997), indicating that Canadian's preferences for work time look more like Americans. Indeed, in their 2001 examination of international hours and inequality trends Bell and Freeman noted that the major differences to be explained were between North America and Europe, and that Canada and the U.S. were more similar in terms of average hours and inequality.

Nevertheless, one could still argue that Canadians simply declined to meet an increasing demand of hours during the last expansionary phase. That Canadians preferred not to work more hours in the 1990s. This seems more plausible if work hours were declining among families with high wages. High wage families might be choosing to limit their work hours, given their material

needs are satisfied, and instead devote their time to more leisure. However, when we examine this possibility we find that work hours fell in Canada for workers with the lowest weekly earnings. Figure 7 graphs weekly work hours against the quintile of weekly earnings. For Canadian men (shown in the top panel), declines in hours worked are clearly concentrated among those with weekly earnings in the bottom quintile. These declines were primarily observed between 1980 and 1982, and then again between 1989 and 1992, associated with recession periods. There was no substantial recovery in the 1980s boom period, and while some recovery in hours was seen between 1992 and 1994, working hours for bottom quintile earners does not appear to have returned to pre-recession levels until the economic recovery was well advanced in 2000. For Canadian women, weekly hours declined for bottom quintile earners after 1989 and rose for top quintile earners steadily across the whole period. For U.S. men, increases in work hours were concentrated among top quintile earners with no decline among bottom quintile earners, while for U.S. women, increases were observed across the whole weekly earnings distribution, but especially at the bottom and the top. Thus, it is not just that the distribution of hours has changed that is important, but who got those hours changed over the 1980s and 1990s. Declines in hours for Canadian families have mostly affected low earners and not higher earners. This makes it harder to argue that some Canadians were choosing to work short hours based on personal considerations. Rather it seems more likely that the recovery of the 1990s failed to aid the economic situation of low wage workers in Canada through the provision of more work hours until quite late in the recovery. That weekly hours rose only near the end of the decade suggests that the effects of the 1990s recession on low wage workers long outlived the end of the recession itself[15].

7. The influence of macroeconomic factors

This argument suggests, at least in part, a cyclical explanation for the hours gap. The well developed literature on the Canada-U.S. unemployment rate gap suggests that the development of the gap across the 1990s was due in significant part to the relatively poor performance of the Canadian economy at the beginning of the 1990s (Riddell and Sharpe (1998)).

The relation between the unemployment rate and hours worked is demonstrated in Figure 8. We graph relative unemployment rates for 25-54 year old males against relative annual hours worked (per person and per worker) for prime aged men and prime aged women. The top left panel relates unemployment to hours per person for prime aged men. The relationship between relative hours per person and relative unemployment rates in the two countries are closely correlated. As the unemployment rates diverged in the two countries, the hours' gap for men correspondingly rose. This is especially true during the period 1981 to 1984 corresponding with the emergence of the unemployment rate differential, and 1989 to 1998 when relative unemployment rose a second

[15] For this part of analysis we excluded the top decile of the hourly wage distribution. Kuhn and Robb (1994) stated that due to reporting errors in either weeks worked or annual wages and salaries, workers in the top of the wage distribution of the SCF have unexpectedly low weeks worked, high weeks of unemployment and high weeks of labour force non-participation. However, including the top decile of hourly wage earners does not substantially affect these results. Traditionally, analysis of hourly wages in Canada has not used SCF data because of the fact that contemporaneous estimates of annual work hours are not available. Nevertheless, analysis of wages using other sources by Morisette (1995) noted an increase in the covariance term between hours worked and wages across the 1980s, especially between 1981 and 1984. This result is consistent with a decrease in hours worked for workers in the bottom quintile of the weekly earnings distribution.

time. Notably, during three periods when the unemployment rate differential partly closed, between 1979 and 1980, 1984 and 1986, and 1999 and 2000, the hours differential likewise closed. Given relative declines in the unemployment rate differential between 2000 and 2002, it is likely that relative hours also converged in those years. The picture is less clear for women (top right panel). This may be because it is difficult to separate the cyclical path of women's hours from the development of women's labour force participation due to other factors. However, when we look at the relationship between hours per worker and unemployment rates for prime aged women, we again see a negative correlation. As labour market conditions diverged in Canada and the U.S., hours per worker likewise diverged.[16]

8. Conclusion

In this paper we examined annual work hours in Canada and the United States for the 1979 to 2000 period. We found that a gap in hours supplied per person emerged during the 1980s and widened through the 1990s decade, driven by rising U.S. hours and stagnant Canadian hours. In the aggregate, Canadian labour supply was at about 5.8% higher on a per capita basis in 2000 as in 1979, while U.S. labour supply per capita was about 13.8% higher. The small increase in the hours gap in the1980s was related to changes in population shares which favoured the U.S.. However, other interesting changes were observed in the 1980s as Canadians increased labour supply through boosting employment and Americans by increasing hours per worker, with these changes strongly concentrated among women. During the 1990s we note that it was mainly a faster increase in hours worked per worker seen among all age and gender groups that underlies the relative increase in U.S. hours in that decade. The faster increase appears to be due to rising hours at the top of the hours distribution. In Canada in the 1990s, hours fell slightly due to sluggish employment.

In searching for an explanation for this divergence in work hours we examine the hypothesis that differences in work time are driven by intercountry differences in wage inequality advanced by Bell and Freeman (1996, 2000, 2001). We also examine the possibility, as Osberg (2001) showed in the U.S.-German case, that Canada-U.S. differences are rooted in the propensity for women to work and for men to retire early, or some other major difference in labour force engagement between the countries. We find that neither of these satisfactorily explains the U.S.-Canada differences which may be because both of these explanations are based on differences in preferences for work and non work time, which may be large between the U.S. and Germany, but may not be that large between Canada and the United States. The idea that Canadians are choosing to supply fewer hours also does not correspond well with the stylized fact that hours were falling for workers at the bottom of the weekly earnings distribution. In particular, the relative increase in work hours in the U.S. does not appear to be associated with supply side incentives derived from wage inequality or from differences in preferences for work and non-work time.

[16] Correlation coefficients are:

	Men	Women
HPP	-0.92	-0.12
HPW	-0.91	-0.80

We find that differences in the business cycle provide a potential explanation of trends. In particular, the evolution of the hours gap tended to coincide with business cycle developments reflected in the Canada-U.S. unemployment rate gap. That the development of the hours gap is highly correlated with the relative increase in labour market slack in Canada suggests that the explanation for the relative difference in hours in the two countries lies in relatively sluggish labour demand in Canada rather than differences in labour supply.

Table 1: Decomposition of change in annual labour supply, 1979-1989

	Due to changes in rates				Due to changes in shares			
Age	16-24	25-54	55-69	total	16-24	25-54	55-69	total
U.S.								
				annual employment rates				
men	-0.004	-0.005	-0.007	-0.015	-0.029	0.046	-0.005	0.012
women	0.002	0.032	0.003	0.037	-0.027	0.029	-0.004	-0.001
total	-0.002	0.027	-0.004	0.022	-0.056	0.075	-0.008	0.010
				hours per worker				
men	-0.002	0.000	-0.002	-0.005	-0.028	0.036	-0.016	-0.007
women	0.002	0.029	0.000	0.031	-0.019	0.047	-0.002	0.027
total	0.000	0.029	-0.002	0.026	-0.046	0.083	-0.018	0.019
				hours per person				
men	-0.005	-0.006	-0.010	-0.022	-0.022	0.057	-0.006	0.029
women	0.003	0.060	0.003	0.065	-0.018	0.027	-0.003	0.006
total	-0.002	0.053	-0.007	0.044	-0.040	0.084	-0.009	0.035
Canada								
				annual employment rates				
men	0.005	-0.006	-0.012	-0.013	-0.036	0.041	0.002	0.008
women	0.010	0.062	-0.001	0.071	-0.034	0.026	0.000	-0.008
total	0.014	0.057	-0.013	0.058	-0.070	0.067	0.002	-0.001
				hours per worker				
men	-0.009	-0.005	-0.002	-0.017	-0.029	0.017	-0.016	-0.027
women	-0.004	0.025	0.000	0.021	-0.020	0.062	-0.003	0.040
total	-0.013	0.020	-0.003	0.004	-0.049	0.080	-0.018	0.012
				hours per person				
men	-0.006	-0.012	-0.017	-0.035	-0.028	0.052	0.003	0.026
women	0.003	0.082	-0.001	0.083	-0.022	0.023	0.000	0.000
total	-0.004	0.069	-0.018	0.048	-0.050	0.075	0.003	0.027
U.S.-Canada								
				annual employment rates				
men	-0.009	0.001	0.005	-0.003	0.007	0.004	-0.007	0.004
women	-0.008	-0.030	0.004	-0.034	0.006	0.004	-0.004	0.007
total	-0.016	-0.029	0.009	-0.036	0.013	0.008	-0.011	0.011
				hours per worker				
men	0.007	0.005	0.000	0.012	0.001	0.019	0.000	0.020
women	0.005	0.004	0.000	0.010	0.001	-0.015	0.001	-0.013
total	0.013	0.009	0.000	0.022	0.003	0.004	0.001	0.007
				hours per person				
men	0.001	0.006	0.006	0.014	0.006	0.006	-0.008	0.003
women	0.000	-0.022	0.004	-0.018	0.005	0.004	-0.003	0.006
total	0.002	-0.016	0.010	-0.004	0.010	0.010	-0.011	0.009

Table 2: Decomposition of change in annual labour supply, 1989-2000

	Due to changes in rates				Due to changes in shares			
Age	16-24	25-54	55-69	total	16-24	25-54	55-69	total
U.S.								
				annual employment rates				
men	-0.009	-0.007	0.003	-0.013	0.000	0.008	-0.003	0.006
women	-0.004	0.011	0.008	0.014	-0.003	0.006	-0.004	0.000
total	-0.013	0.004	0.010	0.001	-0.003	0.015	-0.006	0.005
				hours per worker				
men	0.001	0.011	0.003	0.015	-0.007	-0.001	0.000	-0.008
women	0.002	0.020	0.005	0.028	-0.005	0.014	0.003	0.013
total	0.003	0.032	0.008	0.044	-0.012	0.013	0.003	0.004
				hours per person				
men	-0.006	0.003	0.006	0.003	0.000	0.010	-0.003	0.007
women	0.000	0.031	0.012	0.042	-0.002	0.006	-0.003	0.001
total	-0.006	0.034	0.018	0.046	-0.002	0.016	-0.006	0.008
Canada								
				annual employment rates				
men	-0.011	-0.013	-0.003	-0.028	-0.011	0.008	0.002	-0.001
women	-0.009	0.008	0.009	0.008	-0.009	0.009	0.000	0.000
total	-0.021	-0.005	0.006	-0.020	-0.020	0.018	0.002	-0.001
				hours per worker				
men	-0.003	-0.004	-0.002	-0.008	-0.014	0.004	0.000	-0.011
women	-0.003	0.006	0.000	0.003	-0.010	0.024	0.008	0.022
total	-0.006	0.002	-0.002	-0.005	-0.025	0.027	0.008	0.011
				hours per person				
men	-0.011	-0.020	-0.005	-0.036	-0.008	0.010	0.002	0.005
women	-0.009	0.014	0.008	0.013	-0.006	0.009	0.000	0.003
total	-0.019	-0.006	0.003	-0.023	-0.013	0.019	0.002	0.008
U.S.-Canada								
				annual employment rates				
men	0.002	0.007	0.006	0.015	0.011	0.000	-0.004	0.007
women	0.005	0.002	-0.001	0.006	0.006	-0.003	-0.003	0.000
total	0.007	0.009	0.004	0.020	0.017	-0.003	-0.008	0.006
				hours per worker				
men	0.004	0.015	0.005	0.023	0.007	-0.004	0.000	0.002
women	0.006	0.015	0.005	0.025	0.005	-0.010	-0.005	-0.009
total	0.009	0.030	0.010	0.049	0.013	-0.014	-0.006	-0.007
				hours per person				
men	0.005	0.023	0.011	0.039	0.008	0.000	-0.005	0.003
women	0.009	0.017	0.004	0.030	0.004	-0.003	-0.003	-0.002
total	0.014	0.040	0.015	0.069	0.011	-0.003	-0.008	0.001

Table 3: Changes in hours per worker, prime aged men

	Employment	Hours per worker						Hours per Person
		bottom quintile	2nd quintile	3rd quintile	4th quintile	top quintile	Total	
1979-89								
United States	-0.012	-0.001	0.005	0	0.002	-0.006	-0.001	-0.013
Canada	-0.014	0.003	0.004	0	-0.002	-0.016	-0.012	-0.025
Difference in differences	0.001	-0.003	0.001	0	0.004	0.010	0.012	0.012
1989-2000								
United States	-0.017	0.004	0.003	0	0.001	0.018	0.026	0.008
Canada	-0.035	0.005	0.002	0	-0.005	-0.012	-0.008	-0.042
Difference in differences	0.016	-0.001	0.001	0	0.006	0.028	0.034	0.050

NOTE: Data for the U.S. is from the March supplement to the CPS. Data for Canada from 1979 to 1995 is from the Survey of Consumer Finances and the Labour Force Survey, and from 1995 to 2000 is from the Survey of Labour and Income Dynamics.

Table 4: Estimates of wage inequality[a], men working full year and full time

U.S.

March Supplement Estimates	1979	1989	2000
	0.53	0.60	0.62

Canada

Survey of Consumer Finances Estimates	1979	1989	1997
	0.47	0.52	0.53

Survey of Labour and Income Dynamics Estimates	1996	2000
	0.56	0.57

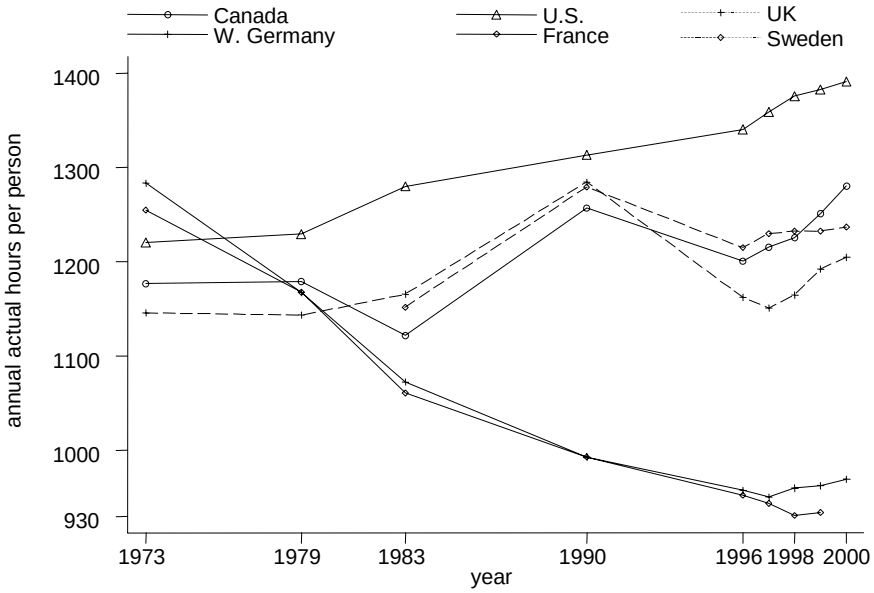
a: Wage inequality approximated by the standard deviation of log annual earnings for men employed full year and full time. Data for the U.S. is from the March supplement to the CPS. Data for Canada is from the Survey of Consumer Finances and the Survey of Labour and Income Dynamics. Canadian and U.S. data are adjusted for changes in the topcoding on the CPS using the method outlined in Card and Dinardo (2002). Specifically, in reference years 1979 and 1980 earnings were topcoded at $50,000 in nominal dollars, from 1981 to 1983 they were topcoded at $75,000, between 1984 and 1988 they were topcoded at $100,000, and after 1988 earnings from the main job was topcoded at $100,000 and earnings at the second job was topcoded at $25,000. Earnings in Canada were not available for the main and secondary jobs so after 1988 earnings in Canada were topcoded at $125,000. Data are then deflated to 1979 dollars and Canadian data is further adjusted using a purchasing power parity factor of 0.85. Observations with earnings of less than $2000 or more than $200,000 in 1979 dollars are then dropped. One addition we made to Card and Dinardo's method was to also exclude men with non-zero farm income or self employment income of more than $5,000. Inequality is conducted using the remaining observations, adjusted by their corresponding sample weights.

Table 5: Changes in hours per worker, prime aged women

	Employment	Hours per Worker						Hours per Person
		bottom quintile	2nd quintile	3rd quintile	4th quintile	top quintile	Total	
1979-1989								
United States	0.110	0.017	0	0.02	0.037	0.024	0.099	0.219
Canada	0.231	0.012	0.005	0.016	0.034	0.02	0.088	0.339
Difference in differences	-0.121	0.005	-0.005	0.004	0.004	0.004	0.012	-0.120
1989-2000								
United States	0.033	0.009	0	0.008	0.028	0.018	0.063	0.098
Canada	0.026	0.003	0.001	0.001	0.009	0.001	0.017	0.044
Difference in differences	0.007	0.006	-0.001	0.006	0.019	0.018	0.048	0.054

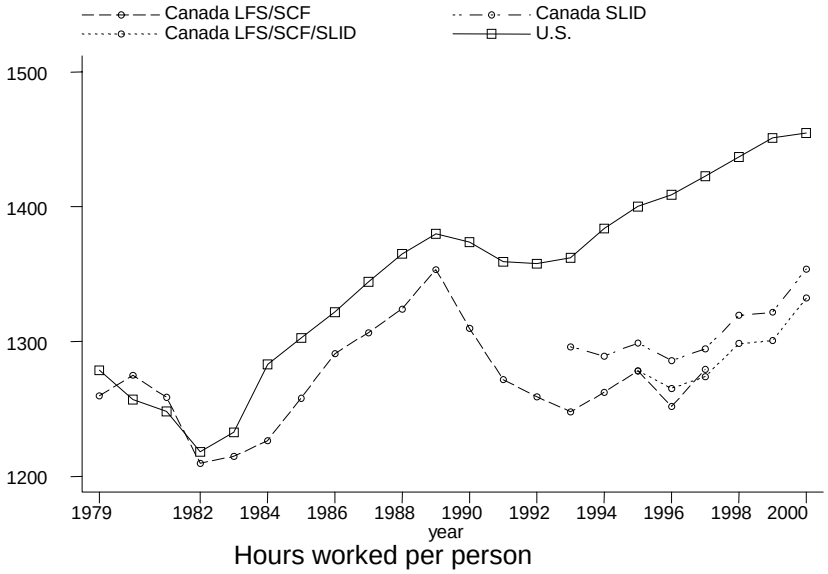
NOTE: Data for the U.S. is from the March supplement to the CPS. Data for Canada from 1979 to 1995 is from the Survey of Consumer Finances and the Labour Force Survey, and from 1995 to 2000 is from the Survey of Labour and Income Dynamics.

Figure 1: Average annual hours actually worked per person, international comparison



NOTE: Data is from OECD (1995, 1997, 2001b). Hours worked per person equals average hours per worker multiplied by the employment rate.

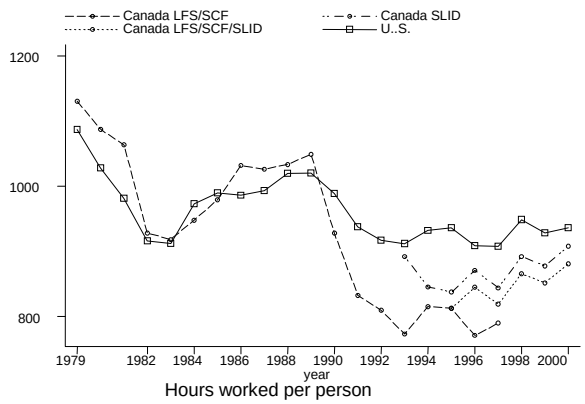
Figure 2: Annual usual hours per person



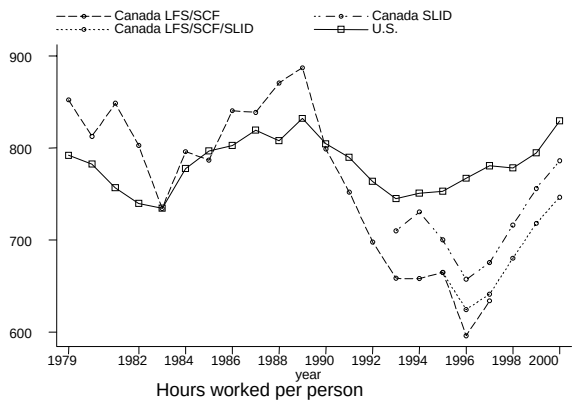
NOTE: Data for the U.S. is from the March supplement to the CPS. Data for Canada from 1979 to 1997 is from the Survey of Consumer Finances and the Labour Force Survey, and from 1993 to 2000 is from the Survey of Labour and Income Dynamics. Includes the population 16-69.

Figure 3: Labour supply for men and women, aged 16-24

Men



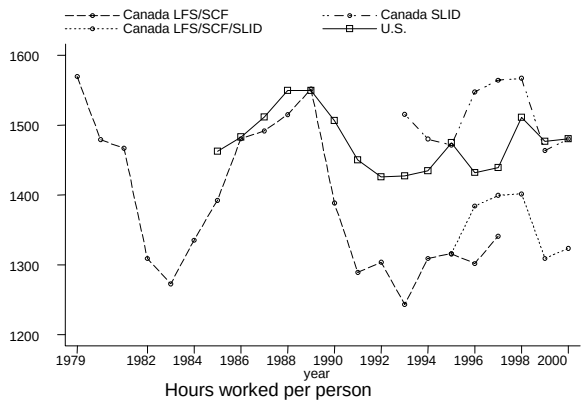
Women



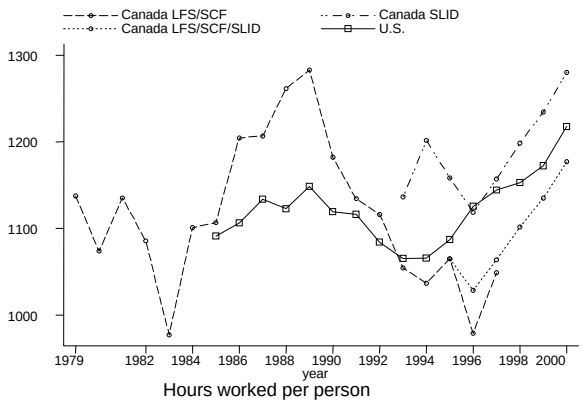
NOTE: The series labelled LFS/SLID/SCF extrapolates SCF estimates of hours based on SLID growth rates from 1995 through 2000.

Figure 4: Labour supply for men and women, aged 16-24, full and part time students excluded

Men



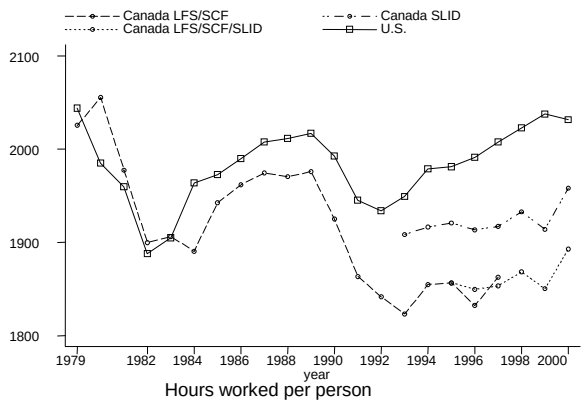
Women



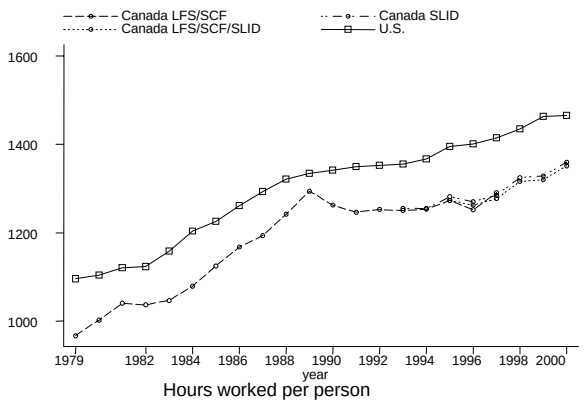
NOTE: The series labelled LFS/SLID/SCF extrapolates SCF estimates of hours based on SLID growth rates from 1995 through 2000.

Figure 5: Labour supply for men and women, aged 25-54

Men



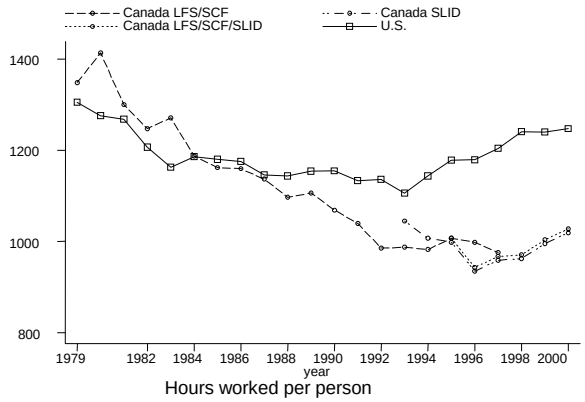
Women



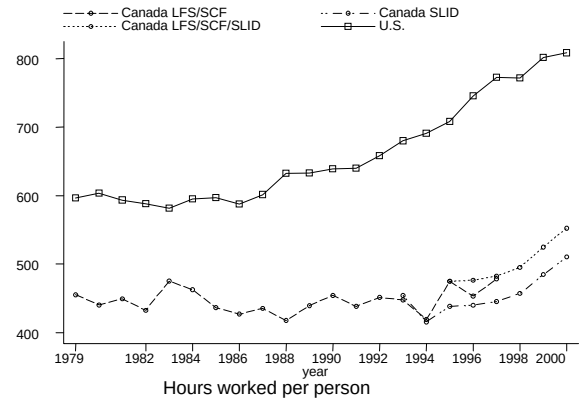
NOTE: The series labelled SLID/SCF extrapolates SCF estimates of hours based on SLID growth rates from 1995 through 2000.

Figure 6: Labour supply for men and women, aged 55-69

Men

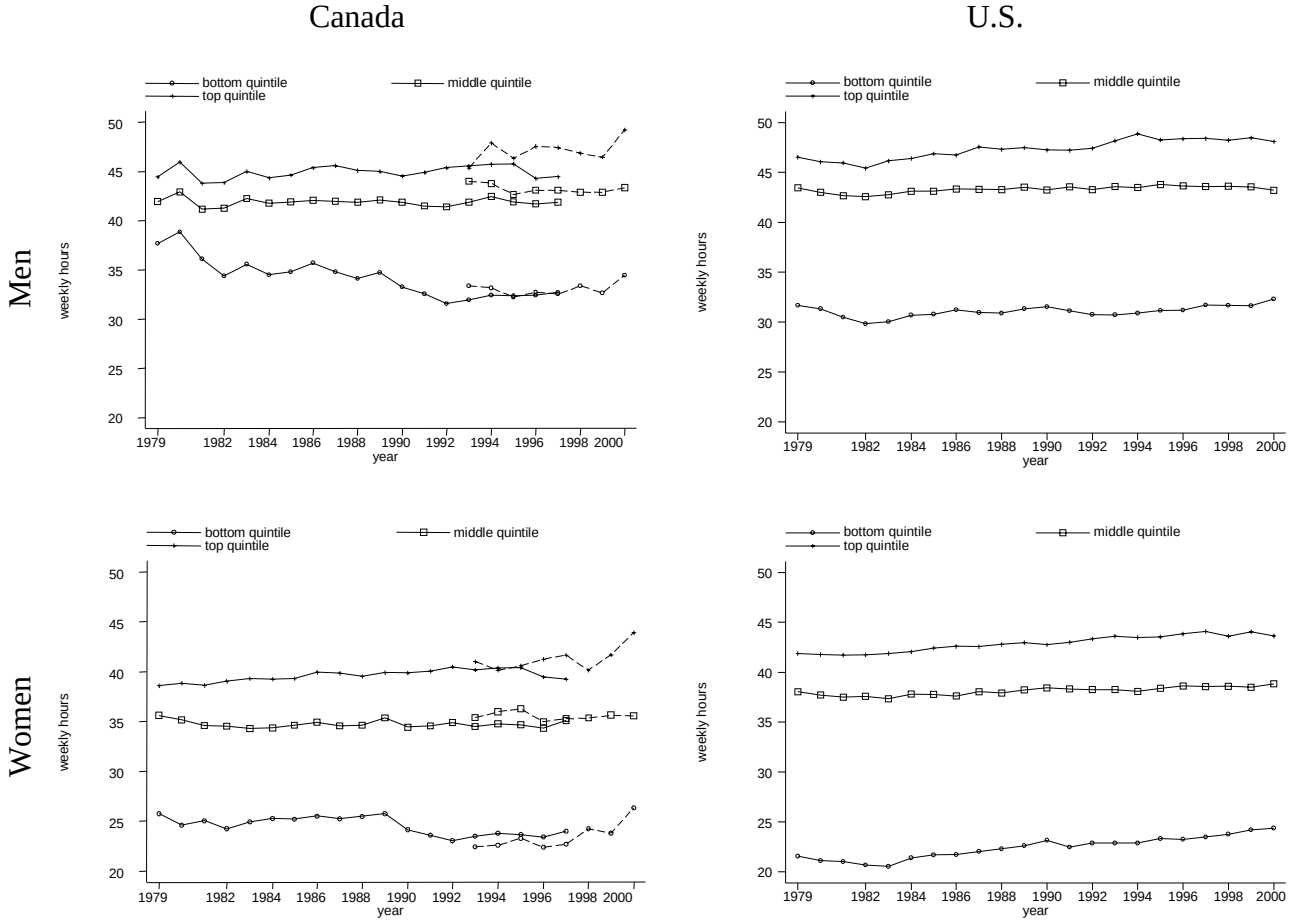


Women



NOTE: The series labelled SLID/SCF extrapolates SCF estimates of hours based on SLID growth rates from 1995 through 2000.

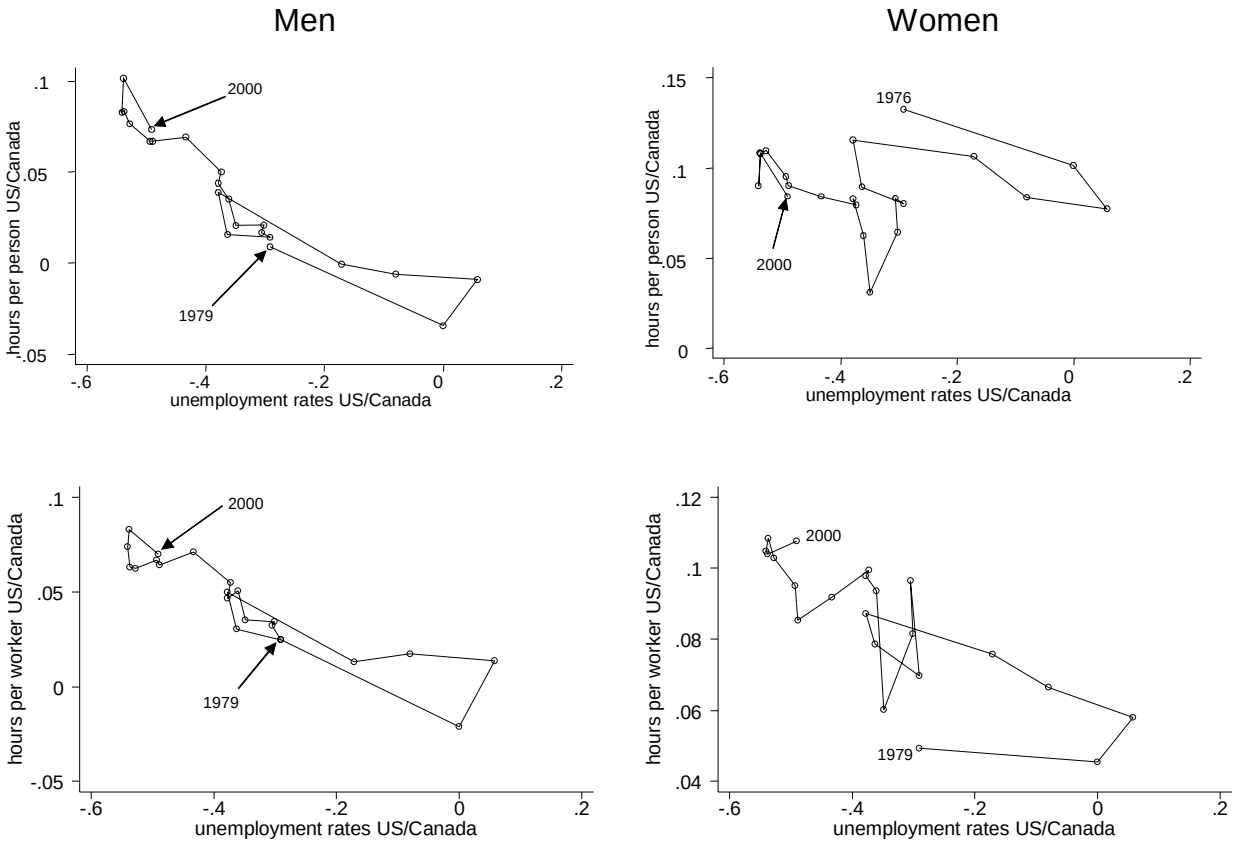
Figure 7: Usual weekly hours by quintile of weekly wages



NOTE 1: Weekly wages is derived from annual earnings from wages, salaries and self employment divided by the number of weeks worked. Data for the U.S. is from the March supplement to the CPS. Data for Canada from 1979 to 1997 is from the Survey of Consumer Finances and the Labour Force Survey, and from 1993 to 2000 is from the Survey of Labour and Income Dynamics. Includes the population 16-69. For Canada the dashed lines indicate data obtained from SLID while the solid lines indicates data taken from the LFS and SCF. Weekly hours refers to the usual hours worked in a typical week except for data from the LFS/SCF where weekly hours refers to the usual hours worked at jobs held in the April following the reference year.

NOTE 2: (Solid lines: SCF/LFS, dashed lines: SLID)

Figure 8: Relative hours and unemployment rates[a], men and women aged 25 to 54



a: Hours are measured on a per person or per worker basis. Defining H as hours, relative hours are $H_{U.S.} \div H_{Cnada}$ -1. Defining the unemployment rate as UR, relative unemployment is $UR_{U.S.} \div UR_{Canada}$ -1. The unemployment rate is for men age 25 to54.

Appendix: Validating Canadian hours estimates

One point of concern was with the validity of our estimate of annual usual hours using SCF and LFS. This is because the LFS estimate of hours temporally refers to a different reference period than the weeks worked question, and conceptually it may not even refer to the same job as the respondent held in the SCF reference year. We tested the use of this assumption in two ways.

First, we used the longitudinal properties of SLID to examine the appropriateness of using hours worked per week from April of year t+1 to estimate annual hours for year t. We found that this does yield a highly accurate estimate, with the distribution of annual hours having a slightly stronger central tendency, but otherwise no major differences (Figure A1).

Second, average usual hours can also be computed using the method described by Rones, Ilg and Gardner (2001). In this method, average weekly hours from the monthly survey (either the LFS or the CPS-Outgoing survey) is combined with the number at work during the year from the annual survey (either the SCF, SLID or the CPS-March Supplement) in the following way:

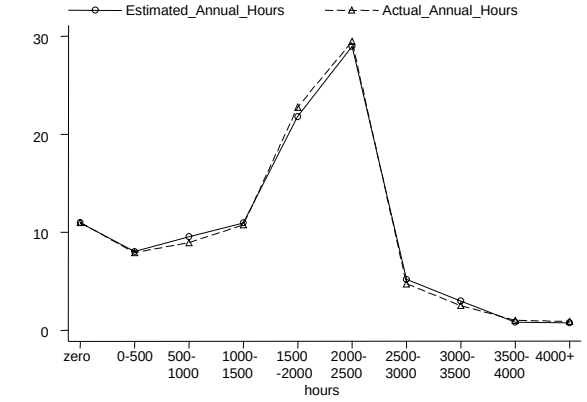
$$\begin{array}{c}\text{Average}\\ \text{Annual Hours}\\ \text{at Work in}\\ \text{Year Y}\end{array} = \begin{array}{c}\text{Number at}\\ \text{Work in an}\\ \text{Average}\\ \text{Week}\end{array} \times \begin{array}{c}\text{Average}\\ \text{Weekly}\\ \text{Hours at}\\ \text{Work}\end{array} \times \begin{array}{c}52\\ \text{Weeks}\end{array} \div \begin{array}{c}\text{Number at}\\ \text{Work}\\ \text{During the}\\ \text{Year}\end{array} \qquad (3)$$

Information for the first two elements comes from the monthly survey while that for the last comes from the annual survey. The disadvantage of this method is that it can only be used for estimating average hours, and does not offer any information on other points in the hours distribution. Nevertheless, computation of average hours in this way provides a useful check on all the results. Figure A2 shows average annual hours usually worked per person computed for Canada and the U.S. for the 16-69 population using the method outlined in equation 3. Hours from the main job are shown only since usual hours for subsequent jobs were not collected in the CPS-outgoing before 1994 (although the trends look identical from what data is available). Comparing figure A2 and figure 2, we see virtually identical time series properties for both Canadian and U.S. data.

A final concern is that the April value for average usual weekly hours may trend differently from the annual value due to changes in seasonality. We examined this possibility using monthly LFS data and found that over the 1976 to 2000 period the annual estimate of weekly hours was 0.30 hours longer for men and 0.38 hours longer for women, with no important trend in this difference over the period. For prime aged men and women the April versus annual hours gap was 0.12 and 0.21 respectively, again with no important trend. (The hours question changed to exclude unpaid hours with the 1997 LFS but this does not appear to affect April relative to annual hours.)

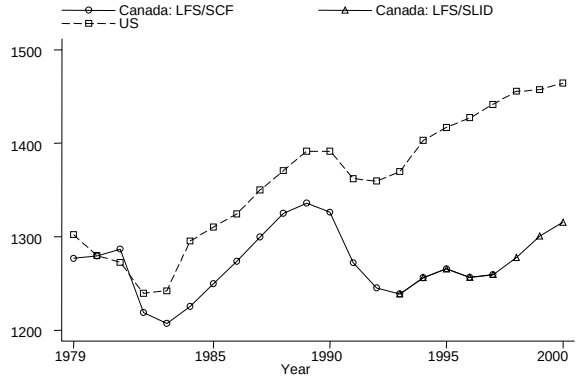
The preceding discussion and graphs demonstrate that the concepts of usual hours and our methods for estimating annual usual hours in Canada and the U.S. appear reasonable. In particular the estimates we obtain from various approaches have similar trend properties.

Figure A1: Distribution of Usual Hours, Canada, 1994, Estimated and Actual



NOTE: Data is from the Survey of Labour and Income Dynamics. Estimated annual hours shows the distribution of values obtained from multiplying annual weeks worked in 1994 with average hours worked per week in April of 1995.

Figure A2: Estimates of Annual Hours per Person using the method of Rones, Ilg and Gardner (2001)



NOTE: "Rones" method refers to the method used for calculating average work hours outlines in Rones, Ilg and Gardner, 1997. Results refer to the main job only. The population is those aged 16-69. Data for the U.S. is from the March supplement to the CPS.

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