DID THE 'QUIET REVOLUTION' REALLY CHANGE ANYTHING?

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Abstract/Résumé

The year 1960 is often presented as a break year in the economic history of Quebec and Canada. It is used to mark the beginning of the "Quiet Revolution" during which Canada's French-speaking province of Quebec under rapid socio-economic change in the form of rapid economic convergence with the rest of Canada and the emergence of a more expansive state. Using synthetic control methods, we analyze whether 1960 is associated with a departure from previous developments. With regards to GDP per capita, GDP per worker, household-size adjusted income, life expectancy at birth, and enrollment rates in primary and secondary schools, we find that 1960 was not an important date. For most of these measures, the counterfactual scenario is slightly better than the actual data but not by significant margins. Only with respect to the size of government do we find sign of a break.

L'année 1960 est présentée comme une année charnière dans l'histoire économique du Québec. Cette année marque le début de la révolution tranquille et du rattrapage économique du Québec suite à la création d'un État plus interventionniste. En faisant usage de la méthode des contrôles synthétiques, nous évaluons si cette année marque véritablement un point de départ. Nous trouvons que le rattrapage économique et scolaire du Québec n'a pas accéléré en 1960. Nous trouvons un effet positif mais modeste au titre de l'espérance de vie à la naissance. Nous trouvons aussi un effet positif important au titre de la taille de l'État.

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1.   **Introduction**

Writing about changes in Quebec that took place during the 1960s and 1970s, sociologist Hubert Guindon wrote that "centuries – not decades – separate the Quebec of the 1980s from the Quebec of the 1950s" (Guindon 1988: 138). The predominantly French population of Quebec had long been one of the poorest in Canada (Raynauld 1961; Inwood and Irwin 2002; Geloso and Macera 2020; Dean and Geloso 2022) and North America (Altman 2003; Geloso 2019; Geloso 2022a). Its government had also been quite small in contrast to other provincial governments (Dupré 1988; Gow 1986; Vaillancourt 1988). By 1980, it is argued that Quebec had converged rapidly towards the rest of Canada in terms of living standards and its government became one of the largest and most proactive of all provincial governments. These changes, starting in 1960, were grouped under the nickname of the 'Quiet Revolution' as a result to a quip made by the Quebec premier Jean Lesage about reforms he was enacting.

However, like any attempt to segment history into clearly delineated periods using break dates (Le Goff 2015), the date of 1960 has been heavily contested. Many scholars pushed back arguing that Quebec was already converging towards the rest of Canada during the 1950s and that the changes in living standards during the 1960s and 1970s were either a continuation or even a mild reversal (Caldwell and Czarnocki 1977; Migué 1998; Paquet 1999; Migué and Bélanger 2007; Geloso 2013; 2017; Lemay 2016). Some even point out that the Quebec government was already showing signs of modernization and expansion pre-1960 (Paquet 1999). Others have shifted the date of the convergence to the late 1940s due to reforms to the educational system (Dean and Geloso 2022; Gagnon et al. 2022). Others criticized these claims advancing either some rebuttal data (Fortin 2001; 2022a; Fortin et al. 2022) or dismissed them as the works of "reactionaries" against statism (Montpetit and Rouillard 2001; Paquin and Rioux 2022; Fortin 2022b).

In fact, with the exception of a few contributors who did so in an indirect manner (Dean and Geloso 2022; Gagnon et al. 2022), no econometric efforts have been employed to adjudicate the different claims. In this paper, we provide the first direct estimate of whether 1960 was a break date. To do so, we rely on synthetic control methods applied on six different indicators: GDP per worker; GDP per capita; size-adjusted household income; life expectancy at birth; enrollment rates in primary and secondary schools; and government spending as a share of GDP.

The choice of method is ideal for the question. A synthetic control method creates a counterfactual Quebec (i.e., without the Quiet Revolution which we will henceforth refer to as the "synthetic Quebec") using a weighted averaged of the other provinces determined by outcomes and

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other control variables prior to 1960. This synthetic Quebec is then used to estimate how outcomes in Quebec would have evolved absent the Quiet Revolution. The difference between the observed outcomes in Quebec and the counterfactual can be considered as the causal effects of the onset of the Quiet Revolution. Given that debates over the Quiet Revolution *always* centre on comparisons with other provinces, the donor pool made up of the other provinces is ideal for our purposes.

The three measures of material living standards (GDP per worker, GDP per capita and size-adjusted household income) all show that the synthetic Quebec modestly overperformed relative to the actual data. However, these differences are not statistically significant suggesting that the Quiet Revolution did not significantly alter the pace of convergence towards the rest of Canada. The results based on life expectancy at birth suggest that improvements were faster after the Quiet Revolution and these estimates are statistically significant in most years. However, the improvements in life expectancy are minor, the estimated net gain in life expectancy for Quebec is less than half a year.. Our results for the size of government are the only consistently large and statistically significant effects. There was substantial growth in the size of Quebec's government after the Quiet Revolution.

These are important results. They suggest that it is correct to state that the state's activities expanded rapidly in 1960. We connect this result qualitatively and quantitatively to the rise of federal transfers in helping funds social spending in Quebec. They also suggest that this expansion of the state did not yield the fruits that many claim it did. At best, it did not speed up changes already underway. This finding is not only consistent with regional convergence in growth theory but it is also consistent with recent empirical findings about living standards in Quebec pre-1960.

Our paper is divided as follows. Section 2 explains the dividing lines of the debates on the Quiet Revolution. Section 3 explains our choice of method. Section 4 presents and discusses our results. Section 5 concludes.

2.   **The Quiet Revolution**

The origins of Quebec's longstanding relative poverty within Canada and North America have been long debated amongst many scholars. Some blame long-standing cultural mentalities, others emphasize the long-lasting legacy of the British conquest of Quebec in 1763, or the predominant role of the Catholic clergy over education. Regardless of which of these causes one believes to be true, all agree that the gap in living standards began in the post WW-2 era. However, the dating is different. One group (Migué 1998; Paquet 1999; Lemay 2016; Geloso 2017) believes that the convergence process was underway by 1945. The other believes that 1960 – with the onset of the Quiet Revolution

– is the crucial date (see for example Fortin 2011; 2022b; Polèse 2021; Montpetit and Rouillard 2001; Paquin and Rioux 2022; Fortin 2022b).

The division of dating is not trivial – it follows very different narratives regarding convergence. The latter group tends to be associated with social-democratic tendencies. The onset of the Quiet Revolution marked the beginning of an entirely new state-philosophy. Prior to 1960, Quebec's government is depicted as *laissez-faire* or largely conservative – even by Canadian standards (Boismenu 1981; Gow 1986; Vaillancourt 1988; Dupré 1988; 1993). Whereas other provinces had adopted universal healthcare programs or undertaken large expansion of public education in the 1940s and 1950s, Quebec left the Catholic church in charge of the provision of both services (with minimal subsidies) (Guérard 1996; Cadotte and Meunier 2011; Doray and Lessard 2016). The quality of these services, it is argued, left much to be desired. For example, French-Canadians in the province had levels of schooling comparable to African-Americans enduring segregation in the US South (Fortin 2011, p. 98) while life expectancy barely exceeded that (Piché and Bourdais 2003; Geloso 2017). Finally, business was generally conducted in English by non-francophones who generally dismissed and economically marginalized the French majority (Bélanger and Fournier 1987; Roby 1976). Most important was the fact that the "commanding heights" of the economy (e.g., electrical utilities, finance and insurance) were owned by English-speakers (Jobin 1978; Hogue et al. 1979; Bellavance 2003).

The Quiet Revolution marked a radical departure (Bouchard 2005). First, the provincial government created multiple institutions to intervene more actively in the economy. It nationalized the hydro-electric industry, representing more than 4% of total economic activity in the province, and tended to offer management positions to francophones (Bellavance et al. 1999). It created the Caisse de Dépôt et Placement du Québec to manage all governments funds – including the equivalent of social security in Quebec. Again, francophones were offered key management position within the new entity which was also entrusted – alongside other state investment bodies like the Société Générale de Financement – to direct funds for the development of Quebec businesses (i.e., owned by francophones) (Brooks and Tanguay 1985). Second, it rapidly expanded public education (at all levels), reformed educational programs and took over from the Church for the provision of educational services. Third, it also took over from the Church in terms of the provision of health services and introduced (gradually between 1960 and 1970) universal health care. Essentially, Quebec went from having one of the least interventionist states in Canada to the most interventionist.

The former group, on the other hand, is more skeptical of this ramping up of state activities as a key determinant. First, they tend to emphasize that reforms earlier in the 1940s – notably

compulsory education – were more important than those of the 1940s in terms of creating the convergence (Gagnon et al. 2022; Geloso 2017; Dean and Geloso 2021). Second, they point out that Quebec's government was not particularly different from the rest of Canada in terms of involvement in economic activity (Armstrong 1984; Paquet 1999).[1] The depiction of an exceptionally non-interventionist state is dismissed. Third, they tend to emphasize that the benefits of the reforms post-1960 are overblown and could even be negative. Indeed, these scholars tend to rely heavily on public choice theory and rent-seeking theory to argue that the rise of the interventionist state created a group of rent-seeking firms that used the state to secure their interests (Smith 1983; Palda 1994; Paquet 1999; Migué 1998; 2001; Bélanger 2007; Boyer and Elgrably-Lévy 2014).[2] However, they differ as to whether the Quiet Revolution was on net beneficial. Some state that the Revolution slowed down convergence, others state the absence of any net benefits and some state for small benefits.[3]

The debate between the two camps has been contentious. Because the common denominator in the second group has often been argued to be a classically liberal worldview, some proponents in the first group argues that they are reactionaries. While it is true that many of the scholars in that group are classical liberals, many are not. The stronger common denominator is that they tend to be nearly exclusively economists or political scientists familiar with public choice theory. As such, it is unsurprising that the reply from that latter group has been to depict the former as being economically illiterate.[4] It is unsurprising that conversations between both sides have essentially stalled and what has seeped into public discourse (when policy discussions are involved) has caused vitriolic attacks.[5]

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[1] Ranking provincial premiers based on fiscal discipline, Geloso (2022b) finds that the premier who reigned from 1944 to 1959 – Maurice Duplessis – could hardly be judged as a fiscal conservative. That premier arrived 8th out 14th for discipline. While the size of government was small under his reign, it did increase gradually (both in per capita terms and relative to the size of the economy). Moreover, the numbers of Dupré (1988; 1993) that reconstructed government accounts from 1867 suggest per capita differences in government spending that roughly match the differences in income with Ontario (the only compared province in her work). As such, Quebec was spending less because it was poorer. However, it seemed to have been spending roughly the same proportion.

[2] In this, they tend to rely on the work of Albert Breton (1964) on the economics of nationalism. They argue that nationalism is merely a vehicle for rent-seeking by a majority group that has the means to organize. Breton, while he was writing about the economics of nationalism broadly defined, did rely extensively on Quebec to make his case.

[3] Some have also moved between these positions. Geloso (2017) started with statements that the Quiet Revolution slowed down developments whereas he appears to have moved to more modest claims that the origins of the convergence have to be found much earlier (essentially downplaying the Revolution's importance) (Dean and Geloso 2021; Gagnon et al. 2022).

[4] While there are some economists in the former group – notably Pierre Fortin – the group is predominantly formed of scholars outside of economics. This is a true source of the divide.

[5] A good example of this contentiousness can be found in the work of pundits such as Éric Martin (2014; Martin and Ouellet 2014), political activists like Simon Tremblay-Pépin and Éric Duhaime public intellectuals like Mathieu Bock-Côté (2012) and popular radio show hosts Jeff Fillion and Dominic Maurais.

This stalling of the conversation can only be resolved by a rigorous econometric investigation of whether the Quiet revolution changed the course of Quebec's economic evolution and the nature of the state. This is why, in the next section, we rely on the use of synthetic control methods to break the deadlock.

3.   **Data and Methodology**

   3.1. The Synthetic Control Method

The goal of our empirical analysis is to test whether the policy reforms associated with the Quiet Revolution of 1960 represent a break point in the development of Quebec's economy. We use a variety of macroeconomic indicators including GDP per worker, GDP per capita, size-adjusted household income, life expectancy at birth, enrollment rates in primary and secondary schools, and government spending as a share of GDP to test this hypothesis. The synthetic control method is used to estimate the causal effects of the Quiet Revolution on our six indicators.

   Synthetic control was originally developed by Abadie and Gardeazabal (2003) and Abadie, Diamond, and Hainmueller (2010) and has since been used in numerous applied studies in economics (Acemoglu et al. 2014; Bohn, Lofstrom, and Raphael 2014; Cunningham and Shah 2018; Geloso and Grier *forthcoming*; Grier and Maynard 2016; Geloso and Bologna Pavlik 2021).[6] The purpose of synthetic control is to perform quantitative case studies of aggregate units to answer questions related to the effect of policy interventions or other events. However, instead of comparison units being chosen with complete discretion by the researcher, a data-driven process is used to create a counterfactual (synthetic) control unit from a donor pool of units. The donor pool of units is chosen by the researcher and intended to represent a group of units that is similar to the treated unit. The synthetic control unit will track the real outcomes in the period prior to intervention. If the identifying assumptions are met, the difference between the real and synthetic outcomes observed post intervention are the estimated treatment effect of the policy intervention or other event.

   Abadie (2021) suggests there are three primary data requirements to credibly apply the synthetic control method. These requirements include aggregate data on predictors and outcomes, sufficient pre-intervention information, and sufficient post-intervention information. The data we use in our analysis (see section 3.3. below) meets all three requirements. We have yearly aggregate data on all predictors and outcomes at the province level from 1945 to 1975. This gives us 15 years of pre-

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[6] See Abadie (2021) for a formal exposition of the synthetic control method as well as practical advice for applying the method.

intervention data and 15 years post-intervention data where 1960 marks the year of intervention. Under these conditions, we can use the synthetic control method to construct a synthetic Quebec in which the Quiet Revolution did not occur and compare it to the actual outcomes for Quebec.

Given a set of donor pool units and predictors, weights are assigned determining the importance of each donor unit and predictor in the creation of synthetic Quebec. Our donor pool consists of the other Canadian provinces except for Newfoundland.[7] Following Geloso and Grier (forthcoming), the logic of using the other Canadian provinces as our donor pool rests on two facts. The provinces share the same currency, and over the period of interest, have increasingly similar underlying macroeconomic processes. For these two reasons, we can be confident the identifying assumptions of synthetic control method are satisfied such that the post-intervention differences between actual outcomes and synthetic outcomes represent estimates of causal treatment effects. The predictor variables we use include pre-intervention outcomes and variables that affect those outcomes. In each specification, a donor pool unit receives more weight the better it predicts pre-intervention outcomes in Quebec and similarly for predictors. The resulting donor unit weights and predictor weights minimize the mean squared prediction error between Quebec and synthetic Quebec.[8]

It should be noted that minimizing the mean squared prediction error does not guarantee that outcomes for synthetic Quebec closely track actual outcomes for Quebec. The synthetic control estimation provides the best possible match given the available pool of donor units and predictors. There is the possibility that in situations where outcomes for Quebec lie far outside those for the other provinces, the resulting synthetic Quebec is a poor match.

For our purposes, there are two virtues of the synthetic control method. First, it tells us what would have happened if Quebec had continued to behave like its counterfactual. It does not create a counterfactual where the state remains *exactly* as it was in 1960. The counterfactual tells us if Quebec's changes in 1960 were different than changes elsewhere and if these changes can explain the convergence. Second, if the fit in the pre-treatment period is weak, it suggests that there might be another shock occurring that matters more than the one we chose to study. In our case, if the fit in the 1945-60 (i.e., our pre-treatment period) is weak, it means that the period is *not* a pre-treatment period. If the fit is strong, but there are no differences between the counterfactual and the actual in

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[7] Newfoundland did not officially become a province until 1949 and is missing data across all indicators in the years from 1945 to 1948. Due to the missing data, we are unable to use Newfoundland as a unit to match outcomes during the pre-intervention period.

[8] Weights on the donor pool units are restricted to non-negative values and must sum to one. These restrictions ensure that the estimated synthetic Quebec lies within the convex hull of actual outcomes for Quebec (Abadie, 2021).

the treatment period, then we can say that the treatment was not significant. This second virtue will matter heavily when considering one of the criticisms of the second group of scholars who claim that the seeds of convergence were sown in the 1940s.

The above two virtues stem from three technical advantages of the synthetic control method as proposed by Abadie (2021) which have been adapted to our application: 1) Straightforward verification that the assigned weights making up the synthetic control unit sum to one and therefore are free from extrapolation; 2) The difference between the actual Quebec data and the synthetic Quebec will be clearly observable in the pre-intervention and post-intervention periods giving a visual of how well the synthetic unit fits the actual data prior to the Quiet Revolution; 3) The makeup of the synthetic control unit can be shown for each test making clear which provinces are contributing to our counterfactual Quebec. These advantages will allow us to provide a strong empirical evaluation of the claim that the Quiet Revolution represents a historical break in the economic fortunes of Quebec from 1960 through 1975.

We implement synthetic control using the R package developed by Jens Haimueller and Alexis Diamond.[9] The package uses optimization algorithms to find the combination of predictor and donor unit weights that minimize the mean squared prediction error (MSPE) in the pre-intervention period.[10] There are several optimization methods that can be chosen; however, we rely on the default "Nelson-Mead" and "BFGS" optimization.[11] Both methods are used to construct the synthetic control and the method yielding the lowest MSPE is chosen. The weights selected by the best method are used as a distinct synthetic Quebec for each of our six indicators.

3.2 Inference

Following Cavallo et al. (2013) and the procedure provided in Galiani and Quistorff (2017), we conduct inference on the estimated treatment effects in Quebec by first falsely assigning treatment to all donor units and estimating placebo treatment effects in the post intervention period. This produces a distribution of treatment effects in each year post-intervention that can be compared to the estimated treatment effects for Quebec. The treatment effects are studentized by dividing by their respective pre-intervention match quality given by the root mean squared prediction error (RMSPE). Some

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[9] See the following link for 'synth' package documentation, https://cran.r-project.org/web/packages/Synth/Synth.pdf
[10] The MSPE is the normalized difference between the values of predictors for the treated unit and all donor pool units. The smaller this value is, the closer the synthetic control unit tracks real outcomes. See Abadie (2021) for the formalization of this optimization problem.
[11] For details of the optimization methods as implemented in R see, https://www.rdocumentation.org/packages/optimx/versions/2022-4.30/topics/optimx

placebos may produce large treatment effects but track real outcomes in the pre-intervention period poorly (i.e., high RMSPE). Dividing by RMSPE discounts those effects producing a distribution of treatment effects in each period weighted by the quality of pre-intervention fit.

We sum the number of placebo treatment effects at least as large as the Quebec treatment effect in absolute value and divide by the number of donor units to calculate two-sided p-values for treatment effects in each period t.[12] This is captured by the following equation:

$$p - value = Pr(|\widehat{\alpha_{jt}^{PL}}| \geq |\widehat{\alpha_{1t}}|) = \frac{\sum_{j>1}^{J} I(|\widehat{\alpha_{jt}^{PL}}/RMSPE_j| \geq |\widehat{\alpha_{1t}}/RMSPE_1|)}{J}$$

$\widehat{\alpha_{jt}^{PL}}$ and $\widehat{\alpha_{1t}}$ are the estimated treatment effects for the placebo units and actual treated unit respectively, where the effect is the difference between actual outcomes and synthetic outcomes for each unit in period t. $RMSPE_j$ and $RMSPE_1$ are the pre-intervention root mean squared prediction errors for each placebo and Quebec. J is the number of placebo countries which is equal to the number of donor units. Given the small number of donor units, Quebec treatment effects are only statistically significant if there are no placebo effects at least as large to give a p-value equal to 0.

3.3 Data

We collect data on our outcome and predictor variables for the Canadian provinces from 1945 to 1975 using various publicly available databases and secondary sources. Real GDP per worker, real GDP per capita, and nominal GDP are all collected from the online Finances of the Nation Macroeconomic Database.[13] Real GDP figures from this database are deflated using a CPI to 2020 Canadian dollars. We also use household-size adjusted income per capita (Geloso et al. 2016). Data on school enrollment and nominal government expenditures were collected from the *Canada Year Book* Historical Collection.[14] School enrollment covers public, private, and federal primary and secondary schools across Canada. Total enrollment data from these sources is missing for all provinces in 1948, 1954, 1955, and 1966-1968. Those missing values are imputed via linear interpolation. Total enrollment is converted to a ratio of school age population using population data for ages 5 to 19 from the Statistics Canada database. Government expenditures are defined as gross general expenditures from 1945 to 1947 and again from 1965 to 1975, gross ordinary expenditures from 1948 to 1957, and net general expenditures from 1958 to 1964. This is problematic in terms of level but not in terms of evolution over time (Dupré 1988). Life expectancy from birth (males and females) data is collected from the

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[12] t indexes the post-intervention years 1961-1975 such that $t = \{1, \dots, 15\}$.
[13] https://financesofthenation.ca/macrodata/ (will put the full correct citation in later).
[14] https://www65.statcan.gc.ca/acyb_r000-eng.htm

Canadian Human Mortality Database. We convert raw life expectancy data to a life expectancy index, setting life expectancy in 1945 equal to 100 for each province. Summary statistics for the six outcome variables and other predictors used in our estimations are reported in Table 1.

[Table 1 Here]

4. Results and Discussion

4.1 Material living standards

Table 2 reports the makeup of the estimated synthetic Quebec for each of our material living standards indicators. Synthetic Quebec for the first indicator, Real GDP Per Worker, shown in the second column is primarily comprised of Manitoba (66.6%) and the remaining contributions are from Ontario (22.6%) and Prince Edward Island (10.8%). In contrast, the provinces primarily making up synthetic Quebec in our specification for Real GDP Per Capita shown in the third column are Ontario (49.7%) and Prince Edward Island (25.7%) and the other substantial contributions come from Saskatchewan (14.8%) and Nova Scotia (9.4%). The synthetic Quebec estimate for the third indicator, size-adjusted household income, shown in the fourth column closely matches that for Real GDP Per Capita with Ontario (44.1%) and Prince Edward Island (47.4%) making up the majority of the unit and Nova Scotia (6.1%) being the other substantial contribution. We will discuss the fit and results of each material living standards synthetic control separately below.

[Table 2 Here]

4.1.1 Real GDP Per Worker

Table 3 shows the predictor balance between Quebec and synthetic Quebec for Real GDP per worker. Pre-intervention outcomes in 1945, 1952, and 1959 and the pre-intervention averages of government spending as a percentage of GDP and population are used to predict real GDP per worker. Most of the predictive weight comes from pre-intervention outcomes which together account for over 75 percent of the predictive power.[15] As a result, pre-intervention outcomes are the most balanced predictors between Quebec and synthetic Quebec. Average population stands out as poorly balanced between the two units, however, the variable minimally contributes to the predictive power of the synthetic unit. Despite the unbalanced predictors, the synthetic Quebec tracks Quebec well. The

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[15] Only three years of pre-intervention outcomes are used to estimate the synthetic control to avoid overfitting (may need to change this, read conflicting things about choosing predictors in synthetic control).

RMSPE reported in Table 3 provides a summary measure for the match quality of synthetic Quebec which is around $886. Average GDP across all provinces in the pre-intervention period is $42,052, the RMSPE for the synthetic control represents only 2% of this average.

[Table 3 Here]

The fit of synthetic Quebec in this specification can be visually inspected in the top panel of Figure 1. Real GDP per worker in Quebec is closely tracked by real GDP per worker of synthetic Quebec. This provides useful qualitative information for the reliability of our synthetic unit as a relevant counterfactual. The two units continue to track each other well in the post-intervention period. Recall that synthetic Quebec is estimated using only data from the pre-intervention period, outcomes in the post-intervention period are projected using the assigned weights. The bottom panel of Figure 1 shows the estimated treatment effects from 1961 to 1975 on real GDP per worker as the difference between Quebec and synthetic Quebec.

[Figure 1 Here]

We estimate a positive effect on real GDP per worker which is highest in 1961 at nearly $2,000. These positive effects diminish until going negative starting in 1967. The negative effects on real GDP per worker continue, apart from a small positive effect in 1972, until the end of our sample. The declines in real GDP per worker found in the post-intervention period are cumulatively much larger than the estimated positive effects. Summing the treatment effects from 1961 to 1975, there is $11,700 decline in GDP per worker during the post-intervention period, equivalent to 16% of average real GDP per worker for synthetic Quebec from 1961 to 1975. Although the effects are large, they are statistically insignificant as shown by the p-values above and below the treatment effect bars in the bottom panel of Figure 1. The lack of statistical significance suggests that 1960 does not represent a break point in Quebec's economic history. The closest we come to finding a statistically significant effect is in 1961 and later in 1973, even then the p-values are a high 12.5% indicating that one other province in our donor pool for which we falsely assigned Quiet Revolution intervention had a larger standardized effect relative to its synthetic counterpart. Similar results are found for the other two measures of material living standards.

4.1.2 Real GDP Per Capita

We use a similar set of predictors to estimate synthetic Quebec for real GDP per capita. Table 4, showing the predictor balance between synthetic Quebec and Quebec for real GDP per capita also shows that pre-intervention outcomes produce most of the predictive power in our estimates. The RMSPE we find in this estimation is also low reflecting a high-quality match between Quebec and synthetic Quebec that is confirmed in the top panel of Figure 2 which plots real GDP per capita in Quebec and synthetic Quebec from 1945 to 1975.

[Table 4 Here]

Shown in the bottom panel of Figure 2 are our estimated treatment effects which are both positive and negative, though the effects for real GDP per capita are smaller in magnitude than those for real GDP per worker. The cumulative effect is a $6,240 decline in real GDP per capita in Quebec relative to synthetic Quebec. Importantly, these results are also statistically insignificant. There is little evidence that the Quiet Revolution had an effect on real GDP per capita distinct from that for the placebo units.

[Figure 2 Here]

4.1.3 Size-adjusted Household Income

Our final measure of material living standards for which we estimate a synthetic Quebec is size-adjusted household income. Table 5 reports the balance and fit for this synthetic Quebec. Once again, the synthetic Quebec relies heavily on pre-intervention outcomes to predict actual outcomes for Quebec leading to a strong balance in our three pre-intervention outcome predictors. Balance for the other two predictors is weak, however, we still obtain a strong match between synthetic and actual Quebec. The RMPSE for this synthetic Quebec represents 3% of the average for household income in the pre-intervention period. The top panel of Figure 3 also shows that household income in Quebec is closely tracked by synthetic Quebec in the pre-intervention period.

[Table 5 Here]
[Figure 3 Here]

The bottom panel of Figure 3 shows our estimated treatment effects for household income, which in this case are more consistently negative than the other two measures of living standards with only marginally positive gains estimated in the first two years following 1960. These effects are small in magnitude relative to those found for the other measures of material living standards and similarly are statistically insignificant. The cumulative decline in household income between 1960 and 1975 for Quebec relative to synthetic Quebec is $8,254. The results of our synthetic control estimates across the three measures of material living standards provide little evidence that the Quiet Revolution can justifiably be considered a break point in the development of Quebec's economy.

If anything, living standards would have been higher in Quebec absent the Quiet Revolution especially during the 1970s. This claim, however, can only be weakly made given the lack of statistical significance found for the estimated treatment effects across all measures and does not support the contention in the historical literature that the Quiet Revolution caused a substantial shift in economic performance. The other provinces of Canada experienced similar changes over this time such that the attribution of changes in living standards to the Quiet Revolution in Quebec is unfounded.

4.2 Life expectancy at birth

Now we turn to our results for life expectancy. Synthetic Quebec in our specification estimating the effects of the Quiet Revolution on life expectancy is mostly made up of British Columbia (43.3%) and New Brunswick (53.5%) with minor contributions from Alberta, Nova Scotia, Prince Edward Island, and Saskatchewan as shown in Table 6. The use of a life expectancy index allows us to estimate a synthetic Quebec that tracks actual Quebec well. Most of the predictors, except for the average of the life expectancy index, are not well balanced but the RMSPE reported in Table 7 is much lower than the average RMSPE for the placebo units. There are significant deviations between Quebec and the synthetic unit in the pre-intervention period as shown in the top panel of Figure 4, however, the two follow similar trends over time. Quebec begins to diverge from synthetic Quebec a few years prior to 1960 and continues from 1960 on. It is important to note that despite the divergence prior to intervention, we will be able to calculate statistical significance as our treatment effects will account for the pre-intervention RMSPE.

[Tables 6 and 7 Here]

[Figure 4 Here]

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We find that there are small statistically significant effects on life expectancy after 1960 shown in the bottom panel of Figure 4. These effects are reported as the percentage difference between the life expectancy index values for Quebec and synthetic Quebec. Positive effects ranging from under 0.5% to 2% are found in all 15 post-intervention years, and 8 of those effects are statistically significant. Life expectancy in Quebec increased faster relative to its 1960 value than it did for synthetic Quebec. If we convert the life index values to life expectancy in years, we find that Quebec gained around 2.26 years in life expectancy between 1960 and 1975. Synthetic Quebec gained 2.15 years in life expectancy over the same fifteen-year period. The net effect (2.26 minus 2.15) is a miniscule gain in life expectancy for Quebec relative to synthetic Quebec. While the results are consistently positive and some are statistically significant, the magnitudes of the effects hardly constitute what would be considered a dramatic shift in outcomes.

4.3 Enrollment rates

The final indicator we use to estimate the impact of the Quiet Revolution on Quebec is enrollment rates in primary and secondary schools. Enrollment rates in Quebec prior to the Quiet Revolution are substantially lower than those for the other provinces and rapidly increase in the years leading up to 1960. These two features make it difficult to produce a well-matched synthetic Quebec. The synthetic Quebec for enrollment rates that we estimate is a combination of New Brunswick (34%) and Prince Edward Island (66%) as reported in Table 8. Table 9 shows that the predictors used to estimate the synthetic unit are poorly balanced and result in a RMSPE that is nearly eight times larger than the average RMSPE for placebo units. The poor match in pre-intervention trends for enrollment rates is also shown in the top panel of Figure 5. Enrollment rates in Quebec lie below those for synthetic Quebec over the entire pre-intervention period.

[Tables 8 and 9 Here]

[Figure 5 Here]

The bottom panel of Figure 5 reports the estimated treatment effects. Most of these effects are statistically insignificant, as would be expected from the poor match between Quebec and synthetic Quebec. We interpret this as the Quiet Revolution having no effect on enrollment rates in Quebec. Bringing our attention to actual enrollment rates reported in the top panel of Figure 5 once again, enrollment clearly begins increasing long before 1960, likely due to factors other than the Quiet

Revolution. Furthermore, the two statistically significant treatment effects in 1961 and 1969 roughly cancel each other out.

4.4 Government size

The results for the size of government provide the most convincing evidence for a historical break associated with the Quiet Revolution. Table 10 shows the weights on control units making up synthetic Quebec in this specification. Ontario (79%) again makes up most of synthetic Quebec and Saskatchewan (19.4%) contributes substantially. Table 10 shows the predictors for this synthetic Quebec are relatively well balanced especially in the three years of government expenditure share and four years of public-school enrollment which drive most of the predictive power of the synthetic. Synthetic Quebec tracks actual Quebec very well in this specification as shown in the top panel Figure 6 and the RMSPE reported in Table 11.

[Tables 10 and 11 Here]

[Figure 6 Here]

The bottom panel of Figure 6 presents our main results for this estimation. There are large and statistically significant positive effects for the size of government relative to GDP after 1960. These effects represent a shift in the economy of Quebec as the government commanded more resources. By 1975, government expenditures as a share of GDP in Quebec were 4.7 percentage points higher relative to synthetic Quebec. Using the weights of synthetic Quebec to get an estimate of nominal GDP, this 4.7 percentage point increase in government expenditures is equivalent to $2.7 billion (nominal) in government spending that would not have occurred absent the Quiet Revolution. This also may speak to why so many historians have viewed the Quiet Revolution as a break point in history. With government growth happening at this pace there would be substantial changes to how the economy operated.

4.5 Discussion

Our findings are mixed. With regards to health outcomes and size of government, it appears that the Quiet Revolution did mark a departure relative to the rest of Canada. As such, it appears that it is true that Quebec's government became more strongly interventionist after 1960 and that there were some benefits with regards to health outcomes. However, that effect is small and it is not echoed on other metrics of well-being such as income and educational outcomes. This suggests that the results fall between the two existing camps. The Quiet Revolution was not a benefit. However, it was not a drag

either. On the whole, its effects were trivial. How much confidence can we assign to these results? Are they consistent with other findings? How can they be interpreted? There are three answers to these questions.

First, Albouy (2008), Nadeau (2010), Vaillancourt (1988; 2020), Geloso (2017), Dean and Geloso (2022) and Gagnon et al. (2022) made findings that confirm our results regarding material living standards by considering the within-Quebec wage gap between French-speaking and English-speaking workers. These articles are the only ones that deploy econometric efforts in the matter. They all found that wage gaps were *far* smaller among younger French-Canadians so that, by the early 1970s, they were as rich as English-Canadians in the province. They also find that they had begun to converge before the 1960s. [1] Dean and Geloso (2022) found that convergence had begun between the 1941 and 1951 censuses and that it continued unabetted to the 1971 census. Their work essentially points to convergence being a process already underway by 1961. As French-speaking workers represented the vast majority of Quebec workers (more than 80%), our findings of no effect of the Quiet Revolution on incomes is unsurprising.

Second, Gagnon et al. (2022) found that the francophone-anglophone convergence could be largely due to educational reforms – notably compulsory zero-priced education – enacted during the 1940s. [16] This is evident from the Geloso work on education and our results on enrollments. The synthetic's weak fit pre-1960 is probably due to compulsory education being a more significant reform than the changes enacted during the Quiet Revolution. These educational reforms of the 1940s would have yielded visible fruits only during the 1960s and 1970s as children exited schools and entered the workforce. It would have reinforced any other ongoing convergence process. This also reinforces our results for finding no effects of the Quiet Revolution.

These answers are, at first glance, problematic. How could there be a large expansion of the state with no changes in outcomes? One answer would be that the evidence connecting welfare states adversely to economic growth tends to be weak (Bergh 2020; Lindert 2004a, 2004b; 2021). This is a strong possibility. However, it is not mutually exclusive with a second answer: Quebec didn't have to pay for the expansion of its state. Starting in the late 1950s and early 1960s, federal transfers to provinces increased dramatically – especially those to poorer provinces like those of Atlantic Canada

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[16] Quebec was a late-comer to compulsory zero-priced education (by many decades). At the turn of the 20th century when compulsory education was uncommon in Canada, Quebec had rates of school of participation (after adjusting for daily attendance) that were comparable to the rest of Canada (Minns et al. 2007). By 1940, it had fallen behind considerably. After compulsory education was finally introduced, there was a rapid increase in school attendance and completion such that by 1960, Quebec had essentially closed the gap in high school participation rates.

and Quebec (Usher 1980; 1995; Boadway and Flatters 1980; Dahlby 2011; Geloso 2017). Federal transfers of all forms – see right panel of figure 7 below – surged gradually to represent close to 5% of the provincial economy in 1975. That proportion is roughly equal to the gap between the synthetic control and the actual scenario (see right panel of figure 7 below) throughout the period from 1960 to 1975. In fact, since transfers before the ramping-up of the 1960s stood at between 0.5% and 1% of GDP, we can subtract that proportion from the right-side panel of figure 7 to get an idea of the effect of *additional* transfers. In such a case, the near totality of the treatment effect appears to be represented by these additional transfers. This echoes numerous scholars who were skeptical of the Quiet Revolution's importance and argued that it was largely fueled by federal transfers (Bélanger and Migué 2007; 2013; Vaillancourt and Laberge 2010). This is consistent with our findings regarding the size of government. The onset of the Quiet Revolution occurred simultaneously with the ramping up of federal transfers to provinces which suggests that the expansion of the state was essentially made possible by them. That is even if the expansion had no noticeable on most outcomes (except life expectancy).

5.   **Conclusion**

In this paper, we revisited a contentious and unresolved question in Canadian economic history: was Quebec's Quiet Revolution – a series of momentous state reforms in the 1960s and 1970s -- the cause of the province's gradual catching-up in terms of living standards? Resolution of the question has been elusive for decades. Using a synthetic control approach – a method ideally suited for this question – we believe that we have provided a strong step forward.

Our results suggest that the Quiet Revolution was indeed a departure in terms of what the state did. Quebec's state grew exceptionally larger than it otherwise would have had had it not been for the Quiet Revolution. We also find signs that some outcomes improved – notably life expectancy at birth. However, we find no signs of improvements for other outcomes. This is an important finding because it suggests that the Quiet Revolution was not a drag as some (Migué 1998; Paquet 1999; Geloso 2017) have suggested. However, it also suggests that it was no boon to economic activity and that it was in no way responsible for Quebec's convergence.

As such, on a spectrum between the two existing camps, our results fall in the middle with a slight favor towards those who downplay the Revolution's importance. The favor is due to two elements. First, our findings with regards to education suggest that the convergence process was indeed present since the 1940s. Second, the expansion of the state was made largely possible by federal

transfers to Quebec. They financed more generous social programs and a more interventionist stance with regards to development even though they appear to have had only limited benefits.

We believe our results are a step forward because they now force the conversation to move on to *which* factors pre-1960 mattered for initiating the convergence. Proceeding by elimination is a step forward after all.

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Tables and Figures

Table 1

Summary statistics of outcome and predictor variables

Variable	Years	Mean	Std. Dev.	Min	Max
Enrollment Rate	31	0.795	0.062	0.531	0.922
Government Expenditure Share	31	0.104	0.061	0.029	0.333
Life Expectancy at Birth	31	70.92	2.21	63.76	74.25
Real GDP Per Capita	31	19677.15	8302.85	6132.73	52171.68
Real GDP Per Worker	31	55665.03	19430.87	17702.92	120783.49
Size-adjusted Household Income	31	19620.83	6926.22	7851.28	41319.30

Table 2
Province weights in synthetic control models of material living standards for Quebec

Control Units	Real GDP Per Worker	Real GDP Per Capita	Size-adjusted Household Income
Alberta	0	0.001	0
British Columbia	0	0	0
Manitoba	0.665	0.003	0.024
New Brunswick	0	0.001	0
Nova Scotia	0	0.094	0.061
Ontario	0.226	0.497	0.441
Prince Edward Island	0.108	0.257	0.474
Saskatchewan	0.001	0.148	0

Table 3
Predictor balance and weights and synthetic fit for Real GDP Per Worker in Quebec

Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg. Gov. Expenditure Share	0.045	0.049	0.23	0.067
Avg. Population	4190380	1631388	0.01	1245502
Real GDP Per Worker 1945	36707	38362	0.114	34662
Real GDP Per Worker 1952	45217	44787	0.275	42550
Real GDP Per Worker 1959	54492	55820	0.37	52606
RMSPE		**886.15**		**4566.39**

Table 4
Predictor balance and weights and synthetic fit for Real GDP Per Capita in Quebec

Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg. Gov. Expenditure Share	0.045	0.063	0.098	0.067
Avg. Population	4190380	2613348	0.108	1245502
Real GDP Per Capita 1945	12976	13938	0.645	12506
Real GDP Per Capita 1952	15869	16033	0.149	14924
Real GDP Per Capita 1959	17748	18067	0	17322
RMSPE		**430.14**		**1230.09**

Table 5
Predictor balance and weights and synthetic fit for Size-adjusted Household Income in Quebec

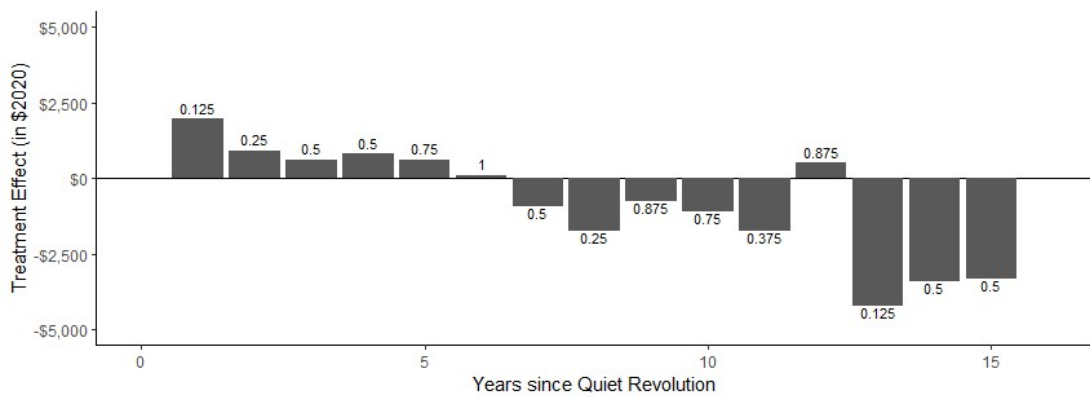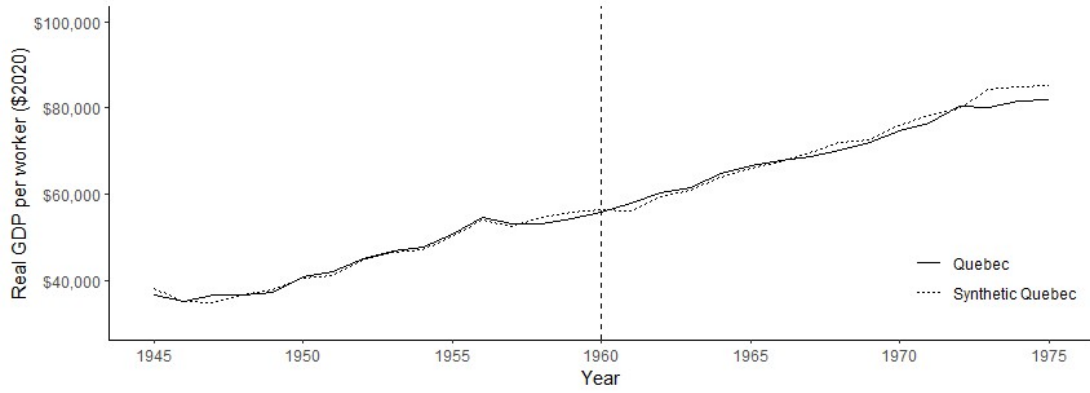| Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg Government Expenditures/GDP	0.045	0.071	0.073	0.067
Avg Population	4190380	2234097	0.059	1245502
Adj. HH Income 1945	13101	13991	0.017	13832
Adj. HH Income 1952	14396	14996	0.622	15567
Adj. HH Income 1959	16588	17053	0.23	17276
RMSPE		**457.27**		**1604.04**

Figure 1 Real GDP per worker (in $2020) for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on real GDP per worker, p-values of effects shown above(below) each effect (bottom panel).
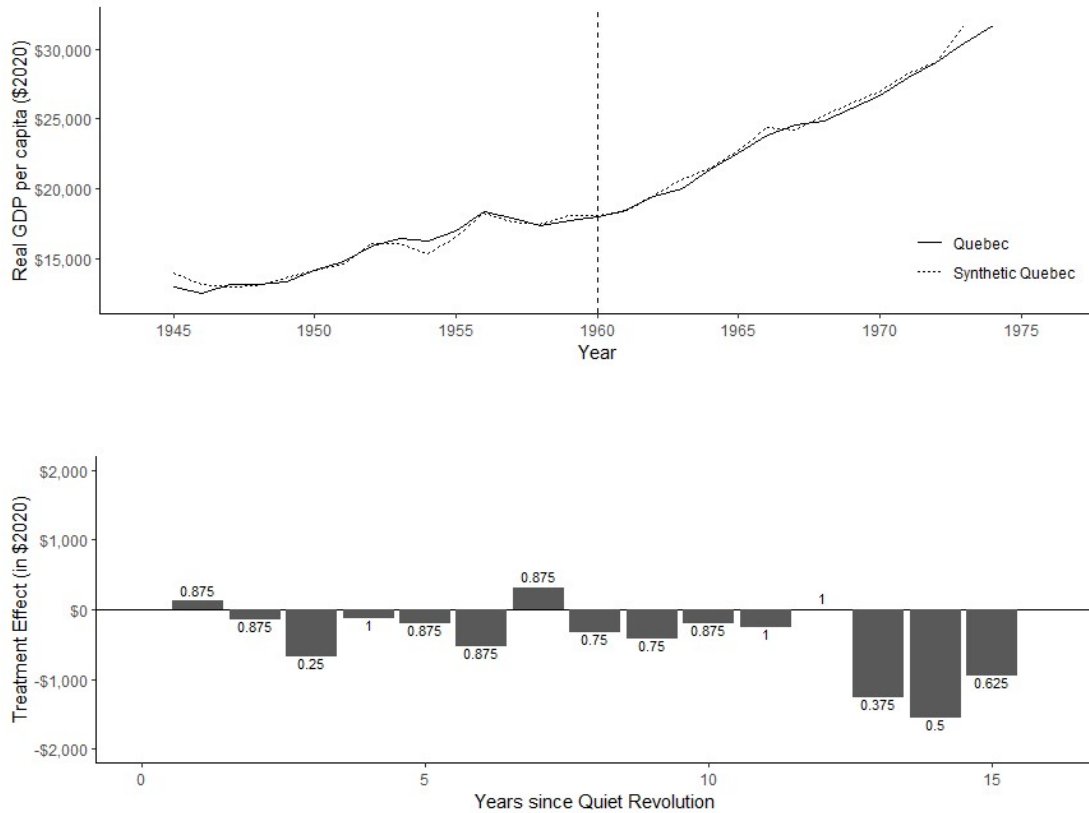
Figure 2 Real GDP per capita (in $2020) for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on real GDP per capita, p-values of effects shown above(below) each effect (bottom panel).
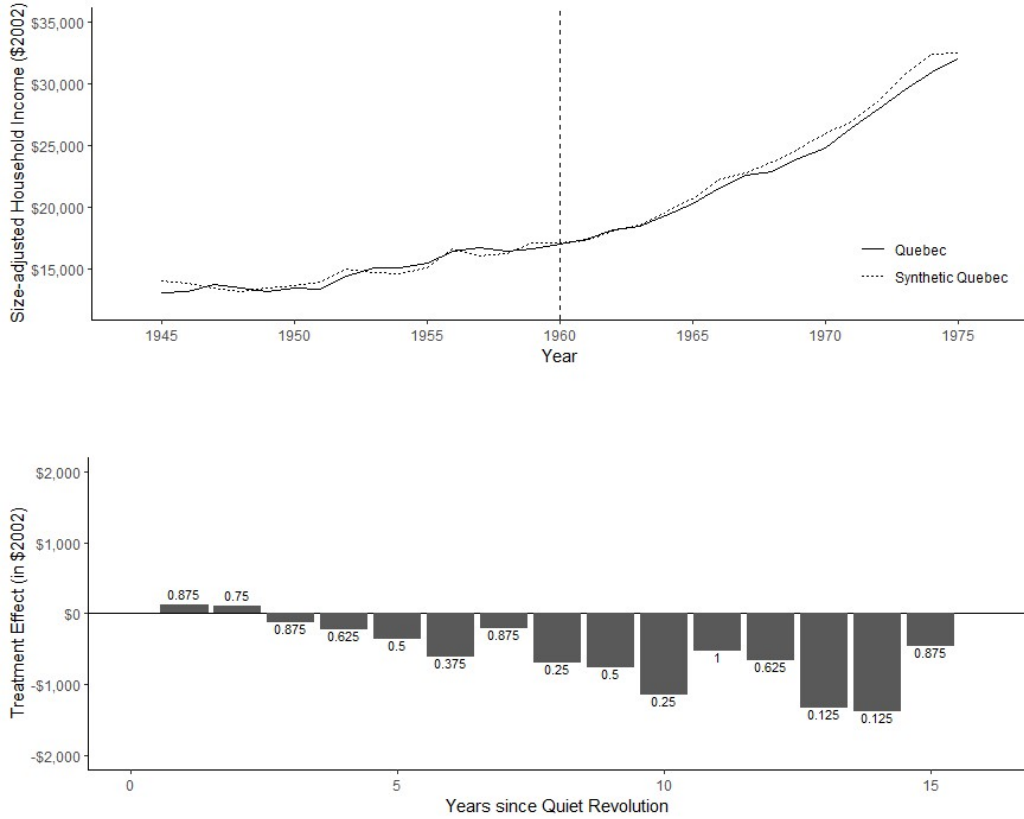
Figure 3 Size-adjusted household income (in $2002) for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on household income, p-values of effects shown above(below) each effect (bottom panel).

Table 6

Province weights in synthetic control model of life expectancy in Quebec

Control Units	Control Unit Weight
Alberta	0.007
British Columbia	0.433
Manitoba	0
New Brunswick	0.535
Nova Scotia	0.004
Ontario	0.013
Prince Edward Island	0.003
Saskatchewan	0.005

Table 7

Predictor balance and weights and synthetic fit for life expectancy in Quebec

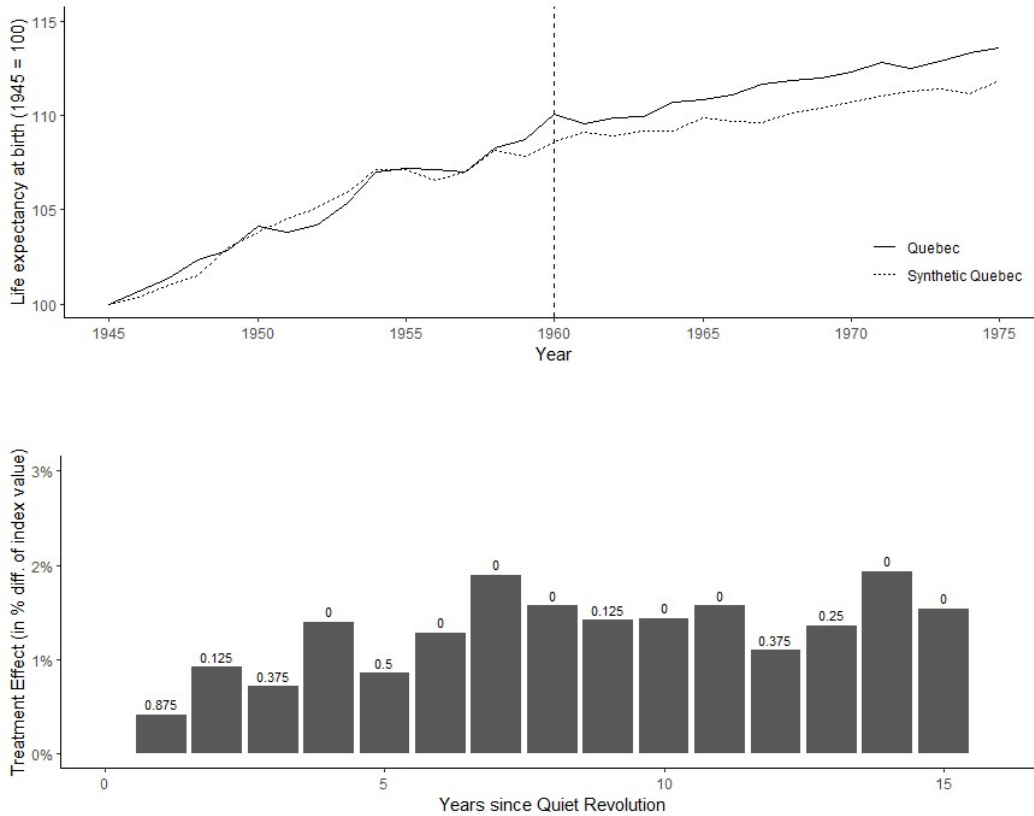| Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg. Pre-collegial School Enrollment	821048	174520	0.001	249839
Avg. Real GDP Per Capita	15377	14658	0.307	14502
Avg. Population	4190380	887449	0	1245502
Avg. Life Expectancy Index	104.67	104.60	0.691	103.57
RMSPE		0.605		0.935

Figure 4 Life expectancy at birth index (1945 = 100) for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on life expectancy as the percentage difference between index values, p-values of effects shown above(below) each effect (bottom panel).

Table 8
Province weights in synthetic control model of enrollment rates in Quebec

Control Units	Control Unit Weight
Alberta	0
British Columbia	0
Manitoba	0
New Brunswick	0.34
Nova Scotia	0
Ontario	0
Prince Edward Island	0.66
Saskatchewan	0

Table 9
Predictor balance and weights and synthetic fit for enrollment rates in Quebec

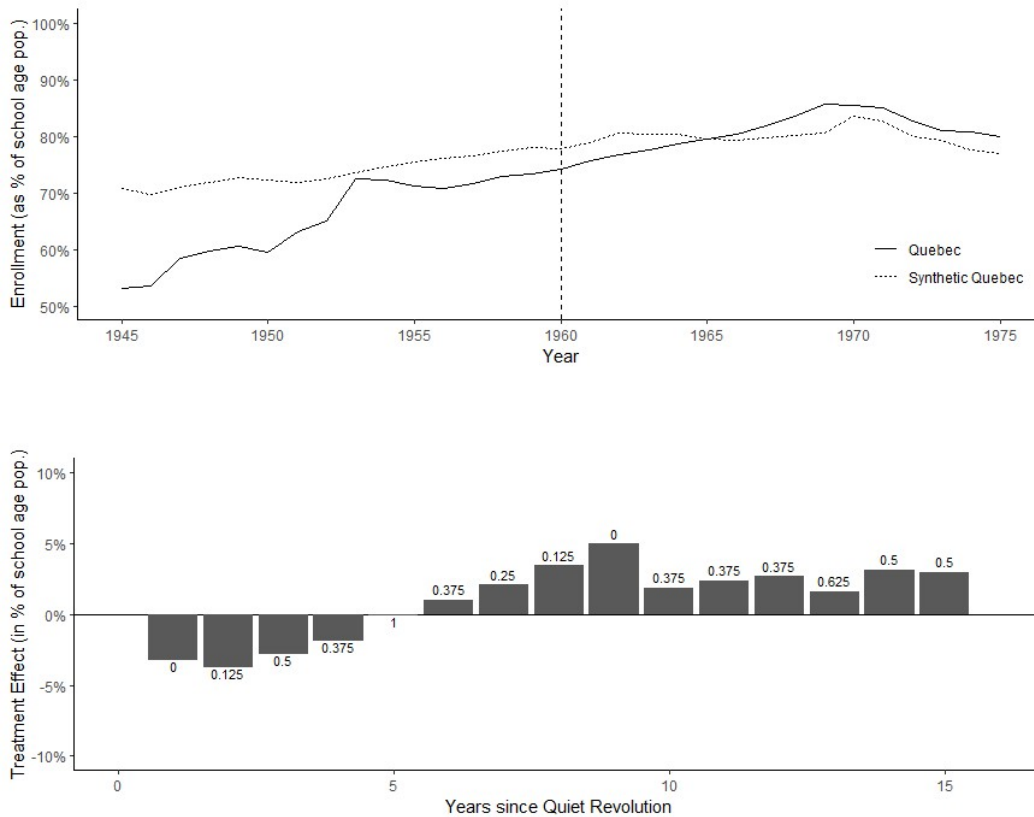| Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg. Gov. Expenditure Share	15377	8326	0	14502
Avg. Real GDP Per Capita	0.045	0.098	0	0.067
Enrollment Rate 1945	0.531	0.707	0.071	0.718
Enrollment Rate 1952	0.651	0.726	0.489	0.766
Enrollment Rate 1959	0.733	0.78	0.439	0.812
RMSPE		0.095		0.012

Figure 5 Enrollment rates for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on government size as a percentage of school-age population, p-values of effects shown above(below) each effect (bottom panel).

Table 10
Province weights in synthetic control model of government size in Quebec

Control Units	Control Unit Weight
Alberta	0.009
British Columbia	0
Manitoba	0.006
New Brunswick	0
Nova Scotia	0
Ontario	0.790
Prince Edward Island	0
Saskatchewan	0.194

Table 11
Predictor balance and weights and synthetic fit for government size in Quebec

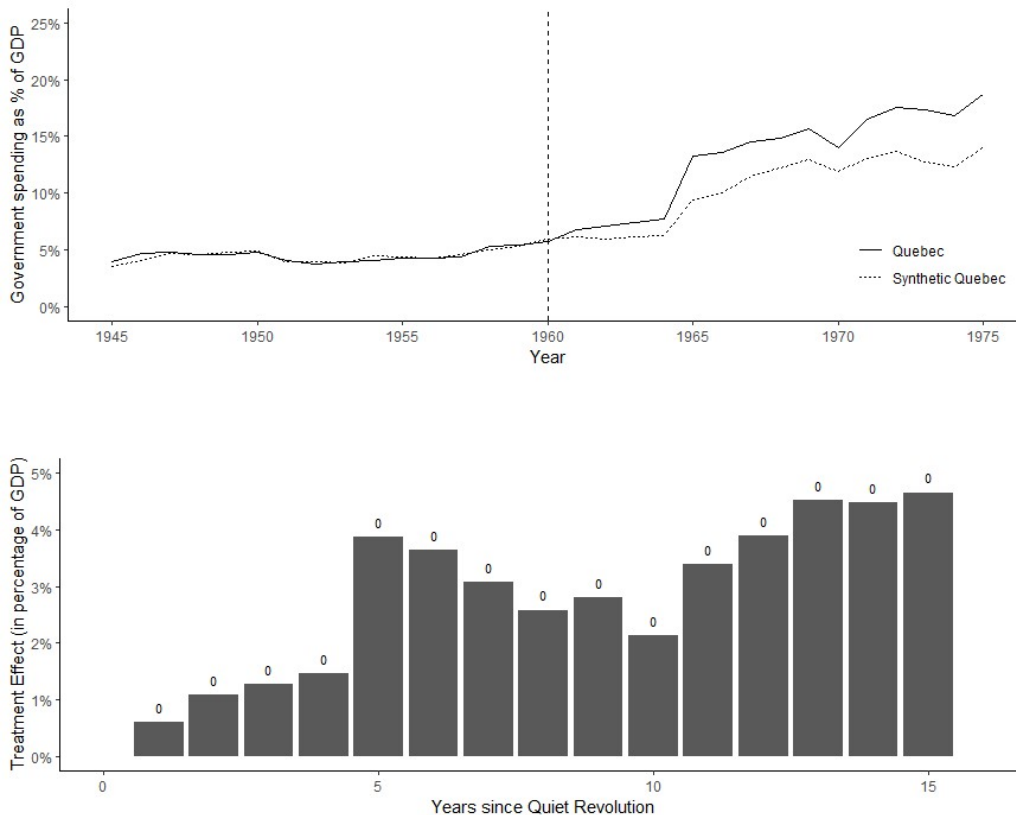| Predictors	Quebec	Synthetic Quebec	Predictor Weights	Donor Pool Average
Avg. Population	4190380	3992091	0.124	1245502
Avg. Real GDP Per Capita	15377	19451	0	14502
Gov. Expenditure Share 1945	0.04	0.035	0.028	0.05
Gov. Expenditure Share 1952	0.038	0.04	0.152	0.062
Gov. Expenditure Share 1959	0.054	0.054	0.159	0.079
Enrollment in Public Schools 1945	557341	562417	0.1	185164
Enrollment in Public Schools 1950	640833	641859	0.183	208864
Enrollment in Public Schools 1955	861789	858478	0.132	268782
Enrollment in Public Schools 1959	1043059	1085248	0.122	329074
RMSPE		0.0026		0.0142

Figure 6 Government expenditures as a percentage of nominal GDP for Quebec and synthetic Quebec, 1945-1975 (top panel). Estimated treatment effects of the Quiet Revolution on government size as a percentage of nominal GDP, p-values of effects shown above(below) each effect (bottom panel).
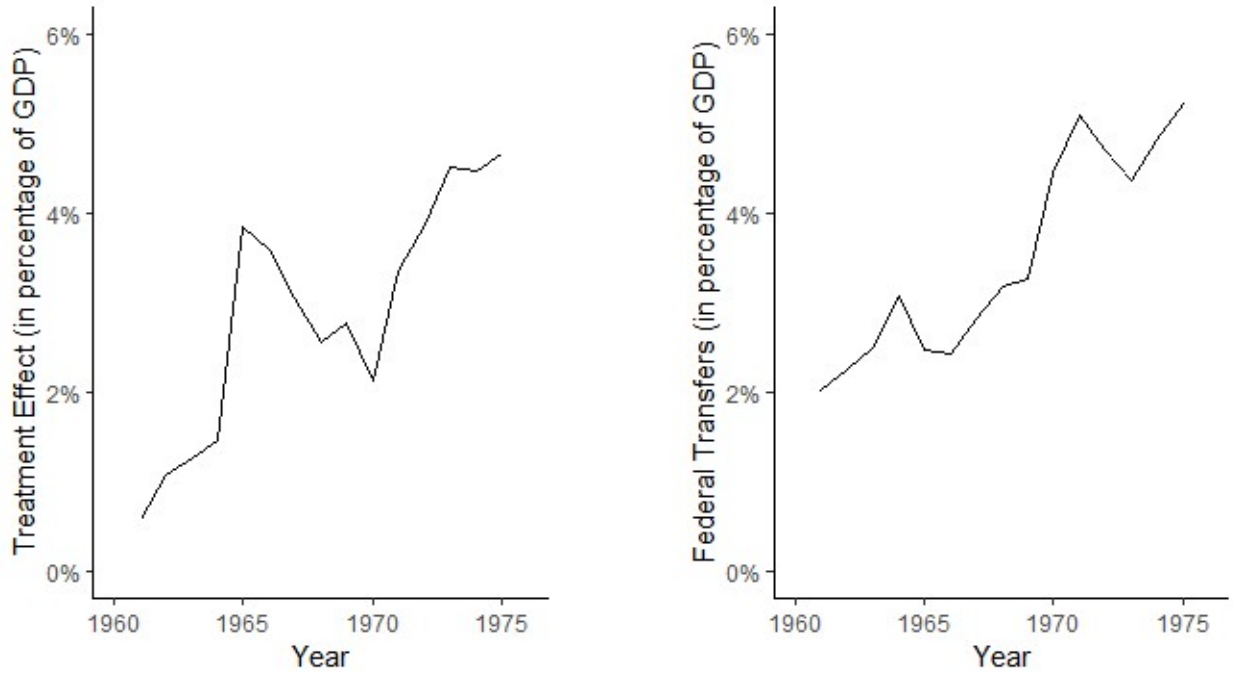
Figure 7 Effects of the Quiet Revolution on the Size of Government (left panel) and federal transfers to Quebec (right panel) as share of GDP