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Why Are Women Working So Much More in Canada? An International Perspective

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IMF Working Paper

Western Hemisphere Department

Why Are Women Working So Much More in Canada? An International Perspective

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Abstract

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This paper analyzes the role of the tax and benefit system in spurring the impressive increase in Canadian female labor participation in the last decade. Using annual panel data for 10 large industrial countries over the period 1980–2001, I find that reforms in the Canadian tax and benefit system in the mid-1990s account for at least one-third of the observed increase in female participation in the period 1995–2001. The analysis indicates that policy initiatives similar to the “family-friendly” policies introduced in Canada could boost female participation in other countries and help policymakers meet the challenges of population aging.

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I. INTRODUCTION

The female labor force participation rate has received considerable attention in recent years, not only as a potential source of faster growth, but also as a possible answer to the problem of population aging. Such an aging could potentially put a downward pressure on labor supply, with negative consequences for living standards, welfare, and health systems. Policies to encourage female participation, which in most countries is much lower than male participation, could help mitigate these problems.² Policies that induce particularly younger women to enter the workforce might also have significant long-term gains by raising life-time participation, through a hysteresis effect.

A large literature has developed on the impact of policies to help combine work and family life. Most of these studies are country-specific, however, and deliver varied results. This paper examines this issue using an international dataset. While the analysis is multi-country, the focus of the paper is Canada, which in the last decade has experienced an impressive increase in its female labor force participation rate following reforms in the tax and benefit system in the mid-1990s (Table 1). Canada therefore provides an interesting case to evaluate the role of policy changes in boosting female labor participation rates.

Table 1. Select OECD Countries: Labor Force Participation, Ages 15–64, by Gender, 1995 and 2004

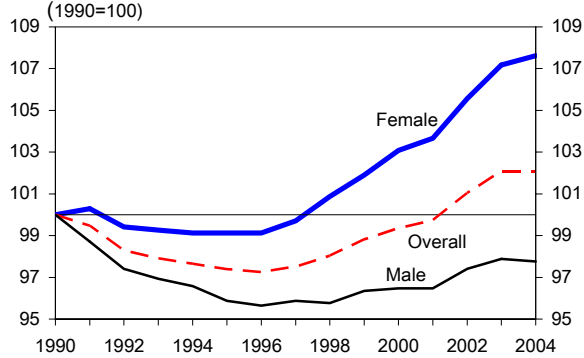
	Total		Female	
	1995	2004	1995	2004
Canada	74.6	78.2	67.7	73.5
Nordics	77.2	78.0	73.1	75.1
EU15	67.6	70.5	57.0	62.6
G10	72.8	74.1	63.4	66.6
OECD	69.5	70.0	58.0	59.9
United States	76.9	75.4	69.7	69.2

Source: OECD, Labor Force Statistics Database, 2005.

After a long period of stability, the Canadian labor participation rate has risen rapidly over the last decade, driven mainly by an increase in female participation (Figure 1). The aggregate participation rate has surpassed that in the United States and converged to the high levels of the Nordic countries. While the male participation rate has fallen modestly since the early 1990s, female participation has risen significantly. At 73 percent, it is now only just short of the rate in the Nordic countries (Figure 2). This remarkable performance has helped spur Canada's remarkable growth performance since 1995 despite only average growth in labor productivity.

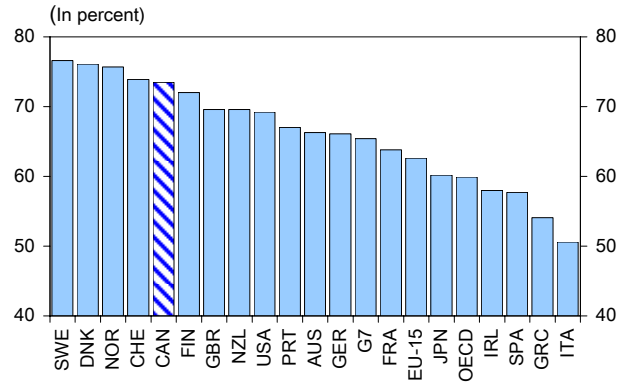
² Various surveys suggest that female participation is below the desired level in many countries (Jaumotte, 2003). For example, the surveys of the International Social Science Program (ISSP) show that the desires to participate in market work are very similar among Americans and Germans, even though their actual market work differs significantly.

Figure 1. Canada: Labor Force Participation Rate by Gender, Ages 15-64, 1990-2004
(1990=100)



Source: OECD, Labor Force Statistics Database, various years.

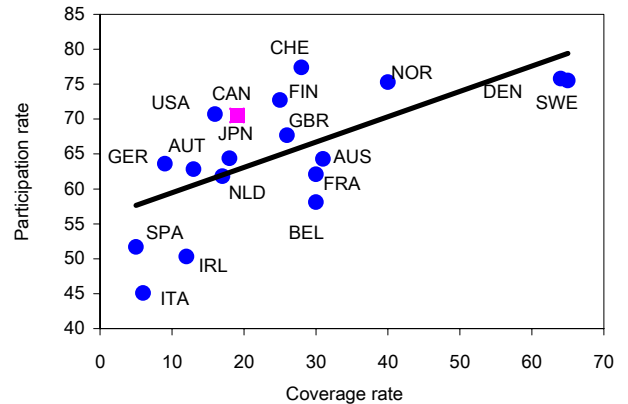
Figure 2. Select OECD Countries: Female Labor Force Participation Rate, Ages 15-64, 2004
(In percent)



Source: OECD, Labor Force Statistics Database, 2005.

This paper analyzes the factors behind the increase in the Canadian female participation rate, in particular the role of the tax and benefit system. Theory suggests that economic incentives play a key role in explaining labor force attachment, particularly for secondary earners. In particular, higher tax wedges raise the opportunity cost of working and discourage work-effort, while benefits, such as affordable and available childcare, encourage women to enter the labor force by lowering the opportunity cost of work (Figure 3). For example, according to the 2001 European Labor Force Survey, more than 40 percent of female part-timers in Austria, Germany, Switzerland, and the United Kingdom worked part-time rather than full-time because they had to look after their children or elderly adults/parents (OECD, 2004a).

Figure 3. Select OECD Countries: Formal Childcare Coverage, Ages 0-2, and Female Participation Rate, 2001 (or latest available date) 1/



Sources: OECD, Labor Force Statistics Database, various years; Immervoll and Barber (2005).

1/ Children's age coverage differs by country.

Following Jaumotte (2003), it is assumed that the marginal female worker is married with children. In particular, we assume that women are usually the secondary earners in the family, in the sense that they usually earn a lower income and their decision to enter the labor market depends on a comparison of the additional household after-tax income with the costs associated with work, such as the opportunity cost of lost leisure time and child care. In this framework, both tax wedges and childcare subsidies are pivotal in determining participation.

The novelty of this study is that we examine the effects of both tax and benefit wedges to gauge the effect of policies aimed at helping women combine work and family life. Also considered are the role of other determinants, such as preferences for education and child-bearing; labor market conditions measured in terms of unemployment rate, current wage rate, and male-female wage gap; and institutional labor market characteristics, such as wage compression, employment protection, and union density. Cultural factors and social norms are also modeled using the proportion of parliamentary seats possessed by women or country-specific time trends partly intended to capture demographics.³ The econometric analysis uses a panel of 10 large industrial countries over the period 1980–2001 to explain the importance of changes in the tax and benefit system in raising Canadian female participation, after controlling for the aforementioned determinants.⁴

The examination of a broad range of countries using macro-level data has a number of advantages. First, the countries chosen exhibit a wide range of policies and experiences regarding female participation, thereby providing a valuable source of information and a benchmark on the relative effectiveness of the various policies for Canada.⁵ Second, data limitations would deter a Canada-specific analysis because the state of childcare statistics across Canada is “patchy,” as noted in a recent OECD study (2004b).⁶ Third, country-specific studies (briefly discussed in the next section) tend to give variable and badly determined coefficients, implying that a panel analysis might be more informative.

The econometric analysis suggests that economic factors, together with institutional factors and preferences, have shaped female labor force participation decisions in Canada and other industrial countries. Results across alternative specifications indicate that the reforms in the Canadian tax and benefit system since 1995 can explain 30–80 percent of the rise in female participation rates through 2001, indicating that policy initiatives can be pivotal in boosting labor supply, particularly in view of the problem of population aging. Nonpolicy variables are also found to be important:

- The unemployment rate, which is designed to capture labor market pressures, drives a “discouraged worker” effect, implying that when job prospects are poor, women tend to leave the labor market.

³ Dugan and Robidoux (1999) highlight the impact of demographic shifts in explaining the fall in Canadian aggregate participation rate in the 1990s.

⁴ Our analysis is limited for the period 1980–2001 because data limitations hinder the construction of the benefit wedge for the post–2001 period.

⁵ Jaumotte (2003) also observed that the use of macroeconomic data implies that the estimated coefficients incorporate to some extent general equilibrium effects.

⁶ For example, the last national survey on childcare use was conducted in 1988 (Lefebvre and Merrigan, 2005). Some information on recent childcare use is available in Friendly and Beach (2004); they have been collecting data on early childhood education and care across Canadian provinces in recent years.

- Other indicators of prevailing economic conditions, such as the female wage rate, are also found to be significant and of the right sign.
- Union density and employment protection regulation seem to encourage female participation, suggesting that women are more willing to enter a market that exhibits greater job security.
- Lower wage compression also seems to raise participation rate, because it lowers the relative market price of hiring a nanny.
- Preferences for education and having children could also affect participation developments.
- The provision of greater parental leave tends to have a small but negative effect on participation.

The paper is structured as follows. Section II briefly reviews the existing literature. Section III analyzes the main developments in the tax and benefit system in Canada in the last decade, with emphasis on policies targeting female participation. Section IV presents the econometric framework, and the results are analyzed in Section V. Section VI concludes and offers some policy implications.

II. LITERATURE

Existing country-specific studies find diverse results of the impact of childcare costs and taxation on female labor supply using non-Canadian data:

- *Child care.* Using constructed childcare costs variables from either the U.S. household expenditure survey or U.S. average prices, studies such as Blau and Robins (1988), Connelly (1992), and Kimmel (1998) find that childcare prices have a significant and negative effect on married mothers' employment decisions, with elasticities ranging from zero to -1.6 . For single mothers, the literature provides less clear evidence, with elasticities in the range -4.54 to $+1.38$ (Kimmel, 1998).⁷ More recently, Blau and Currie (2004) and Blau (2003), using U.S. data, and Choné, Le Blanc, and Robert-Bobée (2004), using a sample of French mothers with young children, find that the link between childcare prices and labor supply is rather weak.
- *Taxation.* Literature surveys such as Pencavel (1986) and Killingsworth (1983) find a wide range of estimates of income and substitution effects for both genders, while Fuchs, Krueger, and Poterba (1998) find that there is little consensus among economists on the magnitude of labor supply elasticities. More recent research is also inconclusive. While Prescott (2004) and Ueberfeldt (2004) find that taxes are

⁷ As pointed out by Gelbach (2002), several explanations have been proposed for the lack of robustness in the results, including quality heterogeneity (Blau and Hagy, 1998), budget set nonlinearities and misspecification (Averrett, Peters, and Waldman, 1997), and simultaneity due to the use of regional variation in childcare costs (Gelbach, 1999).

important in determining labor supply, Blanchard (2004) claims that Europeans, irrespective of gender, work less than Americans due to differences in preferences rather than tax rates.

Canadian studies, on the other hand, find that lower taxes and higher childcare benefits raise female participation:

- *Child care.* Cleveland, Gunderson, and Hyatt (1996) and Powell (1997) find a substantial negative effect of childcare prices on labor supply using Canadian data. For example, the former authors find that a 10 percent decrease in prices increases maternal employment by almost 4 percent, while Powell's childcare price elasticity is estimated at -0.38 for participation and -0.32 for hours worked. A recent study by Lefebvre and Merrigan (2005), using data for the province of Québec, finds that the low-fee daycare policy implemented in 1996 has had substantial labor supply effects on the mothers of pre-school-aged children.
- *Taxation.* According to the OECD (2005, p. 156), the Canadian tax reforms of 1988, which introduced tax credits whose value was less dependent on the primary earner's income, provided financial incentives for women with high-earning husbands to enter the labor market. As a result, according to Jeon (2004), participation rates for women with high-earning husbands increased by 7.3 percent, while their working hours increased by 200 hours compared to women with low-earning husbands.

The analysis of "family-friendly" policies and taxation on female participation using panel data has been rather limited, again with conflicting results:

- *Childcare.* Jaumotte (2003) using a panel of OECD countries finds that female participation is boosted by public childcare spending and provisions for parental leave; Genre, Salvador, and Lamo (2005), using a sample of 12 European countries, confirms Jaumotte's finding on parental leave. Immervoll and Barber (2005), using OECD's Taxing Wages models for OECD countries, find that childcare costs should be analyzed in conjunction with the broad range of financial incentives that workers face, including institutional setups and welfare state regimes.
- *Taxation.* Smith and others (2003) show that for Britain, Denmark, Ireland, and Germany the tax system and the level and progressivity of tax rates have large effects on the labor participation of married women. Jaumotte (2003) also finds that secondary earner's tax wedge negatively affects female participation, while Tsounta and Bonato (2005), and Genre, Salvador, and Lamo (2005), using two different measures of tax wedges, find that the effect of tax wedges is statistically insignificant.

III. THE CANADIAN TAX AND BENEFIT SYSTEM IN THE 1990S

A. Tax System

The recent increase in the Canadian female participation rate has been associated with falling tax wedges on secondary earners. While the average tax wedge on primary workers (earning the average production worker's wage in manufacturing) has stayed relatively stable since 1996 at around 23 percent, the tax wedge for secondary earners has fallen steadily from 35 to 31 percent (Appendix I).⁸

Policy initiatives at both the federal and provincial levels have been responsible for these changes in tax wedges (Figures 4 and 5). Tax wedges had risen in the early 1990s to address the large budget deficits and accelerating debt at both the federal and provincial levels. However, as the fiscal situation improved in the mid-1990s, the tax burden began to be relaxed. At the federal level, the 3 percent general surtax was initially eliminated for low- and middle-income families in 1998; a year later it was rescinded for other income groups. The 5 percent deficit-reduction surtax for incomes up to C\$85,000 was also eliminated in other income groups, and the middle-income personal income tax rate was lowered from 26 percent to 24 percent in mid-2000. In addition, in 1997, the new Canada Child Tax Benefit was announced, with additional enriched supplements initially for low-income families, which in 2000 also became available for modest- and middle-income families, as well.⁹ Further tax cuts were initiated after 2000 as part of the five-year tax reduction plan introduced that year. Similar cuts in provincial income tax rates were initiated during this period, but the increase in the primary earner's tax wedge observed in recent years could reflect the increase in Ontario's surtax to address health care costs, which more than offset recent tax cuts on the federal level.¹⁰

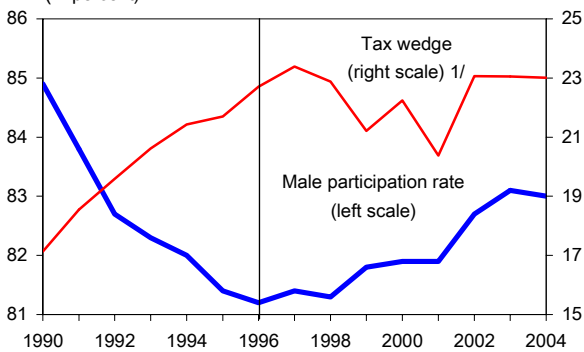
Canada's secondary earner's average tax wedge is now much lower than the one in Germany and Denmark, but is still higher than the United States, Sweden, Switzerland, and Australia (Figures 6 and 7). Many countries are in the process of aligning the two tax wedges, in part reflecting empirical evidence which suggests that income elasticity is larger for female than for male labor market participants.

⁸ These figures are calculated for workers in Ontario, the largest province in Canada, since these data are readily available from the OECD. Taxation of Canadian secondary earners is higher than for single earners with the same income, despite the individual, progressive taxation system due to the *spouse or common-law partner allowance* that is lost if both family members work. The tax wedge for secondary earners does not include social security contributions due to data limitations.

⁹ Childcare tax benefits are included in the tax wedge but not in the benefit wedge to avoid double counting.

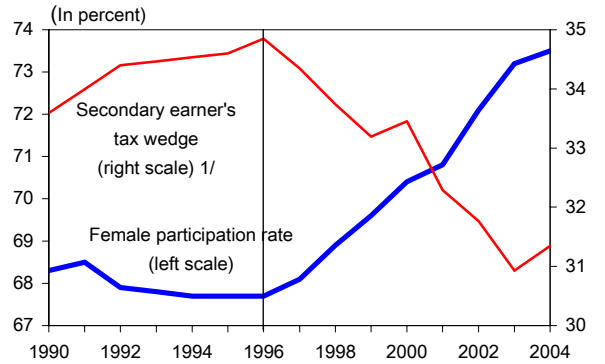
¹⁰ The decline in the secondary earner's tax wedge since 1996 has been steeper since tax breaks and childcare tax allowances were much more generous for lower than for middle and higher-income workers. The secondary earners considered in the analysis, are assumed to have gross earnings equal to two-thirds of the primary worker's earnings.

Figure 4. Canada: Average Tax Wedge for Primary Earners and Male Participation Rate, 1990–2004 1/
(In percent)



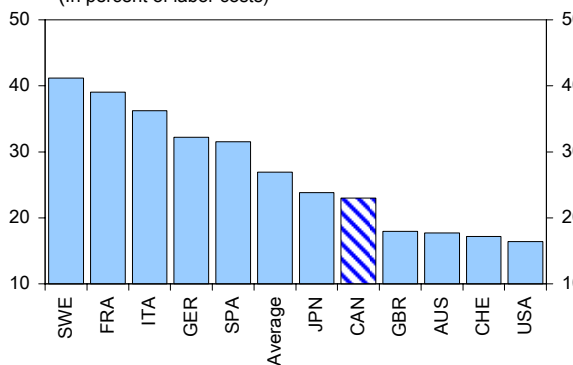
Sources: Jaumotte (2003); OECD; and staff calculations.
1/ Excluding Social Security contributions due to data limitations.

Figure 5. Canada: Tax Wedge for Secondary Earners and Female Participation Rate, 1990-2004
(In percent)



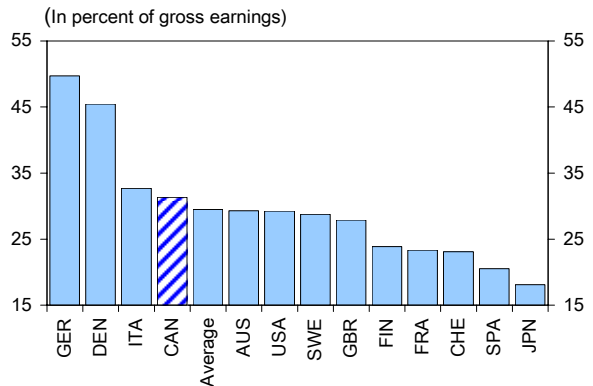
Sources: Jaumotte (2003); OECD; and staff calculations.
1/ Excluding Social Security contributions due to data limitations.
Assuming secondary earner receives 67 percent of average production worker's wage.

Figure 6. Select OECD Countries: Tax Wedge for Primary Earners, 2004 1/
(In percent of labor costs)



Source: OECD, Taxing Wages-Historical Tax Rates.
1/ The tax wedge is defined as the share of total labor costs taken by the state in income tax plus employer and employee social security contributions, minus any cash benefits paid. Primary Breadwinner is the single earner, earning 100% of the average production worker's wage, in a married-couple household; with two children.

Figure 7. Select OECD Countries: Tax Wedge for Secondary Earners, 2004 1/
(In percent of gross earnings)



Source: OECD, Taxing Wages, 1997-2004.
1/ The tax wedge is defined as the share of gross earnings taken by income tax, minus any cash benefits paid and is given by the following formula:

$$\text{Tax wedge} = 1 - \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Gross Income})_B - (\text{Household Gross Income})_A}$$

where A denotes the situation in which the household is a one-earner married couple earning 100 percent of APW's wage, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW's wage respectively.

B. Benefit System

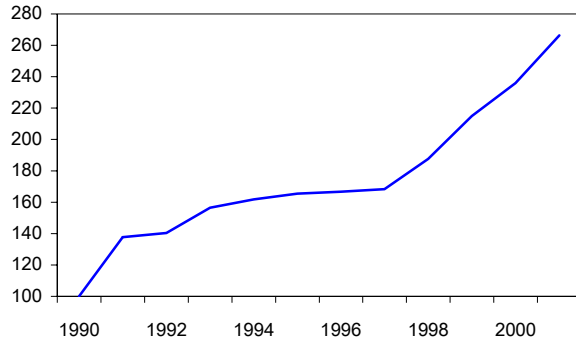
Recent benefit policies have also supported female participation. Following the 1996 ministerial meeting on *Making Lifelong Learning a Reality for All*, federal and provincial/territorial education ministers assigned a high priority to improving access to and quality in early childhood education and care (OECD, 1998; Appendix II). As a result:

- In 1997, the federal/provincial/territorial governments agreed on a National Children's Agenda to support and enhance the health, safety, and development of all young children. The introduction of the National Child Benefit at the federal level increased particularly the incentives for single parents to enter the labor market and freed up provincial funds to be invested in family support projects (Human Resources and Employment Canada, 2005).
- In 2000, the Early Childhood Development (ECD) Agreement was signed to provide federal funds to provinces/territories to improve and expand childcare and other services for children under 6 years old.
- In January 2002, maternity and parental leave benefits, administered under Employment Insurance system, were expanded so that an eligible parent can take up to 50 weeks off work, compared with 35 weeks previously, while enjoying a partial salary replacement paid by the federal government. The hours of work needed to be eligible for this benefit were also reduced from 700 to 600.
- In March 2003, the Multilateral Framework on Early Learning and Childcare was signed, and this required that all federal funds given to provinces/territories under this agreement be used to "improve access to affordable, quality, provincially/territorially-regulated early learning and childcare programs" (Appendix III). The 2004 budget included a federal spending of C\$5 billion in the next five years to help develop further childcare provision to support young children's development and support their parents' participation in employment or training.
- On a provincial level, a comprehensive family support policy has been developed and implemented in Québec since 1996/97 that included, among other features, full-day universal childcare for C\$5 per day (Appendix IV). Ontario has also indicated its intention to follow Québec's example, and the Ontario's 2004 *Best Start Strategy*, includes a universal expansion of childcare to all children above 2½ years old within the next 10–15 years.

This enrichment of childcare can be proxied by a national benefit wedge, which was constructed based on the amount of public spending on childcare, similar to the tax wedge index described above (Appendix V). Our measure quantifies the proportion of labor costs of a potential secondary earner (typically a mother) that is lost if market work is forfeited to

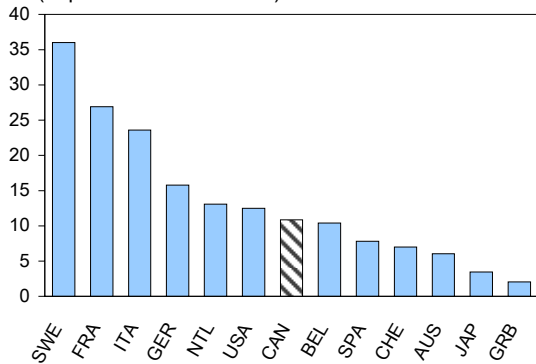
raise one's own children.¹¹ We find that the Canadian benefit wedge has tripled in the last decade, with the largest increase occurring during the second half of the 1990s (Figure 8). In 2001, the year of the latest available data, the Canadian benefit wedge was close to the average for large industrial countries (Figure 9). Combining the impact of the tax cuts and the increase in benefits, we find that Canadian net tax wedge on secondary earners (i.e., tax wedge minus benefit wedge) has fallen by 30 percent between 1995 and 2001 (Figure 10).

Figure 8. Canada: Benefit Wedge, 1990–2001
(1990=100)



Source: OECD, Social Expenditure Database, 2004; and staff calculations.

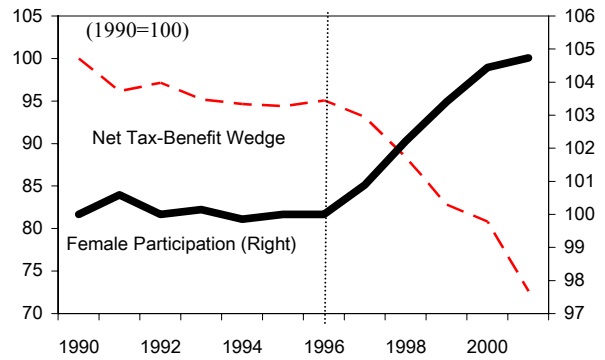
Figure 9. Select OECD Countries: Benefit Wedge for Secondary Earners, 2001 1/
(In percent of labor costs)



Source: OECD, Social Expenditure Database, 2005; and staff calculations.

1/ Based on a household (with two children less than 15 years old) with earnings 67 and 100 percent of APW. The calculation only includes benefits in kind relating to childcare.

Figure 10. Canada: Net Tax-Benefit Wedge and Female Participation, 1990–2001



Source: OECD, Labor Force Statistics Database, various years; and staff calculations.

¹¹ In the calculation, we assume that the benefit depends on the female's participation in the labor market. While this may not be a legal requirement for all the benefits we identify, these benefits are clearly more valuable to working women than to those who stay at home.

IV. ECONOMETRIC ANALYSIS

The sample covers 10 large industrial countries over the period 1980–2001.¹² The empirical participation equation is the following:

$$PR_{it} = \beta X_{it} + \gamma Z_{it} + c_i + t_i + \varepsilon_{it}. \quad (1)$$

The dependent variable is the female labor participation rate (aged 15–64), for country i and period t . The explanatory variables in vector Z_{it} include a range of nonpolicy variables that theory suggests affect the participation rate, while those in vector X_{it} include policy variables, i.e., tax and benefit wedges. A drop in the tax rate, or an increase in the benefit wedge would be expected to reduce the opportunity cost of working and encourage work effort, while at the same time reducing the incentives to work due to the income effect. The equation also includes the square of the tax and benefit wedges, to capture the nonlinear impact of taxes and benefits and alleviate the lack of a proper marginal measure for taxes and benefits (Appendix I). In some specifications, we also include the primary earner's tax wedge and its square to investigate whether a female's decision to enter the labor market is also influenced by her spouse's tax wedge.

Country fixed effects, c_i , capture social norms not modeled explicitly by the independent variables, while time trends, t , are introduced in some specifications for robustness tests and to investigate the importance of demographic factors in cross-country participation trends. The variables in Z_{it} , which include proxies for labor market structure, preferences for education and child-bearing, and social norms, and their expected signs are as follows:¹³

- *Union density.* The effect of union density on female participation is unclear a priori, since greater employment protection could encourage labor participation, but it could also discourage “outsiders” by making entry more difficult.
- *Employment Protection.* This variable, proxied by an index of employment protection legislation, would be expected to encourage female participation since job security acts as a premium to being in the labor market.
- *Wage Compression.* This variable, proxied by the ratio of the median to the 10 percentile of gross earnings for all employed, is expected to hinder participation since childcare fees are relatively higher in countries with compressed wage structures, as child minders typically belong to the lower end of the wage distribution.

¹² The country list and all data specifications are provided in Appendix VI. All variables are expressed in their natural logarithm. The sample is unbalanced, since data for all series are not available for all years.

¹³ Future potential earnings are also expected to affect participation rate in a theoretical framework. Unfortunately, data limitations hinder our ability to include such a proxy in our estimation. See Genre, Salvador, and Lamo (2005) for more details.

- *Proportion of Population below 15 Years of Age.* This is a proxy for preferences for children and child-bearing and is expected to have a negative sign since having young children could reflect a lesser desire on the part of women to enter the labor force.
- *Male Unemployment Rate.* It is expected to have a negative sign since weak economic conditions would depress female participation due to the “discouraged worker” effect. We choose to introduce male unemployment rate to avoid problems of simultaneity and endogeneity that could arise if the female unemployment rate was used instead.
- *Paid Parental Leave.* The theoretical effect of this variable on female participation is unknown, since parental leave might encourage women to enter the labor market by enabling them to reconcile work and family (Ruhm, 1998), while it could deteriorate labor skills and future career paths and earnings (Edin and Gustavsson, 2001).¹⁴ In addition, in many countries, women on parental leave count as being out of the labor force.
- *Proportion of Parliamentary Seats Held by Women.* This variable is expected to have a positive sign since it captures cultural characteristics and social norms related to liberal views about women.
- *Education Enrollment.* It is measured in years of study for women aged 25 years and above. Its effect is ambiguous since education is expected to discourage participation in the short term, since it is regarded as an alternative to labor participation. In the long term, however, education raises future potential earnings which is expected to raise the participation rate.
- *Wage Gap.* It is expected to have a negative sign, since female participation could be deterred due to lower female wages vis-à-vis those for men.
- *Female Wage Rate.* It is expected to have a positive impact on female participation since higher returns from work are expected to induce more women to enter the labor market.

V. RESULTS

Our results suggest that tax and benefit wedges are significant determinants of female labor force participation. We test the sensitivity of our results and investigate whether institutional factors could help explain trend changes across countries using two specifications: without and with country-specific time trends (reported in Tables 2 and 3, respectively). In the specification without such time trends, tendencies in female participation across countries are assumed to be fully explained by our explanatory variables including social factors such as the proportion of parliamentary seats held by women. Adding country-specific trends provides a broader specification in which trends in participation can also be explained by factors not captured in our independent variables.

¹⁴ The maximum number of paid leave weeks to which a mother (not a father) is entitled is used in the analysis.

Table 2. Panel Data Estimates of Participation Rate,
without Country-Specific Time Trends

	Specification	
	General	Specific
Policy Variables	(Coefficient)	
Benefit wedge	1.65 **	1.70 **
Benefit wedge (in squared terms)	-2.58 **	-2.95 **
Tax wedge	-2.63 **	-2.58 **
Tax wedge (in squared terms)	4.61 **	4.31 **
Primary earner's tax wedge	1.17 *	1.47 **
Primary earner's tax wedge (in squared terms)	-1.92 *	-2.65 **
Other Determinants		
Female wage	0.02	0.06 **
Education enrollment	-0.09	-0.10
Young children	-0.39 **	-0.38 **
Wage compression	-0.06 *	-0.09 **
Union density	0.14 **	0.13 **
Male unemployment rate	-0.03 **	-0.04 **
Wage gap	0.14	...
Women's parliamentary seats	0.07 **	0.04 **
Parental leave (weeks)	0.00	-0.03 *
Parental leave (in squared terms)	0.00	...
Observations Number	200	200
R-square	0.98	0.98
Standard error	0.03	0.03
Prob(F-statistic)	0.00	0.00

Source: Staff calculations.

*=significant at the 95-percent level; **=significant at the 99-percent level.

Table 3. Panel Data Estimates of Participation Rate,
with Country-Specific Time Trends

	Specification	
	General	Specific
Policy Variables	Coefficient	
Benefit wedge	0.25 *	0.16 *
Benefit wedge (in squared terms)	-0.16	...
Tax wedge	-3.09 **	-2.97 **
Tax wedge (in squared terms)	5.35 **	4.99 **
Other Determinants		
Female wage	0.00	...
Education enrollment	-0.39 **	-0.42 **
Employment protection	0.02 **	0.02 **
Wage compression	-0.01	...
Union density	0.02 **	0.05 *
Male unemployment rate	-0.1	...
Parental leave (weeks)	0.01	...
Observations number	200	200
Standard error	0.02	0.02
Prob(F-statistic)	0.00	0.00

Source: Staff calculations.

*=significant at the 95-percent level; **=significant at the 99-percent level.

As expected, a high secondary earner’s tax wedge negatively affects female participation rate, while a high secondary earner’s benefit wedge induces women to enter the labor market. Both models find an extremely similar nonlinear impact of the tax wedge on female participation, which is generally negative. The negative level term and positive squared term imply that the tax wedge lowers participation as the wedge rises, for tax levels below 35 percent of the average production worker’s (APW) wage.¹⁵ A 1-percentage-point cut in the current tax wedge could raise Canadian female participation by 0.17–0.19 percentage points (i.e., tax elasticity around -0.24), with the largest impact recorded when country-specific time trends are considered (Table 4).¹⁶ The results without time trends also suggest that the primary earner’s tax wedge could affect the female’s decision to participate in the labor market.

Table 4. Impact on Female Participation Rate of 1-Percentage-Point Change

	Without Time Trends		With Time Trends	
	Tax Wedge	Benefit Wedge	Tax Wedge	Benefit Wedge
Australia	-0.28	1.17	-0.31	0.15
Canada	-0.17	0.89	-0.19	0.14
Finland	-0.59	0.19	-0.67	0.12
France	-0.63	0.19	-0.71	0.12
Germany	0.60	0.65	0.71	0.14
Spain	-0.80	1.06	-0.92	0.15
Sweden	-0.31	-0.11	-0.35	0.12
United Kindom	-0.36	1.42	-0.40	0.16
United States	-0.29	0.83	-0.32	0.14

Source: Staff calculations.

The benefit wedge has a positive impact on female participation, but the magnitude of its effect varies between the two specifications. When time trends are included a 1-percentage-point increase in the benefit wedge raises female participation rate by 0.14 percentage points. When time trends are not included, however, there is a much larger increase in the female

¹⁵ Above this value, the increase in work associated with lost income appears to outweigh the lower marginal value of work.

¹⁶ Jaumotte (2003), the study that is closest to our specification, finds a tax elasticity of -0.27 , which is the same across all countries examined, since she ignores nonlinear effects of the tax wedges (i.e., ignores the interaction of the income and substitution effects at different levels of tax wedge).

participation rate than has been found in other studies.¹⁷ The results of the specification excluding time trends suggest that our proxies for cultural developments across countries do not fully capture differences in trends in participation.

Other economic factors appear to affect female participation in the labor market and partly explain differing time trends. In the specification without time trends, we identify a statistically significant and positive sign for the female wage rate and find that higher wage compression lowers the female participation rate, while higher union density raises it.¹⁸ It is found that countries with a higher proportion of parliamentary seats held by women, a proxy for cultural attitudes toward women, also exhibit higher female participation in the labor market, while parental leave has a small but negative effect on participation. The latter result is in contrast to Jaumotte (2003) and Genre, Salvador, and Lamo (2005), who find that only highly extended parental leave provision discourages female participation. As expected, females' decisions to become labor market participants is hindered by a choice for child-bearing and weak economic conditions, as proxied by the proportion of youngsters in the population and the male unemployment rate, respectively. In this same specification, we find that wage differentials between men and women and education enrollment are not important when considering females' decisions to enter the labor market.

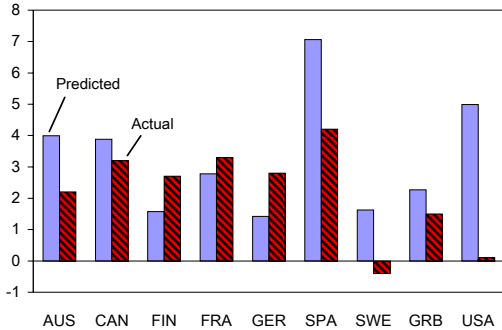
The specification with time trends yields some additional, important insights. First, it indicates that institutional factors could be important in explaining the different trends in female participation across countries as wage compression, wage gap, women's parliamentary seats, unemployment rate, and parental leave provisions drop out of the specification. Second, the results suggest that education enrollment could act as a substitute to labor participation, while in both specifications union density and employment protection could induce higher female labor participation. These results are in line with Hotchkiss (2005), who finds that the education enrollment and weaker labor market conditions contributed to the decline in U.S. labor force participation since 2000.

Both specifications do a good job in predicting the changes in Canadian participation rate following the reforms in the tax and benefit system (Figures 11 and 12). The models predict the overall increasing trend in the Canadian female participation rate, but generate a somewhat faster increase than actually recorded, particularly for the specification without time trends. The predicted increases in Canadian female participation are 4.3 and 3.8 percentage points respectively, while the actual is around 3.2, since the models overpredict the contribution of nonpolicy variables on female participation. The models also rightly predict the direction and the magnitude of participation changes for all other countries considered (except for Sweden in the specification with trends).

¹⁷ The results also suggest that the benefit wedge may exhibit diminishing returns. Even so, the impact of the benefits on female participation is positive for almost all plausible values (the effect switches signs at a 34 percent wedge).

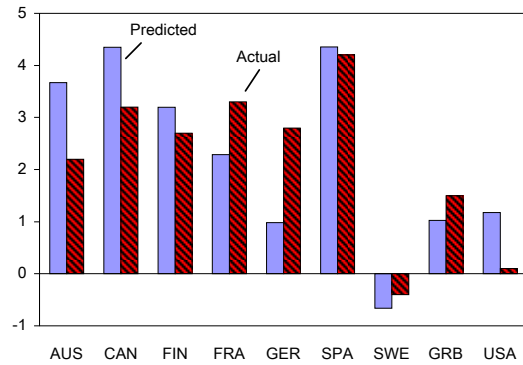
¹⁸ The result on wage compression contradicts Blau and Kahn (1999), who find that minimum wage laws have little effect on employment except in France, the Netherlands, and Spain.

Figure 11. Select OECD Countries: Predicted and Actual Labor Market Developments (With Time Trends) 1/
(In percentage points)



Source: Staff calculations.
1/ This chart compares predicted and actual changes in female participation, between 1995 and 2001. Data for Denmark are not reported since the predicted series is too short.

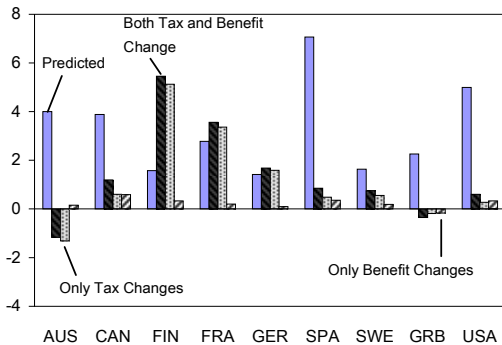
Figure 12. Select OECD Countries: Predicted and Actual Labor Market Developments (Without Time Trends) 1/
(In percentage points)



Source: Staff calculations.
1/ This chart compares predicted and actual changes in female participation, between 1995 and 2001. Data for Denmark are not reported since the predicted series is too short.

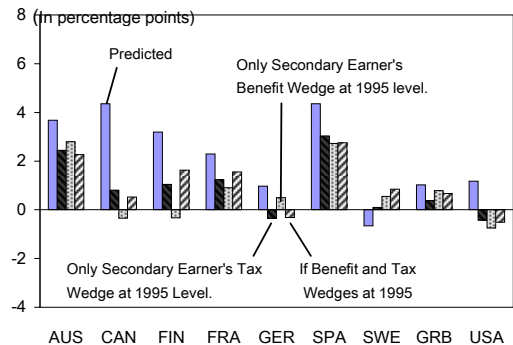
In Canada, we find that if secondary earner's tax and benefit wedges had remained at their 1995 level, the female participation rate would have been considerably lower. In particular, in the model with time trends, we find that the reforms in the tax and benefit system accounted for 1.2 percentage points (equally divided among taxes and benefits) of the 3.2 percentage points actual increase in female participation between 1995 and 2001 (Figure 13). In the model that excludes time trends the effects are even larger given the much larger benefit elasticity (Figure 14).

Figure 13. Contribution of Select Policy Variables to Participation Developments 1/
(With Time Trends)
(In percentage points)



Source: staff calculations.
1/ This chart compares predicted changes in female participation between 1995 and 2001 with those obtained if only the secondary earner's tax and benefit wedges are changed between 1995 and 2001, in order to show the relevance of the developments in these variables to explain changes in participation.

Figure 14. Select OECD Countries Contribution of Select Policy Variables to Participation Developments 1/
(Without Time Trends)
(In percentage points)



Source: staff calculations.
1/ This chart compares predicted changes in female participation between 1995 and 2001 with those obtained if the secondary earner's tax and benefit wedges are maintained at the levels of 1995, in order to show the relevance of the developments in these variables to explain changes in participation.

VI. CONCLUSION AND POLICY IMPLICATIONS

Using annual panel data of 10 large industrial countries over the period 1980–2001, this study looks at the role of policy variables, institutional factors, and social norms in explaining female labor participation rate in Canada.

We find that the decrease in the secondary earner's tax wedge, coupled with the increase in childcare benefits, can explain at least one-third (or 1.2–4 percentage points) of the increase in Canadian women's participation rate between 1995 and 2001. Looking at policy variables in more detail, we infer that:

- The secondary earner's tax wedge acts as a disincentive to labor participation, while childcare benefits encourage women to enter the labor market. We find that a 1–0.19 percentage-point tax cut would raise female participation rate by 0.17–0.19 percentage points, while the impact of an equivalent increase in childcare benefits is similar or larger with estimates ranging from 0.14–0.99 percentage points.
- The effect of tax wedges on female participation exhibits nonlinear effects, implying that the negative impact of tax wedges on female participation is only valid for tax wedges below 35 percent.
- Some results suggest that the impact of the benefit wedge on female participation could be nonlinear, with benefits above 35 percent of APW's wage possibly discouraging female participation. This finding suggests that for moderate benefit levels, the substitution effect dominates, inducing women to become active labor market participants, while for very high benefit levels the income effect sets in.

Nonpolicy variables, such as preferences and institutional factors, are also found to be important in explaining female participation rate and trends across countries. In particular:

- The unemployment rate, which is meant to capture labor market pressures due to fluctuations in economic activity, dampens female participation, possibly due to the “discouraged worker” effect.
- The degree of labor market regulation (e.g., union density, employment protection) has, in all specifications, a positive impact on female participation since incentives to enter the labor market are higher when the risks of getting unemployed are smaller. High wage compression discourages female participation since it raises the relative price of childcare, as child-minders typically belong to the lower end of the wage distribution.
- Preferences are also found to be important in shaping female participation in the labor market. The decision to study, captured in years of education enrollment, and the decision to have children both act as a disincentive to enter the labor market. The effect of parental leave on female participation is ambiguous. In particular, in some specifications, it raises participation (though not in a statistically significant way); while in others, it discourages women's involvement in the labor market.

- Cultural characteristics, captured by the role of women in politics and by country fixed effects, often linked to institutional characteristics, preferences, and social norms not modeled explicitly, are also found to be important in understanding female participation in the labor market.

The analysis indicates that policies, similar to the ones initiated in Canada to “reconcile work and family,” could positively boost female participation in other countries that suffer from low female participation. Policies that induce particularly young women to enter the workforce could also have positive long-term implications due to the effect of hysteresis by raising life-time participation. Given the challenges of population aging and the subsequent increasing strains on the welfare, pension, and health systems, raising participation would remain a policy challenge, even for Canada. For example, the Canadian old-age labor force participation rate (aged 55 and above) is only average by international standards, while participation for low-income workers is very weak. Therefore, following the success of the current “family-friendly” policies, the challenge remains to adopt appropriate policies (e.g., lower tax wedges, reforms in the pension system) to boost participation rates in these two latter categories as well.

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Constructing a Tax Wedge

In constructing tax and benefit wedges, one needs to decide whether to use average or marginal tax-benefit rates. The marginal tax rate affects the decisions regarding working hours, while the average rate affects decisions regarding labor market participation (Koskela, 2001). De Haan, Sturm, and Volkerink (2003) analyze the interaction between various measures of the tax burden on labor and find that this is strong, and Nickell and Layard (1999) find that average and marginal tax rates are considerably correlated, both reconfirming the conjecture that any measure used provides reliable results. We choose to use average tax wedges since they are readily available. We will also use their square terms to incorporate any non-linearities.¹⁹

Tax wedges for primary and secondary earners are used. The tax wedge on the primary breadwinner is the combined burden of income taxes plus employee and employer social security contributions as a percentage of labor costs (gross earnings plus employer social security contributions), for a one-earner married couple that has two children and earnings equal to the APW's wage. Following Jaumotte (2003), we define the tax wedge on the secondary breadwinner (with two children) as the share of her earnings that goes into paying additional household taxes calculated as:²⁰

$$\text{Tax wedge} = 1 - \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Gross Income})_B - (\text{Household Gross Income})_A} \quad (1)$$

where A denotes the situation in which the household is a one-earner married couple earning 100 percent of APW's wage, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW's wage, respectively.

¹⁹ I am very grateful to Florence Jaumotte for kindly providing her database.

²⁰ Only gross earnings are considered since labor costs data for the income group under consideration are unavailable prior to 1997.

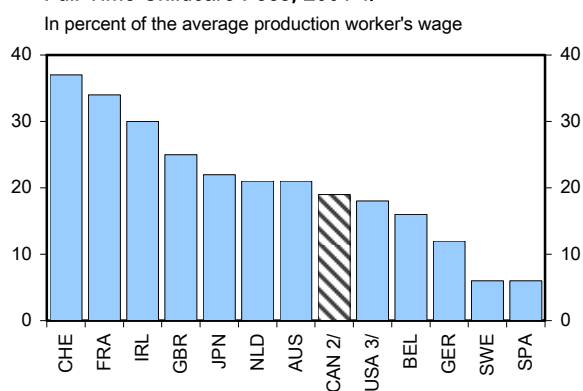
Early Childhood Education and Care in Canada

In Canada, the main early childhood education and care services (ECEC) are kindergarten and childcare. The primary purpose of the former is child development and of the latter is to encourage parents to participate in the labor market. ECEC falls under provincial/territorial jurisdiction.²¹ Each province/territory has separate childcare and kindergarten programs, which include a regulatory system, funding arrangements, and policy. Childcare is neither an entitlement nor a mandated service. Only kindergarten services, for children five years old and above, are part of the public education system and as such they are regarded a public and universal good.²²

The cost of ECEC is shared by the government at the federal and provincial/territorial level and by the parent. The way that financing is allocated between the three sources varies by province/territory and by the kind of service provided. Kindergarten is publicly funded, primarily by the province/territory. Childcare, on the other hand, is mostly privately operated on a not-for-profit basis:

- *Childcare fees are mostly paid by parents* (see Appendix II, Figure 1). These fees, excluding in Québec, fluctuate between 34–82 percent of the cost. For example, parents in Ontario pay around one-fifth of their APW’s wage in childcare fees, much less than the French and the British, but still more than the Scandinavians.
- *Provincial/territorial governments pay fee subsidies directly to programs on behalf of low-income parents.* In most provinces, such as Ontario and British Columbia, fee subsidization is conditional on both social and economic criteria, i.e., parents must be in the labor force or engaged in training or education in addition to having a low income.
- *The federal government provides direct and indirect financial assistance for ECEC in various ways:*

Figure 1. Select OECD Countries: Center-Based Full-Time Childcare Fees, 2001 1/



Source: Immervoll and Barber (2005).

1/ Data refer to fees that parents pay after deducting any subsidies offered to the provider by the government. Data refer to 2001 or latest available year.

2/ Data refer to Ontario (1998).

3/ Data refer to Child Care and Development Fund (CCDF) day care in the State of Michigan. CCDF is available in most states only for low-income families.

²¹ The federal government is responsible for service to Aboriginals, military families, and new immigrants.

²² While traditionally kindergarten was for five-year-olds and above, more recently many provinces, such as Ontario, have extended their services to four-year-olds, on a full-time basis.

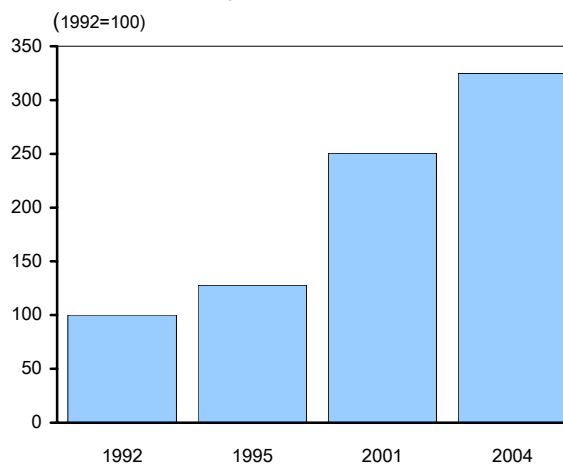
- It offers the Childcare Expense Deduction, an income tax deduction for working families that pay for childcare.
- It offers direct funding on specific programs that target Aboriginal children, military families, and new immigrants.
- It transfers funds to provinces/territories via the Early Childhood Development Agreement and the Multilateral Framework on Early Learning and Childcare.

Quality and Availability of Canadian Child Care

The quality and availability of publicly provided childcare has improved in recent years. Almost one-third of mothers in paid employment have now access to center-based childcare, up from less than one in five a decade ago. While there are no formal guidelines across Canada regarding the quality of childcare providers and kindergartens, various studies find that it is of an acceptable standard. For example, a study for kindergartens across four provinces by Johnson and Mathien (1998) finds that seventy percent of kindergartens obtained ratings in the “acceptable to good range.” Studies regarding regulated childcare providers find that most centers

provide a healthy and safe environment for the children, but only offer few activities that would stimulate children’s development.²³ Over the past few years, most provinces/territories have introduced a variety of initiatives to enhance childcare quality, such as higher staff’s salaries and more training (Appendix III, Figure 1). For example, since 1998, five provinces improved childcare staff’s salaries by earmarking funds for this purpose. All provinces have also adopted regulation on the quality and quantity of staff at place; the staff-to-child ratios usually ranges from 1:3 to 1:5 for infant care, while many provinces, such as Québec, Ontario, and Manitoba, require that at least two-thirds of the staff have a university degree in early childhood education.²⁴ These standards are high, even when compared to the Nordic countries. For example, in Sweden and Finland about half and one-third of the staff in preschool holds higher education degrees, respectively (NAER, 2004).

Figure 1. Canada: Public Spending for Regulated Child Care Per Child, Ages 0–12, 1992–2004



Source: Friendly and Beach, 2005.

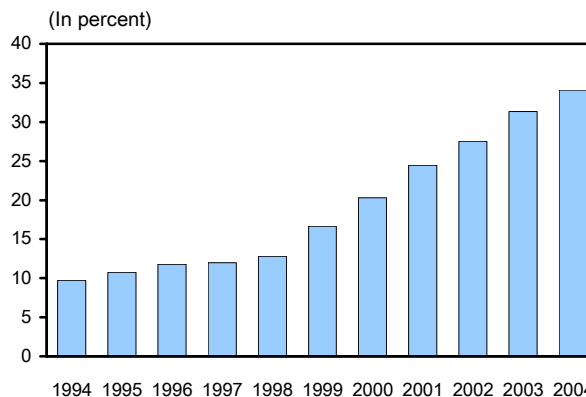
²³ Friesen (1992); Lyon and Canning (1995); Doherty and others (2000); and Goelman and others (2000).

²⁴ In Canada, as a whole, more than four out of five childcare workers have at least one year of postsecondary education in early childhood education (OECD, 2004b).

Childcare Provision in Québec

Québec had been the pioneer and the driving force behind Canada’s enhancement in childcare provision. In 1997, Québec has introduced a comprehensive family support policy, including public funding for universal childcare (comprising ¾ percent of GDP in 2001, up from ¼ percent in 1995, (Appendix IV, Table 1).²⁵ The policy pursued three major objectives: fight poverty, increase mother’s labor participation, and enhance child development (MESSF, 2003, 2004).²⁶ To pursue these goals, parental contribution was set at only C\$5 per day per child (now C\$7) for up to 10 hours and access to childcare spaces increased significantly (Appendix IV, Figure 1).

Figure 1. Québec: Childcare Coverage at Reduced Fee for Children, Ages 0-5, 1994-2004



Source: Lefebvre and Merrigan (2005).

Table 1. Public Spending on Childcare Services

	Finland (2002)	Quebec (2001)	Sweden (2002)	United Kingdom (2003)
In percent of GDP	1.1	0.8	2	0.4
In percent of total spending on families	38	37	44	16
Annual spending per child enrolled, in USD (PPP) 1/	11251	8791	10074	1529
Spending per child enrolled, in percent of GDP per capita 1/	42	32	37	5

Source: OECD (2005, p. 109).

1/ Child care only, excluding pre-primary education and out-of school-hours care.

- **Fees.** With regulated childcare at a cost of C\$7 per day for up-to 10 hours, which is subsidized further for low-income workers, Quebec residents enjoy cheap childcare,

²⁵ Elsewhere, fee subsidization is only available to low-income and other needy groups, although there is an implicit subsidy through the Childcare Expense Deduction.

²⁶ Baker, Gruber, and Milligan (2006) find that Québec’s initiative had benefited female participation by stimulating work outside the house for mothers. However, they observe, at least in the short run, a deterioration in the well-being of children and their families who use the childcare provision.

even by international standards (Appendix IV, Table 2).²⁷ For example, according to OECD (2005, p. 26), the maximum childcare fee in Finland is around EUR 200 per month (covering around 16 percent of total cost) and in Sweden around EUR 140 (covering around 11 percent of total cost). Quebec’s childcare fees, covering around one-fifth of the total cost, account for only one-fourth of the amount that the rest of Canadian parents pay. For example, in the rest of Canada, in 2001, a single-earner family with a child in childcare would have a monthly gross earning of around C\$3,000 and pay C\$400–600 as a childcare fee, if no subsidy is offered.

Table 2. Parental Fees
(In percent of net earnings, by income group and family type)

	Gross Earnings 1/	Finland	Quebec	Sweden	United Kingdom
(In percent of APW)					
One child 2/					
Lone Parent	100	7.9	4.8	3.4	23.4
Couple	133	6.9	3.9	3.9	7.1
Couple	167	5.7	3.4	4	11.8
Two children 2/					
Lone Parent	100	11.2	9.3	3.4	30.8
Couple, one child	133	10.7	7.7	3.9	9.9
Couple, two children	167	10.8	6.8	4	16.5

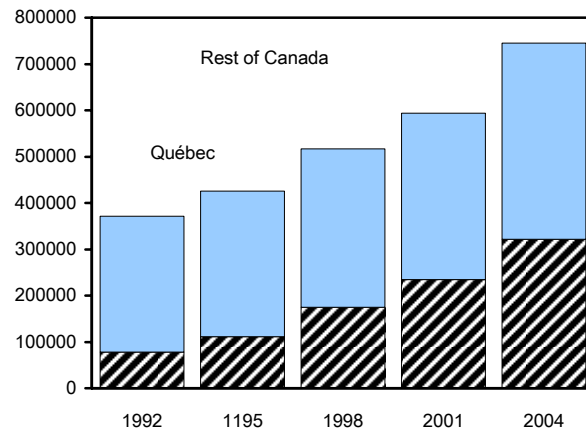
Source: OECD (2005, p.113)

1/ Annual earnings of the average production worker (APW) in the manufacturing sector. In 2004 these were: USD 34,358 in Canada, USD 29,855 in Finland, USD 26313 in Sweden and USD 33,210 in the UK.

2/ First child aged 1 and second child(if any) aged four.

- *Spaces.* Childcare spaces for the age group 0–5 have more than doubled, from around 80,000 in 1997 to 180,000 in March 2004 (expected to reach 200,000 by 2006 for 370,000 children), and as a result, the proportion of children (aged 0–12) in formal childcare has increased from 19 percent to 45 percent (OECD, 2005, p. 118). This remarkable increase implied that 40 percent of all Canadian childcare capacity is in the province of

Figure 2. Canada and Québec: Regulated Childcare Spaces, 1992–2001



Source: Friendly and Beach, 2005.

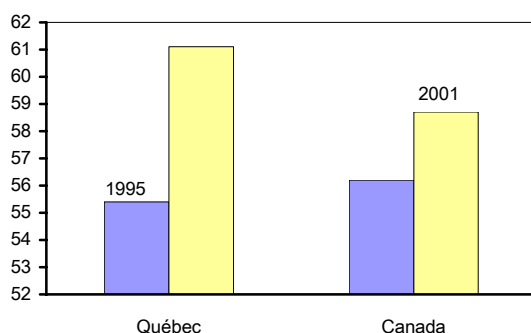
²⁷ Baril, Lefebvre, and Merrigan (2000) estimated that in 1997, prior to the reforms, the net price of center-based regulated childcare in Montréal (after federal and provincial tax credits) ranged from C\$5/day for a very low-income family to C\$15/day for a high-income family. The corresponding estimate by the Ministry of the Family and Childhood was C\$18/day (Théberge, 2003)

Québec; while its population of young children is only 22 percent of the Canadian total (Appendix IV, Figure 2).

Québec’s female labor force participation performance, following the reforms, has been impressive, even by Canadian standards:

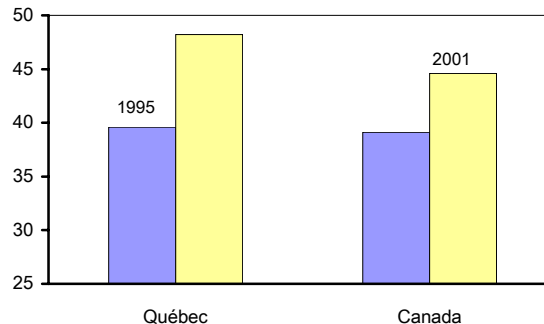
- *Maternal employment rose remarkably following the reforms.* While pre-reform employment of mothers (with youngest child aged below 3 years old), was below the Canadian average, by 2001, at 61 percent, it has surpassed it, exhibiting an increase of almost 7 percent (Appendix IV, Figure 3).
- *The proportion of dual full-time-earner families with dependent children, in Québec has surpassed the Canadian average, following the reforms.* In particular, while in 1996 less than 40 percent of families with dependent children had both parents in full-time employment, now one out of two families consists of full-time dual earners (Appendix IV, Figure 4). This performance is even more impressive in national and international comparisons: the proportion of dual-earner full-time families is 45 percent in Canada as a whole, 40 percent in Sweden, and around 30 percent in the United Kingdom.

Figure 3. Canada and Québec: Maternal Employment, 1995 and 2001



Source: OECD, 2005, *Babies and Bosses*, Paris.
1/ Employment of mothers with youngest child aged below 3 years.

Figure 4. Canada and Québec: Full-Time Dual-Earner Families with Dependent Children, 1995 and 2001 1/
(In percent of total families with dependent children)



Source: OECD, 2005, *Babies and Bosses*, Paris.
1/ Employment of mothers with youngest child aged below 3 years.

Constructing a Benefit Wedge

Only publicly provided benefits in kind related to family care (child and youth) are included in the benefit wedge. We ignore cash benefits since they are already included in the tax wedge calculation by the OECD. The benefit wedge on the secondary breadwinner (with two children) is defined in a symmetric manner as the tax wedge, i.e., it is the share of the secondary earner's gross income that is obtained through public childcare provision, conditional on female labor force participation. The formula is given by:

$$\text{Benefit Wedge} = \frac{\text{Female Participation Rate} * \frac{\text{Public Benefits in kind for family}}{0.5 \times \text{Population below 15 years}}}{\text{Household Gross Income}_B - \text{Household Gross Income}_A}$$

where A denotes the situation in which the household is a single earner married couple earning 100 percent of APW's wage, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW's wage, respectively.

We assume that the benefit wedge targets female labor participation and thus it solely affects secondary breadwinners. Due to data limitations, we are unable to distinguish between the benefit wedge for primary and secondary earners. Ideally, one would want to construct a benefit wedge for primary earners as well. However, given that most of the family social benefits considered tend to affect primarily women than men, we believe that this limitation does not hinder the validity of our analysis.

Implicit income and substitution effects can be analyzed when considering benefits in kind. Public provision of childcare indirectly raises the opportunity cost of home work, and thus creates a substitution effect. On the other hand, subsidized childcare creates an income effect since no additional income is needed to pay for childcare. As a result, our estimates are mixtures of price and income elasticities.

Data Analysis

Time period: 1980–2001

List of countries: Australia, Canada, Denmark, Finland, France, Germany, Great Britain, Spain, Sweden, and the United States.

Female labor force participation rate: Data were obtained from OECD's Labor Force Statistics database available at http://www.oecd.org/topicstatsportal/0,2647,en_2825_495670_1_1_1_1_1,00.html

Data were interpolated for years for which data were not available.

Primary earner's tax wedge: Data were obtained from OECD's Taxing Wages Statistics-Historical Tax Rates. Primary breadwinners tax wedge is defined as the tax wedge of a married household with two children, with a sole breadwinner earning 100 percent of the average production worker's wage. Data were interpolated when missing.

Secondary earner's tax wedge: Data on tax wedge were obtained from Jaumotte (2003) and updated using OECD's Taxing Wages Database for missing years.²⁸ The tax wedge on the secondary earner is defined as the proportion of the additional earnings of the household, due to both members working, that goes into paying increased household taxes, and is calculated as:

$$\text{Tax wedge} = 1 - \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Gross Income})_B - (\text{Household Gross Income})_A}$$

where A denotes the situation in which the household (with two children) is a single earner married couple earning 100 percent of APW, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW, respectively.

Benefit wedge: The benefit wedge series was constructed using OECD's Social Expenditure Database (2004c) and OECD's Labor Force Statistics Database. The benefit wedge, which refers to a household with two children, was constructed using the following formula:

$$\text{Benefit Wedge} = \frac{\text{Female Participation Rate} * \frac{\text{Public Benefits in kind for family}}{0.5 \times \text{Population below 15 years}}}{\text{Household Gross Income}_B - \text{Household Gross Income}_A}$$

where A, as before, denotes the situation in which the household (with two children) is a single-earner married couple earning 100 percent of APW, and B denotes the situation where the household has two breadwinners who earn 100 and 67 percent of APW, respectively.

²⁸ Canadian tax wedges refer to Ontario.

Missing data were interpolated using Jaumotte's (2003) data on public childcare spending per child.

Average production wage (APW): APW for the countries under consideration is as follows:

Table 1. Select OECD Countries:
Average Production Worker's
Wage, 2002

(US dollars with equal purchasing power)

Australia	35,867
Canada	32,488
Denmark	36,142
Finland	27,988
France	23,771
Germany	34,260
Netherlands	32,747
Norway	32,412
Spain	20,946
Sweden	24,259
United Kingdom	29,701
United States	32,360

Source: OECD (2002), Taxing Wages.

Union density: Data were obtained from the OECD's Labor Force Statistics database cited above.

Wage compression: Wage compression was proxied by the ratio of the median to the 10 percentile of gross earnings for all employed. Data were obtained from the OECD's Labor Force Statistics database cited above.

Female wage rate: The wage rate is measured by the average hourly wages in manufacturing (in PPP) as obtained from Gauthier, A.H. (2003). Data were interpolated for missing years and were expressed in real terms using each country's Consumer Price Index.

Education enrollment: It represents the average years of education of women aged 25 years and over, obtained from Jaumotte (2003).

Employment protection: The index of employment protection legislation was obtained from Allard (2003) and covers both permanent and temporary contacts.

Parental leave: Data were obtained from Jaumotte (2003), using "Comparative maternity, parental, and childcare database" from Gauthier and Bortnik (2001).

Proportion of young population: We calculated the proportion of the population aged less than 15 years from OECD's Labor Force Statistics database.

Male unemployment rate: Data were obtained from OECD's Labor Force Statistics database.

Women parliamentary seats held by women. Seats occupied by women as a percentage of total seats in parliament obtained from Huber and others (2004).

Wage gap. The wage gap is defined as the ratio of male to female wage rate, as obtained from Gauthier (2003).