

Income Redistribution in Canada: Minimum Wages versus Other Policy Instruments

by

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1. INTRODUCTION

Minimum wage legislation is one of the oldest government intervention in the labour market. In Canada, the first minimum wage laws applicable to women in certain types of employment were enacted during the 1910s. Six Canadian provinces had implemented such laws by 1920.¹ The scope of minimum wage legislation gradually expanded over the years to cover young workers and men. By the 1960s, most workers were covered by minimum wage laws.

The original policy objective of minimum wage legislation was to protect women and children, who were perceived to be the most vulnerable and exploited groups of workers at that time. During the same period, related legislation regarding excessively long hours of work and unhealthy working conditions was introduced. In all cases, the basic goal of the legislation was to impose minimum standards in the conditions of employment.

The fundamental goal of minimum wage legislation is to guarantee a "decent" or "fair" wage for all workers in the covered sectors. This type of legislation may also have other intended or unintended consequences on the workings of the labour market. Since Stigler, economists have questioned the principle of minimum wage legislation because of its potential adverse effect on employment.² The textbook minimum wage theory—in which a minimum wage set above the free-market equilibrium for less skilled labourers moves the economy along the demand curve and thus reduces employment—has long been at the centre of the argument against minimum wages. There is still much debate, however, on the empirical magnitude and importance of the adverse effect of minimum wages on employment. In their influential book, Card and Krueger argue that minimum wages have no adverse effect on employment in the United States.³ Recent studies for Canada also suggest that minimum wages have, at best, only a small adverse effect on

employment.⁴

Minimum wage legislation may also help reduce poverty and thus serve as a redistributive tool even if this is not the primary goal of the legislation. If a large proportion of minimum-wage workers are poor and if raising the minimum wage effectively increases the income of these workers, then a higher minimum wage will help reduce poverty. It is not clear, however, that these conditions prevail in today's labour market.⁵ It is often believed, as argued by Gramlich, that minimum-wage workers are mostly secondary earners—teenagers and wives—from middle and high income families.⁶ Raising the incomes of these workers is clearly not an effective mean to fight poverty. On the other hand, Benjamin reports that, in Canada, only 36 percent of minimum-wage workers, accountings for only 19 percent of hours worked, are teenagers.⁷ He also finds that while the poorest families are not headed by minimum-wage earners —rather they have no earner at all— more than 40 percent of minimum-wage earners come from low-income families

If minimum wages are used to redistribute income, this raises the question of who pays for the redistribution. As underlined by Freeman, the answer to this question depends on the labour and product market conditions in the sectors where minimum-wage earners work.⁸ The potential groups of payers are thus the consumers of the products of minimum-wage workers, the shareholders of businesses who employ minimum-wage workers, and the low-wage earners themselves who may suffer disemployment effects or longer unemployment spells. The answer may also depends on the other redistributive schemes. As argued by Webb, in absence of a minimum wage, the community or the state may be partly subsidizing the employers of teenagers and wives who pay them “a wage insufficient to keep them in full efficiency”.⁹ In that respect,

minimum wages may be seen as moving redistribution from the state to the market.

Finally, the minimum wage may be an effective tool to reduce wage inequality. DiNardo, Fortin and Lemieux have shown that the falling real value of the US federal minimum wage during the 1980s has contributed significantly to rising wage inequality in the United States.¹⁰ In the fiery debate on the pros and cons of minimum wages, relatively little emphasis has been placed on the effect of minimum wages on the reduction of wage inequality, and more generally on the reduction of wage differentials between men and women, and between younger and older workers.¹¹ This singular neglect of the effect of minimum wages on the reduction of inequality is particularly remarkable given that rising wage inequality and changes in the gender wage gap have attracted much attention in the recent economic literature. The debate on these issues reflects the same concerns about social justice and fairness that were at the heart of the early minimum wage legislation. Such concerns may explain ongoing public support for these policies.

The first goal of the paper is to investigate the contribution of minimum wages to the reduction of inequality in Canada. For that purpose, we analyse the effect of minimum wages on the distribution of wages using the 1988 Labour Market Activity Survey (LMAS) and the 1995 Survey of Work Arrangements (SWA) of Statistics Canada.

The second goal of the paper is to compare the redistributive impact of minimum wages to that of other policy instruments. We do so by studying the impact of minimum wages on the distribution of family income (based on income-to-needs ratios) relative to other redistributive programs using the 1993 Survey of Labour and Income Dynamics (SLID). If minimum wages are to be used as redistributive tools, they must increase the wages of low paid workers significantly; in other words, they must have some "bite."

The other important queries—who pays? what are the unintended consequences on employment? —have already attracted much attention in the literature and are not addressed directly in this paper. The two sets of concerns—who benefits vs. who bears the cost— are not unrelated. Evaluating the impact of the minimum wage on the distribution of wages may help assess its negative efficiency effects. The more "bite" the minimum wage has, the more likely it is to affect the employment opportunities of less-skilled workers. If the negative efficiency effects of the minimum wage were found to be important at a given wage level in a particular economy, these effects would have to be weighed against the potentially beneficial redistributive effects of the minimum wage.

Other than the minimum wage, we consider two main redistributive tools: social assistance and employment insurance. These are the two most important income support programs not directed at the elderly. Note that these redistributive programs may also entail some disemployment effects. A comprehensive comparison of the different programs would have to take these potential disemployment effects into account. This formidable task, however, is beyond the scope of this study. Here, we set a more modest objective of assessing the relative effectiveness of these programs at redistributing income.

2. MINIMUM WAGES AND THE DISTRIBUTION OF WAGES

Our first objective is to find out which groups of workers are most helped by the minimum wage and whether it has some significant impact on the distribution of wages of the affected groups.

2.1 Data

Using US data, DiNardo, Fortin and Lemieux showed that a sizeable percentage of the workforce (up to 12 percent in 1979, but only 4 percent in 1988) earns the minimum wage and that high minimum wages have an important impact of the shape of the distribution of wages. In an histogram, the large concentration of workers at the minimum wage translates into a spike at that value. In a smoothed histogram, this “spike” is smoothed, so that instead of looking like a bell curve the distribution of wages has its lower tail compressed by the minimum wage. When attempting to reproduce a similar analysis for Canada, we are confronted with two problems. First, there are many effective minimum wages in Canada, which calls for an analysis at the provincial level. Second, large data bases containing reliable hourly wage data from which detailed analysis by provinces could be carried through are not yet available for the 1990s.¹² These problems must be kept in mind when considering the evidence provided below. In the only other Canadian study of the effect of minimum wages on the distribution of wages to date, Green and Paarsch, focuses on teenage wage distributions over the 1980s.¹³ Shannon focuses on the effect of minimum wages on the gender gap in 1986.¹⁴

As in the United States, during the 1980s minimum wages in Canada did not keep pace with inflation or rising average industrial wages despite frequent nominal increases.¹⁵ While the precise year where the ratio of the minimum wage to the average industrial wage reached its lowest point varies by province, it is generally not until the 1990s that the downward trend in this ratio was stopped or reversed. We use the 1995 Survey of Work Arrangements (SWA) and the

1988 Labour Market Activity Survey (LMAS) to compare the distribution of hourly wages in the years 1988 and 1995.¹⁶ The nominal value of the minimum wages in the ten provinces for these years, as well as the average industrial wage and the ratio of the minimum wage to that average are reported in Table 1. The table shows that, in 1988, the ratio hovered in the low 40 percent; by 1995, it was over 45 percent in Ontario and Quebec. We indicate in Figure 1 the lowest and highest of these provincial minimum-wage values by a vertical line. We do not use the distinction between the adult minimum wage and youth subminimum since, as reported by Katz and Krueger and by Baker, Benjamin and Stanger, that the latter is seldom used.¹⁷

A graphically clear way to illustrate the impact of minimum wages on the distribution of hourly wages is to picture the distributions using smoothed histograms that integrate to one, which are called kernel density estimates.¹⁸ The kernel density estimates for men and women for the years 1988 and 1995 are presented in Figure 1. The log wages in 1995 dollars are reported on the horizontal axis, while the vertical axis indicates the value of the density. The kernel density estimates presented in this paper reflect the distribution of wages per hour worked in the economy rather than the distribution of wages per worker. Rather than focusing only on full-time workers, we include part-time workers in our samples but weight the observations by the number of weekly hours of work to better reflect the contribution of each worker to the labour market.¹⁹

We define as minimum-wage workers individuals whose wage is within 25 cent of their provincial minimum wage.²⁰ In 1988, these minimum-wage workers account for 3.5 percent of hours worked under this definition. In 1995, it is more difficult to identify “minimum-wage workers” per se because of a rounding problem.²¹ However, applying a similar definition, the

percentage of hours worked by “low-wage workers” was 5.3 percent.

2.2 The Impact of Minimum Wages on the Distribution of Wages

Figure 1 shows that the impact of minimum wages on the shape of the distributions of male and female wages was more important in 1995 than in 1988. In that latter year, the distributions exhibit a more or less regular bell shape with small humps around the highest minimum wage. In 1995, the minimum wage hump has gained more importance and there is a sizeable increase in the lower part of the distribution in 1995 relative to 1988. The percentage of hours worked by men at a wage between \$5.00 and \$10.00 increased from 15 percent in 1988 to 22 percent in 1995; among women, that percentage increased from 32 percent to 36 percent. In 1995, the minimum wage seems to push up or to compress the bottom end of the female wage distribution. Such an effect would be consistent with the view that increasing the minimum wage may raise wages above the minimum wage, as argued by Grossman for example.²² Card and Krueger did find such small spill-over effects for wages just above the minimum.²³ For Canada, Benjamin found only limited evidence of such spill-over effects in 1990; such limited evidence describes better our 1988 density estimates.

It is difficult, however, to go beyond this simple evidence of a visual impact of the minimum wage on the wage distribution in 1995. When we simulate what the distribution of male and female wages would have been in the absence of a minimum wage in 1995, we find sizeable changes in the asymmetry (or skewness) of the distributions.²⁴ This simulation implies, however, almost no change in the standard deviation of wages. We believe that these results should be

interpreted with caution because of some difficulties with the SWA data.²⁵

Furthermore, there are other factors, illustrated below (see Figure 4), that work in the other direction and tend to spread out the wage distribution. The changes in distributions from 1988 to 1995 illustrated in Figure 1 are still notable given that over the 1980s, the distribution of hourly wages in Canada has remained remarkably stable.²⁶ As noted by Picot, changes in earnings inequality over the 1980s were mostly due to changes in hours of work; more hours worked per week for men and more weeks per year for women among higher earners.²⁷ He finds that changes in the distribution of hourly wages played a much smaller role. He also finds "a slightly larger share of jobs at the very bottom of the distribution" in 1993 by comparison with 1986, while he notes that different cyclical patterns might have been at work. Our findings suggest that while there is no significant change in wage inequality from 1988 to 1995, as measured by the 90-10 wage differential for example, there are increases in the proportion of hours worked at lower wages corresponding to the increase in mass at the bottom of the wage distributions.²⁸

Figure 2 superimposes the density estimates of the distributions of male wages for 1988 (dotted line) and 1995 (solid line) for each of the six regions considered. As explained earlier, because of the small number of observations available in the SWA we had to regroup observations from provinces for which we did not have enough observations to obtain reliable kernel density estimates. Figure 2 shows even more clearly the increases in the proportion of hours worked at lower wages among men. There are a few provinces, the Atlantic Provinces, Ontario and British Columbia, where minimum wages appear to act as a wage floor. The figure also shows clear "union" peaks around \$20.00 in Ontario and British Columbia.

Figure 3 performs a similar exercise for women. The striking feature in these graphs is a "union" peak around \$12.00 in 1988, a peak that widens in most provinces in 1995. Union workers make up a substantial portion of all workers: among women, they represent 34 percent of workers in 1988 and 39 percent in 1995 (among men, these proportions are 41 percent in 1988 and 43 in 1995). This "union peak" visually masks the importance of the minimum wage as a wage floor for female wage distributions. For that reason, we present in Figure 4 densities estimated separately for union and non-union workers. Figure 4 shows that, in 1995, the mode of the wage distribution among non-unionized women, that is, the wage for which the proportion of hours worked is the highest was at \$7.00, the highest minimum wage. For non-unionized men, minimum wages appear to be important as well.

The characteristics of minimum-wage workers go beyond this divide between non-union and union workers, the latter comprising almost no minimum-wage workers. Table 2 shows the changing characteristics of low-wage workers over the 1988-95 period. In 1988, low-wage workers were mostly younger workers (less than 24 years of age); in 1995 among women, a majority of low-wage workers were older workers (24 years old and over). In both years, low-wage workers are underrepresented among university graduates. Minimum-wage workers are mostly concentrated in sales and service occupations. The growth in low-wage occupations has taken place mostly in service occupations and, thus, mirrors general economic trends.

Figure 5 illustrates the dramatic decline in the labour market opportunities of younger workers, both men and women. Whereas in 1988, the wage distributions of young men and young women were bell-shaped and a substantial proportion of them had jobs in the \$10.00-

\$20.00 range, in 1995 that proportion had declined substantially and the modes of both distributions were at the minimum wage. It is interesting to note that the difference in shapes between the 1988 and 1995 densities for young workers mirrors to some extent the differences in shape between the densities without minimum wage and with minimum wage estimated by Green and Paarsch for teenage workers.²⁹ This lends some support to our interpretation that the spikes in Figure 5 are, to a large extent, attributable to the higher minimum wage. What is unclear is whether there is a link between the higher minimum wage and the decline in the proportion of hours worked at wages higher than \$10.00 in 1995 by comparison with 1988.

The declining labour market opportunities of men have been documented several authors including Beaudry and Green and Morissette.³⁰ These authors show that the age-earnings profile of recent cohorts of young men has shifted downwards relative to that of previous cohorts. These studies also suggest that young men who start today at lower wages than their counterparts did in the mid-seventies may also have lower earnings growth thereafter. Card and Lemieux, and Meunier, Boisjoly, Bernard and Michaud also show that the limited labour market opportunities of young people lead them to stay with their parents well into their mid-twenties and delay household formation.³¹ Many young people are unable to find permanent jobs and settle for minimum wage jobs.

In summary, this evidence suggests that minimum wages in 1995 played an important role as a wage floor for women in general, and for young men and women, in particular. As such, it could be argued that it reduced the wage gap between men and women and between the young and the old. In 1995, minimum wages and unionization rates were higher than in 1988. These

two institutional factors could be seen as a powerful counterforce against rising wage inequality stemming from the increase in low-wage jobs. On the other hand, it could also be argued that the larger “bite” of the minimum wage in 1995 lead to larger disemployment effects than it did in 1988.

3. THE IMPACT OF MINIMUM WAGES AND OTHER REDISTRIBUTIVE PROGRAMS ON THE DISTRIBUTION OF FAMILY INCOME

Having provided evidence that minimum wages have some impact on the wage distribution in Canada, particularly on the wage distribution of women and of young workers, we now want to assess their value as policy instruments for redistributing income. This involves several positive and normative issues. On the positive side, we want to know "how big" the minimum wage is as a program for redistributing income, and who benefits the most from it. In other words, we want to evaluate the size and the incidence of the minimum wage viewed as a transfer program. We also want to know how the minimum wage fares as a redistribution program relative to other existing programs in the policy arsenal. We will compare the minimum wage to unemployment insurance (UI) and social assistance (SA) which are the two largest transfer programs for non-elderly individuals in Canada.³² We will also address the normative issue of how "good" or "efficient" is the minimum wage as an instrument for redistribution.

Throughout this section, we implicitly assume that the minimum wage has no adverse effect on employment. If the minimum wage has some adverse impact on employment, we will

thus overstate the redistributive benefits of the minimum wage since some low-wage workers would lose their jobs when the minimum wage increases.

We also assume that the minimum wage has no effect on the wages of workers earning more than the minimum wage (no spill-over effects). This assumption probably leads us to understate the redistributive benefits of the minimum wage since the earnings of low-wage workers earning slightly more than the minimum wage may well increase when the minimum wage increases.

In theory, we may either be understating or overstating the redistributive benefits of the minimum wage, depending on the relative importance of disemployment effects relative to spill-over effects. Since most of the existing empirical evidence suggests that neither effects are particularly large, we think that the most sensible approach is to ignore the distributive impact of disemployment and spill-over effects in the analysis that follows.³³

3.1. Data

Until recently, it would have been difficult to compare the importance and the incidence of the minimum wage relative to UI and SA because of data limitations. Fortunately, all the required information is now available in the first cross-sectional wave (1993) of the Survey of Labour and Income Dynamics (SLID). The SLID contains detailed information on all sources of individual and family income, hourly wages, annual hours of work, and on family composition (see the Data Appendix for more detail). We can thus classify individuals by their levels of own income or family income, and then compare the impact of the minimum wage relative to other transfer programs using these classes of family income. This is in contrast with Benjamin, who was only

able to look at the incidence of the minimum wage by deciles of the distribution of family earnings since the LMAS (the data set used in his analysis) does not contain information on sources of income other than earnings.³⁴ This gives us a first opportunity to look at the link between minimum-wage earnings and family income in Canada.

3.2. Importance and Incidence of the Minimum Wage

As before, we define as “minimum-wage workers” individuals who held at least one wage and salary job paying between 25 cents below and 25 cents above the minimum wage in 1993.³⁵ Table 3 presents three measures of the importance of the minimum wage for the whole country and for the ten provinces separately. The first column reports the percentage of wage and salary workers who worked at the minimum wage in 1993. This percentage ranges from 4.7 percent in Alberta to 11.5 in Newfoundland. As a general rule, a smaller fraction of individuals tend to earn the minimum wage in the three “richer” provinces (Ontario, Alberta, and British Columbia) than in other provinces. For the country as a whole, six percent of wage and salary workers earn the minimum wage. This proportion is comparable to the one found by Benjamin despite important differences between his definition of minimum-wage workers and our definition.³⁶ The proportion is smaller than what is typically found in the United States.³⁷

One alternative measure of the importance of the minimum wage is the percentage of hours worked (by wage and salary workers) at the minimum wage. The second column of Table 3 shows that this percentage is equal to 3.6 percent in Canada, which is smaller than the percentage of workers who earn the minimum wage (6 percent). This reflects the fact that

minimum-wage workers tend to work less hours per year than other workers. The minimum wage looks even less important when it is measured in terms of the percentage of all earnings that are earned by minimum-wage workers (third column). This percentage is equal to 1.5 percent for Canada. It is four times smaller than the percentage of workers who earn the minimum wage since these workers work less hours and have much lower wages (by definition) than the rest of the workforce.

The basic message of Table 3 is that the minimum wage is a small transfer program in Canada since the earnings of minimum-wage workers only represent 1.5 percent of all wage and salary earnings.³⁸ Furthermore, only a fraction of this 1.5 percent represents a transfer to minimum-wage workers since most of these workers would have surely earned something even in the absence of a minimum wage. For example, assume that the minimum wage doubles the average wage of minimum-wage workers and has no disemployment effects. In this case, the minimum wage would effectively transfer 0.75 percent of total earnings to minimum-wage workers.³⁹

Even if the minimum wage is only a small program in the aggregate, it may still have a sizable effect on specific groups of workers likely to earn low wages. Tables 4 and 5 compare the incidence of minimum wage employment and earnings to the incidence of all wage and salary earnings for men and women, respectively. The most noticeable pattern that emerges from these tables is that minimum wage employment and earnings are disproportionately concentrated among young workers. Among men, 29.3 percent of minimum-wage workers are teenagers (aged 16-18) and 41.5 percent are young adults (aged 19-23) despite the fact that these two groups represent

only 4.5 percent and 11.8 percent of the male workforce, respectively. As mentioned earlier, the age groups used in this paper are not strictly comparable to other studies where workers age 15 to 19 are defined as "teenagers" and workers age 20 to 24 are "young adults". A back-of-the-envelope calculation suggest that 15 to 19 years old and 20 to 24 years old would represent 44.2 and 36.9 percent of minimum-wage workers, respectively, if standard age groupings were available in the SLID.⁴⁰

Women are also more likely to work at the minimum wage. Sixty-three percent of minimum-wage workers are women even though women represent 48 percent of the whole workforce. Perhaps not surprisingly, young workers represent a smaller fraction of minimum-wage workers among women than among men. Among females, more than half of minimum-wage earnings (57.2 percent) are earned by adults (age 24-63). Among males, this fraction is less important (43.2 percent). For men and women considered together, slightly more than half of minimum-wage earnings (51.9 percent) are earned by adults despite the fact that only 38.7 percent of minimum-wage workers are adults.⁴¹ This reflects the fact than adult minimum-wage earners tend to work more hours than teenagers and young adults.

Minimum-wage workers also tend to be less educated than other wage and salary workers. Among men, high school dropouts represent 33.6 percent of minimum-wage earners but only 22 percent of the whole workforce. By contrast, university graduates represent only 5.3 percent of male minimum-wage workers despite the fact that they represent 15.4 percent of the male workforce. A similar pattern is observed for women in Table 5. The differences between the different education groups are even more pronounced when we look at the distribution of

hours of work and earnings. Overall, our findings on the distribution of minimum-wage workers by age and education are similar to those reported by Benjamin for 1990.

The last two panels of Tables 4 and 5 show a detailed breakdown of the incidence of the minimum wage among youth (age 16-23) and adults (age 24-63) by type of family arrangements. The tables indicate that 68 percent of young men and 56.6 percent of young women live with their parents (in a husband and wife family or a lone parent family).⁴² The tables also indicate that youth living with their parents are over-represented among minimum-wage workers. This suggests that a substantial fraction of young minimum-wage workers may be living in relatively well-to-do families even if their own earnings are low.

A noticeable fact among adults is that the minimum wage has a relatively high incidence among men living alone and single mothers. For example, men living alone represent 12.7 percent of workers but 22.3 percent of minimum-wage workers. Similarly, single mothers represent 6.6 percent of the female workforce but 10 percent of minimum-wage workers. The incidence of the minimum wage by family arrangements indicates that a disproportionate share of adult minimum-wage earners are the sole wage earner of the family, while the opposite is true for youth. The earnings of minimum-wage workers are thus more likely to be the only source of family income for adults than for youth. This suggests a stronger connection between the minimum wage and family income for adults than for youth.

We explore in more detail the connection between the incidence of the minimum wage and family income in Table 6. More precisely, we compute a family income-to-needs ratio for each individual by dividing total family income by the family equivalence scale.⁴³ The advantage

of using a family income-to-needs ratio is that it is more directly connected to the economic well being of individuals than other income measures. For instance, many individuals, in particular young people, can live in a wealthy family even if their own income is low. It is thus better to look at the income of the whole family than at the income of one member of the family. Furthermore, a family equivalence scale has to be used to take account of the fact that larger families need a higher family income to achieve the same economic well being than smaller families. Note that we find qualitatively similar results when we look at the distribution of unadjusted family incomes instead.

We then divide the sample into ten deciles based on these income-to-needs ratios. The first column of Table 6 presents the distribution of minimum-wage workers across the ten deciles. It clearly shows that minimum-wage workers are more concentrated in the bottom than in the top end of the distribution of the family income-to-needs ratio. For example, 67.3 percent of minimum-wage workers are in the first five deciles of the distribution. Note however, that there are more minimum-wage workers in the second (13.9 percent) and third (16.7 percent) deciles than in the first decile (12.5 percent) of the distribution.⁴⁴ This is explained by the fact that the poorest families (first decile) tend to be poor because individuals in these families do not work very much. We discuss this issue in more detail below.

The second column of Table 6 shows the same distribution for youth living with their parents (in a husband and wife family or a lone parent family). As a general rule, young minimum-wage workers living with their parents are less concentrated in the bottom of the distribution than other minimum-wage workers. This is especially true in the two lowest deciles

in which the percentages of young minimum-wage workers living with their parents is two times lower than the same percentages among all minimum-wage workers. This pattern can also be seen in the third column. Young workers living with their parents only account for 20 percent of all minimum-wage workers in the first two deciles, compared to around 50 percent in middle and upper deciles. Notice, however, that young minimum-wage workers living with their parents are still disproportionately represented in the five lowest deciles of the distribution of the family income-to-needs ratio (bottom of second column).

The percentages of minimum-wage earnings that are earned by workers in the lowest five deciles (fourth column) are almost identical to the percentages of minimum-wage earners in these five deciles. Using earnings accentuates, however, the gap between the first (10.1 percent of all minimum-wage earnings) and the third (21.3 percent) deciles of the distribution. This, once again, reflects the fact that individuals in the first decile supply less hours (at or above the minimum wage) than individuals in other deciles. The last two columns show that the earnings of young minimum-wage workers living with their parents are less concentrated in the lowest five deciles than the earnings of all minimum-wage workers.

In summary, minimum-wage workers tend to be concentrated in the lower half of the distribution of family income-to-need ratios. This is true even for youth living with their parents who disproportionately come from the lower-middle class (deciles 3 to 5). Our results clearly do not support the view that typical minimum-wage workers are teenagers living in upper-class (deciles 9 and 10) or upper-middle-class (deciles 6 to 8) families. This being said, the minimum wage remains a small transfer program, which limits its ability to change in a quantitatively

important way the distribution of family income in Canada.⁴⁵

3.3. The Minimum Wage versus other Redistributive Policies

Broadly speaking, both the minimum wage and other programs, like social assistance and unemployment insurance, can achieve some redistributive objectives even if it is not their primary goal. While the objectives and design features of the programs are clear, their precise redistributive outcomes are not. By definition, minimum wage laws are designed to increase the wage of workers who would otherwise, most often, earn less than the minimum wage because they are less skilled, less productive, or otherwise excluded from higher wage jobs. By contrast, social assistance provides a basic level of income to families that have little or no other sources of income, while unemployment insurance provides income support to workers who are temporarily out of work. Since these programs target individuals with low incomes and/or low wages, they should all have some redistributive benefits.

Conceptually, there are several reasons why it is difficult to compare the actual distributional impact of these different programs. A first problem is that the actual programs are much more complex than the stylized descriptions provided above. For example, not all workers are covered by the minimum wage; social assistance benefits depend on a variety of income and asset tests; the duration of unemployment insurance benefits depends on the duration of the previous job and on the state of the local labour market. It is, therefore, difficult to compare the actual distributional impact of these programs on the basis of their design features. We will take instead a resolutely empirical approach and present the actual incidence of these programs by

deciles of family income-to-needs ratio.

A second problem is that, unless labour market choices are exogenous, the incentives provided by the different programs will affect the behaviour of workers. This will in turn affect the redistributive benefits of the programs. On the one hand, a higher minimum wage provides incentives to affected workers to supply more hours in the labour market (if the labour supply elasticity is positive). The income of these workers can, therefore, increase more than it would have in the absence of such a behavioural response. On the other hand, the adverse employment effects of the higher minimum wage (on the employer's side) could reduce the income of minimum-wage workers by reducing their number of hours of work and worsen their position.

Social assistance perhaps provides even stronger incentives to workers to alter their behaviour. Above a small "disregard" amount, a dollar earned by a social assistance claimant results in social assistance benefits being cut by roughly the same amount, which discourages social assistance claimants to return to work.

The situation is even more complicated because of possible interactions between the different programs. For example, the minimum wage will have no effect on the income of individuals who have withdrawn from the labour market to take advantage of social assistance benefits. Other programs such as workers earnings supplements (earned income tax credits) can also mitigate the redistributive impact of the minimum wage. For example, in Canada the national Child Tax Benefit contains a Working Income Supplement (WIS) which provides an earned income supplement for low income workers. To the extent that the minimum wage raises the earnings of minimum wage workers, it will also reduce their WIS. This interaction between the

two programs reduces the redistributive benefits of the minimum wage.

It would be a formidable challenge to address the issues of behavioural response and program interactions in a formal analytic framework. We take a more pragmatic approach by first reporting the observed incidence of the different programs by deciles of family income-to-need ratio, keeping in mind that this is not a complete representation of the true redistributive benefits of the program in the presence of behavioural responses. In the next Section, we will then discuss how our conclusions would be affected by introducing behavioural responses and possible interactions among programs.

Table 7 compares the distribution of minimum-wage earnings by decile of the income-to-needs ratio to the distribution of social assistance, unemployment insurance, total government transfer, and taxes (provincial and federal). More precisely, we compute a family income-to-needs ratio for each individual, and rank individuals on the basis of this variable. We then compute the mean value of each program variable (mean minimum-wage earnings, mean social assistance income, etc.) among individuals in each given decile. We present the distributions in absolute dollar levels to illustrate the importance of the different programs. We also present the percentage of total transfers that go to the lowest decile, the five lowest deciles, and the five highest deciles at the bottom of the table to compare the “progressivity” of the different programs.

Table 7 reinforces our previous conclusion that the minimum wage is a small transfer program. Average minimum-wage earnings (over all deciles) is 163 dollars, compared to 505 dollars for social assistance, 835 dollars for unemployment insurance, and 2148 dollars for total government transfers. These numbers suggest that, as a transfer program, the minimum wage is

three times smaller than SA and five times smaller than UI. Furthermore, these figures still overstate the importance of the minimum wage since most minimum-wage earners would have positive earnings in the absence of a minimum wage, as argued above. However, as long as this overstatement is the same in all deciles, our analysis of the incidence of the minimum wage by decile will not be affected by this problem.⁴⁶

How does the incidence of the minimum wage, by decile of family income-to-need ratio, compares to the incidence of other transfer programs? The second column of Table 7 shows that SA is much more concentrated at the very bottom of the distribution than the minimum wage. Individuals in the lowest decile of distribution receive 50.6 percent of total SA payments which amounts to \$2557 per individual in this decile. SA income is a negligible source of income for individuals in the five highest deciles. The incidence of the different programs is also illustrated in Figure 6 which shows that SA is much more directly targeted to the two lowest deciles than other programs. As we will discuss in the next section, however, these results should be interpreted with caution since social assistance benefits are mechanically connected to (low) family income.

By contrast, UI income is much more evenly spread across the distribution of family income-to-needs ratio. In fact, the impact of the minimum wage is more concentrated at the bottom end of the distribution than the impact of UI. Individuals in the lowest decile only get 6.4 percent of UI payments, as opposed to 10.1 percent in the case of the minimum wage. When we move to the five lowest deciles, these numbers are 59.8 percent and 68 percent, respectively.

The fourth column of Table 7 provides the same information for all government transfers considered together; these may additionally include child tax benefits, worker's compensation,

GST credits.⁴⁷ These transfers are concentrated in the lowest two deciles and then decline slowly as we move up in the distribution. Overall, the five lowest deciles receive 72.6 percent of transfers as opposed to 68 percent in the case of the minimum wage. Total transfers are thus only slightly more progressive than the minimum wage when we look at the five lowest deciles. They are better targeted to the two lowest deciles than the minimum wage because of SA. In the absence of SA, government transfers would be roughly equal to 2000\$ per individual for each of the first five deciles. The last column of Table 7 shows that, not surprisingly, the income tax system plays an important redistributive role. Only 21 percent of total income tax is paid for by individuals in the lowest five deciles.

If we consider that the primary goal of redistributive policies is to equalize the family income-to-needs ratio, SA achieves the redistributive goal the most directly since it is explicitly targeted at low-income families. By contrast, most other programs are not explicitly targeted towards low-income families. The aim of UI is to compensate individuals (not families) for temporary losses in labour income, while minimum wage policies guarantee a basic wage level to low-wage workers. These two programs nevertheless redistribute some income across families since temporary earnings losses and low wages are negatively correlated with family income-to-needs ratio.

Many authors, including Burkhauser, Couch and Glenn, have argued that the minimum wage is not a “good” way of redistributing income because of this imperfect connection between low wages and low income-to-needs ratio.⁴⁸ According to our findings, an even stronger argument could be made against UI on these grounds. The alternative to the minimum wage

proposed by Burkhauser, Couch and Glenn is an earned income tax credit (EITC), which is now an important redistribution program in the United States. As in the case of SA, the EITC is determined on the basis of family income. Unlike SA, however, the EITC is an income supplement that is gradually "phased out" as earnings increase. It creates less disincentives to work than SA.

Burkhauser, Couch and Glenn find that the EITC is more explicitly targeted to low-income families than the minimum wage. This is not a very surprising finding. As long as the sole goal of redistributive policies is to reduce the dispersion in the family income-to-needs ratio and that the labour market behaviour of individuals is exogenous, SA and EITC are by definition better tools for redistribution than the minimum wage.

3.4. Discussion and Normative Implications

The conclusions that we have reached up to this point are only valid under the assumptions of no behavioural response and no program interactions. How would these conclusions change if these two assumptions were relaxed? One partial answer to this question can be obtained by ranking individuals by the income-to-needs ratio they should have earned given individual characteristics. More precisely, we predict the deciles (of the income-to-needs ratio) in which individuals are likely to fall on the basis of observed characteristics such as education, age, and family structure.⁴⁹ For example, individuals can fall in the lowest decile either for reasons on which they have little control like poor education or single parenthood, or for reasons on which they have more control like the decision not to work in order to take advantage of SA. Intuitively, behavioural responses should have less impact on predicted deciles than on the actual (or

observed) deciles.

Table 8 compares the distribution of minimum-wage earnings by predicted deciles of the income-to-needs ratio to the distribution of social assistance, unemployment insurance, total government transfers, and taxes (provincial and federal). Generally speaking, using predicted instead of actual income-to-needs ratios (Table 7) smooths out the distribution of the different programs. For example, average SA income in the first predicted decile is only 1014 \$, compared to 2557\$ in the first actual decile. Furthermore, average minimum-wage earnings fall monotonically across predicted deciles, while they reach a peak in the third decile of actual income-to-needs ratios.

Overall, "correcting" for behavioural response by looking at predicted instead of actual deciles does not affect qualitatively our conclusions. SA remains a more "progressive" program than the minimum wage or UI, though the difference between these programs is less dramatic than in Table 7. The difference between Tables 7 and 8 also reflects, to some extent, the importance of interactions among the different programs. As mentioned earlier, the minimum wage has no effect on the earnings of individuals who have decided to quit the labour market to take advantage of SA benefits. The difference in minimum-wage earnings in the first two predicted deciles, relative to the first two actual deciles, may thus reflect both the effect of behavioural response and interactions between the minimum wage and SA.

Up to this point, we have evaluated the incidence of the different redistribution programs across income-to-needs ratio. This corresponds to a very specific notion of equity in which the equalization of income-to-needs ratio is the sole criteria used to evaluate the programs. Our

findings indicates that SA is the best way to achieve this redistributive objective since it is explicitly targeted to low-income families. Although this objective is a useful benchmark to start with, we think it ignores other important dimensions of equity. Most importantly, SA and EITC are solely based on family income irrespective of the work effort of individuals. Everything else being equal, an individual working 50 hours a year at \$100 an hour and another one working 1000 hours at \$5 an hour will get the same amount of SA or EITC. On the other hand, the second individual could benefit substantially from a higher minimum wage. He or she could also receive UI if the 1000 hours of work were concentrated in the first part of the year.

This simple example illustrates the fact that, relative to SA or the EITC, the minimum wage tends to help low-wage workers who supply a large number of hours to the labour market. In other words, if all individuals worked the same number of hours, the minimum wage might be a much more “efficient” tool for reducing disparities in the family income-to-needs ratio. We illustrate this point in Tables 9 and 10. In Table 9, we present average hourly wages, average hours of work per year, and average earnings of individuals in each decile.⁵⁰ We also report the fraction of earnings that are earned by minimum-wage workers. The table indicates that individuals in the lowest deciles have low earnings both because of low wages and low hours of work. They are also much more likely to earn their wages and salaries at the minimum wage.

We then compute how much of the “wage gap” and “hours gap” between the different deciles cannot be explained by standard factors (gender, education, experience, and province of residence).⁵¹ These two “gaps” are reported in the last two columns of Table 9. They are normalized to have a mean of zero. In other words, average hours plus the hours gap gives the

"adjusted" hours of work in each decile (adjusted for differences in gender, experience, education, and province). "Adjusted" wages are similarly defined. These results suggest that hours play a more important role in explaining low family income than wages do. One way to see this is to compute the elasticity of (adjusted) hours with respect to (adjusted) wages across the ten deciles, which gives us an elasticity of labour supply of 1.5.⁵² This suggests that hours change more quickly across deciles than wages. Since this elasticity is much larger than standard estimates of the elasticity of labour supply, discussed by Killingsworth, this suggests that individuals in the lowest deciles work a small amount of hours for reasons other than low wages or gender, experience, education, and province of residence.⁵³

In Table 10, we simulate what minimum-wage earnings would be if this "hours gap" was eliminated. To do so, we make the simplifying assumption that the fraction of earnings at the minimum wage is not affected by changes in hours of work. This means that if closing the hours gap doubles the average hours of work in a decile, it will also double minimum-wage earnings. The results of this simulation are reported in the last two columns of Table 9. These results show that the minimum wage would be much more explicitly targeted to the two lowest deciles of the distribution if the hours gap was eliminated. These two lowest deciles would account for 26.1 percent and 14.6 percent of all minimum-wage earnings, respectively. Under this scenario, only SA would still be more progressive than the minimum wage. Governments transfers as a whole would be substantially less progressive than the minimum wage.

This simulation suggests that the minimum wage would be a more effective redistributive policy if the source of low earnings in the lowest deciles was low wages rather than low hours of

work. This is a relevant policy issue since "workfare" provisions for social assistance claimants have been recently introduced in the several Canadian provinces (e.g. Alberta and Ontario) and in the United States. The redistributive impact of the minimum wage will likely increase as a result of these workfare provisions that "force" individuals in the lowest deciles to supply more hours to the labour market. This suggests that the redistributive role of the minimum wage will probably be more important in the future than it has been in the recent past.

As a final point, we also want to point out the limitations of looking only at family income-to-need ratio. Focusing solely on this ratio implies that the sources of income in a given family are irrelevant. It does not matter if we cut in half the wages of the wife and the children as long as the wage of the husband is increased accordingly. This would in turn imply that wage discrimination against women is irrelevant as long as their husbands benefit sufficiently from discrimination against women. These examples show that it is probably too extreme to focus redistribution efforts solely on the income-to-needs ratio. We would probably want to give an important weight to this particular objective, but also some weight should be given to other objectives, such as the reduction of wage inequality per se. Similarly, we probably want to encourage work effort even if it has some negative impacts on the distribution of income-to-needs ratio. Expanding the set of goals of redistribution policies makes the minimum wage look like a more comprehensive policy instrument.

4.. CONCLUSION

In this paper, we analyse the effect of the minimum wage on the distribution of wages and on the distribution of family income (income-to-needs ratio) in Canada. We also compare the role

of the minimum wage as redistributive policy to other transfer programs like social assistance and unemployment insurance.

Our analysis of the effect of the minimum wage on the distribution of wages is based on data from the 1988 Labour Market Activity Survey and the 1995 Survey of Work Arrangements. We find that the minimum wage has a significant impact on the shape of the bottom end of the wage distribution. This impact is more important in 1995 than in 1988 because both the value of the minimum wage relative to average manufacturing wages and the proportion of hours worked at low wages increased during this period. This change is particularly striking for young workers.

We then use the 1993 cross-section of the Survey of Labour and Income Dynamics (SLID) to analyse the link between the minimum wage and the distribution of the family income-to-needs ratio. We find that individuals in the lower half of the distribution of the family income-to-needs ratio benefit the most from the minimum wage. Individuals in this part of the distribution account for close to 70 percent of the earnings of all minimum-wage workers. In this sense, the minimum wage is almost as "progressive" as all government transfer programs considered together since 72 percent of these transfers are received by individuals in the lower half of the distribution. However, other government transfers, especially social assistance, are more directly targeted at individuals in the two lowest deciles of the distribution.

We also find that the minimum wage is a small program since total earnings at the minimum wage only represent a third of total social assistance payments and a fifth of total unemployment insurance payments. The small size of the program is the main reason why the redistributive impact of the minimum wage is modest relative to other transfer programs. This is a

different conclusion from the one reached by other who attribute the weak link between the minimum wage and family income to the fact that minimum-wage earners are drawn from all deciles of family income. This link may be weak compared to some ideal program, but it is not weak compared to the full set of transfer programs that currently exist in Canada.

We conjecture that the role of the minimum wage as a redistribution program will grow substantially in the future for two reasons. First, there have been very substantial cuts to the other transfer programs since 1993 as a result of government efforts to eliminate budget deficits. There is every indication, given the growth in low-wage jobs, that the minimum wage will continue to be a more important program than it was in 1993. In addition, "workfare" is becoming an increasingly important component of social assistance programs in most provinces. By design, these programs increase substantially the hours of work of individuals at the bottom end of the income distribution. Since many of these individuals are likely to work at the minimum wage, the redistributive impact of the minimum wage could increase substantially in the years to come.

Endnotes

1. Edith Lorentsen and Evelyn Woolner, "Fifty Years of Labour Legislation in Canada", *Legislation Branch, Labour Canada*, September, 1950, p. 7.
2. Stigler, George. "The Economics of Minimum Wage Legislations," *American Economic Review*, vol. 46 (1946), pp. 358-65.
3. David Card and Alan Krueger, *Myth and Measurement: The New Economics of the Minimum Wage*, (Princeton, N.J.: Princeton University Press, 1995). The consensus view before Card and Krueger was that the minimum wage had a negative, albeit small, effect on employment. See, for instance, Charles Brown, Curtis Gilroy and Andrew Kohen, "The Effect of the Minimum Wage on Employment and Unemployment", *Journal of Economic Literature*, vol. 20 (June 1982), pp. 487-528;
4. Michael Baker, Dwayne Benjamin and Shuchita Stanger, "The Highs and Lows of the Minimum Wage Effect: A Time Series-Cross Section Study of the Canadian Law," *Journal of Labor Economics*, forthcoming.
5. See, for example, Richard V. Burkhauser and T. Aldrich Finegan, "The Minimum Wage and the Poor: The End of a Relationship", *Journal of Policy Analysis and Management*, vol. 8, no.1 (1989), pp. 53-71.
6. Edward M. Gramlich, "Impact of Minimum Wages on Other Wages, Employment, and Family Incomes", *Brookings Papers on Economic Activity*, vol. 2 (1976) pp.409-451.
7. Dwayne Benjamin, "Minimum Wages in Canada", mimeo, University of Toronto, 1995. (Prepared for the conference volume *Contemporary Labour Policy issues in Canada and Latin America*, edited by Al Berry)
8. Richard B. Freeman, "The Minimum Wage as a Redistributive Tool", *The Economic Journal*, vol. 106 (May 1996), pp. 639-649.
9. Sidney Webb, "The Economic Theory of a Legal Minimum Wage", *Journal of Political Economy*, vol. 20 (December 1912), pp.973-998.
10. John DiNardo, Nicole M. Fortin and Thomas Lemieux, "Labor Market Institutions and the Distribution of Wages: A Semiparametric Approach", *Econometrica*, vol. 64 (September 1996), pp.1001-1044.
11. Among the exceptions, see Richard B. Freeman, "The Minimum Wage as a Redistributive Tool", pp. 639-649.

12. The problem is that the samples available in the 1993 SLID and the 1995 SWA are twice as small as in the 1988 LMAS. This is an important limitation for performing a detailed analysis of wage distributions by province.
13. David A. Green and Harry J. Paarsch, "The Effect of the Minimum Wage on the Distribution of Teenage Wages", Working Paper No. 97-02, Department of Economics, University of British Columbia, August 1996.
14. Michael Shannon, "Minimum Wages and the Gender Wage Gap", Applied Economics, vol.28 (1996) pp.1567-1576.
15. See Figure 1 and 2 in Dwayne Benjamin, "Minimum Wages in Canada".
16. The details of the sample selection are contained in the data appendix.
17. Lawrence Katz and Alan Krueger, "The Effects of Minimum Wages on the Fast Food Industry", Industrial and Labor Relations Review, vol. 46(1), (October 1992) pp.6-21.; Michael Baker, Dwayne Benjamin and Shuchita Stanger, "The Highs and Lows of the Minimum Wage Effect: A Time Series-Cross Section Study of the Canadian Law."
18. See the technical appendix on kernel density estimation.
19. As explained in the data appendix, each observation is weighted by the product of the sample weight and the usual hours of work per week. Note that, as indicated, the other reported statistics may be based on this same weighting scheme.
20. Given that workers may round up their answer to a question on their hourly wage, it is usual to consider as minimum-wage workers individuals whose wage is within a given interval of the actual minimum wage. Note also that few workers earn less than 25 cents below the minimum wage. This may be attributable to non-compliance, non-coverage or reporting errors.
21. See the data appendix concerning a rounding problem in the 1995 SWA. Because of that rounding problem, the minimum wage interval is occasionally larger in 1995. For example, since the Saskatchewan minimum wage is set at \$5.35, we consider workers earning \$5.00 in that province as being at the minimum wage.
22. Jean B. Grossman, "The Impact of the Minimum Wage on Other Wages", Journal of Human Resources, vol. 18 (1983), pp.359-378.
23. David Card and Alan Krueger, "Minimum Wages and Employment: A Case Study of the Fast Food Industry in New Jersey and Pennsylvania", American Economic Review, vol.84 (1994), pp.772-793.

24. We use the rank regressions methodology proposed in Nicole Fortin and Thomas Lemieux, "Rank Regressions, Wage Distributions, and the Gender Gap," Journal of Human Resources, vol.33 (1998), pp. 610-643, to simulate what the distribution of wages would have been in the absence of a minimum wage. The simulation is done by first estimating in a flexible fashion the distribution of wages using an ordered probit model, by linearizing the kink in the returns to skill functions that can be attributed to the minimum wage, and by predicting the new probabilities of belonging to each wage interval. An important difficulty in that simulation is that there are many minimum wages in Canada and that we have to linearize over a somewhat large interval. This simulation implies a change in the coefficient of skewness of 9 percent among men and of 42 percent among women.
25. The simulation results are imprecise because provincial samples are small and wages are rounded to the nearest dollar value (see the data appendix).
26. In an earlier version of DiNardo, Fortin and Lemieux (1995), Working Paper no.9406 , Département de sciences économiques, Université de Montréal, we compared the densities of male and female hourly wages for 1981 and 1988 in Canada. Our results indicated no significant changes between the 1981 and 1988 hourly wage distributions, either for men or for women, or for men and women combined.
27. Garnett Picot, "Working Time, Wages and Earnings Inequality Among Men and Women in Canada, 1981-93", Paper presented at the CILN Conference "Labour Market Institutions and Labour Market Outcomes", August 1996.
28. We find a one percent increase in the 90-10 wage differential for men from 1988 to 1995 and a less than one percent decrease in the same differential for women. These changes are not statistically significant.
29. David A. Green and Harry J. Paarsch, "The Effect of the Minimum Wage on the Distribution of Teenage Wages".
30. Paul Beaudry and David A. Green, "Cohort Patterns in Canadian Earnings and the Skill-Biased Technical Change Hypothesis," Working Paper No.97-03, Department of Economics, University of British Columbia, December 1996; René Morissette, "The Declining Labour Market Status of Young Men," in Miles Corak (ed.), Labour Markets, Social Institutions, and the Future of Canada's Children (Ottawa: Statistics Canada, 1998), chap 3.
31. David Card and Thomas Lemieux, "Multiple Modes of Adjustment: A Comparative Study of Youth in the US and Canada, 1970-1995", National Bureau of Economic Research Working Paper No. 6142, 1997; Dominique Meunier, Johanne Boisjoly, Paul Bernard and Roger T. Michaud, "Eternal Youth? Changes in the Living Arrangements of Young People", in Miles Corak (ed.), Labour Markets, Social Institutions, and the Future of Canada's Children (Ottawa: Statistics Canada, 1998), chap 10.

32. Note that unemployment insurance is now called employment insurance.
33. For the United States, see note 3 above. Recent work for Canada also suggest modest disemployment effects (Benjamin, Baker, and Stanger, 1995). Finally, Card and Krueger (1994) report some small spill-over effects of the minimum wage in the fast food industry.
34. Benjamin (1995) shows that individual earnings are uniformly equal to zero in the lowest decile of the family earnings distribution (nobody works in these families). By definition, there are thus no minimum-wage workers in this decile. This data limitation in the LMAS understates the distributive role of the minimum wage at the very bottom end of the distribution.
35. We use the plus or minus 25 cents window because of possible measurement error (rounding) in wages. When we look at the exact minimum wage, the percentage of minimum-wage workers is systematically larger in provinces where the minimum wage is an exact dollar figure than in provinces where it is not. See the data appendix for more detail.
36. Benjamin (1995) looks at the incidence of minimum wage "jobs" as opposed to minimum-wage workers. He finds that 5.9 percent of jobs are "minimum wage jobs". He classifies a job as a "minimum wage job" when it pays below the minimum wage plus 5 cents. By contrast, we look up to 25 cents above the minimum wage but unlike him, we do not count jobs that pay less than 25 cents below the minimum wage.
37. For example, Card and Krueger (1995) find that 7.1 percent of workers were affected by the minimum wage increase of 1990-91 (from \$3.35 to \$4.25).
38. US studies also tend to find that the minimum wage is only a small transfer program. For example, Card and Krueger (1995) find the 1990-91 increase in the minimum wage from \$3.35 to \$4.25 only increased earnings by 0.2 percent. Since, on average, the wages of workers affected by the minimum wage increased by 48 cents (from an average of \$3.77 before the increase), a back-of-the-envelope calculation indicates that minimum-wage earnings represented 1.6 percent of total earnings ($0.2 \text{ percent} \times 3.77 / .48$) in the United States in 1990.
39. This is probably an overestimate of the true transfer. The average minimum wage in Canada was 5.90 dollars in 1993, which means that this calculation assumes that minimum-wage workers would have earned less than three dollars in the absence of a minimum wage, which seem implausibly low.
40. These calculations are based on the assumption that the percentage of minimum-wage workers of a certain age is a linear function of age.
41. These percentages are not reported in the tables. They are weighted averages of the percentages for men and women where the weights are the share of minimum-wage workers who are men and women, respectively.

42. These percentages are probably higher since the public use files of the SLID did not provide enough information to identify the family arrangements of 17.1 percent of young men and 20.0 percent of young females. For example, if a grand-parent lives in a family with parents and children, under the age of 25, this family is unidentified in the SLID.

43. The family equivalence scale is computed by giving a weight of 1 to the first person age 16 and over in the economic family, and a weight .7 to other individuals age 16 and over. Each child (age 15 or less) in the family gets a weight of .6. The equivalence scale is obtained by summing up the weights of all family members.

44. Benjamin (1995) finds a higher fraction of minimum-wage workers in the second decile of the family earnings distribution (29.5 percent) and a lower fraction (0 percent) in the lowest decile since nobody works in those deciles. Overall, he finds that 58 percent of minimum-wage earners are in the five lowest decile of the family earnings distribution. This is substantially less than our finding that 68 percent of minimum-wage workers are in the five lowest deciles of family income-to-needs ratio. Card and Krueger (1995) find that 63 percent of US minimum-wage workers are in the lowest five deciles of the distribution of family income.

45. A similar conclusion is reached by Michael T. Shannon and Charles M. Beach, "Distributional Employment Effects of Ontario Minimum-Wage Proposals: A Microdata Approach", Canadian Public Policy, vol. 21 (1995), pp. 284-303.

46. A sufficient condition for this to be the case is that i) minimum workers in each decile earn the same wage in the absence of a minimum wage, and ii) the elasticity of income with respect to the minimum wage (one minus the employment elasticity) is the same in all deciles.

47. We do not look explicitly at child benefits since they mix national child tax benefits (which are means tested) with Quebec family allowances (which were universal in 1993).

48. Burkhauser, Richard V., Kenneth A. Couch, and Andrew J. Glenn. "Public Policies for the Working Poor: The Earned Income Tax Credit Versus Minimum Wage Legislation," in S. Polachek (ed.) Research in Labor Economics, vol. 15 (1996), pp 65-109.

49. We compute the predicted probabilities of falling in each decile by estimating an ordered logit model. The explanatory variables used in the logit are age, age squared, dichotomic variables for gender and provinces, as well as a series of dichotomic variables corresponding to the education and family arrangements categories listed in Tables 4 and 5.

50. Note that we weight the hourly wage of each individual by the his or her hours of work to compute the average hourly wage. The advantage of this "hours-weighted" average is that average earnings are equal to the product of average hours and hours-weighted average wages. The product of average hours and unweighted average wages is not equal to average earnings unless the

covariance between hours and wages is equal to zero.

51. More specifically, we run standard regressions of hours (for all individuals) and wages (for workers only) on a set of decile dummies, a set of province dummies, and a full set of interactions among gender, age categories (10 categories), and education categories (4 categories).

52. The elasticity is estimated by running a regression of log adjusted hours on log adjusted wages (by decile). The estimated coefficient is 1.49 with a standard error of 0.33. Similar results are obtained when SA claimants, who have low predicted hours and low predicted wages, are excluded from the sample.

53. Killingsworth, Mark. Labor Supply. (Cambridge: Cambridge University Press, 1983).

DATA AND TECHNICAL APPENDIX

1988 Labour Market Activity Survey (LMAS) and 1995 Survey of Work Arrangements (SWA)

Our LMAS and SWA samples include all paid employees aged 15 and over (as opposed to those aged 16 and over in the SLID) who report an hourly wage of \$1.00 or more. In the 1995 SWA, the hourly wages are top coded at \$40.00; in 1988 LMAS, they are not. Note that we use information on the main job in the 46th week of 1988 (the third week in November) in the LMAS to facilitate comparison with the data from the SWA. We end up with 29968 observations from the 1988 LMAS and 16352 from the 1995 SWA. Both the LMAS and SWA ask workers whether they are paid by the hour, so for these workers we should have been able to obtain a relatively exact measure of hourly wage. For the other workers, we use a measure of average hourly earnings. Unfortunately, for workers paid by the hour (66 percent of the sample in 1995; up from 59 percent in 1988), the hourly wage has been rounded to the nearest dollar figure in both the master file and public use file of the SWA. To make the 1988 and 1995 densities comparable, we also rounded the wages of workers paid by the hour in the 1988 LMAS. The difference between the densities using actual and rounded hourly wages is illustrated in Figure A-1. In the densities using rounded hourly wages, the minimum wage spike is a little more distinct, but the general shape of the density remains the same as with actual wages. Note that we use the Consumer Price Index for Canada as deflator to express 1988 dollars in terms of 1995 dollars.

1993 Survey of Labour Income Dynamics (SLID)

Like the LMAS, the 1993 cross-section of the SLID contains detailed information on hourly

wages and annual hours of work of individuals (for up to three jobs held in 1993). This information is essential for assessing the importance and the incidence of the minimum wage. Like the Survey of Consumer Finance (SCF), the SLID also contains detailed information on annual income sources both for individuals and their families. What is unique about the SLID is that the information previously available in the LMAS and the SCF is now available in the same survey. For example, Benjamin (1995) was able to look at the incidence of the minimum wage only by deciles of the distribution of family earnings since the LMAS (the data set he used in his analysis) does not contain information on sources of income other than earnings.

The 1993 cross-section of the SLID contains detailed information on 29,934 individuals living in the ten provinces. Unlike most other Canadian data sets that contain information on individuals age 15 and more, only individuals age 16 or more at the end of 1993 are surveyed in the SLID. Relative to the 1988 LMAS and the 1995 SWA that we use in Section 3, the SLID may undercount slightly the number of minimum-wage workers because it misses some 15 year old workers. Since we want to compare the minimum wage to other transfer programs for the non-elderly population, we restrict our analysis to individuals under the age of 64. After discarding observations with missing income (individual or family) or missing education data, we end up with a sample of 24,065 individuals.

The SLID contains information both on the wage at the beginning and at the end of the job in 1993. Because of missing data on the initial wage, we determine the minimum wage status by comparing the end-period wage to the minimum wage prevailing at that time in the province of residence. We classify as a "minimum-wage worker" an individual who has earned the minimum

wage on at least one job in 1993. On the other hand, we count as minimum wage hours and earnings only the hours and earnings on "minimum wage jobs".

Kernel Density Estimation

Kernel density estimates are easily understood by reference to histograms. Histograms represent the frequencies of observations in a number of bins of width h , which determines the coarseness or the smoothness of the histogram. With kernel density estimation, a similar parameter, denoted \hat{h} , is called bandwidth. Here, the choice of bandwidth is done using the rule of thumb $\hat{h}=1.06\sigma n^{-1/5}$, which gives the optimal bandwidth for a normal density function. This results in values of $\hat{h}=0.075$ in 1988 and $\hat{h}=0.08$ in 1995, which imply a little undersmoothing with respect to the optimal bandwidth for the densities under study. In an histogram, the frequency of observations in any given bin can be computed as a sum of weights which give the value one to observations in the bin and zero to observations outside the bin. The sum of weights may be normalized by dividing it by the number of observations times the binwidth. Instead of using such a rectangular weight function, the kernel density estimates presented here use a bell-shaped Gaussian weight function, and can be characterized "as a sum of 'bumps' placed at the observations".

Note also that each observation is weighted by the product of the sample weight and the usual hours of work per week. These "hours-weighted" estimates put more weight on workers who supply a large number of hours to the market. To the extent that wages and hours are jointly determined and belong to a bivariate distribution of hours and wages, the hours weighted distribution of wages corresponds to the marginal of the joint distribution.

Table 1. Minimum Wages and Ratio to Average Industrial Wages

Year	1988			1993			1995		
	Adult Minimum Wage	Average Industrial Wage	Ratio	Adult Minimum Wage	Average Industrial Wage	Ratio	Adult Minimum Wage	Average Industrial Wage	Ratio
Province:									
Newfoundland	4.25	9.71	0.44	4.75	11.80	0.40	4.75	12.43	0.38
P.E.I.	4.25	8.17	0.52	4.75	9.89	0.48	4.75	10.37	0.46
Nova Scotia	4.00	10.13	0.39	5.15	11.77	0.44	5.15	11.22	0.46
New Brunswick	4.00	10.01	0.40	5.00	11.89	0.42	5.00	12.11	0.41
Quebec	4.75	11.23	0.42	5.85	13.59	0.43	6.45	14.03	0.46
Ontario	4.75	11.64	0.41	6.35	14.06	0.45	6.85	14.80	0.46
Manitoba	4.70	10.57	0.44	5.00	12.32	0.41	5.25	12.51	0.42
Saskatchewan	4.50	10.38	0.43	5.35	11.70	0.46	5.35	12.74	0.42
Alberta	4.50	10.73	0.42	5.00	12.91	0.39	5.00	12.81	0.39
British Columbia	4.50	12.61	0.36	6.00	14.99	0.40	7.00	16.39	0.43

Notes: Sources: Minimum Wages in November of indicated years - Labour Canada; Average Industrial Wages in November of indicated years - CANSIM (Average Hourly Earnings by Industry, industrial aggregate excluding education industries, excluding overtime, monthly, not seasonally adjusted, employees paid by the hour, firms of all sizes)

Table 2. Characteristics of Low Wage Workers in 1988 and 1995

Percentage of Hours Worked by Low Wage Workers with Indicated Characteristics	1988 LMAS		1995 SWA	
	Male	Female	Male	Female
Share of Low Wage Workers in the Workforce	1.6	3.1	3.7	7.1
<u>Age Groups:</u>				
Younger (< = 24)	57.5	57.7	59.0	46.8
Older (> 24)	42.6	42.2	41.0	53.2
<u>Education:</u>				
8 years or less	15.2	7.0	4.9	7.0
High School and Post-Secondary	77.6	88.0	88.3	88.7
University Degree	7.2	5.0	6.8	4.3
<u>Occupation:</u>				
Professionals, Managers, & Health Care Workers	19.5	12.4	5.5	5
Clerical Workers	6.0	20.4	9.0	19.6
Sales Persons	12.7	20.6	24.0	24.0
Service Workers	25.2	37.2	37.4	39.2
Craft Workers	14.1	5.6	18.3	7.8
Laborers	9.4	2.8	9.4	3.5
Primary Sector Workers	13.2	1.0	4.1	0.9

Notes: Sources: Authors' calculations from the 1988 LMAS and 1995 SWA. In 1988, low wage workers are workers whose wage is within \$0.25 of provincial minimum wage; in 1995, hourly wages are available only to the dollar, low wage workers are identified less precisely as minimum wage workers. Observations are weighed by the product of the sample weight and the number of hours worked a week.

Table 3. Percentage of Workers, Hours of Work, and Earnings at the Minimum Wage – 1993

	Percentage of All Workers	Percentage of Hours Worked	Percentage of Earnings
Canada	6.0	3.6	1.5
<u>Province:</u>			
Newfoundland	11.5	6.5	2.6
P.E.I.	7.8	5.3	2.1
Nova Scotia	6.3	4.2	1.6
New Brunswick	7.3	4.0	1.8
Quebec	6.7	4.2	1.7
Ontario	5.0	3.1	1.4
Manitoba	8.3	5.3	2.3
Saskatchewan	9.5	6.2	2.8
Alberta	4.7	2.4	0.9
British Columbia	5.7	3.1	1.3

Notes: Sources: Authors' calculations from the 1993 SLID. Minimum wage workers are workers whose wage is within \$0.25 of provincial minimum wage.

**Table 4. Distribution of Male Workers and Minimum Wage Male Workers
by Age, Education and Family Situation – 1993**

	Total Population	All Wage & Salary Workers	All Minimum Wage Workers				
		Percentage of All Workers	Percentage of Hours Worked				
		Percentage of All Workers	Percentage of Hours Worked				
Male Share:	50.0	52.3	57.6	62.8	37.3	37.9	37.8
<u>Age Group:</u>							
16-18	6.5	4.5	1.5	0.6	29.3	15.5	15.1
19-23	10.4	11.8	8.6	4.5	41.5	41.7	41.7
24-63	83.1	83.7	90.0	94.9	29.2	42.8	43.2
<u>Education:</u>							
Drop-out	26.8	22.0	20.1	16.4	33.6	31.7	32.2
High School	14.5	15.0	15.8	14.3	15.5	19.6	19.1
Some Post-Secon.	15.0	15.5	14.0	11.8	35.5	35.2	35.4
College or Trade	29.3	32.1	33.3	34.9	10.1	10.2	9.9
University	14.4	15.4	16.8	22.6	5.3	3.3	3.4
<u>Family Situation:</u>							
<u>Younger (16-23)</u>	16.9	16.3	10.0	5.1	70.8	57.2	56.8
Living Alone	10.4	11.3	15.4	16.1	7.8	10.1	10.2
Head/Husband	4.5	6.1	10.0	12.9	2.2	1.2	1.3
Living with	52.7	50.2	43.4	41.6	60.4	57.5	57.1
Living with Lone Parent	15.3	14.6	12.8	11.0	17.9	16.6	17.0
Unidentified	17.1	17.8	17.9	18.5	11.7	14.4	14.4
<u>Older (24-63)</u>							
Living Alone	13.5	12.7	12.4	11.5	22.3	23.6	24.8
Husband w/o Kids	21.2	19.8	19.7	19.8	13.7	11.8	11.7
Husband with	45.5	49.2	50.4	53.6	28.4	35.0	34.3
Lone Father	1.8	1.6	1.5	1.5	1.4	0.8	0.4
Unidentified	18.0	16.6	16.0	13.6	34.3	28.7	28.3

Notes: Sources: Authors' calculations from the 1993 SLID. Minimum wage workers are workers whose wage is within \$0.25 of provincial minimum wage.

**Table 5. Distribution of Female Workers and Minimum Wage Female Workers
by Age, Education and Family Situation – 1993**

	Total Populatio n	All Wage & Salary Workers	All Minimum Wage Workers	Percentage of All Workers	Percentage of Hours Worked	Percentage of All Workers	Percentage of Hours Worked	Percentage of Earnings
Female Share:	50.0	47.7	42.4	37.2	63.7	62.1	62.2	
<u>Age Group:</u>								
16-18	5.9	4.4	1.5	0.7	23.0	13.9	13.8	
19-23	10.6	12.3	9.3	5.6	32.5	29.1	29.0	
24-63	83.6	83.3	89.2	93.7	44.5	57.0	57.2	
<u>Education:</u>								
Drop-out	24.2	16.1	13.8	10.2	29.0	26.6	26.4	
High School	17.3	16.6	16.9	14.9	18.6	20.8	21.1	
Some Post-Secon.	14.8	15.7	14.0	12.2	25.4	21.9	21.9	
College or Trade	31.3	37.0	38.7	39.9	22.6	28.9	28.9	
University	12.4	14.7	16.6	22.4	4.5	1.7	1.7	
<u>Family Situation:</u>								
<u>Younger (16-23)</u>	16.4	16.7	10.8	6.3	55.5	43.0	42.8	
Living Alone	10.1	11.6	16.0	17.5	9.2	7.6	7.3	
Head/Wife	13.0	14.2	18.6	20.8	7.4	6.8	6.8	
Living with	45.9	45.0	38.6	36.1	47.7	44.4	44.2	
Living with Lone Parent	11.0	11.0	8.6	7.5	12.2	11.2	11.1	
Unidentified	20.0	18.2	18.2	18.1	23.0	30.0	30.9	
<u>Older (24-63)</u>								
Living Alone	12.4	13.1	15.2	16.7	12.1	10.0	10.5	
Wife w/o Kids	21.5	20.1	21.2	21.1	21.2	20.6	20.4	
Wife with Kids	43.0	46.0	46.0	42.1	40.6	40.4	40.5	
Lone Mother	7.3	6.6	6.6	6.8	10.0	11.6	11.5	
Unidentified	15.8	14.2	14.2	14.4	16.0	17.4	17.2	

Notes: Sources: Authors' calculations from the 1993 SLID. Minimum wage workers are workers whose wage is within \$0.25 of provincial minimum wage.

**Table 6. Distribution of Minimum Wage Workers and Earnings
by Decile of Family Income-to-Need Ratio – 1993**

Decile:	Percentage of MW Workers			Percentage of MW Earnings		
	All	Youth Living with Parents	Youth Living with Parents /All	All	Youth Living with Parents	Youth Living with Parents /All
1rst	12.5	6.1	20.4	10.1	4.0	12.2
2nd	13.9	7.7	23.2	13.1	8.5	19.8
3trd	16.7	16.2	40.4	21.3	17.0	24.5
4th	12.0	13.6	47.0	12.2	13.9	34.9
5th	12.2	16.1	54.8	11.3	16.7	45.1
6th	8.4	9.4	46.5	7.8	7.4	29.0
7th	7.9	11.2	58.8	8.5	11.2	40.3
8th	7.4	9.2	51.8	6.0	10.6	54.2
9th	4.4	4.9	47.1	4.6	5.8	38.5
10th	4.7	5.6	49.3	5.1	5.0	29.9
First 5	67.3	59.7	36.9	68.0	60.1	27.1
Last 5	32.7	51.2	32.0	39.9	38.3	38.3

Notes: Sources: Authors' calculations from the 1993 SLID. Decile indicates decile of family income-to-need ratio. Youth living with their parents are under the age of 24 and live with their parents in a husband/wife /children family or in a lone parent family.

**Table 7. Average Minimum Wage Earnings and Government Transfers
by Decile of Adjusted Family Income – 1993**

Decile:	Minimum Wage Earnings	Transfers			Taxes	Total Income
		Social Assistance	Unemploy- ment Insurance	Total		
<u>Absolute Terms:</u>						
All	163	505	835	2148	4878	24358
1rst	165	2557	538	4510	283	7655
2nd	214	1365	1098	3812	1121	11914
3trd	347	507	1133	2782	1998	15140
4th	199	267	1180	2501	3032	18621
5th	185	182	1045	2002	3897	21417
6th	127	72	925	1584	4470	23517
7th	139	34	940	1560	5374	26600
8th	97	61	700	1289	6330	29929
9th	75	8	561	923	8061	35580
10th	83	2	234	521	14212	53199
<u>Percentage Terms:</u>						
1st	10.1	50.6	6.4	21.0	0.6	
First 5	68.0	96.5	59.8	72.6	21.2	
Last 5	32.0	3.5	40.2	27.4	78.8	

Notes: Sources: Authors' calculations from the 1993 SLID. Decile indicates decile of family income-to-need ratio.

**Table 8. Average Minimum Wage Earnings and Government Transfers
by Decile of Predicted Adjusted Family Income – 1993**

Decile:	Minimum Wage Earnings	Transfers			Taxes	Total Income
<u>Absolute Terms:</u>		Social Assistance	Unemploy- ment Insurance	Total		
All	163	505	835	2148	4878	24358
1rst	200	1014	937	2953	3346	19332
2nd	193	738	933	2600	3746	20529
3trd	186	611	913	2410	4016	21492
4th	179	531	889	2272	4281	22387
5th	172	472	863	2158	4546	23289
6th	164	424	835	2054	4832	24256
7th	155	382	805	1952	5162	25356
8th	144	342	772	1844	5568	26688
9th	131	303	734	1724	6114	28443
10th	113	265	687	1575	7011	31216
<u>Percentage Terms:</u>						
1st	12.2	20.0	11.2	13.7	6.9	
First 5	56.8	66.2	54.2	57.5	41.0	
Last 5	43.2	33.8	45.8	42.5	59.0	

Notes: Sources: Authors' calculations from the 1993 SLID. Decile indicates decile of family income-to-need ratio.

**Table 9. Average Wages, Hours of Work and Earnings
by Decile of Adjusted Family Income – 1993**

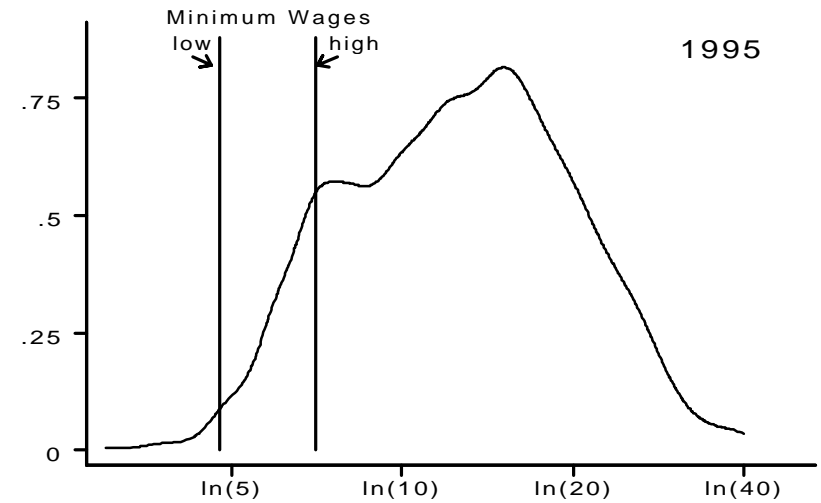
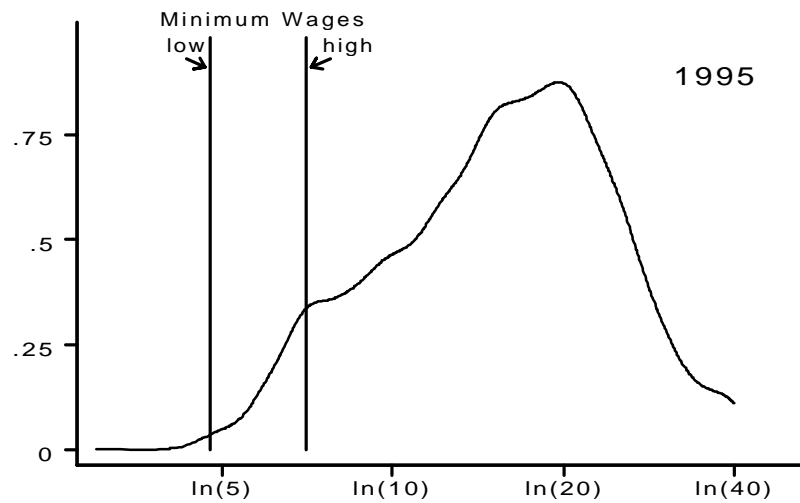
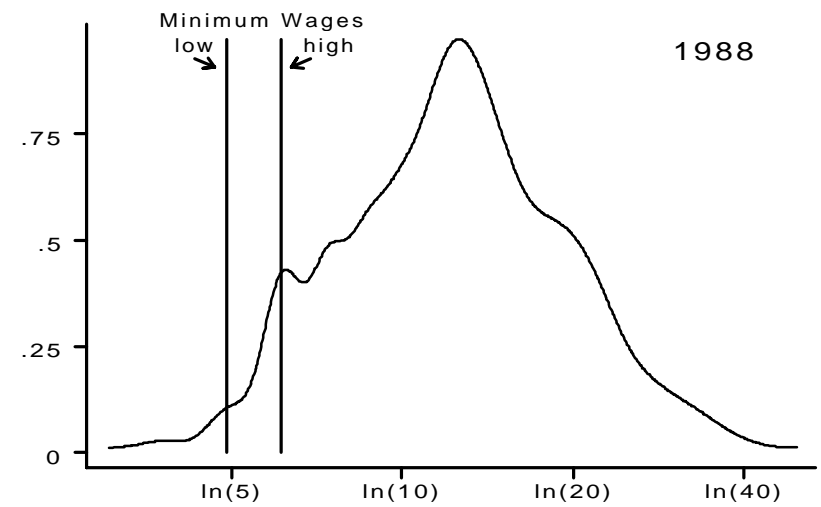
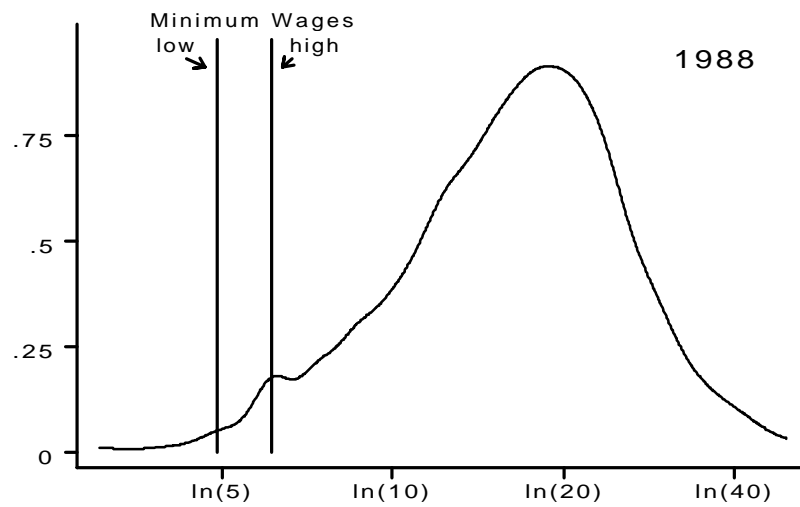
Decile:	Average			Ratio of Minimum Wage		
	Hourly Wage ¹	Hours of Work	Earnings	Earnings to Total Earnings	Wage Gap ²	Hours Gap ³
1st	9.04	262	2360	0.070	-4.11	-592
2nd	10.46	607	6318	0.034	-3.27	-249
3trd	11.75	826	9672	0.036	-2.49	-96
4th	13.38	918	12274	0.016	-1.32	-85
5th	14.20	1023	14500	0.013	-0.27	46
6th	14.74	1103	16211	0.008	0.06	137
7th	15.91	1176	18657	0.007	1.00	136
8th	17.16	1240	21198	0.005	1.88	222
9th	18.61	1319	24524	0.003	2.93	227
10th	22.44	1296	29027	0.003	5.59	255

Notes: Sources: Authors' calculations from the 1993 SLID. Decile indicates decile of family income-to-need ratio.

¹ Average Hourly Wage are hours-weighted. The advantage of using this measure is that average earnings are equal to the product of the average hours of work and the hours-weighted average hourly wage.

² Difference between the average wage in the decile and the average wage over all deciles that is not explained by differences in gender, education, experience and province of residence.

³ Difference between the average hours of work in the decile and the average hours of work over all deciles that is not explained by differences in gender, education, experience and province of residence.



Men

Women

Figure 1.- Density Estimates of Real Log Wages (\$1995) in Canada

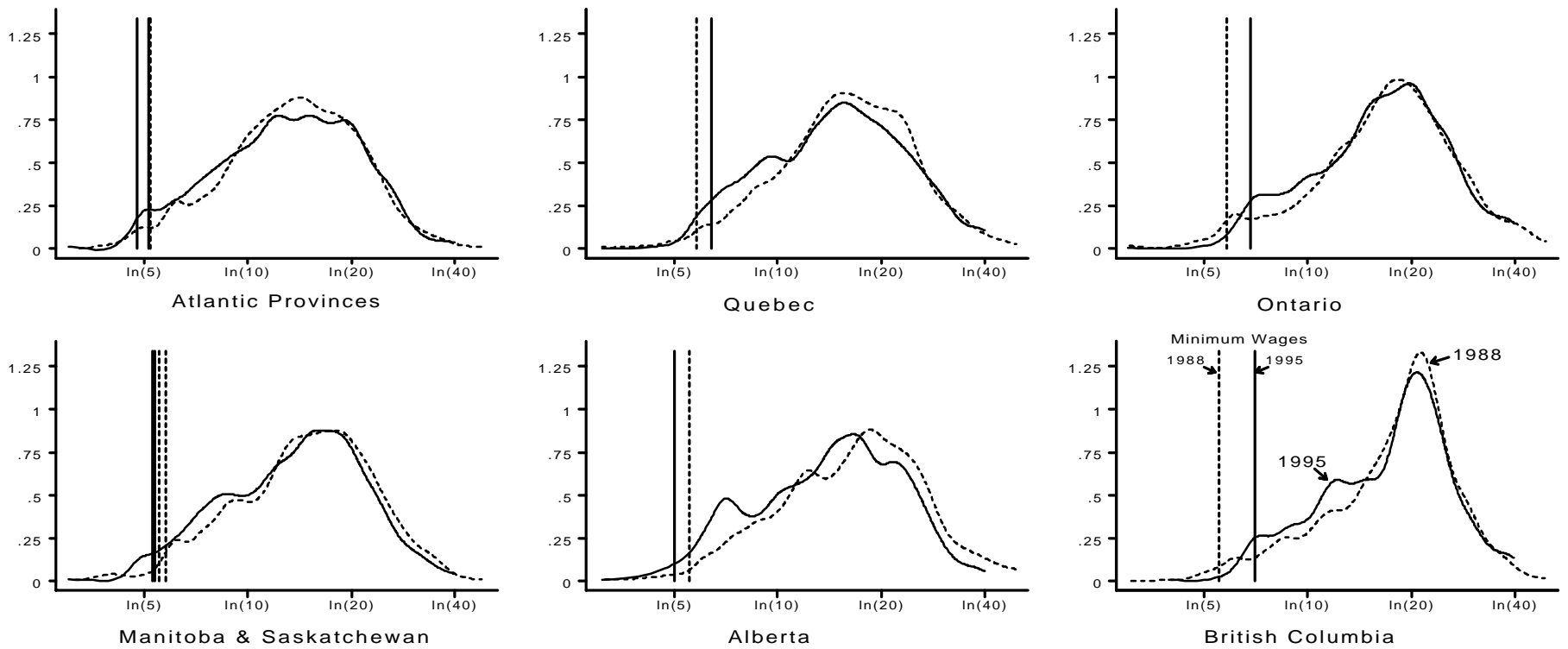


Figure 2.- Density Estimates of Men's Wages by Region

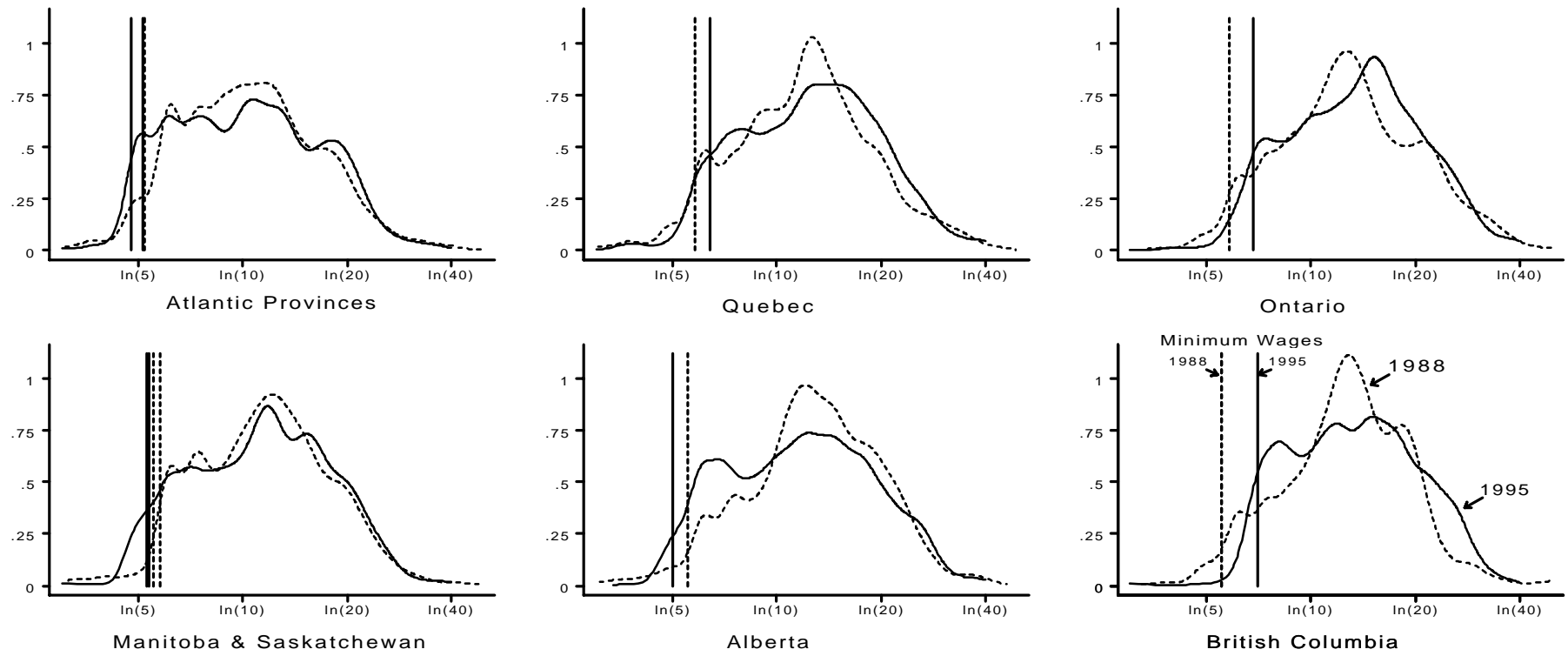


Figure 3.- Density Estimates of Women's Wage by Region

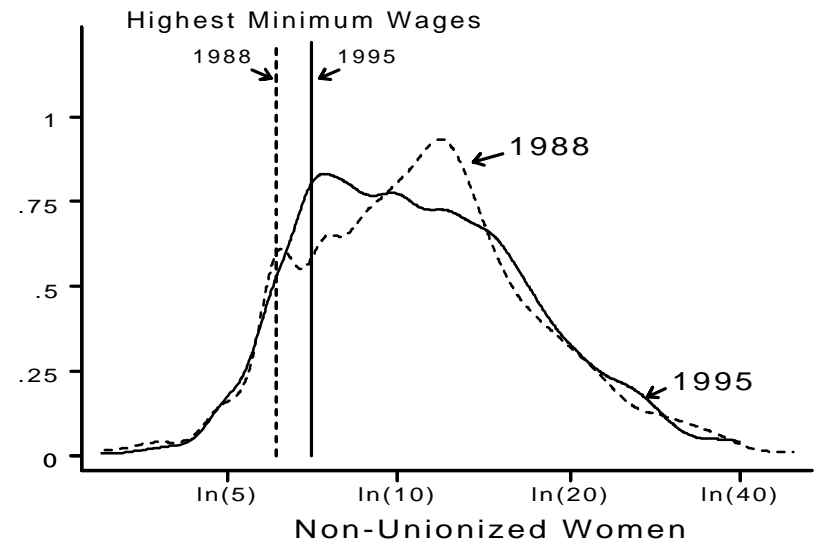
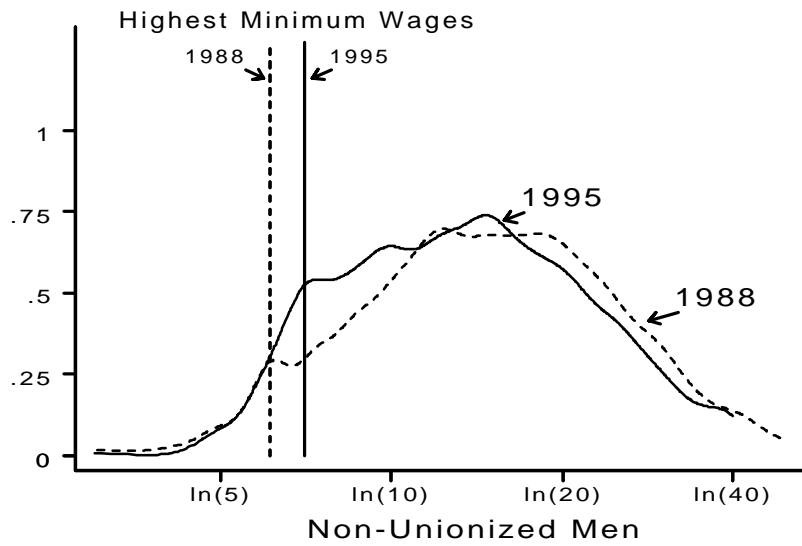
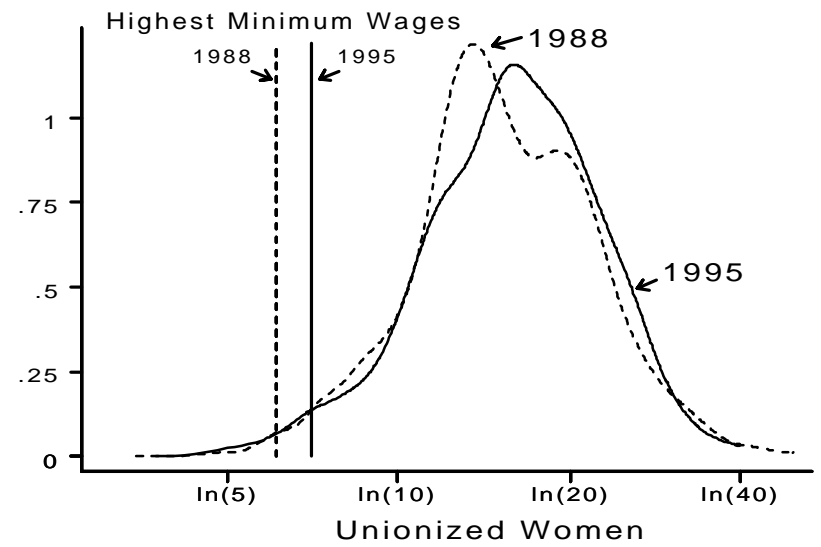
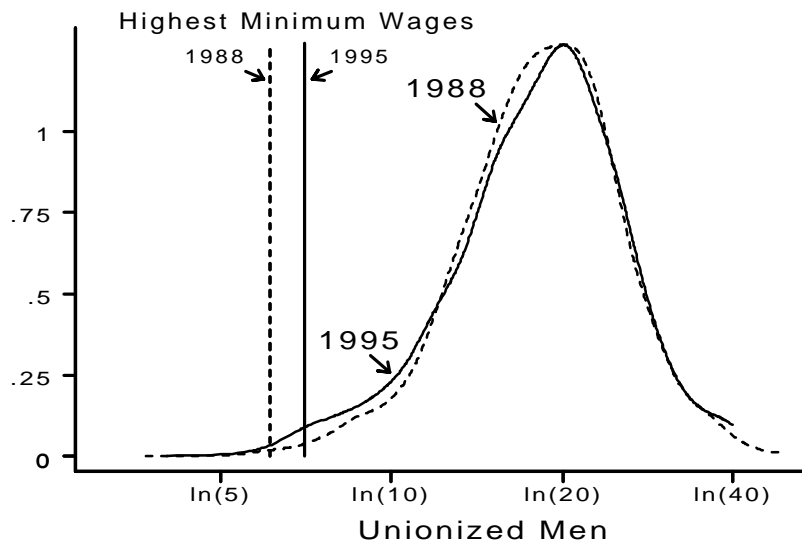


Figure 4.- Density Estimates for Union and Non-Union Workers

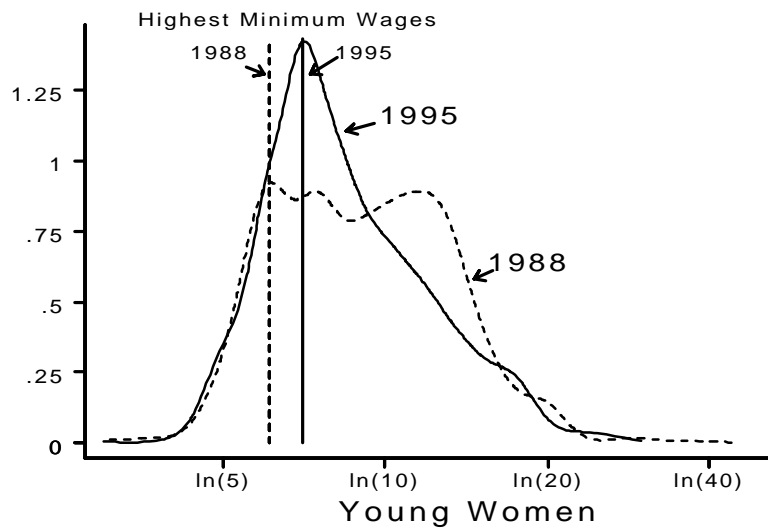
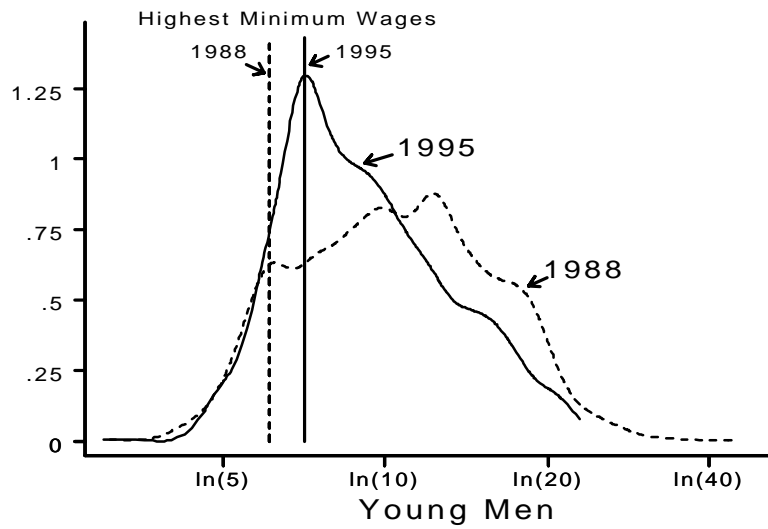
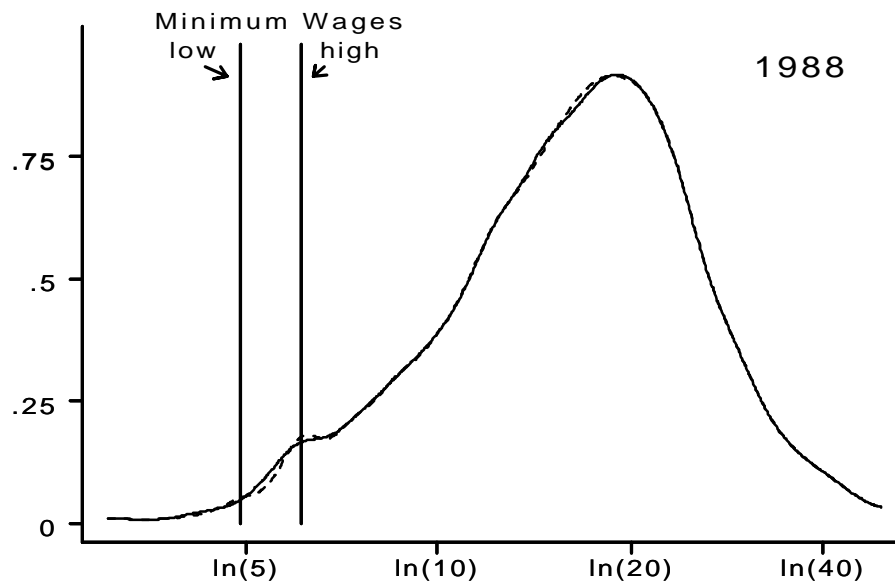


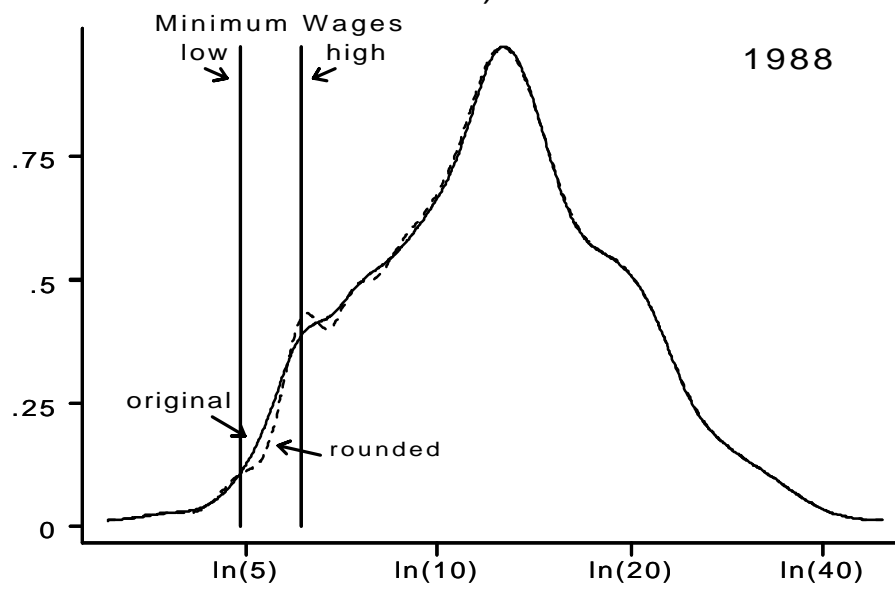
Figure 5.- Densities for Young Workers



Figure 6.- Shares of Minimum Wage Earnings and Government Transfers



a) Men



b) Women

Figure A1.- Density Estimates of Original and Rounded Wages in 1988