2002s-29

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Série Scientifique
Scientific Series

CIRANO
Centre interuniversitaire de recherche en analyse des organisations

Montréal
Avril 2002

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ISSN 1198-8177

Tax Incentives and Fertility in Canada: Permanent vs. Transitory Effects*

Daniel Parent† *and Ling Wang*‡

Résumé / ***Abstract***

Cette étude cherche à déterminer si l'effet de court terme des incitatifs fiscaux sur la décision d'avoir des enfants est de nature transitoire (par lequel seul le moment choisi pour avoir des enfants change) ou permanents (par lequel la taille ultime de la famille change). En utilisant des différences interprovinciales dans la mise en œuvre du programme fédéral canadien d'allocations familiales au milieu des années 70, nous sommes en mesure d'estimer un effet de court terme substantiel pour les familles du Québec, particulièrement dans le cas des familles ayant préalablement deux enfants ou plus. Toutefois, les données des recensements de 1981 et 1991 montrent que les mêmes cohortes de femmes au Québec qui ont réagi fortement à l'incitatif financier à court terme ont ensuite diminué leur taux de fécondité relativement aux femmes ailleurs au Canada. Ces résultats nous donnent à penser que l'impact du programme fut essentiellement transitoire. En somme, bien que le coût d'avoir des enfants ait son importance comme facteur influençant la décision d'en avoir, l'effet semble opérer sur le moment choisi et non sur le nombre.

This paper seeks to provide evidence on whether short term responses in childbearing decisions apparently induced by changes in tax incentives are permanent or transitory. Using inter-jurisdictional differences in the implementation of the Family Allowance Program in Canada in the mid 70's, we first establish that Québec families responded quite strongly to the added incentives in the short run, particularly in the case of families with two or more children prior to being exposed to the program. However, tracking down the cohorts across the 1981 and 1991 Censuses, we find that the same group of Québec women who responded strongly in the short run subsequently showed a decrease in fertility relative to the rest of Canada. These results suggest that the bulk of the program impact was transitory. In summary, while prices seem to matter, their impact in this case appears to work through a timing effect.

Mots-clés : Allocations familiales, fécondité, effet de quantum, effet de tempo

Keywords: Family allowances, fertility, quantum effect, tempo effect

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1 Introduction

Whether governments can alter the childbearing or headship decisions of females through tax policy initiatives has been the subject of increased scrutiny over the last decade or so. Declining birth rates in the Western world has led to some concerns over the burden put on the working age population to support an ever larger fraction of retired people. On a related note, these tax policies can also be viewed as a way to promote horizontal equity given the costs involved in raising tomorrow's tax payers. In some instances the policies introduced have been explicitly pro-natalist in their design, such as some of the ones studied with Swedish data by Heckman and Walker (1990). But even when they are not meant to be explicitly pro-natalist, differential tax treatment policies across family structures still lead to a change in the relative price of having children, and the question naturally then becomes whether and how much potential parents respond to those price incentives. While framing the problem that way seems natural and uncontroversial enough to economists, demographers have instead traditionally focused more on sociological as well as biological factors as the main driving force behind demographic changes.[1] At the risk of oversimplifying, economists view family size largely as the result of choices while traditional demographers view childbearing as a " social act" which results in part from conditioning imposed by social norms and also by biological factors. One reason why sociologists-demographers tend to downplay the role of economic incentives results from their observation that geographic patterns of fertility have been commonly observed in Europe regardless of the socio-economic conditions within each region. Consequently, they argue that the observed variations in fertility cannot be solely attributed to standard measures of costs and benefits (Lesthaeghe and Wilson (1986)).

The evaluation of the impact of tax incentives and other benefits on fertility can be more or less divided into three strands. The first one focuses on the effect of policy variables on the aggregate time series of fertility (e.g. Butz and Ward (1979), Zhang, Quan, and Van Meerbergen (1994), Gauthier and Hantzus (1997)). Since the identification relies solely on time series variation, trends in unobservables could potentially contaminate the results. A second strand in the literature makes use of neoclassical models to evaluate the life-cycle fertility response of women (Hotz and Miller (1988), Heckman and Walker (1990), Mer-

[1] See e.g. Olsen (1994) for a more complete discussion on the sociological vs. "economic optimizing" views surrounding fertility.

rigan and St-Pierre (1998)). These studies focus on the long-run effect of policy on fertility dynamics and take into account the timing and spacing of births. For instance, Heckman and Walker modelled the life-cycle fertility of Swedish women using duration models and found strong short-run responses of fertility to income but relatively weak long run effects on completed fertility. Merrigan and St-Pierre did a similar study with Canadian data.

Finally, a third strand uses midrodata to study the link between the tax /benefits structure and fertility decisions. In that case, the identification comes from cross-jurisdictional variations and also, sometimes, from time variations as well within a jurisdiction. The recent U.S. literature on the effect of payments through Aids to Families with Dependent Children (AFDC) on female headship and fertility decisions has made use of such an identification strategy. For instance, while Shultz (1994) finds that welfare payments have a significant effect on headship decisions using only cross-state variations in benefit levels, Hoynes (1997a) show that including state fixed-effects essentially absorbs all of the measured effect. This leads her to conclude elsewhere (Hoynes (1997b)) that the weight of the evidence does not point towards there being a strong connection between AFDC payments and either female headship or fertility. Rosenzweig (1999), however, reaches a different conclusion on the effect of AFDC on the decision of women to become single parents by modeling jointly the decision to marry and to have children with a multinomial logit. He exploits the within-state variation in benefits across cohorts to identify his effects.

The recent Canadian literature has paid attention to an explicit pro-natalist policy introduced in the Province of Québec in 1988 and which ran until 1997 to study whether such a policy had an effect on fertility. Given that no other province in Canada changed its policy environment, this variation could be exploited to study the link between the policy and inter-provincial differences in fertility over that time period. Whether using a more or less standard difference-in-differences approach (Milligan (2000)) or a slightly more involved structure built around the probability of transiting from having zero (one, two or more) children to having one (a second, a third or more) child (Duclos, Lefebvre, and Merrigan (2001)), the source of identification is the same and the conclusion is also more or less the same: that policy had a strong effect on fertility in Québec. However, given that the cohorts of women which were exposed to that policy have not, to this day, all completed their fertility cycle, it is not clear, as recognized by Duclos, Lefebvre, and Merrigan whether the effect attributed to the policy is a so-called "quantum" effect (women having more children than

they otherwise would in the absence of the intervention) or a "tempo" effect (women simply changing the timing of births).

The main objective of this paper is to address, by using Canadian Census data, this issue of quantum vs tempo effects by exploiting a significant reform in the Family Allowances program introduced by the Canadian federal government in the mid-70's. Given the decentralized nature of the Canadian political system, the Province of Québec was able to modify the federal program by giving stronger financial incentives to families which already had dependents. Since the cohorts of women exposed to that reform had largely completed their fertility cycle by the time of the 1991 Census, (or, at least, were close to having completed it), it is possible to address both the issue of how much families responded to the price change in the short run as well as the question of whether the cohorts which did respond in the short run showed a subsequent *decrease* in fertility later on. Whether there remains a net effect or not on fertility will inform us on the "true" permanent effect of such an implicitly pro-natalist policy.

The results show that while we estimate strong short-run responses which appear to be difficult not to attribute at least partly to the program reform, basically all of the short-run effects are wiped out through reduced fertility later in life. In other words, starting in the mid-seventies, women in Québec "brought forward" their fertility decisions but they eventually had the same number of babies that they would have had in the absence of any intervention. However, we point out that the possibility of confounding effects, always a concern when using differencing identification strategies, may be more of an issue here because of the interaction between the length of time between survey dates and the high degree of decentralization of the Canadian federation. Still, we view the evidence in this paper as providing fairly strong support to the notion that while prices clearly matter, their influence on realized fertility appears to be quite modest, at least in the case considered in this paper.

2 Institutional Background

2.1 The Family Allowance Program in Canada

The Family Allowance Program in Canada became effective in July 1945 with the 1944 Family Allowance Act. Under the original 1944 Act, allowances were restricted to children under the age of 16, whose parent/guardian is himself/herself a dependent attending school. The benefits received by families were originally

relatively modest and were a function of the child's age, with an annual payment of $60 for children aged 0 to 5 and $96 for those aged between 11 and 15. In addition, the original Act stipulated that the benefits per child would be reduced for children of birth rank five and over. They were also originally part of the taxable income with the tax rate being a function of the parents' income. This last provision, though, was abolished starting in 1948 and from then on until 1972, family allowances were not taxable. The benefit reduction for higher parity children was also abolished on 1949. The program parameters were then left unchanged until a new Family Allowance Act was enacted in 1973 and became effective on January 1st, 1974.

Many changes were made with the introduction of the new act in 1973. Eligibility was extended to all children under the age of 18 and the amount paid was increased to $240 per child. In addition, the allowance was indexed to increase with the Consumer Price Index and was now part of the taxable income. The most important change for the purpose of this paper was the fact that provinces were permitted to vary the uniform federal rate on the basis of age or birth rank provided that the smallest monthly payment for each child be no less than 60% of the federal rate and the total amount paid to all children in any province requesting a variation, when averaged over consecutive periods of four (three until 1976) years must be the same as it would have been if the federal rate had been in effect (Statistics-Canada (1982)). Only Alberta and Québec elected to vary the federal government payment structure. Alberta's variation was based on the age of the child while Québec chose to vary it based on the birth order of the child. It is also worth noting that Québec had already introduced its own Family Allowance Program in 1967 as a way to supplement the federal initiative. It, too, was based on birth rank.[2] Note that the federal government restructured its policy in 1978 by partially replacing the family allowance by a refundable Child Tax Credit of $200 per year and for each child admissible to receive family allowances, so that the payment was reduced starting in 1979. The amounts paid in Québec under the both the federal program (as modified by the province) and the Québec program are shown in Table A1. We can see that structuring the benefits received according to the family structure made for a large difference between the amounts received per each new child depending on whether there were at least two other children present.

[2]Quebec started collecting income taxes in 1954. In 1961, it supplemented the federal Family Allowance program by paying an annual amount of $120 for each child aged 16 and 17 enrolled in school.

3 The Data

3.1 Evidence from Vital Statistics

The following set of charts show the evolution of the total fertility rate over the 1925-1995 period in Québec, Ontario, and the Rest of Canada (ROC).[3] The fertility rates shown in those charts are computed by summing the birth rate, defined as the number of births per 1000 women, for each five year age group multiplied by five. As a measure of the reproduction patterns that a jurisdiction can expect to experience, this way of calculating the fertility rate is reliable only if the future fertility behaviour of a given cohort can be accurately predicted by that of the older birth cohorts. Otherwise this definition of the total fertility rate can be fairly misleading when patterns change across birth cohorts.

We can see from figure 1 that the shape of the total fertility curve exhibits much the same patterns as in the United States, except in Québec. The fertility rate in that province over the first half of the twentieth century was well above those in Ontario and elsewhere in Canada.[4] A variety of factors can explain this difference. For one thing, the degree of urbanization among francophone was somewhat lower in Québec than in the rest of Canada, particularly Ontario. Perhaps more importantly, differences in religions were well defined at that time, with the Roman Catholic Church having considerable influence until the early to mid 60's.[5] Consequently, there was more pressure put on families to have a large number of children. As the influence of the Church started to wane in the 60's, fertility rates in Québec dropped below those in Ontario and in ROC. However, this simple characterization is somewhat misleading if we disaggregate fertility by age groups. We can see from Figure 2a-2b that the overall higher fertility in Québec was essentially driven by women over the age of 24. For the below 25 age groups, fertility was actually higher elsewhere in Canada for the entire time period. The degree to which Figure 1 can be misleading is even easier to see when when we look at Figure 3a where we plot the fertility rates by birth cohorts.[6] The decrease in fertility starting with the early 30's cohorts points to other factors playing a role, such as the increase in the participation rate of

[3]Note that the ROC numbers include Ontario.

[4]Note that there wasn't much difference in fertility patterns between Ontario and English Quebec. All the difference was driven by Francophones.

[5]The Vatican has, for the most part, steadfastly advised against the widespread use of contraceptives. I say "for the most part" because there was a more or less significant loosening up of the basic doctrine in the early 60's following Vatican II in 1962.

[6]The vital statistics data series run until 1995. Thus we cannot look at realized rates for cohorts born after 1946, at least not over the full 15-49 age range.

women on the labour market. In order to have a look at the period of time which is the focus of this paper, figure 3b shows the "almost realized" fertility rates by birth cohorts for women aged between 15 and 34. This is actually not too far off the mark as the majority of births occurred before the age of 35. Also, Figure 3b also reveals that fertility rate differentials across jurisdictions seem to have stabilized starting with the mid 30's birth cohorts.

Looking at Figure 1, we can see that Québec has experienced two more or less "sudden" increases in total fertility. The first such increase occurred around 1974, shortly after the federal government reformed the Family Allowances Program and Québec tilted the tax incentives within it toward families which already had other children. The second fertility increase happened following the introduction in Québec in 1988 of the Allowance for Newborn Children.[7] I will argue below that much of the increase documented in the 70's appears to have been the result of a timing effect where women in Québec chose to have the same number children, but sooner. Preliminary evidence of this timing effect can be seen from Figures 3a-3b. While all cohorts born starting in the early 40's were exposed to the program, there is no visual evidence that realized fertility rates increased as a result of it. The caveat to that statement is that I do not observe the true realized fertility rates of the younger cohorts, those born after 1946. Even then, given that most births occur before the age of 35, it seems doubtful that the degree to which fertility patterns follow remarkably parallel paths across jurisdictions would be markedly changed: there is simply very little in this figure which suggests that whatever short-term impact the more generous family allowances in Québec might have had were true quantum effects. Of course, other confounding factors might have contributed to mask true permanent effects. This is what the rest of the paper will try to establish.

3.2 Census Data

The main data set used comes from the Canadian 1976, 1981, 1986, and 1991 Public Use Microdata Files on Families. Although questions related to fertility and family structure are somewhat more detailed in the '81 and '91 censuses, it

[7] See Duclos, Lefebvre, and Merrigan (2001) or Milligan (2000) for an analysis of that program. Milligan essentially argues that the increase shown in Figure 1 reflects a true permanent impact. However, since he cannot observe the full fertility cycle of the women exposed to the program, he cannot reject possibility that the increase is due to a timing effect. With a somewhat different approach, Duclos, Lefebvre, and Merrigan recognize that while there was an effect associated with the program, they cannot tell whether the effect reflects "tempo" (transitory) vs. "quantum" (permanent) considerations.

is still possible to combine them with the '76 and '86 data sets in a coherent way as the main questions I will be using are identical across censuses. The PUMF-F contains data on income and labour market information from the previous calendar year while family-related information is recorded on Census Day.[8] One drawback for using the 1976 Census is that there is no income data. In principle we could also use the 1971 PUMF-Families, but the years of exposure to the Family Allowances program changes do not match quite as well as they do when using the 76 Census. (Will try to fix this by matching income cell means computed with data from the Survey of Consumers Finance).

Sample Selection

To study the short-term impact of the Family Allowance Program, we select two subsamples: one made of families in which the female is aged between 25 and 34 and the other when the female is aged between 30 and 39. We exclude from the analysis all non-resident families since they are not eligible to receive benefits. We also exclude all those families which were residing outside their current province of residence five years before (at the time of the previous Census). This could cause problems in that we may worry that those who moved out of Québec have different fertility behaviour.[9]

To evaluate the long-term impact of the policy change, we use information in 1991 (and also, to a lesser degree, in 1986) on the two cohorts of women studied for the 1976-1981 period. Thus, we focus on families in which the female is aged either between 35 and 44 or between 40 and 49.

A list of the variables used in the analysis is given in Appendix A and the sample means are reported in Table 1.

4 Empirical Framework

The empirical strategy employed in this paper will first consist of a standard application of the "difference-in-differences" approach to measure the short-term impact of the policy reform using the 1976 and the 1981 Censuses. However, since the reform to the Family Allowance program was enacted in 1974, any effect of the program may already have been at work on Census day in 1976.

[8] Census Days correspond to June 4, 1991, June 3, 1986, June yy, 1981, and zz, 1976.

[9] Unfortunately, the Canadian Census does not identify the province of residence at the time of the previous Census.

Still, most of the period in which fertility rates in Québec caught up with the rest of Canada will be covered between the 1976 and 1981 Censuses.

For families in which the female is belongs to age group g, we have:

$$C_{ig} = \beta_0 + \beta_1 Quebec_{ig} * 1981\, Dummy_{ig} + \beta_2 * Quebec + \beta_3 * 1981\, Dummy$$

$$+\beta_4 X_{ig} + \varepsilon_{ig}$$

where X_{ig} is a vector of control variables. As usual in this sort of framework, we are interpreting the parameter associated with the time/location interaction as the effect of the program change on women belonging to a particular age group. The analysis will be carried out for two age groups, the first one consisting of the families in which the female is aged between 25 and 34 in both 1976 and 1981, and the second one made up of women aged between 30 and 39 in those years. In the second step, we follow those same cohorts through time and examine the relative change in fertility of the women aged between either 35 and 44 or 40 and 49 in 1991 compared to when they were ten years younger in 1981. Consequently, the measurement framework for assessing the long term impact on fertility of the program reform is essentially the same as the one used to evaluate the short-term response, except that we actually "fix" the cohort.

Caveats

As is well-known (e.g. Meyer (1995)), while the source of the identification is transparent, it also points to potential threats to the validity of this approach. In both the short-term (1981 vs. 1976) and long-term (1991 vs. 1981) analyses, the crucial identifying assumption is that fertility patterns in Québec and elsewhere in Canada would have followed parallel paths in the absence of the intervention. This may pose a particularly acute problem for the long term comparison given that 10 years is a fairly long period over which to assume such relative stationarity. In discussing the results below, we will look for possible confounding effects. This is an important issue because, as mentioned earlier, the 70's and 80's were a period of substantial out-migration in Québec. If those who stayed had a different trend in fertility compared to those who left, the results could be misleading. In addition, there was a rapid closing of the fertility gap between Québec and the rest of Canada starting in the late 80's and persisting well into the 90's. This sudden change in the Québec trend coincides

with the introduction of a very generous "baby bonus" explicitly aimed at encouraging fertility. In particular, that program strongly encouraged women who already had at least two children to have a third child.[10] Given this structure in the program design, one would expect that slightly older (say, late 20's, early 30's) may have decided prior to the 1991 Census to have another baby. Hence this potential effect could actually work in the direction of getting conservative estimates. In other words, it may be plausible to think that it leads to an underestimation of the true relative reduction in the fertility of the cohort of women who responded in the short term to the Family Allowances reform.

Another potential threat to validity comes from the fact that women in Québec are, by far, the most likely in Canada of having children without being married. More precisely, common law households are much more common in Québec. This difference can be traced to the secularization of the province in the 60's, and is thus an issue for the cohorts that were exposed to the Family Allowances reform in '74 and also the ones exposed to the Allowance for Newborn Children in '88. This may contaminate the results if fertility rates are systematically different across tendencies to get married. If we had a full description of the family structure in the Census, that would not pose a particular problem since we could control for it. Unfortunately, only in 1991 do we have separate information on married or common law couples.[11]

The issue of differential marriage patterns across provinces is a good illustration of the potential pitfalls of the identification strategy. If these differences were time-invariant one could control for them by the use of provincial fixed-effects. However, as the trend in marriage behaviour illustrates, some of those differences are likely to be time-varying. This could pose a particular problem. For instance, catholic women have historically had a tendency to have children later in life compared to their protestant counterparts. Evidence of this can be seen in Figures 2a-2b. The rapid secularization of the province brought about many changes in Québec society which could interplay with fertility behaviour.

Another related problem is the fact that Canada is a much more decentral-

[10] It was also generous for women with no children or with just one, but the program parameters clearly aimed at encouraging larger families.

[11] See Pollard and Wu (1998) for an analysis of the quite striking difference between Québec and the rest of Canada in terms of marriage incidence. For instance, they report that the "total first marriage rate" for Québec women aged between 15 and 49 was only 373 per thousand compared with 608 per thousand elsewhere in Canada. Perhaps even more striking is the difference between the percentage of couples with children, where the female is under 35, that are cohabiting. In Québec it was estimated to be around 32% in 1995 compared to 17% in the rest of Canada. These numbers were computed using the 1995 General Social Survey.

ized federation than the United States. Consequently, many "policy variables" shift over time and to pin down the effect of one of those policies may be a particularly adventurous task.

The design of the program reform is of some help in trying to account for some of those factors. More particularly, the relative tax advantage to having additional children was more obvious to families which already had older children, especially if they had at least two. The existence of such multiple treatment groups allows one to estimate "relative changes in relative changes" by further differencing group means within Québec. The identifying assumption then becomes that there's no group-specific trend in Québec among families which have two or more older children when having a newborn relative to those which had none. Also, evidence will be presented using the 1986 Census. Doing that allows us to narrow the time interval and this could be particularly useful in that, by doing so, we exclude the 1988-1991 period in which Québec was introducing explicitly pro-natal policies. The price to be paid is that we have then to focus on narrower age bands (e.g. 30-34 in 1981 vs 35-39 in 1986).

5 Results

The first set of results is reported in Table 2, in which the standard differencing strategy is employed without controlling for any covariates. As can be seen from Panel A, it seems that women in Québec in 1981 experienced a substantially larger change in fertility (a smaller decline, actually) compared with those in either Ontario or in the Rest of Canada taken as a whole. Assuming that the trend in fertility in the absence of the intervention would have followed the same path as in the other jurisdictions, the implied percentage increase in fertility over the 1976-1981 period corresponding to the estimates shown in Table 1, Panel A are 9.84% and 10.01% relative to Ontario and the ROC, respectively.[12]

Once one looks at how fertility evolved over the life-cycle of the cohort aged between 25 and 34 in 1981, it appears as though the positive short term program effect is completely nullified by a subsequent reduction in fertility. In fact, the difference-in differences estimates for 1981-1991 period showed in the bottom right corner of Panel A are somewhat larger in absolute value than the short term increases. Note, however, that the short-term impact may actually

[12]These percentages are obtained by subtracting the time trend in fertility outside Quebec from its 1976 estimate and then multiplying the inverse of that number by the corresponding DID estimate.

be underestimated in that the Family Allowance program changes were put in place in January 1974. Consequently, even accounting for the usual gestation lag, Québec women were exposed to the new program prior to the 1976 Census. By the same token, the reduction over the later period in their fertility cycle might also be underestimated given the introduction of the "Baby Bonus" in 1988. Both Milligan (2000) and Duclos, Lefebvre, and Merrigan (2001) report strong evidence that women who already had children responded quite strongly to the financial incentive.

In Panel B-C, we break down the total by family structure. If the program had any impact, as Panel A suggests it did, we would expect the effect on the probability of having a child to be stronger in families which already had children. Of course, one cannot ignore the "option value" effect as well: families might have chosen to have children (either a first child or a second) in order to gain eligibility to the more favorable benefit levels. We do find evidence that families with two or more kids responded more strongly in the short-run than families without children, as shown in the "1981-1976 Change" column. We also find that the subsequent relative reduction in fertility in Québec was stronger for those same types of families ("1991-1981 Change").

Finally, we exploit the existence of multiple treatment groups within Québec to compute the relative increase (decrease) in the short-term (long-term) in fertility for those families which had two or more children compared to those with no older children. This is done by simply subtracting the difference-in differences estimates in Panel B from those in Panel D. Doing this allows the absorption of any Québec-specific time trend. Although the parameters are not all that precisely estimated, they do provide some evidence that the program had an impact in the short-run which was then counter-balanced by a reduction in fertility over the 1981-1991 period.

The following set of tables essentially try to verify whether the simple DID results shown in Table 2 are robust to the inclusion of a variety of covariates. Bringing in covariates also allows the estimation of interaction effects between some of the controls and the Québec X Time dummy treatment variable.

We essentially find that the basic conclusion is not altered once we include covariates. However, we also find significant differences in treatment effects across language groups in Québec with female francophones showing an overall smaller estimated response to the policy. This can be seen when one looks at the "Female*Francophone*Québec *81" in Tables 3A-B. This appears to be particularly true for the 30-39 age group in 1981. Once we decompose by family

structure (Table 4), we can see that the difference in treatment effect across languages is not the same for females with two or more kids compared with the others. In fact, the sign changes. Allowing language interactions, though, makes for a much larger estimated main effect of the program of having a child under 6 when there was already two older siblings. When we look at the long-term effects, we can see that while francophones showed the lowest increase in fertility following the introduction of the program, they also showed the *largest* decrease in later fertility. This last result is suggestive that some underlying deep down trend towards having smaller families is likely to be playing a role here independently of the Family Allowance program. Still, even if we restrict the sample of Québec women to francophones only (see Tables 5 and 7), we find the same kind of short-run increase/long run decrease that is qualitatively, if not quantitatively, similar to what we estimated with the overall sample.[13] Also, although not shown here, the same type of models estimated with data from the 1986 Census where we look at the evolution in life-cycle fertility of women in narrower age groups shows very much the same type of patterns.

6 Conclusion

Demographer-sociologists and economists tend to have a fairly different point of view regarding the "choice dimension" involved in family formation. Economists by and large regard family size as resulting from the choice made by the parents subject to the usual price/income constraints. While demographers do not deny that economic factors play a role, they tend to place the emphasis on biological constraints which are themselves in part constrained/shaped by cultural factors. Consequently, the argument made in recent papers in Canada (by Duclos, Lefebvre, and Merrigan (2001) and, particularly, by Milligan (2000)) to the effect that pro-natalist policies introduced in Québec in the late 80s had a large impact on fertility have met with widespread scepticism on the part of demographers.[14]

Our finding in this paper that much of the positive short-term effect on fertility following the introduction of the reformed Family Allowance program in Canada in 1974 appears to represent a "tempo" effect may then be seen

[13] By restricting the sample to francophones only, we also control to a much greater degree for the changing composition of the treatment group over time. The reason is that Francophones, by and large, remained in the province over the sample period, contrary to non-Francophones.

[14] For some reason, this body of work received a lot of press coverage in both English and French Canada over the last couple of years.

as providing evidence that both sides of the cultural/biological vs. economic factors debate are actually not that far apart: prices matter but apparently not in determining ultimate family size, at least in this application.

One serious caveat to measuring such permanent effects is that using either Ontario or the rest of Canada as a whole as the control group may be questionable. The main reason is that Québec society experienced substantial social changes over the last 40 years which may still have an indirect effect on fertility. More particularly, we know there is a large difference in marriage rates between Québec and Ontario, and that this differential is time-varying. Provided that the decision to have children is partly tied to marital status, then the decreasing marriage rate in Québec relative to Ontario would by itself tend to produce a relative decline in fertility, irrespective of any intervention. Some evidence that this may be a problem is reflected in the fact that the relative decline in Québec fertility between 1981 and 1991 measured in this paper is larger than the relative increase over the 1976-1981 time period. There is a strong case to be made that the ideal treatment group for the purpose of measuring the effect of the Family Allowance program would consist of Québec Anglophones, since they were more or less isolated from much of the social changes affecting Francophones, particularly regarding religious affiliation. To do that, though, one would need the Census Master files, where the province of residence is identified and the samples are much larger.

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Appendix A: List of Variables

- Total Fertility Rate: Number of births for women in each five-year age group divided by the population of women in the corresponding age group and multiplied by 5. Sources: Statistics Canada catalogues 84-204 and 84-210; CANSIM series C894142 and C892552.
- Had a child: dummy indicator for the presence of at least one child under age 6 in the family on Census day.
- Zero older child: dummy indicator for the absence of any child age 6 or older in the Family on Census day.
- One older child: dummy indicator for the presence of one child age 6 or older in the family on Census day.
- Two or more older children: dummy indicator for the presence of two or more children age 6 or older on Census day.
- High school: dummy indicator for the receipt of a high school diploma.
- Some college: dummy indicator for having more than a high school diploma but less than than a Bachelor's degree.
- University: dummy indicator for having at least a Bachelor's degree.
- Family income: sum of male's wages, salaries, self-employment income, and investment income plus female investment income.
- Married: dummy indicator for whether the family is made of a "married" couple, including common law unions.
- Francophone: dummy indicator for whether female mother tongue is French.

Table 1. Sample Means

	1976 (25-34 Age Group)		1981 (25-34 Age Group)		1991 (35-44 Age Group)	
	ROC	Québec	ROC	Québec	ROC	Québec
% Who Had a Child	0.61	0.59	0.56	0.60	0.20	0.16
Zero older children	0.50	0.56	0.49	0.58	0.19	0.18
One older children	0.23	0.22	0.24	0.25	0.25	0.28
Two + older children	0.27	0.21	0.26	0.17	0.56	0.54
Female Age	29.35	29.39	29.70	29.60	39.43	39.41
Male Age	30.15	30.30	38.38	37.17	42.13	41.90
Female Dropout	0.48	0.41	0.34	0.29	0.25	0.29
Female H. School Grad.	0.22	0.34	0.20	0.33	0.22	0.31
Female Some Coll/Univ.	0.22	0.19	0.36	0.31	0.39	0.30
Female Bachelor's+	0.09	0.05	0.10	0.08	0.15	0.11
Male Dropout	0.44	0.38	0.28	0.23	0.23	0.25
Male H. School Grad.	0.17	0.28	0.15	0.23	0.16	0.21
Male Some Coll/Univ.	0.17	0.15	0.34	0.32	0.32	0.26
Male Bachelor's+	0.15	0.13	0.14	0.14	0.17	0.14
Female Francophone	0.06	0.81	0.06	0.87	0.06	0.84
Male Francophone	0.06	0.76	0.06	0.79	0.06	0.84
Male Wages/Salaries	-	-	16,437.27	15,690.62	35,611.29	31,662.30
Male Self-empl. Inc.	-	-	1,437.62	1,500.85	4096.91	3,385.05
Invest. Income	-	-	521.49	436.10	1,854.68	1,340.09
Number of Observations	9,185	4,168	9,142	4,337	32,789	14,188

Table 2. Short-Term Impacts: Raw Difference-in-Differences Estimates
25-34 Age Group in 1981 and 1976; 35-44 Age Cohort in 1991
(Standard Errors in Parentheses)

Panel A

		1976	1981	1991	1981-1976 Change	1991-1981 Change
Full Sample	Québec	0.5928	0.5967	0.1577	0.0039	-0.4391
		(0.0076)	(0.0074)	(0.0031)	(0.0106)	(0.0081)
	Ontario	0.6070	0.5574	0.2004	-0.0496	-0.3569
		(0.0066)	(0.0067)	(0.0029)	(0.0094)	(0.0073)
	ROC	0.6088	0.5580	0.1948	-0.0508	-0.3632
		(0.0051)	(0.0052)	(0.0022)	(0.0073)	(0.0056)
DID	Québec-Ontario				0.0535	-0.0821
					(0.0142)	(0.0109)
	Québec-ROC				0.0547	-0.0758
					(0.0129)	(0.0098)

Panel B

Family Structure		1976	1981	1991	1981-1976 Change	1991-1981 Change
Zero Older Children	Québec	0.6386	0.6408	0.2920	0.0022	-0.3488
		(0.0099)	(0.0096)	(0.0089)	(0.0138)	(0.0131)
	Ontario	0.6615	0.6394	0.3424	-0.0221	-0.2970
		(0.0089)	(0.0092)	(0.0079)	(0.0128)	(0.0121)
	ROC	0.6646	0.6362	0.3295	-0.0283	-0.3068
		(0.0070)	(0.0072)	(0.0060)	(0.0100)	(0.0094)
DID	Québec-Ontario				0.0244	-0.0518
					(0.0188)	(0.0179)
	Québec-ROC				0.0306	-0.0420
					(0.0170)	(0.0161)

Panel C

Family Structure		1976	1981	1991	1981-1976 Change	1991-1981 Change
One Older Child	Québec	0.6807	0.6722	0.2222	-0.0085	-0.4500
		(0.0153)	(0.0143)	(0.0066)	(0.0210)	(0.0158)
	Ontario	0.7311	0.6842	0.2990	-0.0469	-0.3852
		(0.0124)	(0.0129)	(0.0065)	(0.0179)	(0.0144)
	ROC	0.7420	0.6932	0.2878	-0.0487	-0.4055
		(0.0196)	(0.0098)	(0.0050)	(0.0131)	(0.0110)
DID	Québec-Ontario				0.0384	-0.0648
					(0.0275)	(0.0214)
	Québec-ROC				0.0402	-0.0446
					(0.0250)	(0.0192)

Panel D

Family Structure		1976	1981	1991	1981-1976 Change	1991-1981 Change
Two or More Older Children	Québec	0.3821	0.3421	0.0792	-0.0399	-0.2629
		(0.0162)	(0.0173)	(0.0031)	(0.0237)	(0.0176)
	Ontario	0.3807	0.2716	0.1095	-0.1091	-0.1621
		(0.0131)	(0.0120)	(0.0030)	(0.0178)	(0.0124)
	ROC	0.3962	0.2815	0.1093	-0.1086	-0.1783
		(0.0098)	(0.0092)	(0.0023	(0.0134)	(0.0095)
DID	Québec-Ontario				0.0692	-0.1009
					(0.0296)	(0.0215)
	Québec-ROC				0.0687	-0.0846
					(0.0272)	(0.0200)

Panel E: DID (Two or More Older Children) minus DID (Zero)

	1981-1976	1991-1981
Québec-Ontario	0.0448	-0.0491
	(0.0351)	(0.0279)
Québec-ROC	0.0381	-0.0426
	(0.0321)	(0.0256)

Table 3A. Short-Term Impact: Probit Estimation-Québec vs. ROC
(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	1	2	3	4
1981*Québec Dummy	0.0558	0.0937	0.0446	0.0706
	(0.0128)	(0.0359)	(0.0140)	(0.0391)
1981	-0.0336	-0.0330	-0.1302	-0.1315
	(0.0092)	(0.0093)	(0.0098)	(0.0098)
Quebec	-0.0208	-0.0188	0.0225	-0.0037
	(0.0123)	(0.0094)	(0.0129)	(0.0099)
Female*Francophone*Québec*81		-0.0057		-0.0482
		(0.0222)		(0.0212)
Married*Québec*81		-0.0376		0.0157
		(0.0330)		(0.0336)
Female HS Grad	-0.0110	-0.0110	-0.0144	-0.0145
	(0.0099)	(0.0099)	(0.0103)	(0.0103)
Female Some Coll/Univ.	-0.0112	-0.0112	0.0488	0.0491
	(0.0105)	(0.0105)	(0.0111)	(0.0111)
Female Bachelor's+	-0.0317	-0.0319	0.0791	0.0801
	(0.0110)	(0.0110)	(0.0110)	(0.0110)
Male HS Grad	-0.0110	-0.0112	-0.0120	-0.0124
	(0.0107)	(0.0107)	(0.0113)	(0.0113)
Male Some Coll/Univ.	-0.0092	-0.0095	0.0318	0.0327
	(0.0115)	(0.0115)	(0.0125)	(0.0125)
Male Bachelor's+	0.0016	0.0019	0.0748	0.0756
	(0.0105)	(0.0105)	(0.0107)	(0.0107)
Married	-0.0737	-0.0684	-0.0583	-0.0635
	(0.0184)	(0.0191)	(0.0209)	(0.0234)
Male Age<25	-0.0053	-0.0017	-0.0256	-0.0302
	(0.0185)	(0.0194)	(0.0224)	(0.0244)
Male Age∈[25, 34]	0.2162	0.2197	0.3506	0.3496
	(0.0180)	(0.0182)	(0.0129)	(0.0129)
Male Age∈[35, 44]	0.0739	0.0773	0.1071	0.1064
	(0.0182)	(0.0183)	(0.0128)	(0.0128)
Number of Observations	26,832	26,832	24,796	24,796

Table 3B. Short-Term Impact: Probit Estimation-Québec vs. Ontario
(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	1	2	3	4
1981*Québec Dummy	0.0534	0.0831	0.0410	0.0737
	(0.0142)	(0.0386)	(0.0154)	(0.0419)
1981	-0.0334	-0.0328	-0.1276	-0.1287
	(0.0116)	(0.0117)	(0.0122)	(0.0122)
Quebec	-0.0154	-0.0166	0.0278	-0.0053
	(0.0137)	(0.0103)	(0.0142)	(0.0109)
Female*Francophone*Québec*81		-0.0053		-0.0492
		(0.0222)		(0.0214)
Married*Québec*81		-0.0287		0.0083
		(0.0352)		(0.0368)
Female HS Grad	-0.0097	-0.0097	-0.0050	-0.0054
	(0.0115)	(0.0115)	(0.0120)	(0.0120)
Female Some Coll/Univ.	0.0073	-0.0072	0.0499	0.0500
	(0.0127	(0.0127)	(0.0134)	(0.0134)
Female Bachelor's+	-0.0256	-0.0257	0.0843	0.0852
	(0.0129)	(0.0129)	(0.0128)	(0.0128)
Male HS Grad	-0.0103	-0.0143	-0.0092	-0.0103
	(0.0125)	(0.0239)	(0.0131)	(0.0131)
Male Some Coll/Univ.	-0.0188	-0.0190	0.0145	0.0153
	(0.0140)	(0.0140)	(0.0150)	(0.0150)
Male Bachelor's+	-0.0048	0.0045	0.0717	0.0727
	(0.0124)	(0.0124)	(0.0125)	(0.0125)
Married	-0.0855	-0.0801	-0.0528	-0.0563
	(0.0218)	(0.0229)	(0.0246)	(0.0292)
Male Age$<$25	-0.0217	0.0143	-0.0274	-0.0313
	(0.0221)	(0.0239)	(0.0264)	(0.0301)
Male Age$\in$[25, 34]	0.2241	0.2279	0.3556	0.3542
	(0.0218)	(0.0222)	(0.0154)	(0.0154)
Male Age$\in$[35, 44]	0.0826	0.0863	0.1100	0.1089
	(0.0218)	(0.0223)	(0.0154)	(0.0154)
Number of Observations	19,394	19,394	18,107	18,107

Table 4A. Short-Term Impacts: Results by Family Structure-Québec vs. ROC
(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	1	2	3	4
1981*Québec Dummy*Zero Older Children	0.0355	0.0331	0.0520	0.0683
	(0.0175)	(0.0325)	(0.0276)	(0.0480)
1981*Quebec*One Older Child	0.0448	-0.0222	-0.0175	-0.0519
	(0.0270)	(0.0515)	(0.0269)	(0.0474)
1981*Quebec*Two+ Older children	0.0746	0.1392	0.0806	0.1539
	(0.0269)	(0.0452)	(0.0212)	(0.0385)
1981*Quebec*Zero*Francophone		0.0044		-0.0290
		(0.0314)		(0.0422)
1981*Quebec*One*Francophone		0.0740		0.0362
		(0.0476)		(0.0500)
1981*Quebec*Two*Francophone		-0.0920		-0.0873
		(0.0547)		(0.0345)
Number of Observations	26,832	26,832	24,796	24,796

Note: Other covariates are the same as those in Table 3, in addition to lower-level interactions.

Table 4B. Short-Term Impacts: Results by Family Structure-Québec vs. Ontario

(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	1	2	3	4
1981*Québec Dummy*Zero Older Children	0.0307	0.0260	0.0415	0.0599
	(0.0195)	0.0337)	(0.0303)	(0.0495)
1981*Quebec*One Older Child	0.0394	-0.0167	-0.0261	-0.0654
	(0.0299)	(0.0547)	(0.0295)	(0.0500)
1981*Quebec*Two+ Older children	0.0754	0.1333	0.0818	0.1460
	(0.0298)	(0.0485)	(0.0235)	(0.0409)
1981*Quebec*Zero*Francophone		0.0048		-0.0297
		(0.0314)		(0.0425)
1981*Quebec*One*Francophone		0.0627		0.0435
		(0.0509)		(0.0529)
1981*Quebec*Two*Francophone		-0.0812		-0.0776
		(0.0569)		(0.0368)
Number of Observations	19,394	19,394	18,107	18,107

Note: Other covariates are the same as those in Table 3, in addition to lower level interactions.

Table 5. Short-Term Impact: Francophones Only in Québec vs. ROC/Ontario
(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	Que. vs. ROC	Que. vs. Ont.	Que. vs. ROC	Que. vs. Ont.
Basic Impact:				
1981*Québec Dummy	0.0564	0.0536	0.0487	0.0447
	(0.0136)	(0.0149)	(0.0149)	(0.0163)
By Family Structure				
1981*Québec*Zero Older Children	0.0302	0.0233	0.0609	0.0507
	(0.0186)	(0.0204)	(0.0294)	(0.0319)
1981*Quebec*One Older Child	0.0614	0.0579	-0.0033	-0.0119
	(0.0283)	(0.0309)	(0.0289)	(0.0313)
1981*Quebec*Two+ Older children	0.0612	0.0646	0.0779	0.0790
	(0.0296)	(0.0320)	(0.0229)	(0.0249)
Number of Observations	25,483	18,045	23,461	16,772

Note. Other covariates are the same as those in Table 3.

Table 6. Long-Term-Term Impact: Basic Regressions
(Standard Errors in Parentheses)

	Cohort Aged 25-34 in '81 and 35-44 in '91		Cohort Aged 30-39 in '81 and 40-49 in '91	
	Que. vs. ROC	Que. vs. Ont.	Que. vs. ROC	Que. vs. Ont.
1991*Québec Dummy	-0.0634	-0.0736	-0.0392	-0.0401
	(0.0081)	(0.0091)	(0.0049)	(0.0050)
1991	-0.2080	-0.1928	-0.1791	-0.1635
	(0.0074)	(0.0092)	(0.0061	(0.0073)
Quebec	0.0938	0.1020	0.0378	0.0451
	(0.0097)	(0.0104)	(0.0060)	(0.0060)
Family Income	-0.0004	-0.0005	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0000)	(0.0001)
Francophone	-0.0803	-0.0904	-0.0298	-0.0415
	(0.0061)	(0.0071)	(0.0046)	(0.0044)
Female HS Grad	-0.0299	-0.0295	-0.0257	-0.0224
	(0.0091)	(0.0105)	(0.0050)	(0.0063)
Female Some Coll/Univ.	-0.0022	0.0010	-0.0083	-0.0058
	(0.0086)	(0.0101)	(0.0054)	(0.0056)
Female Bachelor's+	0.0430	0.0465	0.0209	0.0206
	(0.0082)	(0.0094)	(0.0048)	(0.0050)
Male HS Grad	-0.,0188	-0.0166	-0.0119	-0.0105
	(0.0094)	(0.0112)	(0.0059)	(0.0063)
Male Some Coll/Univ.	0.0055	0.0056	-0.0028	-0.0045
	(0.0090)	(0.0107)	(0.0062)	(0.0064)
Male Bachelor's+	0.0410	0.0410	0.0208	0.0203
	(0.0079)	(0.0094)	(0.0050)	(0.0052)
Married	-0.2825	-0.2977	-0.0686	-0.0642
	(0.0189)	(0.0222)	(0.0118)	(0.0127)
Male Age$<$25	0.1796	0.1673	0.1104	0.0915
	(0.0295)	(0.0337)	(0.0618)	(0.0644)
Male Age$\in$[25, 34]	0.3785	0.3824	0.3011	0.3067
	(0.0092)	(0.0109)	(0.0113)	(0.0126)
Male Age$\in$[35, 44]	0.1916	0.1906	0.0961	0.0953
	(0.0056)	(0.0067)	(0.0045)	(0.0047)
Number of Observations	60,456	43,327	44,342	38,926

Table 7. Long-Term Impacts: Results by Family Structure-Québec
(Standard Errors in Parentheses)

	25-34 Age Group		30-39 Age Group	
	Que. vs. ROC	Que. vs. Ont.	Que. vs. ROC	Que. vs. Ont.
1991*Québec*Zero Older Children	-0.0337	-0.0407	-0.0070	-0.0160
	(0.0125)	(0.0135)	(0.0103)	(0.0093)
1991*Quebec*One Older Child	-0.0338	-0.0492	-0.0188	-0.0243
	(0.0156)	(0.0166)	(0.0088)	(0.082)
1991*Quebec*Two+ Older children	-0.0844	-0.1004	-0.0517	-0.0443
	(0.0148)	(0.0160)	(0.0058)	(0.0062)
Quebec*One Older Child	-0.0267	-0.0189	-0.0130	-0.0102
	(0.0166)	(0.0188)	(0.0091)	(0.0099)
Quebec*Two+ Older Children	0.0416	0.0597	0.0273	0.0338
	(0.0204)	(0.0227)	(0.0108)	(0.0117)
1991*One Older Child	-0.0903	-0.0808	-0.0048	-0.0010
	(0.0106)	(0.0140)	(0.0085)	(0.0097)
1991*Two+ Older Children	-0.0018	-0.0086	0.1162	0.0950
	(0.0120)	(0.0158)	(0.0110)	(0.0113)
One Older Child	0.0806	0.0712	0.0014	-0.0002
	(0.0113)	(0.0145)	(0.0061)	(0.0074)
Two+ Older Children	-0.2288	-0.2427	-0.1535	-0.1579
	(0.0099)	(0.0227)	(0.0064)	(0.0082)
Number of Observations	60,456	43,327	44,342	38,926

Table 8. Long-Term Impact: Francophones Only in Québec vs. ROC/Ontario
(Standard Errors in Parentheses)

	Cohort Aged 25-34 in '81 and 35-44 in '91		Cohort Aged 30-39 in '81 and 40-49 in '91	
	Que. vs. ROC	Que. vs. Ont.	Que. vs. ROC	Que. vs. Ont.
Basic Impact:				
1991*Québec Dummy	-0.0804	-0.0900	-0.0416	-0.0475
	(0.0081)	(0.0091)	(0.0051)	(0.0049)
By Family Structure				
1991*Québec*Zero Older Children	-0.0511	-0.0574	-0.0098	-0.0216
	(0.0124)	(0.0132)	(0.0102)	(0.0088)
1991*Quebec*One Older Child	-0.0568	-0.0707	-0.0243	-0.0354
	(0.0153)	(0.0160)	(0.0085)	(0.0072)
1991*Quebec*Two+ Older children	-0.0974	-0.1125	-0.0525	-0.0510
	(0.0150)	(0.0160)	(0.0057)	(0.0057)
Number of Observations	57,658	40,529	42,844	36,336

Note. Other covariates are the same as those in Table 6.

Table A1. Annual Family Allowances Benefits per Child in Quebec, for Children 0 to 11 Years of Age

1996 Can $	First Child			Second Child			Third Child			Each Additional Child		
	Federal	Quebec	Total	Federal	Quebec	Total	Federal	Quebec	Total	Federal	Quebec	Total
1974	489.46	122.37	611.83	734.19	163.15	897.35	1142.08	203.94	1346.02	1264.45	244.73	1509.18
1976	453.90	126.07	579.97	680.68	168.54	849.23	1124.99	210.34	1335.33	1238.73	252.13	1490.86
1977	454.85	126.24	581.10	681.96	168.75	850.71	1126.99	210.62	1337.60	1609.75	252.49	1862.24
1978	448.86	152.53	601.39	672.71	204.20	876.91	1381.23	254.56	1635.79	1721.22	305.35	2026.58
1979	320.10	157.92	478.02	480.16	211.27	691.43	985.66	263.55	1249.21	1228.40	316.10	1544.51
1980	316.72	156.18	472.91	475.08	208.97	684.05	975.35	260.79	1236.14	1215.32	312.85	1528.16
1981	309.64	152.81	462.45	464.67	204.32	668.98	954.12	255.18	1209.30	1188.83	306.04	1494.87
1982	313.97	137.84	451.81	498.66	184.30	682.96	1213.69	230.18	1443.87	1213.69	276.06	1489.75
1983	314.78	138.27	453.04	499.93	184.78	684.71	1216.81	230.75	1447.56	1216.81	276.72	1493.53
1984	316.63	139.12	455.76	502.78	185.79	688.57	1223.75	232.10	1455.85	1223.75	278.24	1501.99
1985	318.15	133.91	452.06	505.28	178.82	684.10	1229.72	223.40	1453.12	1229.72	267.81	1497.53

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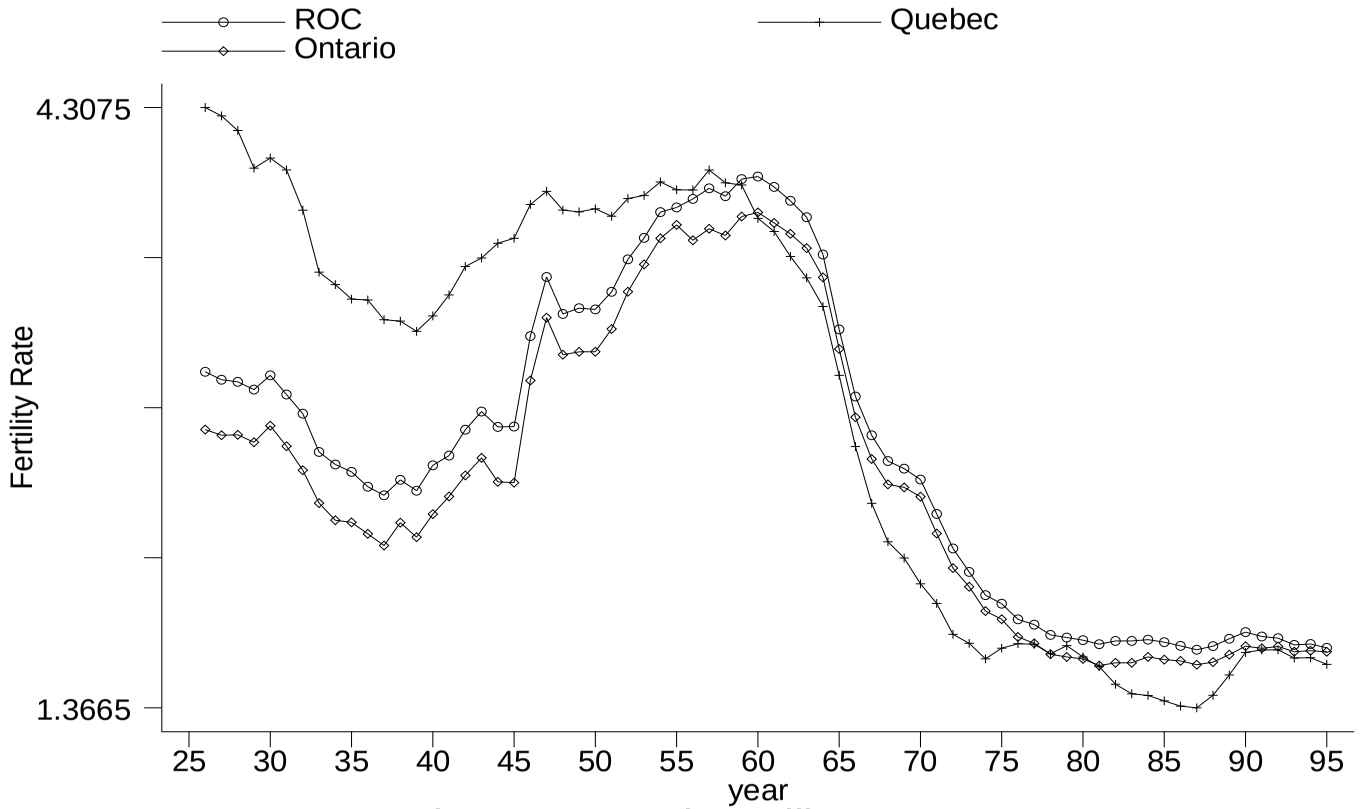

Figure 1. Total Fertility Rates

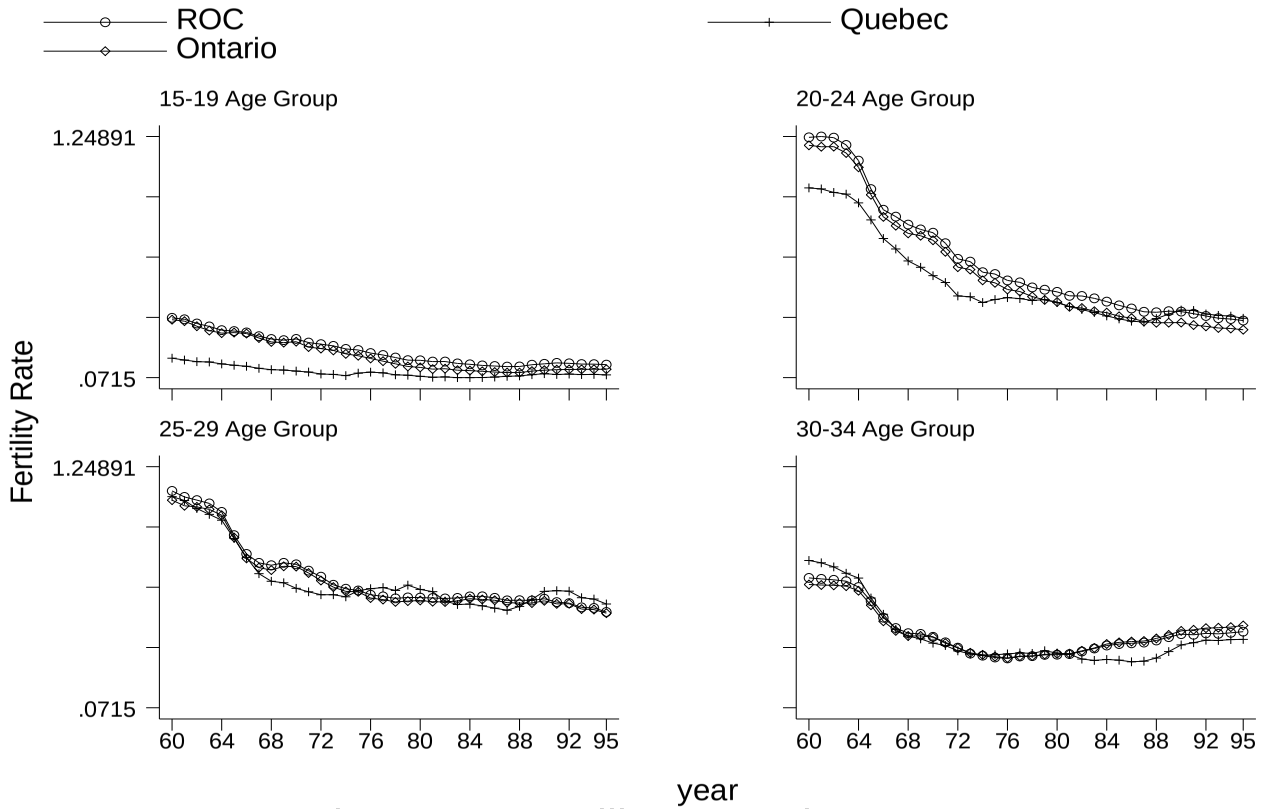

Figure 2a. Fertility Rates by Age Group

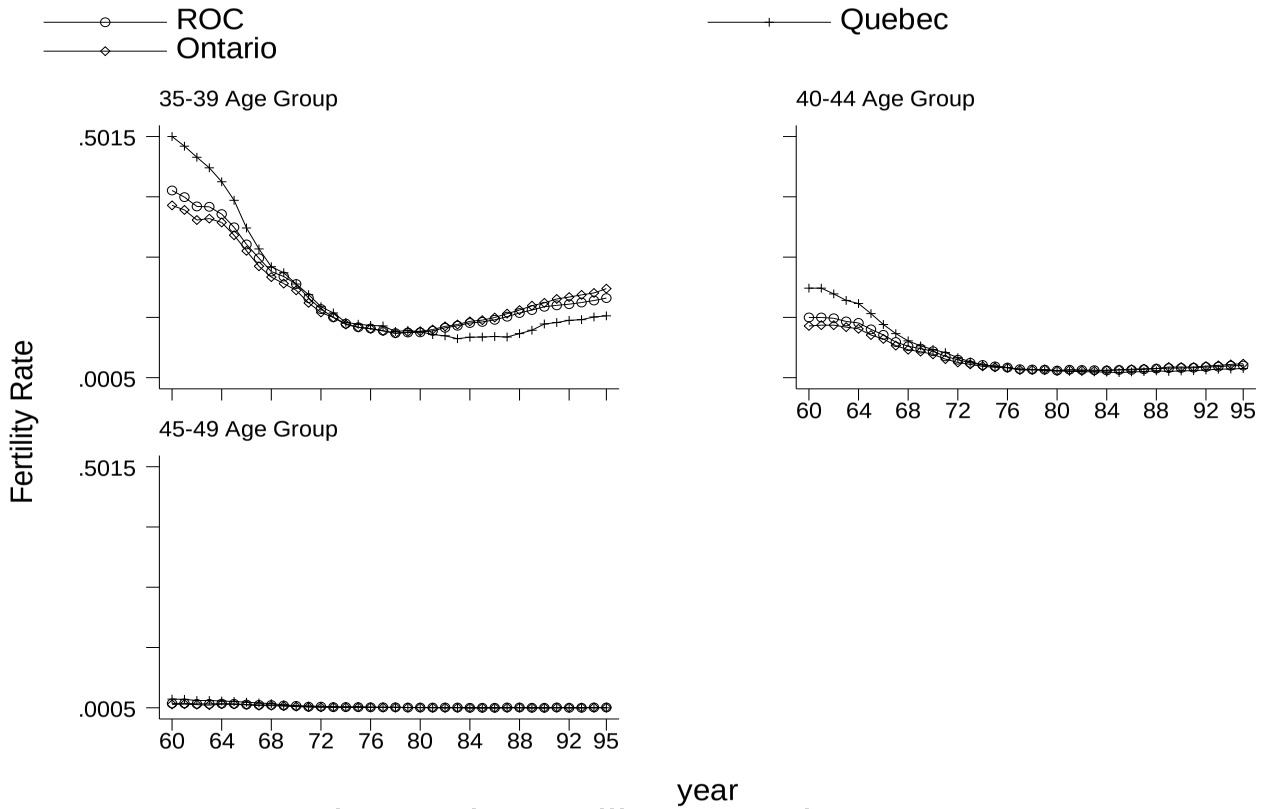

Figure 2b. Fertility Rates by Age Group

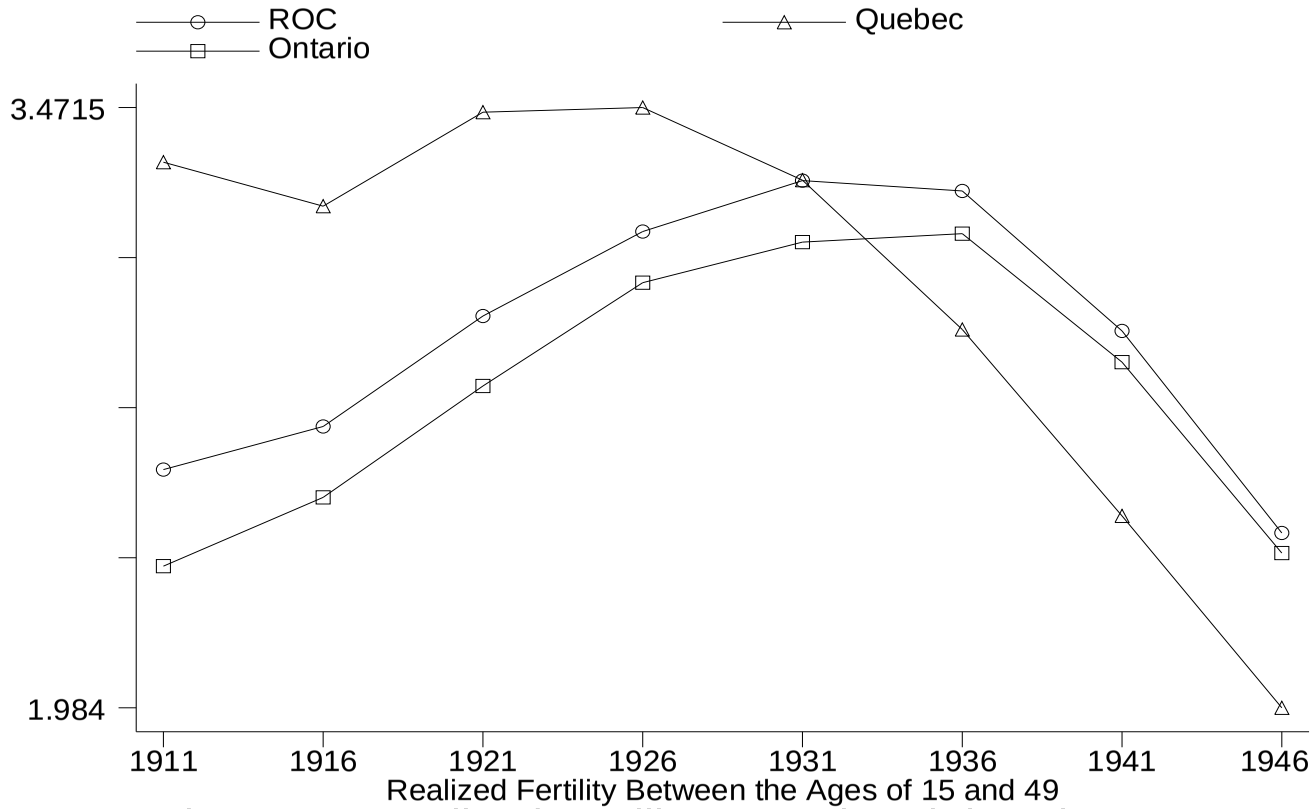

Figure 3a. Realized Fertility Rates by Birth Cohort

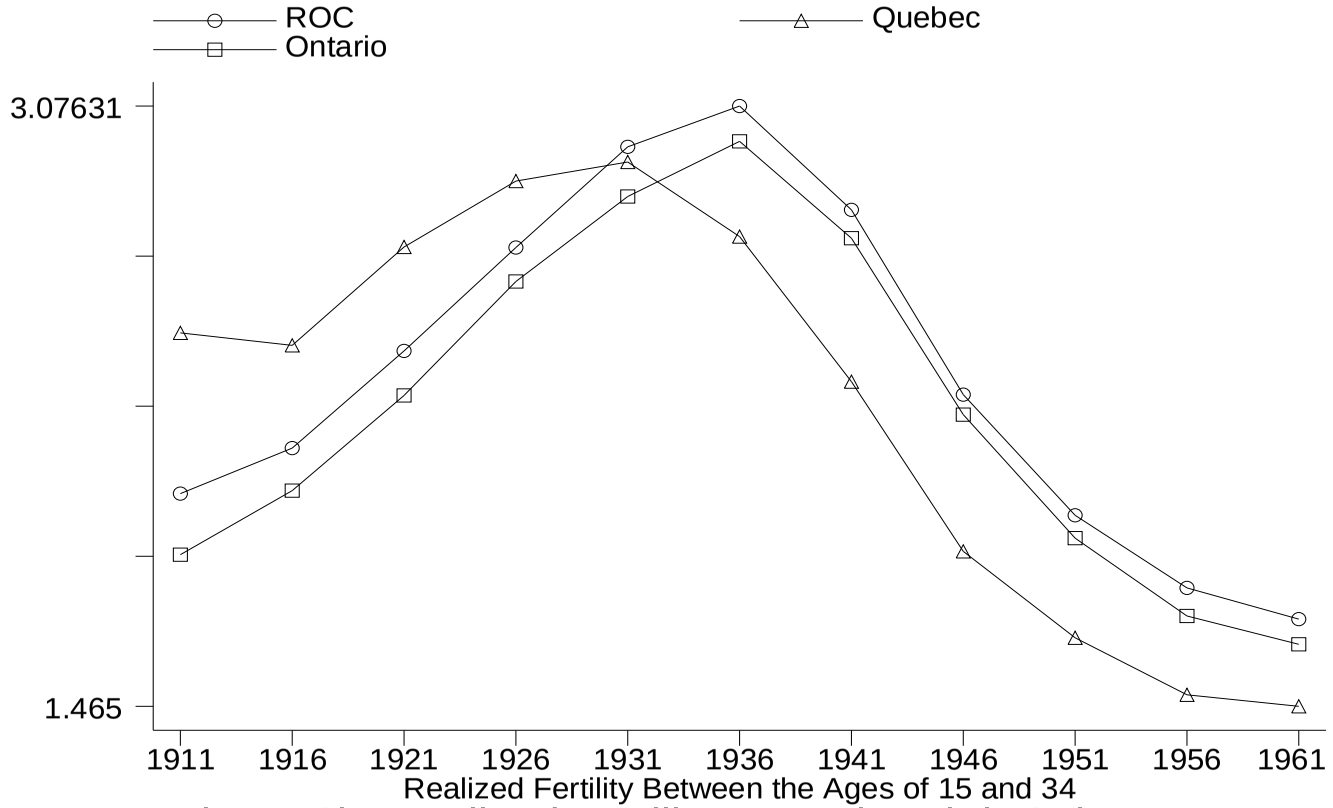

Figure 3b. Realized Fertility Rates by Birth Cohort

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