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Marriage, Cohabitation and Women's Response to Changes in the Male Wage Structure

René Morissette
Statistics Canada

Yuqian Lu
Statistics Canada

Feng Hou
Statistics Canada

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Marriage, cohabitation and women's response to changes in the male wage structure

René Morissette*, Yuqian Lu and Feng Hou*****

Analysis Branch
Statistics Canada
Ottawa, ON
Canada K1A 0T6
*rene.morissette@yahoo.com
**yuqian.lu@statcan.gc.ca
***feng.hou@statcan.gc.ca
Fax 613 951 5403

ABSTRACT

Using micro data and grouped data that cover the period 1996-2006, we assess the extent to which cohabiting women adjust their labour supply to a lesser extent, if any, than married women in response to changes in male wages. Both micro data regressions and grouping estimators unambiguously indicate that cohabiting women respond less to variation in male wages than married women. However, the magnitude of the difference is not sizeable. Combined with the fact that married men's and cohabiting men's own-wage elasticities do not differ much, this explains why the impact of changes in male wages on family earnings ends up being very similar for married couples and cohabiting couples.

Keywords: marriage, cohabitation, women's labour supply.

JEL classification code: J2

Executive summary

In this study, we assess whether cohabiting women adjust their labour supply to a lesser extent than married women in response to changes in male wages. While marriage itself has become less prevalent and less stable, common-law has grown to be the most common model of entry into conjugal relationships. In Quebec and in some European countries (e.g., Sweden), cohabitation has progressed from a prelude to marriage to an alternative family environment to have and raise children. Hence, quantifying the labour supply responses of cohabiting women and married women to changes in male wages (as well as their own wages) is critical for a thorough assessment of families' responses to wage shocks.

We first estimate labour supply functions for both groups of women using cross-sectional micro data from the 1996 and 2006 censuses. We also estimate female labour supply functions using grouping estimators. This allows us to provide further evidence on the degree to which married women and cohabiting women respond to changes in male wages.

Both micro data regressions and grouping estimators indicate that cohabiting women respond less to variation in male wages than married women. However, the magnitude of the difference is not sizeable. Since married men's and cohabiting men's own-wage elasticities do not differ much and on average men had a larger share in family earnings than women, the end result is that the impact of changes in male wages on family earnings is very similar for married couples and cohabiting couples.

We also find that cohabitating women in both Quebec and the rest of Canada are quite similar in that they are less responsive to male wages than married women even though cohabitation is much more prevalent in Quebec.

I. Introduction

Understanding the degree to which families respond to shocks—such as layoffs and changes in the wage structure—by adjusting their work hours is critical for the design of policies, if any, aimed at helping families smooth transitions across states. Recent U.S. studies have provided evidence that women increase their labour supply when their male partner experiences job loss (Stephens, 2002) or wage declines (Devereux, 2004, 2007) and that the labour supply response of women to male wages has fallen since the early 1980s (Blau and Kahn, 2007). Yet the question of whether married women and cohabiting women—those living in common-law relationships—exhibit different behavioural labour supply responses to shocks experienced by their male partner has received little attention so far. If cohabiting women respond to the job losses or wage changes experienced by their male partner to a lesser extent than married women, then cohabiting couples might face greater instability in family income than their married counterparts following a shock of a given magnitude. In light of the fact that common-law unions have been dramatically altering family life in North America and Europe (Bumpass and Lu 2000; Le Bourdais, 2004), investigating whether married couples and cohabiting couples adjust differently to shocks is a prerequisite for a thorough understanding of how families now respond to changing economic parameters.

We investigate one dimension of this issue in this paper. Specifically, we assess whether cohabiting women adjust their labour supply to a lesser extent, if any, than married women in response to changes in male wages. Knowing whether cohabiting women and married women respond to changes in the male wage structure is critical to understand the extent to which increases in male earnings inequality cause increases in

family income inequality. If the labour supply of neither group of women responds to changes in male wages, then increases in male earnings inequality will translate mechanically into increases in family income inequality (Devereux, 2004). Conversely, married and/or cohabiting women might increase (decrease) their work hours in response to declines (increases) in male wages, thereby mitigating the impact of growing male earnings inequality on family income inequality. Thus, assessing the magnitude of married and cohabiting women's behavioral labour supply response to male wages is essential for unpacking how changes in the male wage structure affect family income inequality. In light of the substantial increases in family income inequality that many OECD countries witnessed since the early 1980s (Gottschalk and Smeeding, 1997), such assessment is important.

There are several reasons why cohabiting women might respond less to male wages than their married counterparts. Compared to married individuals, cohabitating partners are more likely to embrace individualism, equality, independence, self-reliance, and self-determination (Brines and Joyner 1999; Clarkberg et al., 1995; Wu, 2000). Unlike married couples, partners in cohabiting relationships are more likely to view each other as individual economic entities because of the conditions they confront – high uncertainty and the absence of a reliably enforceable contract (Brines and Joyner 1999; Heimdal and Houseknecht 2003). Cohabiting women might be more career-oriented and thus, might be less prone to alter their work hours in response to changes in their husband's wages (as well as in their own wages) than their married counterparts. They might be more risk-averse than married women and/or view their relationship as being more likely to end than marriages (Ambert 2005; Oppenheimer 2003). If so, they might

attempt to self-insure against the financial consequences of family dissolution by working longer hours than married women and by making their labour supply decision less sensitive to the wage changes experienced by their partner (Clarkberg et al., 1995; Kerr et al, 2006). Time spent in a common-law relationship might also be viewed by some women as a trial period that could possibly lead to marriage, depending on the quality of the match between partners that will be revealed. During this trial period, some women might base their labour supply decisions purely on individualistic grounds, not taking into account the changing economic fortunes of their partner.

As mentioned above, the question of whether labour supply responses of married women and cohabiting women differ has received little attention so far. One plausible reason is that until recently, cohabiting couples accounted for a fairly small fraction of all couples. For instance, only 4% of couples were unmarried in the mid 1980s in the United States (Thornton, 1988). Furthermore, cohabitation used to be a short-lived state: median duration of cohabitation in the United States was only 1.3 years in the 1980s (Bumpass and Sweet 1989).

Yet these patterns changed markedly over the past two decades. In 2006, 18.4% of couples lived in common-law arrangements in Canada, compared to 6.4% in 1981 (Milan, et al., 2007; Kerr et al., 2006). In the Canadian province of Quebec over 34% of couples were in common-law unions (Milan, et al., 2007). For a growing number of Canadians, common-law is also replacing marriage as an acceptable way to become parents. While 4.5% of children aged 14 and under lived with common-law parents in 1986, the corresponding level rose to 14.6% in 2006 (Milan, et al., 2007). Taken together, these numbers imply that cohabitation is no longer the marginal form of living

arrangement it used to be. While marriage itself has become less prevalent and less stable, common-law has grown to be the most common model of entry into conjugal relationships (Bumpass and Lu 2000; Kerr, 2007). In Quebec and in some European countries (e.g. Sweden), cohabitation has progressed from a prelude to marriage to an alternative family environment to have and raise children (Le Bourdais et al., 2004; Heimdal and Houseknecht 2003). Hence, quantifying the labour supply responses of cohabiting women and married women to changes in male wages (as well as their own wages) is critical for a thorough assessment of families' responses to wage shocks.

To do so, we first estimate labour supply functions for both groups of women using cross-sectional micro data. Since regressions based on cross-sectional micro data require strong assumptions to generate consistent estimates of cross-wage elasticities, we follow Blundell, Duncan and Meghir (1998), Devereux (2004, 2007) and Blau and Kahn (2007) and also estimate female labour supply functions using grouping estimators. This allows us to provide further evidence on the degree to which married women and cohabiting women respond to changes in male wages.

Our empirical results are unambiguous: both micro data regressions and grouping estimators indicate that cohabiting women respond less to variation in male wages than married women. Our estimates of the cross-wage elasticity of unconditional annual hours of married women vary between -0.15 and -0.40 while those for cohabiting women vary between -0.01 and -0.09. Although it is generally statistically significant at conventional levels, this difference not sizeable. We also assess the magnitude of married men's and cohabiting men's own-wage elasticities and find that they do not differ much. Taken

together, these two findings imply that the impact of changes in male wages on family earnings is very similar for married couples and cohabiting couples.

The paper is structured as follows. Section II provides a brief overview of recent studies that quantify the labour supply response of women to male wages. Sections III and IV describe the methods and data, respectively, used in the study. Empirical results are presented in Section V. A conclusion follows.

II. Overview

Numerous studies of the degree to which women's labour supply responds to the wages of their male partner rely on the following cross-sectional model, estimated on micro data (Blau and Kahn, 2007):

$$H_i = \beta_0 + \beta_1 w^f_i + \beta_2 w^m_i + \beta_3 Y_i + \beta_4 Z_i + \varepsilon_i \quad (1)$$

where H_i is a measure of female labour supply (participation, annual hours, hours per week, weeks per year or their logarithmic values), w^f_i is the logarithm of a woman's hourly wage rate, w^m_i is the logarithm of her partner's hourly wage rate or the annual income of her partner, Y_i is the asset income of the family, Z_i is a vector of controls and ε_i is an error term.

Early studies summarized by Killingsworth (1983) yield a median cross-wage elasticity of only -0.08 for married women. In a recent study, Blau and Kahn (2007) provide instrumental variables estimates of equation (1) with U.S. data and find that the responsiveness of married women's unconditional annual hours to their husband's wages fell substantially in absolute value during the period 1980-2000.

As is well known, estimation of equation (1) through OLS assumes the absence of unobserved heterogeneity in women's preferences for work, a strong assumption required in order to yield consistent parameter estimates. While instrumental variable estimators are often used in an attempt to remove the correlation between husbands' wages and unobservable factors, they generally rely on arbitrary exclusion restrictions.

An alternative approach is to group micro data and take advantage of the changes in male wages that took place in many OECD countries since the early 1980s across groups (defined jointly, for example, by age, region, educational level and/or occupation) in order to identify women' labour supply response to changes in male wages. By relying on economy-wide changes in the male wage structure, one can exploit (potentially) exogenous variation in male wages that can be used to identify the degree to which women's labour supply responds to variation in the wages of their male partners. This empirical strategy has been used recently by Blundell, Duncan and Meghir (1998), Devereux (2004, 2007a), Blau and Kahn (2007) and Morissette and Hou (2008).

Using grouped data to estimate women's labour supply response to changes in male wages allows researchers to deal with omitted variable bias as well as measurement error that affects the calculation of hourly wages. The reason is that unmeasured factors related to preferences for work and measurement errors on hourly wages will likely cancel out as the number of observations within groups becomes large (Blau and Kahn 2007). Unlike traditional instrumental variables approaches, estimation based on grouped data does not require the use of exclusion restrictions which are often difficult to justify on theoretical grounds. Grouping estimators uses group indicators as instrumental

variables for hourly wages and thus, are equivalent to estimating labour supply equations on individual-level data using group averages as the instruments (Angrist 1991).

Like OLS (estimated on micro data), the use of grouped data imposes some restrictions. When estimated in first-differences across years, models based on grouped data assume that β_1 and β_2, the parameters for women's response to their own wages and their male partner's wages, are constant throughout the period considered. Furthermore, because they identify these parameters through wage variation over time across the *whole set* of groups defined, these models are best suited to yield an average female labour supply response. Testing whether some subsets of groups (e.g. female university graduates versus female high school graduates) exhibit different responses is more demanding since this requires that the data display substantial wage variation over time across these subsets, rather than across the whole set of groups.

Using grouped data on *weekly* hours from the U.K. over the period 1978-1992, Blundell, Duncan and Meghir (1998) find that elasticities of unconditional hours with respect to other income are small for women with children—they vary between -0.06 and -0.19—and are zero for women without children. In contrast, Devereux (2004) groups U.S. Census data on *annual* hours and estimates that wives' cross-wage elasticity of conditional hours (i.e. annual hours given participation) was sizable during the 1980s: it amounted to roughly -0.40. Using grouped data on *annual* hours from the U.S. Current Population Survey, Blau and Kahn (2007) find that wives' cross-wage elasticity of unconditional hours varied between -0.42 and -0.65 during the 1980s and between -0.17 and -0.19 during the 1990s. Using grouped data on *weekly* hours from the Current Population Survey over the period 1979-1993, Devereux (2007a) reports elasticities of

conditional hours with respect to other income (defined as husband's weekly earnings) that range between -0.28 and -0.40. Morissette and Hou (2008) use Canadian Census data on *annual* hours and find that cross-wage elasticities of women's unconditional hours varied between -0.39 and -0.88 for the 1980s and between -0.17 and -0.78 for the 1990s.

While the aforementioned studies take advantage of the substantial changes in the male wage structure that took place in the United Kingdom, the United States and Canada since the early 1980s, none of them distinguishes the labour supply behaviour of married women from that of cohabiting women. Devereux (2004, 2007) and Blau and Kahn (2007) restrict their attention to married women while Blundell, Duncan and Meghir (1998) and Morissette and Hou (2008) pool married women and cohabiting women.

III. Methods

In addition to using micro data to estimate equation (1) through OLS, we specify the following labour supply equation, based on grouped data:

$$H_{akrt} = \gamma + \alpha_0 t + \alpha_1 w^f_{akrt} + \alpha_2 w^m_{akrt} + \alpha_3 Y_{akrt} + \alpha_4 Z_{akrt} + \upsilon_{akr} + \mu_{akt} + \eta_{rt} + \varepsilon_{akrt} \qquad (2)$$

where t indexes time, a refers to the age of the male partner (3 categories: 25-34, 35-44, 45-54), k refers to his occupation (22 occupational categories), and r refers to the region of residence (6 categories: the Atlantic provinces, Quebec, Ontario, Manitoba/Saskatchewan, Alberta and British Columbia).[1] The dependent variable refers to average unconditional annual hours worked by women in a given group. The explanatory variables include the average log hourly wages of male partners in couples ak

[1] The list of occupational categories selected is shown in Appendix Table 1.

in region r at time t, w^m_{akrt}, and the average log hourly wages of women in these couples, w^f_{akrt}. Y_{akrt} is average non-labour income and Z_{akrt} is a vector of controls defined at the group level. The term υ_{akr} represents a vector of fixed effects that allow women in each of the 396 groups defined above to have intrinsic differences in their labour supply because of unobserved attributes such as motivation, career-orientedness, tastes for leisure, etc. The term $\alpha_0 t$ measures an overall time trend that allows wives' labour supply to shift over time as a result of changes in attitudes, societal norms and economy-wide factors that affect women's preferences for work.

Applying first-differences highlights the implications of equation (2):

$$\Delta H_{akr} = \alpha_0 + \alpha_1 \Delta w^f_{akr} + \alpha_2 \Delta w^m_{akr} + \alpha_3 \Delta Y_{akr} + \alpha_4 \Delta Z_{akr} + \Delta \mu_{ak} + \Delta \eta_r + \Delta \varepsilon_{akr} \qquad (3)$$

where, at the group level, changes in women's labour supply during the period 1996-2006, ΔH_{akr}, are related to changes in their own wages (Δw^f_{akr}), changes in their husband's wages (Δw^m_{akr}), changes in non-labour income (ΔY_{akr}), and changes in control variables (ΔZ_{akr}).[2]

Since women's attitudes towards work and public policies regarding child care may evolve in a different manner across regions, it is crucial to allow for the possibility that women's intrinsic growth in labour supply might differ across regions. Equation (3) does so by treating the region-specific error component ($\Delta \eta_r$) as a fixed effect, captured by a vector of region indicators.

Likewise, it is conceivable that, over a given period, the labour supply of older women and/or women living with highly skilled men rises to a different degree than that

[2] When estimating equation (3), we weight each group by the average number of observations in the group in 1996 and 2006. Over the period 1996-2006, sample size per group averages 739 for married couples and 219 for cohabiting couples.

of other women. We take this scenario into account by specifying $\Delta\mu_{ak}$ as a vector of fixed effects capturing intrinsic differences in wives' labour supply growth, differences that may arise across the 66 groups of couples (22 occupations times 3 age categories) defined above.

Since $\Delta\varepsilon_{akr}$ is assumed to be a random term, our identifying assumptions are that: a) cross-regional differences in women' labour supply growth are the same across the 66 groups of couples defined above and, b) differences in women's labour supply growth across men's age and occupation are the same across regions. Under these assumptions, cross-regional variation and age-occupational group variation in changes in relative wages of men and women can be used to identify the labour supply response of women to changes in male wages (as well as their own wages).

To assess the impact of changes in male wages on family earnings, we define family earnings Y as follows:

$$Y = W^m H^m + W^f H^f \qquad (4)$$

where W^m, H^m , W^f and H^f denote hourly wages and annual hours worked by men and women, respectively. Equation (4) implies that:

$$\partial Y/\partial W^m = W^m (\partial H^m /\partial W^m) + H^m + W^f (\partial H^f /\partial W^m) \qquad (5)$$

As a result, the elasticity of family earnings with respect to male wages equals:

$$(\partial Y/\partial W^m) (W^m/Y) = s^m (1+ \gamma^m) + \gamma^{fm} (1 - s^m) \qquad (6)$$

where $s^m \equiv (H^m W^m) /Y$, $\gamma^m \equiv (\partial H^m /\partial W^m) (W^m /H^m)$ and $\gamma^{fm} \equiv (\partial H^f /\partial W^m)(W^m /H^f)$.

The terms s^m, γ^m and γ^{fm} on the right-hand side of equation (6) denote men's share of family earnings, the elasticity of men's labour supply with respect to their own

wages, and the cross-wage elasticity of female labour supply, respectively. The first set of terms on the right-hand side of equation (6) indicate that the impact of a given change in male wages on family earnings increases with men's share of family earnings (s^m) and men's own wage elasticity (γ^m). The second set of terms show that the impact of a change in male wages on family earnings is largely attenuated when γ^{fm} is negative and large in absolute value and women's share of family earnings ($1 - s^m$) is sizeable. Equation (6) makes clear that the impact on a given change in male wages on family earnings might differ substantially between married couples and cohabiting couples if γ^{fm} (and γ^m) differ markedly between married women (men) and cohabiting women (men). Estimates of γ^{fm} will be obtained from equations (1) – (3), using both micro data and grouped data. To obtain estimates of γ^m, equations (1) – (3) will be re-estimated using male annual hours (or changes in male annual hours during the period 1996-2006) as the dependent variable.[3] As Appendix Table 2 shows, men's share of family earnings amounted to roughly 65%-70% during the period 1996-2006.

IV. Data

We use the 20% samples of the Canadian Census of Population of 1996 and 2006. We focus our analysis on Canadian-born couples (i.e. couples where both partners are born in Canada) where women are aged 25 to 54 and live with men who are also aged 25 to 54. We exclude immigrants because the labour supply responses of immigrant women, especially those arrived recently in Canada, are likely to differ from those of

[3] When using micro data (grouped data), own-wage elasticities and cross-wage elasticities of male and female labour supply are evaluated at the mean by dividing the corresponding parameter estimates by men's and women's average annual hours during the reference year (at the beginning of 10-year study period).

their Canadian-born counterparts. We exclude couples who receive income from self-employment as well as those who live outside the ten Canadian provinces. We include husbands (a) who are employed both in year t-1 and in May of year t (the month when the Census was taken), (b) earn a hourly wage that varies between $2 and $200 (in 2000 dollars), and (c) who work less than 60 hours per week. While we restrict our attention to couples in which husbands are employed, we include in our samples both participating and non-participating women.

Our measure of women's labour supply is annual hours worked in year t-1. This measure is obtained by multiplying weeks worked in year t-1 by weekly work hours in May of year t.[4] The two focal explanatory variables are partners' hourly wages and women's own hourly wage. The hourly wage measure (expressed in 2000 constant dollars) is calculated by dividing annual wages and salaries in year t-1 by the product of weeks worked in year t-1 and weekly hours worked in May of year t. [5] For non-participating women, hourly wages are imputed using values observed either at the 30th percentile or the 40th percentile of the (396) group-specific wage distributions of participating women in our sample.

Descriptive statistics show that there is substantial variation in male *wage changes* across occupations during the period 1996-2006. Such variation is critical for the

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[4] Whenever wives work in year t-1 but not in May of year t, we impute their weekly hours in year t-1 based on the following procedure. For those who work mainly full-time (part-time) in year t-1, we use the average weekly hours worked by wives employed full-time (part-time) (from the Labour Force Survey) in a given age group (25-34; 35-44; 45-54) and province. The same imputation procedure is used for wives who work full-time (part-time) in May of year t but report working mainly part-time (full-time) in year t-1.

[5] For instance, when using 1996 Census data, hourly wages are obtained by dividing annual wages and salaries in 1995 by the product of weeks worked in 1995 and weekly hours worked in May 1996.

identification of women's cross-wage elasticity (γ^{fm}) and men's own-wage elasticity (γ^{m}) when using grouping estimators. For instance, across the 22 occupations selected, changes in married men's log hourly wages ranged from -0.02 to 0.15 between 1996 and 2006 (Figure 1). Similarly, changes in cohabitating men's log hourly wages ranged from -0.14 to 0.10.[6] Furthermore, descriptive evidence suggests that married women are more responsive to their male partner's wage changes than cohabiting women. Grouped data regressions of changes in women's annual hours between 1996 and 2006 on a constant as well as changes in male wages between 1996 and 2006 yields a labour supply parameter for married women that is twice as large as the one for cohabitating women.[7] In the following sections, we investigate this (potential) difference in the labour supply response of married and cohabitating women using multivariate models.

V. Marriage, cohabitation and the Quebec-rest of Canada difference

Table 1 shows that 27% of Canadian couples aged 25 to 54 were cohabiting in 2006, up from 17% in 1996. The growing incidence of common-law relationships during the period 1996-2006 is observed in all age groups and education levels. In both years, young couples (those where men are aged 25 to 34) are more likely to be cohabiting than their older counterparts. Yet, even though cohabitation declines with age, it reached almost 18% in 2006 among older couples (those where men were aged 45 to 54). While couples where men or women have no high school diploma are more likely to be

[6] The weighted mean of male wage changes across cells defined jointly by age, occupation and region (over the period 1996-2006) equals 0.06 with a standard deviation of 0.08 for married men, compared to the mean of 0.02 with a standard deviation of 0.09 for cohabiting men.

[7] The parameter estimate equals -456 (t-value of 2.55) for married women. For cohabiting women, the corresponding number is -251 (t-value of -1.55).

cohabiting than those with more schooling, the incidence of cohabitation varies little across education levels for women with at least a high school education. Furthermore, estimates from the 2006 Canadian General Social Survey show that about 41% of cohabitating women aged 25 to 54 remained in their unions 3 years or more after first living together. Among couples who were cohabiting as of 2006, the average duration of their unions was 7.4 years (based on authors' estimates). Taken together, these numbers provide compelling evidence that rather than being a marginal form of living arrangement that affects few couples for a very short period of time, cohabitation is now a state in which a relatively large number of Canadian couples spent a significant amount of time.

Canadian cohabitating men are less educated, work shorter hours and have much lower annual earnings than their married counterparts (Appendix Table 2). This is consistent with the proposition that: (a) marriage is still highly selective for men and (b) men with better economic prospects are more likely to marry than to cohabitate (Kerr, et al., 2006, Oppenheimer, 2003). In contrast, cohabitating women participate more often in the labour force and work longer hours than married women, even though they are slightly less likely to have a university degree. They earn lower hourly wages than married women, owing partly to their younger age.[8]

As is well documented in the literature, cohabitation is much more prevalent in the province of Quebec than in the rest of Canada.[9] The difference might reflect Quebec's unique religious and cultural background as well as the possibility that the

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[8] Regressions of log hourly wages and log annual wages on a cohabitation indicator, education controls and a quadratic term in age suggest that working cohabiting men earn 11% less in hourly wages and 18% less in annual wages than married men in 2006. Repeating the exercise for working women indicates that cohabiting women earn 6% less in hourly wages, but 4% more in annual wages than married women.

feminist movement brought about more profound changes in men's and women's roles and expectations in Quebec than in the rest of Canada (Le Bourdais, et al., 2004; Kerr, et al., 2007). Forty-nine percent of couples in Quebec were cohabiting in 2006, almost twice the rate of 27% observed in the rest of Canada. Even among older couples, the incidence of cohabitation reached almost 33% in Quebec. The relatively high incidence of cohabitation in Quebec is widespread since it is found across all age groups and education levels. As is the case in the rest of Canada, young couples in Quebec are much more likely to live in common-law relationships than their older counterparts. However, contrary to the rest of Canada, the incidence of cohabitation does not necessarily drop as education levels of men and women rise.

The relatively high incidence of cohabitation in Quebec is not simply due to higher rates of entry into common-law relationships: estimates of average (truncated) duration of common-law arrangements from the General Social Survey of 2006 are also substantially higher in Quebec than in the rest of Canada. They indicate that Quebec couples who were cohabiting as of 2006, had been doing so for 8.6 years on average, compared to 6.1 years for their counterparts in the rest of Canada.[10] The higher duration of common-law unions in Quebec in turn suggests that the nature of common-law relationships in this province might differ from that in the rest of Canada. Specifically, common-law relationships in Quebec might be viewed less often as transitory living arrangements preceding marriages and more often as a family form nearly indistinguishable from marriage (Le Bourdais, et al., 2004). If so, the labour supply of

[9] In 2006, Quebec accounted for 24% of Canada's population.
[10] In comparison, the difference in the duration of current marriage between Quebec and the rest of Canada is smaller, at 15.5 and 14.1 years respectively.

cohabiting women in response to partner' wage changes in Quebec should be similar to married women but stronger than that of cohabiting women residing elsewhere in Canada.[11] We test this hypothesis in the next section.

VI. Model Results

VI.1 Female labour supply estimated on micro data

We start by estimating a variant of equation (1) using micro data:

$$H_i = \beta_0 + \beta_1 w^f_i + \beta_2 w^m_i + \beta_3 Y_i + \beta_4 KIDS_i + + \beta_5 Z_i$$
$$\theta_0 C_i + \theta_1 C_i w^f_i + \theta_2 C_i w^m_i + \theta_3 C_i Y_i + \theta_4 C_i KIDS_i + \varepsilon_i \quad (7)$$

where H_i equals the number of (unconditional) annual hours worked by women, w^f_i is the logarithm of a woman's hourly wage rate, w^m_i is the logarithm of her partner's hourly wage rate, Y_i is non-labour income of the family, $KIDS_i$ is the number of children under 6 years of age, and C_i is a binary indicator that equals 1 when couples are cohabiting, 0 when they are married. Along with controls for a couple's region of residence, the vector Z_i includes indicators of educational levels as well as a quadratic term in age, both defined for women and their male partner.[12] The interaction terms defined in the second line of equation (7) allow the labour supply of cohabiting women and married women to respond differently to male wages, to their own wages, to non-labour income and to the number of pre-school age children.

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[11] As Appendix Table 3 shows, cohabiting men and women are more similar to married men and women in terms of educational levels, working time and annual wages in Quebec than they are in the rest of Canada.

[12] Descriptive statistics for married couples and cohabiting couples are presented in Appendix Table 2.

We estimate equation (7) separately for 1996 and 2006. For each year, two different models are estimated, depending on the values used to impute wage offers for non-participating wives. Hourly wages of non-participating women are imputed using the 30^{th} or 40^{th} percentile of the group-specific wage distributions observed for participating women, i.e. the wage distributions observed in each of the 396 groups defined in Section III.

The results are shown in Table 2. The cross-wage parameter for married women (β_2) varies between -164 and -193 and thus, indicates that married women's cross-wage elasticity of labour supply hovered between -0.14 and -0.15 during the period 1996-2006. In contrast, the parameter θ_2 varies between 176 and 182, thereby suggesting that cohabiting women's response to male wages ($\beta_2 + \theta_2$) is close to zero. In fact, cohabiting women's cross-wage elasticity of labour supply varies between -0.01 and 0.01 during the period 1996-2006. Hence, OLS regressions run on micro data suggest that cohabiting women respond less — perhaps not at all — to variation in male wages than married women.

VI.2 Female labour supply estimated on grouped data

To assess the robustness of this finding, we estimate an extended version of equation (3):

$$\Delta H_{akr} = \alpha_0 + \alpha_1 \Delta w^f_{akr} + \alpha_2 \Delta w^m_{akr} + \alpha_3 \Delta Y_{akr} + \alpha_4 \Delta KIDS_{akr} + \Delta\mu_{ak} + \Delta\eta_r + \Delta\varepsilon_{akr}$$

$$+ \quad \lambda_0 C + \lambda_1 C\, \Delta w^f_{akr} + \lambda_2 C\, \Delta w^m_{akr} + \lambda_3 C\, \Delta Y_{akr} + \lambda_4 C\, \Delta KIDS_{akr} \qquad (8)$$

where ΔH_{akr} denotes changes in women's (unconditional) average annual hours in a given group over the period 1996-2006, $\Delta KIDS_{akr}$ denotes changes in the number of pre-school

age children in that group, and C is a binary indicator that identifies cohabiting couples. All other variables have been defined in Section III.

Two key differences between equation (3) and equation (8) must be noted. First, like equation (7), equation (8) contain interaction terms that allow the labour supply of cohabiting women and married women to respond differently to male wages, to their own wages, to non-labour income and to the number of pre-school age children. Second, because it distinguishes married couples from cohabiting couples, equation (8) should be estimated, a priori, on 792 groups (i.e. 396 cells each for married couples and cohabiting couples) rather than the 396 groups defined in Section III.[13]

Regression results from equation (8) are shown in the first two columns of Table 3. The parameter α_2 varies between -254 and -273 and thus, yields a cross-wage elasticity that ranges from -0.21 to -0.23 for married women. As was the case with micro data, the interaction term between (changes in) male wages and the cohabitation indicator (λ_2) is positive, statistically significant at conventional levels and suggests a lower cross-wage elasticity (in absolute value) that ranges from -0.04 to -0.05 for cohabiting women.

In the third to sixth column of Table 3, we relax the assumption that $\Delta\mu_{ak}$, $\Delta\eta_r$ and $\Delta\varepsilon_{akr}$ are the same for married couples and cohabiting couples and estimate equation (3) separately for each type of couples. Compared to the results obtained from equation (8), this strategy yields a lower cross-wage parameter (in absolute value) for married women and implies for them a cross-wage elasticity ranging from -0.14 to -0.15. The cross-wage parameter for cohabiting women is about twice as small as for married women and is

[13] Because we restrict samples sizes within each group to be at least equal to 5 both in 1996 and 2006, equation (8) is actually estimated on 765 groups.

measured imprecisely. Once again, it implies a lower cross-wage elasticity (ranging from -0.07 to -0.10) for cohabiting women than for their married counterparts.

The results from the first six columns of Table 3 assume that movements in men's wages are unrelated to changes in women's labour supply. However, a negative correlation between ΔH_{akr} and Δw^{m}_{akr} might reflect both an increase in women's labour supply in response to declines in men's wages as well as the depressing impact on men's wages of a rightward shift in female labour supply. In other terms, movements in men's wages might be endogenous to changes in women's labour supply.[14] Likewise, increases in women's labour supply at the group level may tend to depress women's wages, thereby potentially biasing estimates of own-wage elasticities.

To account for potential endogeneity at the group level, we use male and female wages in 1996 as instruments for Δw^{m}_{akr} and Δw^{f}_{akr}. Because wages observed in 1996 cannot be affected by subsequent movements in wives' labour supply, the use of these instruments rules out reverse causality. Our identifying assumption is that, within cells jointly defined by partners' age, occupation and region, increases in wives' labour supply at the group level are uncorrelated with men's and women's initial wages. Our instrumental variable (IV) estimation is conducted separately for married couples and cohabiting couples.

[14] Unless substitution between male and female employees can be ruled out, increases in women's labour supply might tend to depress men's wages. This is what Acemoglu, Autor and Lyle (2004) find during the mid-1940s-1950s, using (plausibly exogenous) variation in female labour supply associated with cross-state variation in men's mobilization rates during World War II.

The results are presented in the seventh to tenth column of Table 3.[15] Compared to column 2, IV estimates at the group level yield for married women a cross-wage parameter that is about 30% larger (in absolute value): it varies between -351 and -376. This implies a cross-wage elasticity of roughly -0.30. In contrast, IV estimates for cohabiting women are small and not statistically significant at conventional levels. For these women, estimates of cross-wage elasticity are close to 0.

Estimates of female cross-wage elasticities from both the micro and group data vary little with the values used to impute wages of non-participating women. In contrast, estimates of women's response to their own wages tend to be much larger when the imputed wages are based on values at the 30th percentile than at the 40th percentile. Regardless of the values used for wage imputation, regressions run on micro data yield own wage elasticities that are smaller for cohabiting women than for married women. When using grouped data, however, the difference between married and cohabiting women varies across model specifications.

VI.3 Male labour supply

Using for men the same estimation methods employed for women, we also examine whether married and cohabitating men have different own wage elasticities of labour supply (γ^m). As equation (6) shows, this will enable us to assess the impact of changes in male wages on family earnings. The results in Table 4, based on micro data, show that the own-wage parameter for married men varies from -66 to -123 depending on

[15] Results of first-stage regressions are shown in Appendix Table 4. Whatever percentiles are used for imputing wages of female non-participants, initial wages of men and initial wages of women are, as

the year and model specification considered. The corresponding own-wage elasticity for married men ranges from -0.03 to -0.06. There is virtually no difference between married men's and cohabiting men's own-wage elasticity. As Table 5 shows, this conclusion also holds true in grouped data (OLS estimates). However, when we use IV estimates at the group level, cohabiting men display a smaller own-wage elasticity than married men.

VI.4 Impact of male wage changes on family earnings

The first panel of Table 6 summarizes the cross-wage elasticities of female labour supply reported in Tables 2 and 3. The second panel reports the own wage elasticities of male labour supply shown in Tables 4 and 5. The third panel uses equation (6) to derive the corresponding estimates of elasticity of family earnings with respect to male wages.

The results show that even though cohabiting women respond less to male wages than married women, the elasticity of family earnings with respect to male wages is very similar for cohabiting couples and their married counterparts. Depending on the models used and the percentiles selected for the imputation of the wage offers of female non-participants, a 1% change in male wages is associated with a change in family earnings that ranges from 0.57% to 0.68% for married couples. For cohabiting couples, the corresponding numbers range from 0.61% to 0.67%.

VI.5 Comparison between Quebec and the rest of Canada

To test whether cohabiting women in Quebec are more similar to married women in their labour supply in response to partner' wage changes and whether they have a

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expected, strongly (negatively) correlated with Δw^{m}_{jr} and Δw^{f}_{jr}, respectively, (with F-tests amounting to 23

stronger response than that of cohabiting women residing elsewhere in Canada, we first modify equation (7) for micro data to add two-way interactions between Quebec and the main independent variables, as well as three-way interactions among Quebec, cohabitation, and the main independent variables. The results are presented in Table 7.

The three-way interaction among Quebec, cohabitation and partners' wage is positive and statistically significant in 1996, but not significant in 2006 (Table 7), thereby suggesting that (a) in 1996 cohabiting women in Quebec were less responsive than their counterparts in the rest of Canada to partners' wage changes, (b) but this regional difference disappeared in 2006. Even the statistically significant difference in the three-way interaction, however, only leads to a minor difference in the estimated cross-wage elasticities between cohabiting women in Quebec and in the rest of Canada: both are close to zero. The difference in cross-wage elasticity between married and cohabiting women is slightly larger in Quebec than that in the rest of Canada. By 2006, the estimated cross-wage elasticities for married women are essentially the same in Quebec and the rest of the Canada. The difference in the estimated cross-wage elasticity for cohabitating women is also very small between Quebec and the rest of Canada.

We also modify equation (8) to examine possible differences between Quebec and the rest of the Canada using grouped data. Similar to the micro data results, the grouped data results (available upon request) show that the difference between cohabitating women in Quebec and the rest of Canada in response to partners' wage changes is not statistically significant. These results suggest that in spite of the large difference in the prevalence and social contexts in cohabitation, cohabitating women in Quebec and the

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or more).

rest of Canada are similarly different from married women in response to partners' wage changes. Interestingly, previous studies also find that the differences between marriage and cohabitation in some other aspects are similar across societies where cohabitation is in different progressive stages. For instance, even though cohabitation is much more prevalent and socially acceptable in the Netherlands than in the United States, in both countries a specialized division of labour tends to strengthen the stability of marriage while cohabitators are more likely to remain together under the condition of equality (Brines and Joyner, 1999; Kalmijn, et al., 2007). Similarly, Heimdal and Houseknecht (2003) found that cohabitation couples are more likely to manage their income separately than married couples and this relationship is the same in the United States and Sweden even though cohabitation is much more institutionalized in the latter.

VI.6 Checks for robustness

To assess the robustness of our results, we used the following alternative model specifications. First, we exclude male and female partners in the top decile of the wage distribution, and use occupation for grouping and annual hours as the dependent variable. Second, we re-estimate our models on grouped data pooling two sets of five-year intervals (i.e., 1996-2001, 2001-2006) instead of using a single set of 10-year interval. Although the size of the coefficients varies across various model specifications, the main conclusion derived from the third panel of Table 6 remains: the difference is small in elasticity of family earnings to male wages between married couples and cohabiting couples (tables are available upon request). Furthermore, when we use as a dependent variable the percentage of women working full-year full-time rather than annual hours,

we still find that married women have a higher cross-wage elasticity (in absolute value) than cohabitating women.

VII. Conclusion

Given the rapid rise in the prevalence in cohabitation, investigating whether married couples and cohabiting couples adjust differently to shocks is a prerequisite for a thorough understanding of how families now respond to changing economic parameters. The magnitude of women's labour supply response to changes in their husband's wages is a critical piece of information required to understand the degree to which changes in inequality in male earnings translate into changes in family income inequality. Using micro data and grouped data that cover the period 1996-2006, we assess the extent to which cohabiting women adjust their labour supply to a lesser extent, if any, than married women in response to changes in male wages.

Both micro data regressions and grouping estimators indicate that cohabiting women respond less to variation in male wages than married women. However, the magnitude of the difference is not sizeable. Since married men's and cohabiting men's own-wage elasticities do not differ much, the end result is that the impact of changes in male wages on family earnings is very similar for married couples and cohabiting couples.

Quebec is probably a decade ahead of the rest of Canada in the progression of cohabitation in terms of prevalence and family functions (Le Bourdais, et al., 2007). However, we find that cohabitating women in both Quebec and the rest of Canada are quite similar in that they are less responsive to male wages than married women.

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Table 1
Percentage of couples cohabitating in Canada by region: 1996, 2006

	Canada		Quebec		Rest of the country	
	1996	2006	1996	2006	1996	2006
			Percent			
Overall	17.2	26.8	29.8	49.2	11.6	17.4
By male partner's age						
25-34	27.3	41.9	49.7	73.6	18.3	29.2
35-44	15.7	26.4	28.2	52.2	10.2	15.9
45-54	10.0	17.8	16.0	32.5	7.0	11.1
By male partner's education level						
less than high school	20.1	33.5	29.6	51.7	15.8	24.7
high school graduate	18.5	26.3	29.4	46.7	12.1	19.6
some post-secondary	15.9	27.5	30.2	50.2	10.8	16.6
university degree	14.7	22.1	29.9	47.2	8.0	12.1
By female partner's education level						
less than high school	18.2	33.1	26.4	47.2	14.4	26.0
high school graduate	16.7	24.0	26.3	43.2	11.3	17.7
some post-secondary	17.0	28.0	32.2	50.6	11.4	17.0
university degree	17.5	25.3	37.8	53.0	9.6	14.4

Source: Canadian Census of population, 1996 and 2006.

Table 2
Female labour supply parameters based on micro data

		1996		2006	
		Coefficients	Standard errors	Coefficients	Standard errors
30th percentile					
log (Male wage)		-176.2	3.2	-193.2	3.5
log (Female wage)		169.3	3.3	183.3	3.6
couple's investment income/$10,000		-5.7	2.1	-14.2	2.4
number of children under 6		-259.5	2.4	-306.4	2.8
Interactions with cohabitation indicator					
log (Male wage)		179.6	6.9	176.0	6.3
log (Female wage)		-58.9	7.4	-78.0	6.5
couple's investment income/$10,000		0.4	6.5	9.2	3.4
number of children under 6		-45.8	5.5	-14.6	5.3
Elasticities					
Male wage	married women	-0.148	0.003	-0.139	0.003
	cohabiting women	0.002	0.005	-0.012	0.004
Female wage	married women	0.142	0.003	0.132	0.003
	cohabiting women	0.082	0.005	0.071	0.004
40th percentile					
log (Male wage)		-163.9	3.2	-182.3	3.5
log (Female wage)		35.8	3.1	74.0	3.4
couple's investment income/$10,000		-4.7	1.9	-13.2	2.2
number of children under 6		-259.5	2.4	-312.1	2.8
Interactions with cohabitation indicator					
log (Male wage)		182.2	6.9	179.6	6.3
log (Female wage)		-47.4	7.2	-76.4	6.3
couple's investment income/$10,000		0.2	6.4	8.9	3.1
number of children under 6		-45.9	5.5	-13.5	5.3
Elasticities					
Male wage	married women	-0.138	0.003	-0.131	0.003
	cohabiting women	0.014	0.005	-0.002	0.004
Female wage	married women	0.030	0.003	0.053	0.002
	cohabiting women	-0.009	0.005	-0.002	0.004

Source: Canadian Census of population, 1996 and 2006.
Note: The dependent variable is the annual hours worked by women. Other controls include a quadratic term in age for women and their male partner, the education levels of women and their male partner, region indicators and a cohabitation indicator. Robust standard errors are presented.

Table 3
Female labour supply parameters from grouped data (first-differences)

		Ordinary least squares estimates						Instrumental variables estimates			
		Pooled		Married women		Cohabiting women		Married women		Cohabiting women	
		B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error
30th percentile											
Log (Male wage)		-273.1	57.2	-181.9	63.1	-118.8	82.1	-363.2	173.1	-14.4	118.4
Log (Female wage)		185.2	55.0	101.0	58.5	192.2	85.7	203.8	116.5	201.0	132.2
Couple's investment income/10,000		-0.1	22.1	-8.5	21.6	2.5	43.6	-6.1	23.2	3.9	42.6
number of children under 6		-209.8	66.8	-239.9	74.6	-407.2	106.7	-235.4	72.3	-399.6	108.3
Interactions with cohabitation indicator											
Log (Male wage)		204.9	82.6								
Log (Female wage)		-28.3	94.9								
couple's investment income/10,000		-30.9	51.2								
number of children under 6		-4.0	121.1								
Elasticities											
Male wage	married women	-0.229		-0.153		-		-0.305		-	
	cohabiting women	-0.051		-		-0.100		-		-0.012	
Female wage	married women	0.155		0.085		-		0.171		-	
	cohabiting women	0.116		-		0.161		-		0.169	
40th percentile											
Log (Male wage)		-254.1	57.9	-169.0	63.5	-87.6	83.0	-341.5	178.8	8.8	120.1
Log (Female wage)		89.6	57.1	31.2	60.9	102.2	88.6	114.6	116.2	93.9	132.8
couple's investment income/10,000		1.8	21.3	-7.4	20.8	6.2	43.5	-4.9	23.0	8.2	42.8
number of children under 6		-202.0	67.3	-238.8	75.1	-421.5	107.6	-234.0	73.2	-416.3	108.0
Interactions with cohabitation indicator											
Log (Male wage)		205.9	84.8								
Log (Female wage)		-9.1	100.6								
couple's investment income/10,000		-33.3	50.9								
number of children under 6		-10.0	122.8								
Elasticities											
Male wage	married women	-0.213		-0.142		-		-0.287		-	
	cohabiting women	-0.036		-		-0.074		-		0.007	
Female wage	married women	0.075		0.026		-		0.096		-	
	cohabiting women	0.060		-		0.086		-		0.079	
	number of groups*	765		395		370		395		370	

Source: Canadian Census of population, 1996 and 2006.
Note: * groups with 5 obervations or less were excluded from the analysis

Table 4
Male labour supply parameters based on micro data

		1996		2006	
		Coefficients	Standard errors	Coefficients	Standard errors
30th percentile					
log (Male wage)		-123.1	2.7	-66.3	2.8
log (Female wage)		-8.5	2.1	-17.5	2.2
couple's investment income/$10,000		7.7	2.1	7.8	1.6
number of children under 6		26.6	1.6	21.3	1.8
Interactions with cohabitation indicator					
log (Male wage)		11.7	6.7	-0.7	5.4
log (Female wage)		16.4	5.5	8.9	4.5
couple's investment income/$10,000		18.0	6.1	0.0	4.4
number of children under 6		-8.4	4.1	-4.2	3.5
Elasticities					
Male wage	married men	-0.059	0.001	-0.031	0.001
	cohabiting men	-0.057	0.003	-0.033	0.002
Female wage	married men	-0.004	0.001	-0.008	0.001
	cohabiting men	0.004	0.003	-0.004	0.002
40th percentile					
log (Male wage)		-123.3	2.7	-66.5	2.8
log (Female wage)		-7.1	2.1	-15.2	2.2
couple's investment income/$10,000		7.6	2.1	7.8	1.6
number of children under 6		26.7	1.6	21.8	1.8
Interactions with cohabitation indicator					
log (Male wage)		12.8	6.7	0.2	5.4
log (Female wage)		10.5	5.7	4.3	4.6
couple's investment income/$10,000		18.2	6.1	0.0	4.4
number of children under 6		-8.9	4.1	-4.6	3.5
Elasticities					
Male wage	married men	-0.059	0.001	-0.031	0.001
	cohabiting men	-0.057	0.003	-0.033	0.002
Female wage	married men	-0.003	0.001	-0.007	0.001
	cohabiting men	0.002	0.003	-0.005	0.002

Source: Canadian Census of Population, 1996 and 2006.
Note: The dependent variable is the annual hours worked by employed men. Other controls include a quadratic term in age for men and their female partner, the education levels of men and their female partner, region indicators and a cohabitation indicator. Robust standard errors are presented.

Table 5

Male labour supply parameters from grouped data (first-differences)

		Ordinary least squares estimates						Instrumental variables estimate			
		Pooled		Married men		Cohabiting men		Married men		Cohabiting men	
		B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error
30th percentile											
Log (Male wage)		-116.3	46.1	-131.6	53.0	-91.9	60.2	-172.1	147.8	-78.1	100.7
Log (Female wage)		55.5	37.1	64.4	40.9	148.2	70.3	45.1	76.5	18.0	88.9
Couple's investment income/10,000		33.3	12.8	36.7	13.3	-16.7	21.6	38.2	13.6	-11.4	23.2
number of children under 6		-17.0	41.7	-6.7	42.3	49.6	83.6	-4.9	43.7	32.8	85.1
Interactions with cohabitation indicator											
Log (Male wage)		-5.9	61.6								
Log (Female wage)		86.3	64.8								
Couple's investment income/10,000		-47.3	28.6								
number of children under 6		30.9	79.8								
Elasticities											
Male wage	married men	-0.055		-0.063		-		-0.082		-	
	cohabiting men	-0.063		-		-0.044		-		-0.037	
Female wage	married men	0.026		0.031		-		0.022		-	
	cohabiting men	0.073		-		0.071		-		0.009	
40th percentile											
Log (Male wage)		-117.7	46.6	-133.4	53.4	-94.8	60.0	-172.0	149.1	-78.0	100.4
Log (Female wage)		56.0	39.3	63.6	42.8	159.7	73.9	48.0	80.1	17.5	90.9
Couple's investment income/10,000		33.2	13.0	36.6	13.5	-17.6	21.4	38.0	13.6	-11.5	23.2
number of children under 6		-16.4	41.7	-6.5	42.2	44.7	82.9	-4.8	43.7	32.1	84.4
Interactions with cohabitation indicator											
Log (Male wage)		-8.8	62.7								
Log (Female wage)		96.0	68.9								
Couple's investment income/10,000		-48.1	28.4								
number of children under 6		25.7	79.0								
Elasticities											
Male wage	married men	-0.056		-0.064		-		-0.082		-	
	cohabiting men	-0.065		-		-0.045		-		-0.037	
Female wage	married men	0.027		0.030		-		0.023		-	
	cohabiting men	0.078		-		0.076		-		0.008	

Source: Canadian Census of population, 1996 and 2006.

Table 6
Elasticities derived from micro data and grouped data

I. Cross-wage elasticities of female labour supply

	OLS on micro data		First-differences on grouped data		
	1996	2006	pooled sample	separate samples	IV estimates
30th percentile					
Married	-0.148	-0.139	-0.229	-0.153	-0.305
Cohabitating	0.002	-0.012	-0.051	-0.100	-0.012
40th percentile					
Married	-0.138	-0.131	-0.213	-0.142	-0.287
Cohabitating	0.014	-0.002	-0.036	-0.074	0.007

II. Own-wage elasticities of male labour supply (employed men)

	OLS on micro data		First-differences on grouped data		
	1996	2006	pooled sample	separate samples	IV estimates
30th percentile					
Married	-0.059	-0.031	-0.055	-0.063	-0.082
Cohabitating	-0.057	-0.033	-0.063	-0.047	-0.040
40th percentile					
Married	-0.059	-0.031	-0.056	-0.064	-0.082
Cohabitating	-0.057	-0.033	-0.065	-0.049	-0.040

III. Elasticity of family earnings to male wages

	OLS on micro data		First-differences on grouped data		
	1996	2006	pooled sample	separate samples	IV estimates
30th percentile					
Married	0.612	0.605	0.590	0.606	0.549
Cohabitating	0.604	0.604	0.581	0.578	0.610
40th percentile					
Married	0.616	0.608	0.595	0.611	0.554
Cohabitating	0.608	0.608	0.585	0.585	0.616

Source: Canadian Census of Population, 1996 and 2006.

Table 7

Female labour supply parameters based on micro data - Quebec-the rest of Canada difference

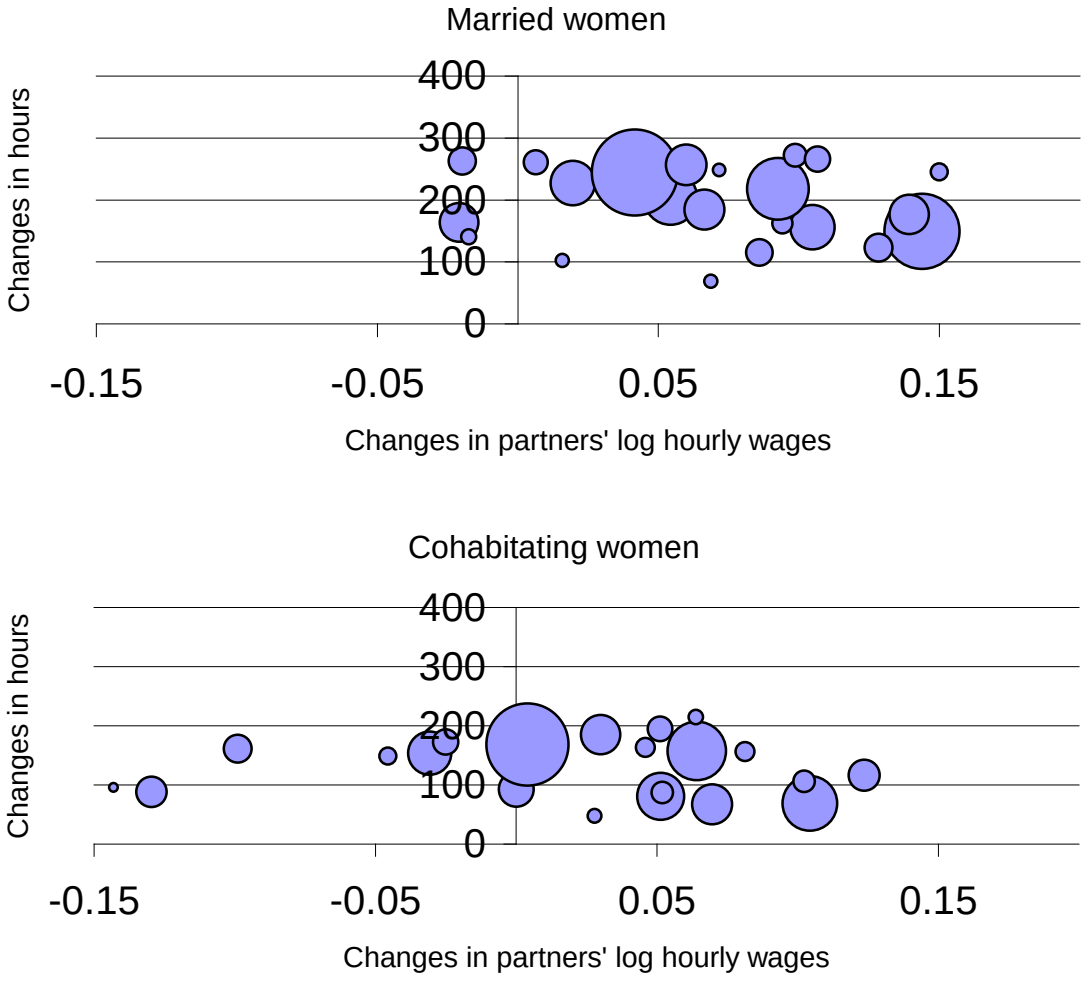
		1996		2006	
		Coefficients	Standard errors	Coefficients	Standard errors
30th percentile*					
log (Male wage)		-172.9	3.6	-194.1	3.8
log (Female wage)		149.2	3.6	165.9	3.8
couple's investment income/$10,000		-5.7	2.2	-16.0	3.2
number of children under 6		-278.3	2.7	-322.6	3.1
Interactions with cohabitation indicator					
log (Male wage)		152.4	8.9	163.2	7.8
log (Female wage)		-55.6	9.6	-86.3	8.3
couple's investment income/$10,000		4.6	7.9	14.0	3.3
number of children under 6		-108.4	9.2	-83.3	8.5
Interactions with Quebec indicator					
log (Male wage)		-9.7	6.6	8.8	7.5
log (Female wage)		49.8	7.0	51.7	8.0
couple's investment income/$10,000		0.9	4.5	11.3	4.0
number of children under 6		81.3	5.0	102.7	7.0
Interactions with cohabitation and Quebec					
log (Male wage)		54.2	11.1	17.7	10.6
log (Female wage)		-38.2	12.1	-18.9	11.4
couple's investment income/$10,000		-10.5	13.9	-24.1	6.8
number of children under 6		36.1	11.7	31.3	11.9
Elasticities					
Male wage	married women, Quebec	-0.169	0.005	-0.136	0.005
	cohabiting women,Quebec	**0.018**	**0.006**	**-0.003**	**0.005**
	married women, rest of the country	-0.141	0.003	-0.139	0.003
	cohabiting women, rest of the country	**-0.015**	**0.006**	**-0.020**	**0.005**
Female wag	married women, Quebec	0.184	0.006	0.159	0.005
	cohabiting women,Quebec	**0.080**	**0.007**	**0.077**	**0.005**
	married women, rest of the country	0.121	0.003	0.119	0.003
	cohabiting women, rest of the country	**0.067**	**0.007**	**0.053**	**0.005**

Source: Canadian Census of Population, 1996 and 2006.

Note: The dependent variable is the annual hours worked by women. Other controls include a quadratic term in age for women and their male partner, the education levels of women and their male partner, region indicators and a cohabitation indicator. Robust

* results using 40th percentile to impute wages of non-participating females are similar. The table is available upon request.

Figure 1.
Changes in partners' log hourly wages and women's annual hours across occupation groups



Appendix Table 1.
The 22 occupation groups

1 Legislators , senior government managers and Officials
2 Other management occupations
3 Professional occupations in business and finance
4 Other business, financial, and administrative occupations
5 Professional occupations in natural and applied sciences
6 Technical occupations related to natural and applied sciences
7 Professional occupations in health
8 Other health occupations
9 Judges, lawyers, psychologists, social workers, ministers of religion, and policy and program officers
10 Other occupations in social science, education, government service and religion
11 Professional occupations in art and culture
12 Technical occupations in art, culture, recreation and sport
13 Sales and service supervisors, wholesale, technical, insurance, real estate sales specialists
14 Other sales and service occupation
15 Contractors and supervisors in trades and transportation, and construction trades
16 Other trades, transport and equipment operators and related occupations
17 Mining, oil and gas related occupations
18 Other primary industry-related occupations
19 Manufacturing, supervisors
20 Manufacturing, machine operators
21 Manufacturing, assemblers
22 Labourers in processing, manufacturing and utilities

Appendix Table 2.

Characteristics of married and cohabitating partners, 1996, 2006

	1996		2006	
	Married	**Cohabiting**	**Married**	**Cohabiting**
Male partners				
Average age	40.5	36.7	42.2	38.2
% with university degrees	18.5	15.3	21.3	16.5
Working full year full time	83.3	73.9	86.9	80.1
Average hourly wage	25.0	22.0	27.5	22.6
Average annual hours	2098	1944	2159	2032
Average annual earnings	44716	35802	63461	48475
Female partners				
Average age	38.6	34.7	40.5	36.4
% with university degrees	15.7	16.1	23.7	21.8
Participation rate	79.6	85.9	85.9	89.2
Working full year full time	42.8	50.6	52.7	58.2
Average hourly wage (working)	20.2	18.4	21.6	18.6
Average hourly wage (p30)	17.7	16.6	19.4	17.1
Average hourly wage (p40)	18.4	17.1	20.0	17.6
Average annual hours (lfs*)	1191	1348	1391	1480
Average annual earning (all)	19337	20178	31077	28613
Averge couple's annual earnings (all)	64053	55980	94539	77088
Average number of kids under 6	0.42	0.38	0.36	0.34
Sample size	321880	67409	261705	94783

Source: Canadian Census of population, 1996 and 2006.

Note: *imputed for not working female based on the age-region-FT specific average weekly hours from the Labour Force Survey.

Appendix Table 3
Characteristics of married and cohabitating partners by region, 1996, 2006

	1996		2006	
	Married	**Cohabiting**	**Married**	**Cohabiting**
Quebec				
Male partners				
Average age	41.7	36.9	44.1	38.7
% university	17.7	17.8	19.8	18.3
working full year full time	80.9	74.9	85.8	81.2
average hourly wage	24.4	22.1	25.8	22.6
average annual hours	2012	1922	2074	2007
average annual earnings	42004	35847	57374	48086
Female partners				
Average age	39.8	34.8	42.3	36.7
% university	12.7	18.2	20.3	23.7
p-rate	74.0	85.6	84.1	89.3
working full year full time	40.0	49.2	54.6	58.4
average hourly wage (working)	19.4	18.8	20.0	18.8
average annual hours (lfs*)	1083	1307	1365	1454
average annual earning (all)	17068	19951	28655	28420
Average couple's annual earnings (all)	59072	55798	86030	76506
Average number of kids under 6	0.36	0.48	0.26	0.40
Sample size	84818	35008	53849	50555
Rest of the country				
Male partners				
Average age	40.0	36.6	41.7	37.7
% university	18.9	12.5	21.7	14.2
working full year full time	84.2	72.7	87.2	78.9
average hourly wage	25.2	21.8	27.9	22.6
average annual hours	2128	1969	2182	2061
average annual earnings	45682	35750	65049	48941
Female partners				
Average age	38.1	34.7	40.0	36.0
% university	16.8	13.6	24.6	19.6
p-rate	81.6	86.2	86.4	89.1
working full year full time	43.8	52.3	52.2	58.0
average hourly wage (working)	20.5	18.1	22.0	18.4
average annual hours (lfs*)	1230	1397	1398	1510
average annual earning (all)	20146	20439	31709	28844
Average couple's annual earnings (all)	65828	56189	96759	77785
Average number of kids under 6	0.44	0.27	0.38	0.26
Sample size	237062	32401	207856	44228

Source: Canadian Census of population, 1996 and 2006.

Note: *imputed for not working female based on the age-region-FT specific average weekly hours from LFS.

Appendix table 4

First stage regressions of female unconditional labour supply functions, group data, 1996-2006.

		Married		Cohabitating	
		30th percentile*	40th percentile	30th percentile*	40th percentile
Dependent variable = ΔWm jr	Wm jr $_{t-1}$	-0.36	-0.35	-0.64	-0.64
		0.05	0.05	0.05	0.05
	Wf jr $_{t-1}$	0.12	0.10	-0.06	-0.07
		0.06	0.07	0.06	0.06
F test: instruments are zero		23.6	22.5	91.0	90.7
{ p-value }		0.00	0.00	0.00	0.00
Dependent variable = ΔWf jr	Wm jr $_{t-1}$	0.08	0.10	0.09	0.09
		0.05	0.05	0.05	0.05
	Wf jr $_{t-1}$	-0.64	-0.67	-0.90	-0.92
		0.06	0.06	0.05	0.06
F test: instruments are zero		62.6	57.5	141.3	132.5
{ p-value }		0.00	0.00	0.00	0.00

Source: Canadian Census of population, 1996 and 2006.

Note: * percentile used for imputing wages of non-participating females