Estimating the Economic Impacts of Wealth Taxation in France

Jeffrey Suzuki*

Department of Economics
University of California, Berkeley
Email: jssuzuki@berkeley.edu

Advisor: Gabriel Zucman

Abstract

Through the use of a synthetic controls methodology, I generate counterfactuals to estimate the effect of the French wealth taxes of 1982 and 1988 on income per adult, savings rates, and wealth per adult. I find that wealth taxation had no significant impact on the growth of incomes. Meanwhile, there is evidence that the wealth tax had a short-term negative effect on savings rates. The negative impact of savings rates on wealth per adult is modest, amounting to approximately 1% of French wealth per adult in 1992. Meanwhile, the overall impact of the taxes on wealth per adult is inconclusive. While the synthetic controls method provides evidence that a large negative effect on wealth per adult is plausible, it fails to generate a conclusive and precise estimate of this effect. If there is a significant, long-term effect on wealth per adult in France, it likely stems from capital flight, which could be ameliorated through policies such as exit taxes.

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1 Introduction

In 1982, France implemented its first individual wealth tax, the Impôt sur les grandes fortune or "IGF' (Verbit 1991). To Eric Pichet (2007), the IGF was a chiefly ideological policy that aimed to "change life" through redistribution. In 1986, under right-wing prime minister Jacques Chirac, the wealth tax was repealed under the auspices of liberalizing the economy. In 1988, socialists regained the head of government when Michel Rocard began his tenure as prime minister, promptly reimplementing a revised, less radical version of the wealth tax, the Impôt de solidarité sur la fortune or "ISF." The ISF remained in effect until 2019. The differences between the tax schedules can be found in the Appendix.

France was not alone in its full commitment to wealth taxation. In 1990, eleven other OECD countries had active progressive wealth taxes. However, as of 2020, only three of these countries (Switzerland, Spain, and Norway) continue to tax individual wealth (Drometer and et al. 2018).

In recent decades, income and wealth inequality have increased over time. Saez and Zucman (2016) observe that, in the case of the US, increasing wealth inequality is driven by increasing income and saving rate inequality. Piketty, Saez, and Zucman (2018) also find that the inverse is true: increasing income inequality has been primarily a capital-driven phenomenon since the 1990s. In other words, income inequality and wealth inequality both exacerbate one another in a positive feedback loop. Increasing economic inequality is hardly unique to the United States—rising wealth and income inequality has been a global trend since 1980, according to the World Inequality Report 2018. With mounting evidence of increasing economic inequality, wealth taxes have become a popular instrument of choice among policymakers around the world. American senators Elizabeth Warren[1] and Bernie Sanders[2] proposed wealth taxes during their 2020 presidential campaigns. In 2019, German Social Democrats made steps toward introducing a wealth tax.[3] And in 2020, Argentina's president spoke for a need for wealth redistri-

[1]Elizabeth Warren, "Ultra Millionaire Tax," https://elizabethwarren.com/plans/ultra-millionaire-tax

[2]Bernie Sanders, "Tax on Extreme Wealth," https://berniesanders.com/issues/tax-extreme-wealth/

[3]Michael Nienaber, "Germany's SPD wants to target super rich with wealth tax, Last modified August 26, 2019 https://www.reuters.com/article/us-germany-politics-taxation/germanys-spd-wants-to-target-super-rich-with-wealth-tax-idUSKCN1VG1LZ

bution with its Economy Minister explicitly advocating for wealth taxation.[4]

However, there is some literature purporting the negative effects of a wealth tax. The first major criticism is that wealth taxes harm economic growth. Hansson (2010) finds that, internationally, each additional percentage point increase in wealth taxation lowers economic growth modestly—0.02 to 0.04 percentage points per year. Pichet (2007) finds that the ISF dampened economic growth by roughly 0.2 percent per annum in France, using a Cobb-Douglas production function to calculate the effects of capital flight on growth.

The second criticism is that wealth taxes lead to economic damage through capital flight and disincentives to save. Pichet (2007) argues that from 1988 to 2007, the ISF caused capital flight equivalent to about 200 billion euros. Wealthier French "tax refugees" often moved to countries without wealth taxes, taking their assets with them. According to Pichet, they often moved to countries like Belgium, which held 63,000 French tax refugees in 2005. However, Pichet's approach in calculating his 200 billion euro figure is rather simplistic and flawed— he simply tallies up the number of tax refugees present in Switzerland (approximately 20,000 at the time of the paper) and multiplies it by the average estate size of citizens subject to the ISF (about 5 million euros) to yield the rough amount of wealth that left the country—100 billion euros. Then, he multiplies this number by two, stating that "a reasonable number would, therefore, be twice this amount."

This calculation is problematic for a number of reasons. First, the value of the assets owned by tax refugees likely vary over time and, according to Pichet himself, around two taxpayers a day leave France because of the ISF; capital flight does not occur all at the same time. Secondly, French tax refugees may have a different average net worth from those who remain in France to be taxed by the ISF. And, finally, the choice to only use the number of tax refugees solely in Switzerland is arbitrary. To Pichet's credit, there does not exist readily available data with the exact value of per capita wealth of these tax refugees. Therefore, an analysis that utilizes counterfactuals generated through publicly available macroeconomic data can potentially provide an estimate of capital flight over time without needing this exact data.

Regarding wealth taxation's effect on savings, wealth taxes are often au-

[4]Sebastian Boyd, "Argentina's Economy Minister Backs Wealth Tax, Rejects Austerity," https://www.bloomberg.com/news/articles/2020-04-19/argentina-s-economy-minister-backs-wealth-tax-rejects-austerity

tomatically assumed to have a negative effect on savings rates. For example, in its article on the negative impacts of capital and wealth taxes, the Cato Institute simply assumes that wealth taxes negatively impact savings behaviors, which would negatively affect capital accumulation and, therefore, economic growth.[5] Despite claims like these, there are no formal analyses in the literature that quantify the effect that wealth taxes have on savings rates.

Overall, the literature tends to be speculative of its impacts or faulty in calculating the impacts of wealth taxation in France. Additionally, because almost all literature on French wealth taxes focuses on the ISF, there is a dearth of analysis on the impact of the IGF, France's first wealth tax. The primary purpose of this paper is to estimate the impacts of the IGF and ISF by generating counterfactuals of France through a synthetic controls method. In this paper, I estimate the impacts to economic growth measured in GDP per adult. I also observe the potential changes in savings behavior and quantify its impact on wealth per adult. Finally, I attempt to quantify the overall economic damage of wealth taxation using wealth per adult as an outcome variable.

2 The Synthetic Controls Method

As Abadie and et al. (2014) explain, the synthetic controls method generates a counterfactual that is a weighted combination of other countries whose weights sum to one. This synthetic control draws from a pool of countries that represents a control group, which the authors dub the "donor pool." The synthetic controls method draws from this donor pool to create a synthetic version of the original country. For example, Abadie and et al. (2014) examine the economic effects of the German Reunification in 1990. To generate their counterfactual of a West Germany that never reunified with its eastern counterpart, they gather data on the standard predictors of economic growth (e.g. educational attainment, industry share of the economy, and etc.) for West Germany and the OECD countries in their donor pool. Then, they assign a weight to each country in their dataset such that two conditions are met: (1) the differences between the countries in terms of their economic predictors are minimized and (2) the weights of all countries in the counter-

[5] Chris Edwards, "Taxing Wealth and Capital Income," Last modified August 1, 2019. https://www.cato.org/publications/tax-budget-bulletin/taxing-wealth-capital-income

factual sum to one. In short, the synthetic controls method aims to generate a counterfactual that best resembles the original country.

Formally, I have a sample of $j+1$ units of observation, where j=1 is our "treated unit" (i.e. France) and $j = (2, 3, \ldots, J+1)$ are potential countries in its synthetic control (i.e. the "donor pool"). In this paper, the donor pool for France must not have implemented a wealth tax during the pretreatment and post-treatment periods.

We possess a sample that is a "balanced panel," a data set where all units are observed at the same time periods $t = (1, 2, \ldots, T)$. With a positive number of pre-intervention periods $(1, 2, ...T_0)$ and post-intervention periods $(T_0 + 1, \ldots, T)$, the treated unit is fully exposed to treatment starting from $T_0 + 1$. The observed time period spans from 1960-1992 with the pre-intervention period $(1, 2, ...T_0)$ being from 1960-1982 and the post-intervention period $(T_0 + 1, \ldots, T)$ being from 1983-1992. This paper's period of observation ends in 1992 because, as Abadie and et al. (2014) note, "a roughly decade long period [...] seems like a reasonable limit on the span of plausible prediction."

A synthetic control is the weighted average of units in the donor pool—a combination of untreated units. A synthetic control is defined as a $(J \times 1)$ vector of weight $W = (w_2, w_3, ..., w_{j+1)'}$ where $0 \leq w_i \leq 1$. Let X_1 be a vector containing the values of pre-intervention characteristics of the treated unit and X_0 be a vector containing the values of the same pre-intervention characteristics of units in the donor pool. For $m = 1, ...k$, let the m-th variable represent values of the m-th pre-intervention characteristic; there are k total pre-intervention characteristics. The weights of units in the synthetic control are selected such that the pre-intervention characteristics between the treated unit and the synthetic control are minimized. Ultimately, the synthetic control minimizes the following expression: $\sum_{m=1}^{k} v_m (X_{1m} - X_{0m} W)^2$

This minimization is performed by selecting a weight W for each country in the donor pool where:

(1) $X_1 - X_0 W$ is the difference between pre-intervention characteristics of the treated unit and the synthetic control multiplied by the weight of a donor pool country.

(2) v_m is the relative importance of a pre-intervention characteristic in predicting the outcome variable when measuring the discrepancy from expression (1).[6]

[6]Practically everything from this general model can be credited to Abadie and et al.

Minimizing this expression minimizes "mean root squared predicted error" (MRSPE), the summation of the squared values of annual differences between France and its synthetic control during the pre-intervention period. The solution to this minimization problem is calculated via the Stata package "Synth," providing country weights in the synthetic control.

For all three synthetic controls I generate on GDP per adult, savings rates, and wealth per adult, the donor pools draw from OECD countries that did not have active net wealth taxes from 1960 to 1992. The 13 countries that meet this requirement are Australia, Belgium, Canada, Greece, Italy, Japan, South Korea, Luxembourg, Mexico, New Zealand, Portugal, the United Kingdom, and the United States.[7] This paper's donor pools exclude countries that had a wealth tax active during this period, which includes Austria, Denmark, Finland, Germany, Iceland, Ireland, the Netherlands, Norway, Poland, Spain, Sweden, and Switzerland. Due to varying data availability, the donor pools are customized for each outcome variable and are described in their respective sections.

While property and bequest taxes do serve as wealth taxes on specific types of wealth, this paper focuses on the effect of a more general wealth tax that France implemented in 1982 and 1988: the net wealth tax on the value of an individual's assets minus liabilities. Therefore, countries with property and bequest taxes are not excluded from the donor pool.

For the pre-intervention characteristics of GDP per adult, I use the same standard set of economic growth predictors of countries utilized by Abadie and et al. (2014): GDP per adult,[8] trade openness, investment rate, schooling, industry share of the economy, and inflation. I collect data for trade openness, investment rate, and inflation from the World Bank. Data for mean years of schooling comes from the Lee and Lee Long-Run Educational Dataset. GDP per adult comes from the World Inequality Database (WID). For the outcome variables of wealth per adult and savings rates, their pre-

(2014)

[7]Israel is excluded due to missing data. Turkey and Chile are excluded due to having income and wealth significantly lower than other countries in the data pool. Regardless, if these countries are included in the donor pools, they would only be used in the income per adult synthetic control; the results do not change with their inclusion.

[8]Abadie and et al. use GDP per capita. However, GDP per adult is arguably superior because it only includes the working-age population. Using GDP per adult also maintains continuity in units used with another outcome variable I study in this paper: wealth per adult.

intervention characteristics use some of the same economic predictors as GDP per adult; their pre-intervention characteristics described in detail in their respective sections. I collect wealth per adult data from the WID and savings rates data from the World Bank. Specific details of all economic predictors and outcome variables along with their respective sources can be located in the Appendix. This paper's sample consists of annual panel data composed of country-level aggregated data. The entire dataset spans from 1960 to 2018.

This paper uses its outcome variables as pretreatment characteristics in a specific manner; Abadie and et al. (2014) state that "the preintervention characteristics in X_1 and X_0 may include pre-intervention values of the outcome variable." In a separate paper that uses a synthetic control to examine the impact of California's tobacco control program, Abadie and et al. (2010) uses its outcome variable, cigarette sales, in specific years as characteristics in the pretreatment period (i.e. cigarette sales in 1988, 1980, and 1975) to create a synthetic control of California that best fits cigarette sales during the pretreatment period. This paper uses a similar method to generate synthetic controls for all three outcome variables to best emulate France's performance during the pretreatment period. These selected years are shown in the respective section of each outcome variable.

There are a number of advantages to generating a synthetic control as opposed to using a difference in differences method. First, according to Abadie and et al. (2014) "a combination of comparison units (which we term 'synthetic control') often does a better job of reproducing the characteristics of the unit or units representing the case of interest than any single comparison unit alone." Finding a country that closely resembles or parallels France's economic performance before its wealth tax can be a matter of trial-and-error. Of all countries I observed in my dataset, there were none that closely approximated France during the pretreatment period as closely as the synthetic controls I generated. Secondly, there is an advantage in tracking the effect of multiple treatments over time when using synthetic controls. The wealth tax was abolished in 1986 and reimplemented in 1988, which would narrow the time frame to analyze the effects of this wealth tax from 1982 to 1986 under a difference in differences method. If one wanted to analyze the effects of the wealth tax after its reimplementation in 1988, there would be a pre-intervention period of only two years (1986 and 1987) that could have easily been impacted by the previous treatment period from 1982 to 1986 from lagged effects. On the other hand, a synthetic controls method has the advantage of generating a counterfactual that can be exposed to multiple treatments over time as long as the initial treatment period is specified, and the donor pool is composed of countries that were never exposed to wealth taxation throughout all periods of observation. The synthetic control of France can be best understood as a France that never dabbled in wealth taxation at all, never undergoing a wealth tax in 1982, a repeal in 1986, and a re-implementation in 1988.

Finally, a difference in differences method has the unverifiable assumption of parallel trends; omitted variables are presumed to remain constant over time. While imperfect, a synthetic controls method has a number of potential robustness tests. In this paper, we perform two types of robustness tests. First, after generating a synthetic control, similarly to Abadie and et al. (2014), I perform a "leave-one-out" robustness test where I generate synthetic controls by removing all positively-weighted countries from the donor pool sequentially. For example, if a synthetic control consists of three positively-weighted countries, the leave-one-out robustness test generates three synthetic controls, removing these three countries one-by-one. If these synthetic controls generate similar results to the original synthetic control, the original results are not overly dependent on the availability of certain individual countries in the donor pool. Secondly, for GDP per capita, this paper runs what Abadie and et al. (2014) dub "placebo studies." In a synthetic controls context, performing a placebo test entails performing the synthetic controls method when treatment did not occur. For GDP per adult, I run an "in-time" placebo test. To run their placebo study for their West German synthetic control, Abadie and et al. (2014) generated synthetic control for West Germany in 1975, even though Germany reunited in 1990 to prove that their original results could be truly be attributed to treatment. Because there is insufficient data for wealth per adult and savings rates, an in-time placebo is inappropriate for these two outcome variables.[9]

[9] The data for both wealth per adult and savings rates both start in 1970, not providing enough time to create synthetic controls that resemble France during the pretreatment period.

3 GDP Per Adult

3.1 Constructing a Synthetic Control

The synthetic control for income utilizes a donor pool of 13 countries: Australia, Belgium, Canada, Greece, Italy, Japan, South Korea, Luxembourg, Mexico, New Zealand, Portugal, the United Kingdom, and the United States. By minimizing the root mean square prediction error in the pretreatment characteristics of GDP per adult values, inflation, trade openness, industry, investment rate, and schooling, I construct a weighted combination of countries that best resembles France in these characteristics. Table I shows the weight of each country that composes its synthetic control.

Table I: Country Weights in Synthetic France (GDP per adult)

Country	Weight
Greece	0.113
Japan	0.248
Luxembourg	0.121
Mexico	0.383
United States	0.136

France's synthetic control is a weighted combination of Greece, Japan, Luxembourg, Mexico, and the United States with all other countries possessing zero weight. The weights in this weighted combination sum to one.

Table II: GDP Per Adult Predictors

VARIABLES	France	Synthetic France	OECD Control Group
GDP Per Adult (1982)	29631.44	29348.62	28089.37
GDP Per Adult (1972)	24342.63	24436.86	25110.44
Inflation	7.01	8.00	13.26
Trade Openness	32.92	38.00	44.04
Industry	29.08	32.96	25.64
Investment Rate	26.61	26.40	34.85
Schooling	5.11	6.22	7.21
RMSPE	371.76		

Table II compares France to its synthetic counterpart during the pre-treatment period from 1960 to 1982. While GDP per adult in 1982 and 1972 represent specific yearly values, the predictor values for inflation, trade openness, industry, investment rate, and schooling are all average values from 1960 to 1982. When constructing a synthetic control, relatively close values in real and synthetic variables are desirable. Similarly to Abadie and et al. (2014), I use the average predictor values of my donor pool of OECD countries as a reference point to observe whether the differences in economic predictors were truly minimized.

The results in Table II suggests that Synthetic France is a suitable counterfactual. While there are notable differences in trade openness and schooling, Synthetic France provides a much closer approximation of France in every economic predictor compared to the average of the control group.

3.2 Wealth Taxation's Effect on Income

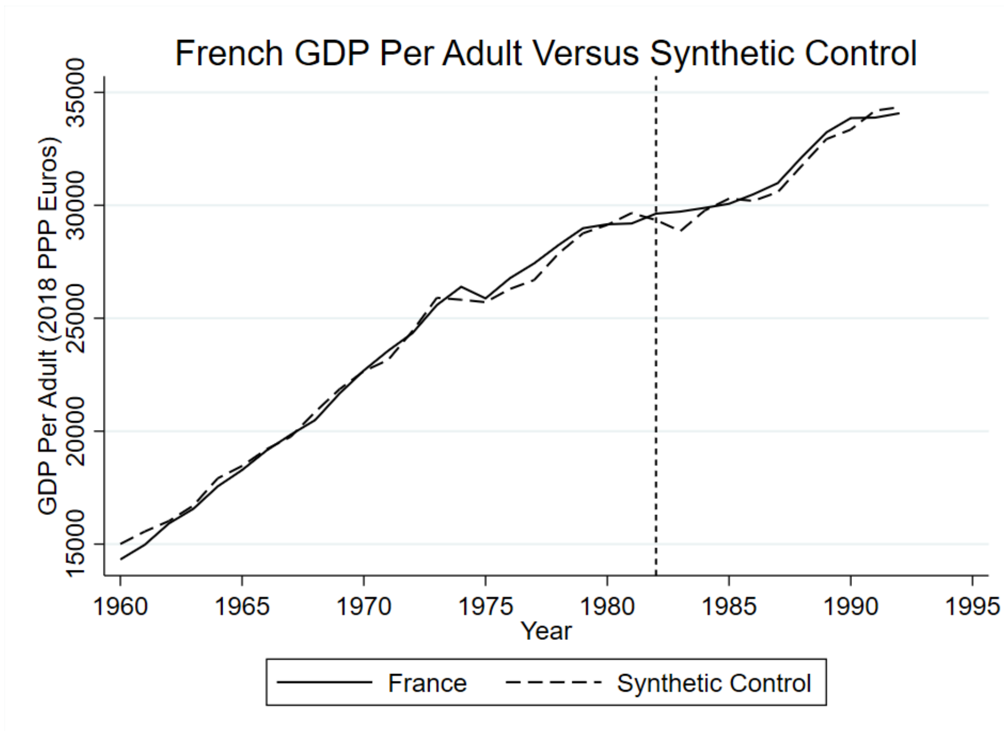

Figure I: A chart of French incomes and synthetic incomes over time

Figure I shows the GDP per adult of France and its synthetic counterpart from 1960 to 1992. The vertical dotted line denotes the beginning of wealth taxation in 1982 with the implementation of the IGF. As shown above, the synthetic control very closely approximates France during the pretreatment period from 1960 to 1982. During the post-treatment period, there is no noticeable divergence nor trend in divergence between France and its synthetic control that emerges during this time.

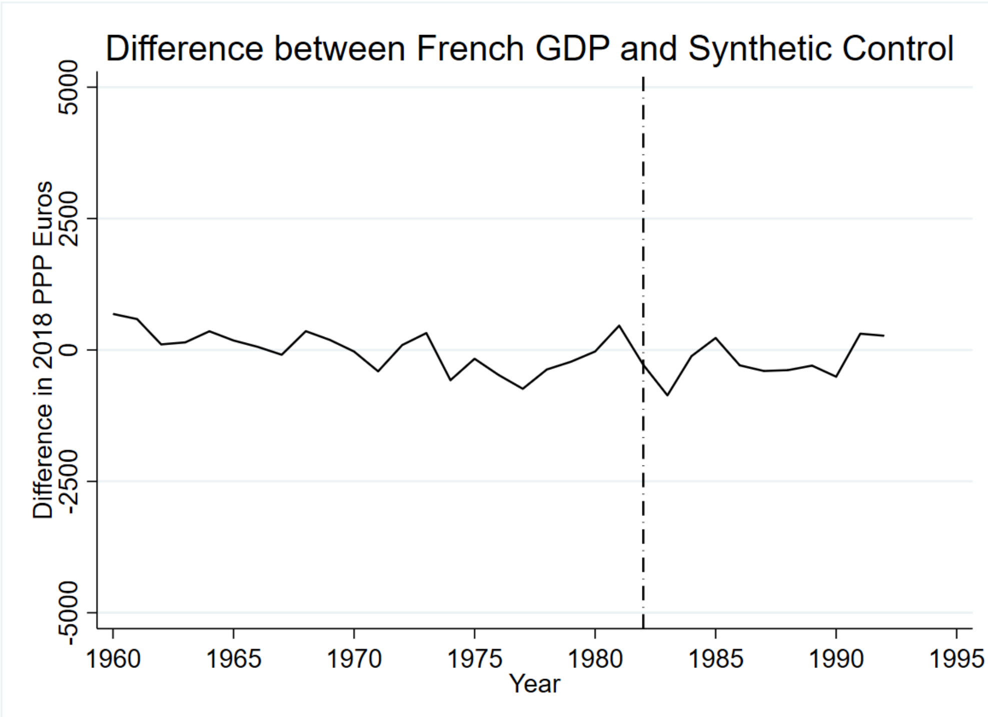

Figure II: Differences in income over time

Figure II visualizes the differences over time. As shown, the differences that develop during the post-treatment period are as insignificant as the differences during the pretreatment period. In other words, it appears that the wealth tax had no discernible impact on French income per person during neither of the time periods with active wealth taxation (1982-1986 and 1988-1992).

A possible concern is that the French wealth tax had spillover effect, positively or negatively affecting incomes in other countries. One possible positive spillover effect is one that occurs from tax competition. That is, because there may be large-scale capital flight from France, other countries boost their accounting flows with formerly French assets. In the case of a significant positive spillover effect, the counterfactual would be an overestimation of French incomes, implying that wealth taxes actually increased French incomes. However, there are no obvious mechanisms for why wealth taxes should increase individual incomes. In the case of a negative spillover effect, France's synthetic control would be an underestimation of French incomes, implying that wealth taxes decreased incomes. But there are no obvious reasons for why a wealth tax would negatively affect the incomes of other countries in a significant way.

If there is a significant spillover effect from the wealth tax that impacts the per adult incomes of the countries that compose this synthetic control (Greece, Japan, Luxembourg, Mexico, and the United States), the wealth tax may have had an effect on incomes. A weakness of a synthetic controls method is that spillover effects cannot be accounted for.

3.3 Leave-One-Out Robustness Test

The leave-one-out robustness test verifies that the original results are not sensitive to the countries selected in the donor pool. If the results vary significantly, the predictive power of the synthetic control is suspect. It can also visualize additional possibilities of how the wealth tax affected incomes if the results do vary. In the original synthetic control, Greece, Japan, Luxembourg, Mexico, and the United States had positive weights. Therefore, I generate five additional synthetic controls, one without Greece, one without Japan, and so on. The distribution of these synthetic controls is visualized in Figure III on the following page.

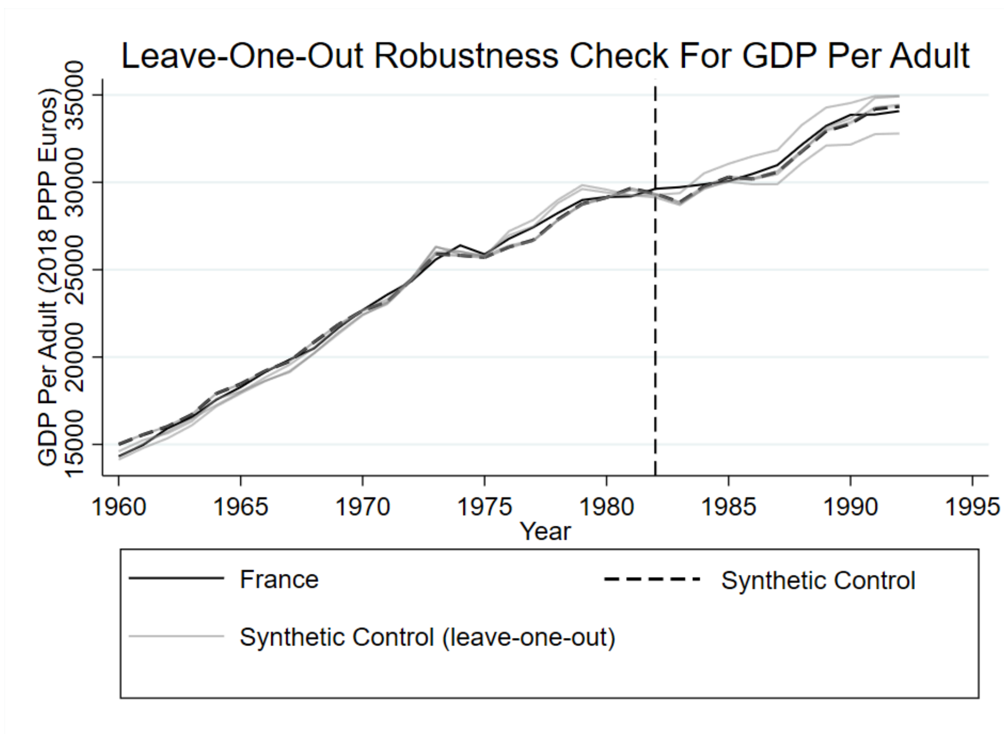

Figure III: Each grey line represents a leave-one-out synthetic control with a country left out.

As shown above, every synthetic control generated does not significantly diverge from France's actual income. Out of all leave-one out synthetic controls, France underperforms two of these leave-one-out synthetic controls, closely follows two others, and outperforms one. In both cases where France underperforms two synthetic controls, French adults earned 850 euros a year less compared to their synthetic counterparts in 1992. This difference represents about 2% of French incomes. Therefore, it is possible that the wealth tax had a modest negative effect on French incomes. However, given that there are three other synthetic controls that either show lack of impact or a positive impact, this modest negative effect on French incomes is, at best, speculative. Nevertheless, the fact that all leave-one-out robustness tests fall within a relatively narrow range of 1000 euros (3% of French income) throughout all treatment periods reinforces shows that the results are not very sensitive to the donor pool.

3.4 In-time Placebo Study

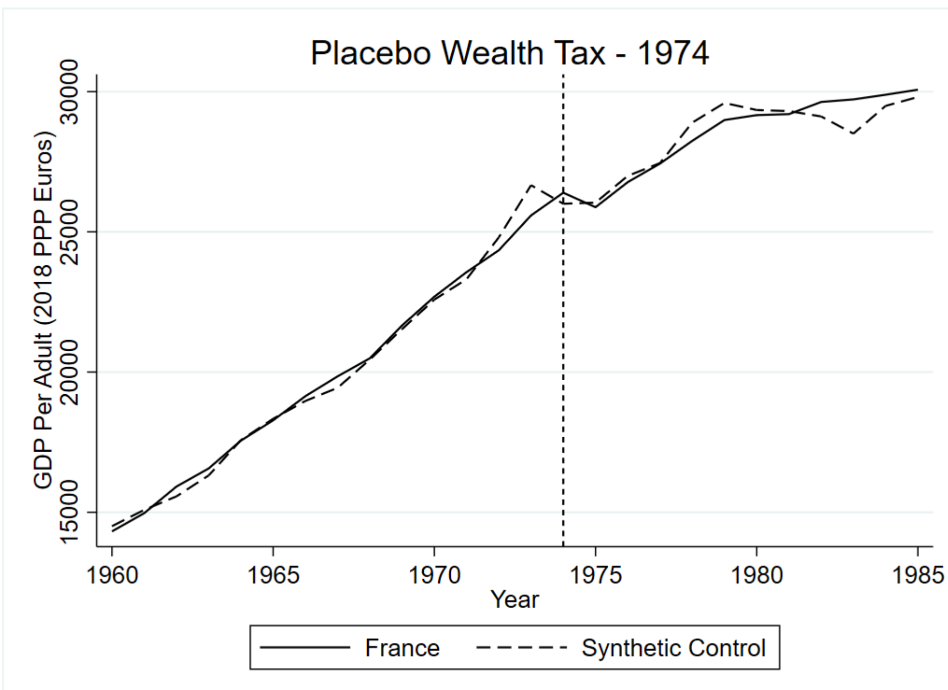

Figure IV: A "placebo" wealth tax is enacted in 1974 to verify that the synthetic control does not produce substantial variation in years without a wealth tax.

To ensure that the wealth tax's lack of significant impact on incomes was not merely happenstantial, I conduct an in-time placebo study illustrated in

Figure IV. Rather than conventionally using an in-time placebo to verify that an impact of treatment is reliant on the time of treatment as Abadie and et al. (2014) would, I use an in-time placebo to verify that the wealth tax would have had as much impact as not implementing it under this synthetic control. If the in-time placebo study shows no substantial divergences between France and its synthetic control, it further proves that the results of the original synthetic control are valid. The in-time placebo study is set in 1974, eight years before the wealth tax was implemented in 1982. The rationale behind selecting 1974 as the year of the placebo study is that it is the most distant pretreatment year from 1982 that has the most predictor data available.

In the above in-time placebo study, France and its synthetic control are largely similar during the pretreatment period. During the post-treatment period, two minor gaps form in 1978 and 1983. The negative gap in 1978 is about 650.04 euros (about 2.3% of French GDP at the time), while the positive gap in 1983 is about 1219.91 euros (about 4.1% of French GDP at the time). Because these gaps are ephemeral and small, they do not form any substantial trends where France underperforms and overperforms its synthetic counterpart. This placebo study verifies that a wealth tax has as much effect on income as not implementing a wealth tax under this synthetic controls study; the effect of a wealth tax on incomes is either nil or insignificant.

Overall, accounting for the narrow range of leave-one-out synthetic controls and placebo study results, the argument that French incomes were negatively affected by wealth taxes in a significant way during the 1982-1992 period is implausible. If there is an effect, it is far too small to observe or requires more than a decade for the effect to manifest significantly.

A natural question that arises is whether these wealth taxes had a negative effect on wealth accumulation. Given that the wealth tax had no effect on the growth of incomes, it is worthwhile to explore how French residents saved this income differently after the passage of these wealth taxes.

4 Savings Rate

4.1 Constructing a Synthetic Control

A synthetic control may reveal a potential effect of wealth taxes on the savings rates of French income earners. Additionally, if there is a negative effect on savings, a drop in savings rate could be used to quantify an negative effect on wealth accumulation. With savings as a percentage of GDP as the outcome variable of interest, this synthetic control utilizes a donor pool of 12 countries: Australia, Belgium, Canada, Greece, Italy, Japan, Luxembourg, Mexico, New Zealand, Portugal, the United States, and the United Kingdom.

I use three predictors for savings rates: GDP per adult, investment rate, and schooling. First, for GDP per adult, the amount of individual income influences savings behavior. Higher income earners tend to consume a smaller proportion of their income, as their marginal propensity to consume decreases with increasing income. This lower consumption translates to a higher savings rate. Secondly, for investment rate, the rationale is that investment rates are usually very close to savings rates; people usually invest their savings. Therefore, investment rates are likely to be useful in predicting savings rates, even if they do not have a causal relationship. Finally, I use mean years of schooling as the final predictor. Cole and et al. (2012) find that additional years of schooling positively predicted individual savings behavior in the United States. Bingley and Martinello (2017) observe that, in Denmark, more years of schooling increases wealth accumulation toward retirement.

Because savings rates often experience 1-2 percentage point fluctuations from year-to-year, fluctuations of 10-20 percent in savings rates occur year-to-year in any given country.[10] These large fluctuations make it practically impossible to create a synthetic control that closely approximates French savings rates every year during the pretreatment period. To "smooth out" these fluctuations, I instead utilize a three year moving average of French savings rates.[11] The advantage of using a moving average is that it allows a synthetic control to resemble France during the pretreatment period. How-

[10]To be precise, changes in percentage points are different from percent changes. For instance, a 2 percentage point change in a 20 percent savings rate represents a 10 percent change in savings rates.

[11]A three year moving average entails averaging values at a specific year n and its two consecutive prior years $(n-1)$ and $(n-2)$ for all years n. For example, the three year moving average for savings rate in 1980 is the mean of the savings rates of 1980, 1979, and 1978.

ever, the disadvantage of using a moving average is that the immediacy of significant effects from the wealth tax are likely to be understated—these effects will appear more gradual.

Table III: Country Weights in Synthetic France (savings rate)

Country	Weight
Belgium	0.606
Greece	0.207
Luxembourg	0.094
Mexico	0.093

As shown in Table III above, the synthetic control is a weighted combination of four countries: Belgium, Greece, Luxembourg, and Mexico.

Table IV: Savings Rate Predictors

VARIABLES	France	Synthetic France	OECD Control Group
Savings Rate (1970)	28.14	28.25	27.09
Savings Rate (1975)	27.59	27.57	25.99
Savings Rate (1978)	25.44	25.26	24.24
Savings Rate (1982)	22.53	22.68	23.64
GDP Per Adult	22590.58	21351.43	23557.34
Investment Rate	26.61	27.02	34.85
Schooling	5.11	6.62	7.21
RMSPE	0.316		

Table IV compares the characteristics of France and its synthetic counterpart during the pretreatment period of 1970-1982. As shown above, Synthetic France closely resembles France in the 1970, 1975, 1978, and 1972 savings rate values. Additionally, GDP per adult and investment rate are similar for France and its synthetic counterpart. However, there is a substantial gap in the mean years of schooling, where Synthetic France has about 1.6 years of additional schooling more than in real France. Nevertheless, relative to the average of the countries in the donor pool, Synthetic France serves as a better approximation of France during the pretreatment period for all characteristics.

4.2 Wealth Taxation's Effect on Savings Rates

As shown below in Figure V, France's synthetic control approximates French savings rates during the pretreatment period from 1970 to 1982. From 1970 to 1974 and 1978 to 1981, there are divergences where French savings are underestimated. The largest divergence that appears during the pretreatment period occurs in 1979, where the difference between France and its synthetic counterpart is 0.69 percentage points, or about 2.74 percent of French savings rate at that time. A notable trend is that real French savings consistently decreased from 1970 to 1982.

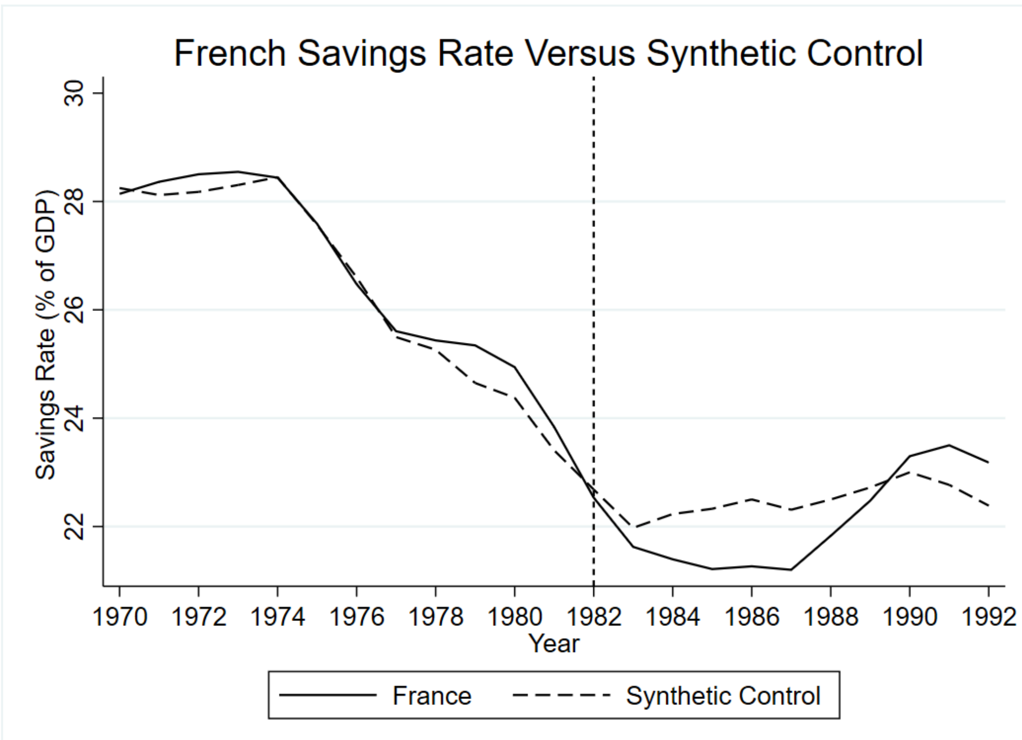

Figure V: Savings rates in France and Synthetic France over time

During the posttreatment period from 1983 to 1992, a divergence emerges during the first years of the wealth tax. The real French savings rate continues falling until 1987, five years after the initial implementation of the wealth tax. On the other hand, its synthetic counterpart bottoms earlier in 1983. The savings rate gap that exists between 1983 and 1989 is the result of France continuing its decline longer than its synthetic counterpart. Therefore, a possible effect of the wealth tax is that it may have prolonged the decline in savings rates. The widest point of the savings rate gap occurs in 1986, representing a 1.23 percentage point difference.

While this gap may appear small, the cumulative effect of the savings rate gap on wealth is potentially significant. Table V shows how the savings rate gap can affect wealth per adult over time.

Table V: Short-term Effects of Savings Rate on Wealth

Year	Difference in Savings Rate	GDP Per Adult	Savings Difference for Year	Cumulative Effect
1982	-0.15%	29,631.44 €	-44.61 €	-44.61 €
1983	-0.35%	29,722.69 €	-104.36 €	-148.98 €
1984	-0.84%	29,888.36 €	-249.78 €	-398.76 €
1985	-1.11%	30,070.19 €	-334.81 €	-733.57 €
1986	-1.23%	30,490.69 €	-376.53 €	-1,110.10 €
1987	-1.11%	30,984.66 €	-343.79 €	-1,453.88 €
1988	-0.67%	32,150.34 €	-215.72 €	-1,669.60 €
1989	-0.24%	33,231.33 €	-81.05 €	-1,750.65 €
1990	0.30%	33,863.31 €	100.37 €	-1,650.27 €
1991	0.73%	33,884.32 €	247.57 €	-1,402.70 €
1992	0.80%	34,076.60 €	271.23 €	-1,131.47 €

Above, the second column shows the percentage point difference between France and its synthetic control (i.e. French savings rate minus Synthetic France's savings rate). The third column shows the average GDP per adult over time. The "savings difference" column represents the difference in yearly savings between France and its synthetic control in euros per adult (i.e GDP per adult multiplied by the difference in savings rate). The "cumulative effect" column of all savings differences since 1982; it could be considered the effect of the wealth tax on wealth per adult purely through savings rates effects. This cumulative effect can be thought of as income that would have otherwise been saved in the absence of wealth taxation. Ten years after the implementation of the wealth tax, the short-term change in savings rate had a negative cumulative effect of 1,131.47 euros. In other words, starting from 1982, French adults on average saved 1,131.47 euros less than their synthetic counterparts over the course of a decade.

However, while the IGF may have had a short-term initial effect on savings rates from 1982 to 1986, this negative effect does not appear from 1988 to 1992 with the implementation of the ISF. While savings rates did bottom in 1986, when the wealth tax was repealed, French savings rates actually increased substantially starting in 1988, the year when the ISF was implemented. From 1988 to 1992, the French savings rate increased to 23.2%, 0.67 percentage points higher than in 1982 when the first wealth tax was implemented. A decade after the implementation of France's first wealth tax, or four years into France's second wealth tax, France had a higher savings rate than its synthetic control. This appears to be counterintuitive as a wealth tax, in principle, should disincentivize savings behavior. It appears that the passage of the first wealth tax in 1982 may have merely had a short-term negative effect of prolonging a downward savings trend. Figure VI below illustrates the differences in savings rates between France and its synthetic control.

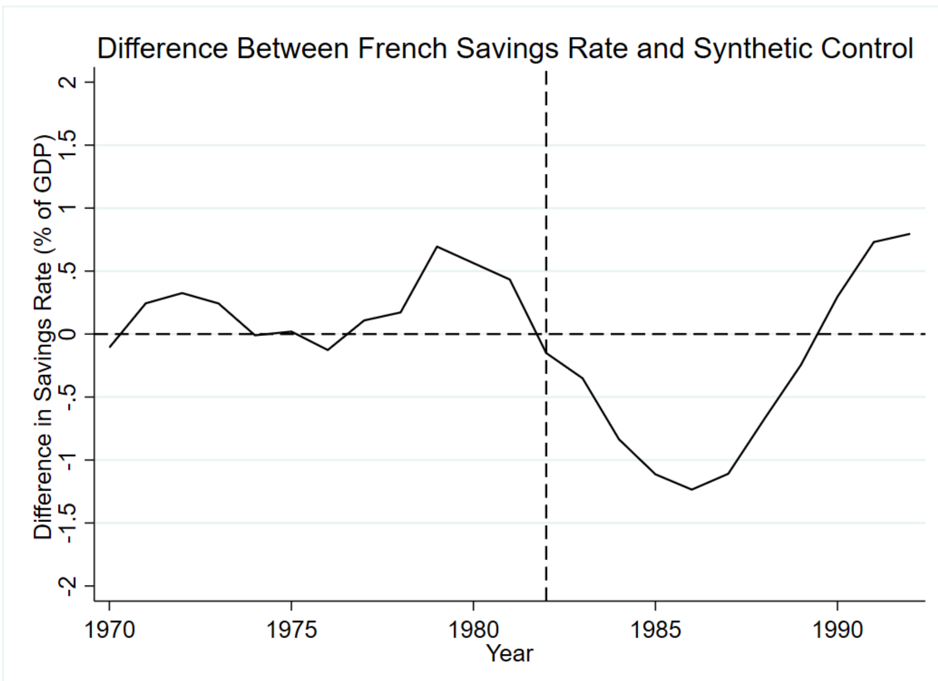

Figure VI: Differences in savings rates over time

As visualized above, France has a lower savings rate than its synthetic counterpart from 1982 to 1989. French savings rates fully recovered in 1990, where recovery entails reconverging with its synthetic control. From 1991 to 1992, French savings actually surpasses its synthetic counterpart. There may be a possible reason for the recovery in savings rates: the initial uptrend begins with the repeal of the IGF in 1986. Then, the ISF in 1988 introduced a tax ceiling that the IGF did not have: an individual's combined income and wealth tax payments could not exceed more than 70 percent of their taxable income. According to Verbit (1991), the tax ceiling was intended to discourage taxpayers from "divesting capital to avoid payment." This ceiling possibly explains the recovery in savings rates. For individuals that exceed this tax ceiling, there are fewer disincentives to save and accumulate wealth.

4.3 Leave-One-Out Robustness Test

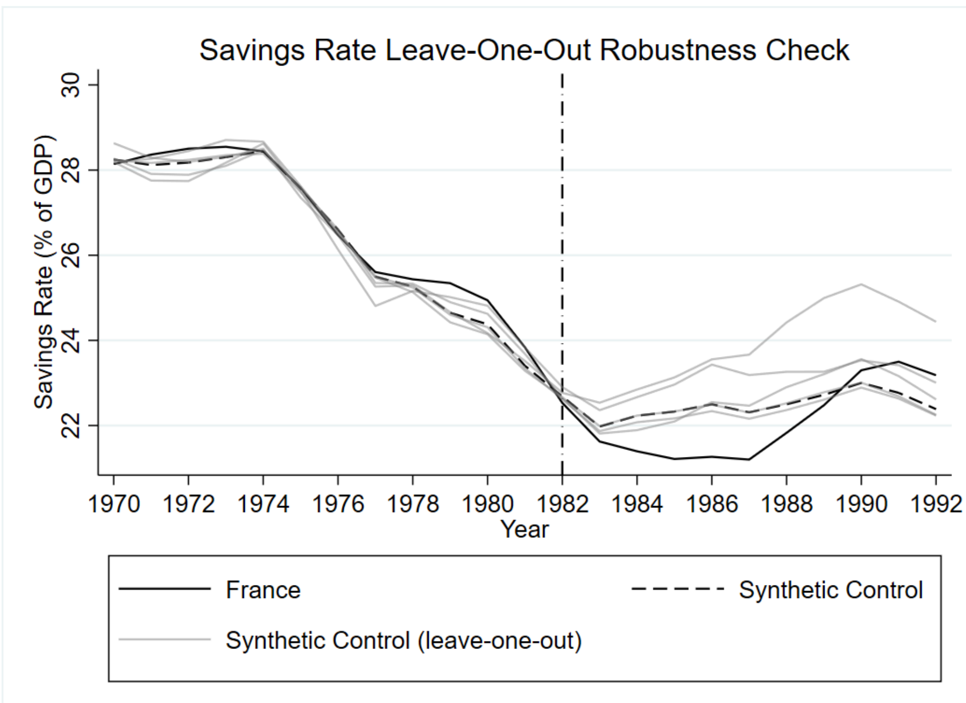

Figure VII: The dashed line represents the original synthetic control while the grey lines represent synthetic controls with one of the original countries removed.

Similar to the previous leave-one-out robustness test performed for French GDP per adult, I generate four additional synthetic controls that exclude each of the following countries one at a time: Belgium, Greece, Luxembourg, and Mexico. The results of this leave-one-out robustness test is visualized above in Figure VII.

As shown above, France saved less than all of its synthetic counterparts between 1982 and 1989—a similar result to the original synthetic control. This corroborates the hypothesis that the IGF in 1982 may have prolonged the savings rate decline. However, there are differences between synthetic controls in the size of the gap from 1982 to 1989 and the ending savings rates in 1992. First, the size of the 1982-1989 gap for all leave-one out synthetic controls, except for one, is larger than the original synthetic control gap. This implies that the negative effect on savings rates could have been larger than originally estimated. Secondly, while France saves more than its counterfactual starting from 1990 in the original results, one of the leave-one-out synthetic controls ends with a higher savings rate than France in 1992, implying that French savings rates may have not fully recovered. However, three other leave-one-out synthetic controls corroborate the original findings that there was a full savings rate recovery.

This leave-one-out robustness test does verify the existence of the 1982-1989 gap. In fact, every leave-one-out synthetic control except for one has a wider gap during this time period. It also confirms that wealth taxation's effect on savings rates translated to a negative effect on wealth per adult, since all of the leave-one-out synthetic controls show either a similarly sized savings gap or larger savings gaps than in the original result. Overall, the robustness test verifies the original findings that the wealth tax had a short-term negative effect on savings, which marginally decreased wealth per adult in France. This leaves capital flight as the other potential factor in losing wealth per adult. I attempt to quantify this capital flight effect through a third synthetic control.

5 Wealth Per Adult

5.1 Constructing a Synthetic Control

To generate a synthetic control for wealth, I use a method very similar to generating one for income. In fact, I use an identical set of economic predictors for wealth: trade openness, investment rate, schooling, industry share of the economy, and inflation. The reasoning behind this is simple: because income is a flow variable, it inextricably affects wealth as a stock variable. In fact, in my dataset, the correlation between income and wealth per adult is 0.82, suggesting that the economic predictors for income would likely work for wealth as well.

Due to the limitations in data, the donor pool for generating a Synthetic France that tracks wealth per adult is smaller than the one that tracks income. In general, there is far less wealth per adult data than income per adult data. To ensure that there is at least 10 years of pretreatment data, I include all countries with wealth per adult that have data from at least 1972 onward. This leaves a donor pool of seven countries: Australia, Canada, Italy, Japan, Greece, the United States, and the United Kingdom. While it is preferable to have a larger donor pool because larger donor pools generally decrease RMSPE and hypothetically increase the predictive potential of synthetic controls, it is possible to generate synthetic controls that utilize smaller donor pools. For instance, Harwell and et al. (2019) utilize donor pools of seven countries to generate synthetic controls to estimate the effects of a country's discovery of natural resources on income inequality.

Table VI: Country Weights in Synthetic France (wealth per adult)

Country	Weight
Canada	0.383
Italy	0.299
Japan	0.109
United States	0.209

As shown in Table VI above, the synthetic control is a weighted combination of four countries: Canada, Italy, Japan, and the United States.

Table VII: Wealth per Adult Predictors

VARIABLES	France	Synthetic France	OECD Control Group
Wealth Per Adult (1972)	74989.89	75576.74	81083.77
Wealth Per Adult (1975)	81990.73	81715.14	80659.06
Wealth Per Adult (1982)	99257.52	99278.21	95588.95
Inflation	7.01	6.72	13.26
Trade Openness	32.92	33.66	44.04
Industry	29.08	36.34	25.64
Investment Rate	26.61	25.57	34.85
Schooling	5.11	8.64	7.21
RMSPE	3020.66		

The results in Table VII compares France's, synthetic France's, and the OECD control group's pretreatment characteristics. Compared to the average of the control group, synthetic France provides a closer approximation of France in every economic predictor. The RMSPE is notably higher than the RMPSE of the first income synthetic control, which had a RMSPE of 371.76. This synthetic control is an inferior approximation of France during the pretreatment period and is likely to have less predictive power than the first synthetic control to approximate French income. Nevertheless, relative to the control group on average, it serves as a much better approximation.

5.2 Wealth Taxation's Effect on Wealth per Adult

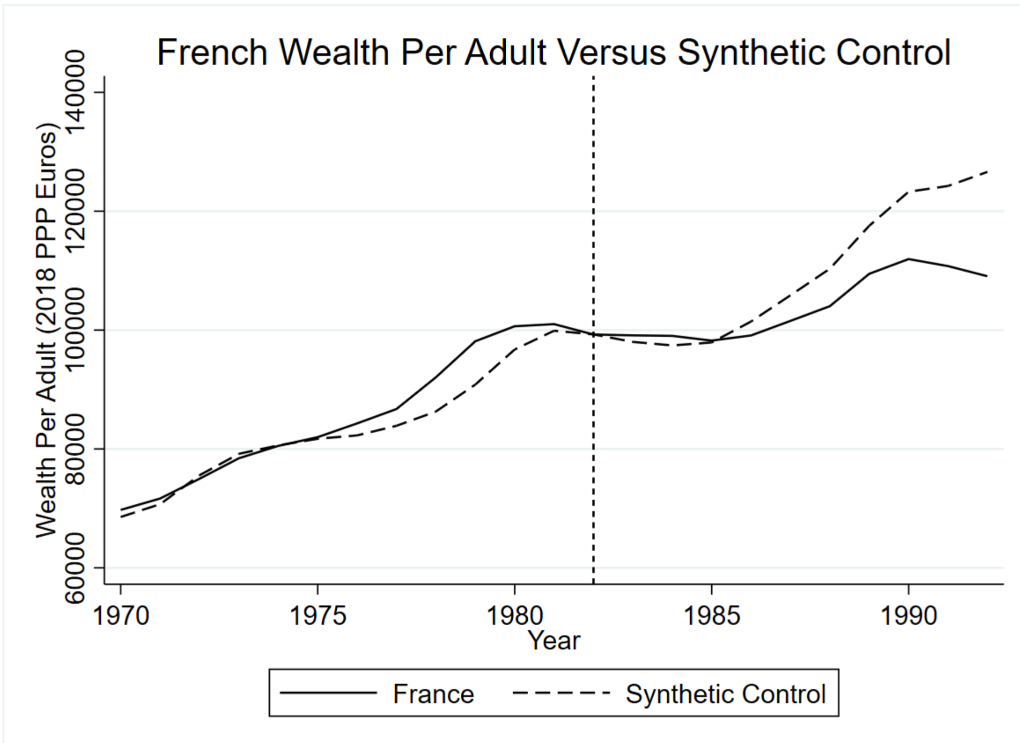

Figure VIII: Wealth per adult and France and its synthetic control over time

Figure VIII visualizes the GDP per adult of France and its synthetic counterpart from 1970 to 1992. The vertical dotted line denotes the start of wealth taxation in 1982. As shown above, the synthetic control has a significant divergence amounting peaking at 7,300 euros (approximately 7.3% of actual GDP per adult in 1979) during the pretreatment years of 1970-1982. This significant divergence during the pretreatment period implies that the synthetic control is likely to be an imprecise counterfactual of France.

During the post-treatment period, it is only until 1986 when a negative divergence begins to emerge. This divergence grows in size over time. Notably, after 1990, French wealth declines slightly by about 2,000 euros while its counterfactual continued to increase.

To more closely observe this divergence, Figure IX visualizes the differences between France and its synthetic control over time. In 1992, France

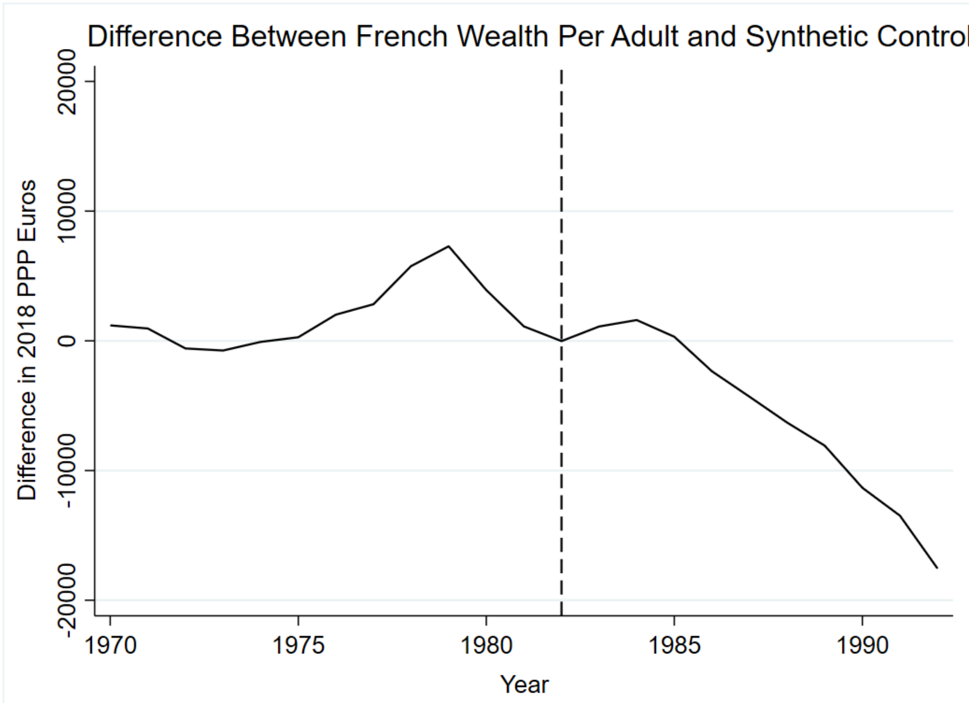

Figure IX: Differences in wealth per adult between France and its synthetic counterpart

underperformed its synthetic control by 17,560 about euros, approximately 13.8% of the synthetic control value at the time. This 17,560 euros can be thought of as wealth per person that would have otherwise been accumulated if neither of the wealth taxes went into effect. If the estimations of this synthetic control are actually correct, this effect on wealth per adult is massive. Recall that only a short-term drop in savings rates only affected wealth per adult by about 1%, implying that capital flight is potentially responsible for dropping wealth per adult by 12.8%.

Regarding a possible spillover effect that would inflate or deflate the value of this synthetic control, the spillover effect of the wealth tax in France may be significant. It would be a concern if one of the countries in the synthetic control was the recipient of capital flight. Indeed, as Pichet (2007) notes, 12 percent of French tax refugees fled to the United States, one of the control countries in synthetic control. However, the exact number of tax refugees that fled from 1982 to 1992 and the amount of wealth taken with them is unknown. Nevertheless, there is a distinct possibility that capital flight from France increased the average wealth per adult of the United States, suggesting that the synthetic control may overestimate the negative effect of the wealth tax.

Because of the synthetic control's suspect predictive power and concerns of a spillover effect, accepting that the lost wealth per adult is precisely 17,560 euros would be hamfisted. A leave-one-out robustness test must be conducted to verify this negative effect.

5.3 Leave-One-Out Robustness Test

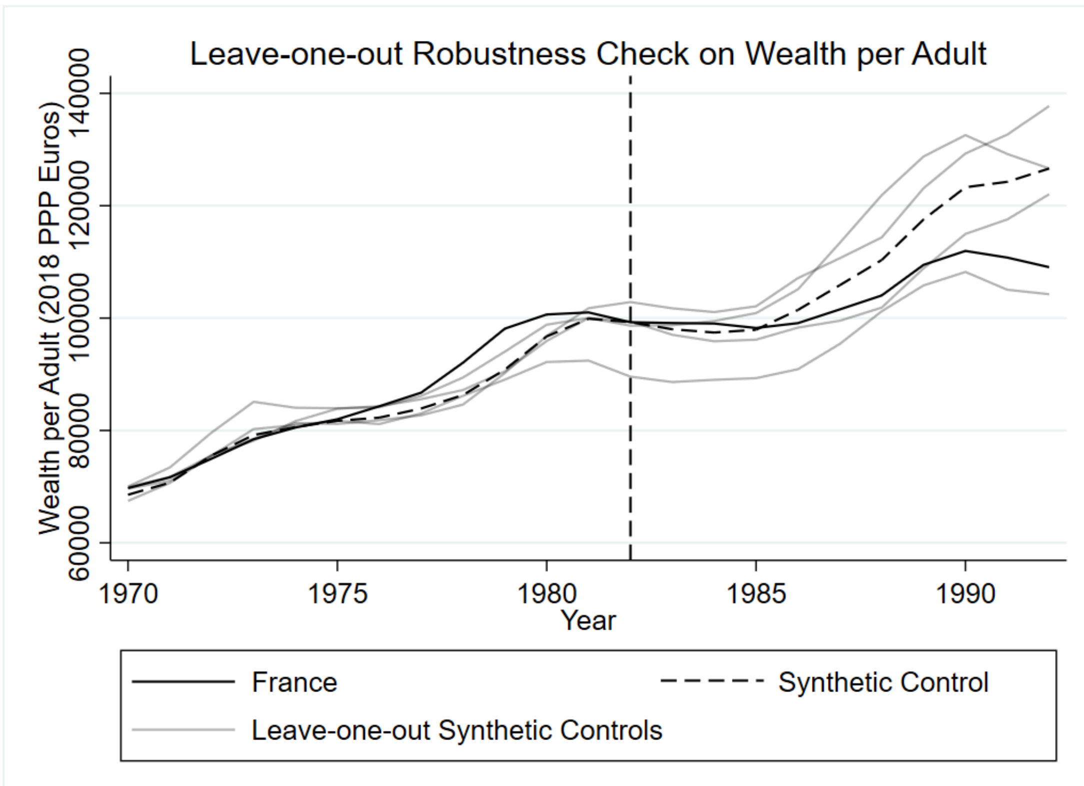

Figure X: The dashed line represents the original synthetic control while the grey lines represent synthetic controls with one of the original countries removed.

Similar to how I conducted a leave-one-out robustness test on income, I generate four additional synthetic controls, removing one country at a time contained in the original synthetic control: Canada, Italy, Japan, and the United States.

As illustrated above in Figure X, France underperforms every leave-one-out synthetic control in addition to the original synthetic control, except for one. France outperforms the leave-one-out synthetic control that excludes the United States—wealthiest country in the dataset. Additionally, this particular synthetic control very poorly approximates French wealth per adult during the pretreatment period, implying that the original synthetic control is likely overdependent on the United States existing in its donor pool. The loss of 13.8 percent of wealth per adult over a decade is not a robust result.

Given that there are three leave-one-out synthetic controls, along with the original synthetic control, which hypothetically has the most predictive power due to having the most data to better minimizes differences between France and synthetic France, a significant negative effect is still highly plausible. The present existence hundreds of thousands of French tax refugees[12] in France's neighboring countries corroborates this plausibility. However, the original estimate of 17,560 euros lost per adult should not be considered a precise or reliable estimate. Overall, the synthetic controls method is incapable of providing a precise and robust result with the data that currently exists. The most loss to wealth per adult that can be confirmed is the 1 percent negative effect that stems from the short-term negative effect on savings rates.

[12]As previously stated, there were roughly 63,000 French tax refugees living in Belgium in 2005. Pichet (2007), using numbers from the French Tax Directorate, states that Belgium holds 18% of all fiscal expatriates. It is likely that there were hundreds of thousands of tax refugees around the world by the time the wealth tax was repealed in 2019.

6 Significance of Results and Implications

The main goal of this paper is to test the plausibility of the purported negative economic impacts of the French wealth tax. These two main criticisms were that (1) wealth taxes lower economic growth and (2) wealth taxes lead to economic damage through capital flight and discouraged savings behavior.

If GDP growth is considered synonymous with economic growth, as is often the case, the synthetic controls method shows that that the wealth tax had no significant impacts on economic growth, a robust result given both of the robustness tests performed. This result is significant— even without additional exit taxes or other punitive measures to prevent capital flight, the French wealth taxes appeared to have no penalty to economic growth.

Out of the results of all three outcome variables, this lack of impact on incomes is the most robust outcome and arguably has the most important policy implications. Often, wealth taxation is often framed as a pursuit for fairness and equality at the expense of economic growth. However, the synthetic controls method provides evidence that this tradeoff is insubstantial. Even if there was large-scale capital flight in France from 1982 to 1992, it did not significantly impact economic growth. If this lack of effect can be confirmed across multiple countries, policymakers can implement wealth taxes without the fear of hindering economic development.

As for the possible economic damage inflicted on French wealth per adult, the only confirmed effect is a short-term decline in savings rates before a speedy recovery. This loss in savings had a cumulative effect equivalent to 1% of French wealth per adult. Not only is this loss in wealth quite small over the course of a decade, but the synthetic controls method provides evidence that wealth taxation did not have a long-term effect on savings behavior. If there is a more substantial negative effect on wealth, it would likely stem from capital flight as there are hundreds of thousands of French tax refugees scattered across the world.

In attempting to quantify this effect, I discovered that a synthetic controls method is insufficient to precisely estimate this capital flight. The method provided evidence that a large negative effect on average wealth per adult is plausible through the leave-one-out robustness test. Estimations of this large negative effect, however, are tenuous. If there was enough data to include more pretreatment years and countries in the donor pool, there would likely be a more precise and robust result.

Nevertheless, to combat the potentially large effect of capital flight, policymakers intent on implementing a wealth tax should prioritize appending obstacles to disincentivize expatriation. For instance, Senators Bernie Sanders[13] and Elizabeth Warren[14] supplemented their wealth tax proposals with exit taxes of 40-60% and 40% respectively, steeply penalizing expatriates attempting to avoid the wealth tax. As Saez and Zucman (2019) note, "the threat of expatriation is primarily a policy variable" rather than an inevitable outcome of wealth taxation; for example, in the United States, there is already the precedent of an exit tax that exists for unrealized capital gains, applying to those with incomes over 160,000 dollars or net wealths above 2 million dollars. As Pichet (2007) notes, in the 2000s, the repeal of the exit tax in France caused a sharp and immediate increase in capital flight, implying that the exit tax was effective before its repeal.[15] If governments need not worry about declines in economic growth or savings, they can address the last major concern of wealth taxation by sufficiently disincentivizing capital flight.

[13]Bernie Sanders, "Tax on Extreme Wealth," https://berniesanders.com/issues/tax-extreme-wealth/

[14]Elizabeth Warren, "Ultra Millionaire Tax," https://elizabethwarren.com/plans/ultra-millionaire-tax

[15]To be clear, this exit tax was passed in the late 90s. There was no exit tax in place during the time frame of my analysis.

Appendix

Description and Sources of Variables:

GDP Per Adult: Gross Domestic Product per adult denoted in 2018 PPP euros. Source: World Inequality Database. Available at: https://wid.world/

Wealth Per Adult: the average net assets per adult denoted in 2018 PPP euros. Source: World Inequality Database

Savings Rates: Gross domestic savings as a percentage of GDP. Source: World Bank. Available at: https://data.worldbank.org/indicator/NY.GDS.TOTL.ZS?locations=FR

Educational attainment: Mean years of education. Source: the Lee and Lee Long-Run Educational Dataset. Available at: http://barrolee.com/Lee_Lee_LRdata_dn.htm

Industry Share: Industry share of the economy expressed as a percentage of GDP. Source: World Bank and World Bank Archival Data. This variable uses a myriad of World Bank Archival Data because the most recent version of the data set has omitted data from past years. The list below shows where every country's data is from in this variable. Available at: https://data.worldbank.org/indicator/NV.IND.TOTL.ZS and https://databank.worldbank.org/source/wdi-database-archives-(beta)#.

France- recent 2019 data
Australia- April 2000 archival data
Belgium- November 2014 archival data
Canada- November 2014 archival data
Greece- October 2012 archival data
Italy- November archival 2014
Japan- November archival 2017
Korea- recent 2019 data
Luxembourg- November archival 2017
Mexico- recent 2019 data
New Zealand- recent 2019 data
Portugal- November archival 2014
United States- November archival 2014 data
United Kingdom- November archival 2014 data

Trade Openness: A country's trade as a percentage of GDP. Source: World Bank. Available at: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

Investment rate: Gross Capital Formation (% of GDP); formerly called "Gross Domestic Investment". Source: World Bank. Available at: `https://data.worldbank.org/indicator/NE.GDI.TOTL.ZS`
Inflation: Annual percentage increase in consumer prices. Source: World Bank Available at: `https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG`

Wealth Tax Schedules Comparison

IGF (1982) Brackets	Tax Rate	ISF (1988) Brackets	Tax Rate
3-5 million Francs	0.5%	4-6.5 million Francs	0.5%
5-10 million Francs	1.0%	6.5-12.9 million Francs	0.7%
>10 million Francs	1.5%	12.9-20 million Francs	0.9%
		>20 million Francs	1.1%
		>40 million Francs*	1.3%

*The bracket above 40 million Francs was introduced in 1990.

Note that during France's transition to the euro in 1999, the exchange rate was fixed at 6.56 francs per euro until the transition was complete.

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