The Effect of Chile's Neoliberal Reforms in the 1970s

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Thesis Summary

This paper estimates the effect of the structural economic reforms introduced in the 1970s by military dictator Augusto Pinochet on the GDP per capita in Chile. Using the synthetic control method and a cross-country data set from the World Bank's World Development Indicators, I create a "synthetic" Chile where Pinochet never ruled. I compare the economic evolution of this counterfactual Chile to the actual one to estimate what effects the reforms had. I find a significant, positive effect on GDP per capita. The results are robust to various robustness checks of both the donor pool and predictors.

Introduction

The Chilean economy is one of the most successful economies in Latin America. Its GDP per capita was 13,866.96 USD in 2019, almost twice the average GDP per capita of countries in Latin America and the Caribbean, which was 8,657.49 USD. However, this has not always been the case. As recently as 1991, Chile's GDP per capita was lower than both the Latin America and Caribbean average and the world average ("GDP per Capita (Constant 2015 US$)," 2021). Chile's high standard of living today is the result of decades of rapid, sustained growth rates that were among the highest in the world, the so-called "Miracle of Chile".

Researchers have proposed various explanations of the source of this growth miracle, but most agree that the structural economic reforms introduced in the early 1970s by the military dictator Augusto Pinochet were at least somewhat responsible for Chile's success (Hudson, 1994); (Muchnik, 1997); (Gallego & Loayza, 2002); (Ffrench-Davis, 2002). These authors use various methods to produce their results including qualitative analysis, linear regression, time-series analysis, growth accounting, analytical models, and cross-country evidence, but none use the synthetic control to analyze the effects of Pinochet's takeover on the trend in GDP per capita.

In this paper, I will estimate the effects of Pinochet's reforms on the GDP per capita in Chile. Here, the rapid transition from a socialized economy under the previous government to a free-market economy under Pinochet represents a natural experiment. Within about two years of his military coup, Pinochet completely transformed the Chilean economy, representing an almost immediate switch from one economic system to another.

To do this, I will use the synthetic control method proposed by Abadie and Gardeazabal (2003), a method that is used to estimate a counterfactual outcome if the unit of interest did not experience a particular policy or intervention. It creates a counterfactual "synthetic" unit that did

not experience the intervention of interest using a weighted combination of pre-intervention outcomes of a chosen set of donor countries that resemble the actual unit's characteristics.

In the context of Chile, the method enables the estimation of how GDP per capita would have evolved in the absence of Pinochet and his reforms to the economy. Using a weighted average of countries from a donor pool of countries with economic characteristics that resemble Chile's in the pre-intervention period, we can model a synthetic Chile where Pinochet was never in power. We can compare the economic evolution of this synthetic Chile to the actual Chile to estimate the effects of Pinochet's takeover and reforms. The results will indicate if they had a positive effect, negative effect, or no effect on the economy in the long term.

Historical Background

In the mid-20th century, Chile experienced several changes in government. After a relatively stable term under the Christian Democrats, the leftist coalition won the 1970 election, and Salvador Allende, a Marxist candidate, became president. After his inauguration, the government quickly worked to socialize the economy, "taking over the copper mines, other foreign firms, oligopolistic industries, banks, and large estates." It took over most great estates and gave the lands to resident workers, then later seized many factories and granted their management to the workers and state (Hudson, 1994).

Initially, wages rose while inflation was kept down, increasing the purchasing power for nearly all Chileans. However, in the second and third years of Allende's rule, deficit spending snowballed, foreign aid was cut, and the price of copper dropped. Inflation erased the gains in purchasing power, and the economy crashed after the government could not agree on a solution to cover the deficit. Chile erupted into protests and strikes from 1971 to 1973, and in 1973, there

was a failed coup by a group of tank commanders. After playing a key role in stopping the coup, General Carlos Prats lost much of the army's support and was replaced by General Augusto Pinochet ("The Allende Years and the Pinochet Coup, 1969–1973," n.d.).

In September 1973, the military attempted another coup led by Pinochet, this time with the full support of the military. The coup succeeded, and Pinochet became president, dismantled Congress, outlawed Marxist political parties, and ended elections in Chile ("The Allende Years and the Pinochet Coup, 1969–1973," n.d.). This takeover ended democratic rule in the country and began the long period of a military dictatorship under Pinochet.

After seizing control, Pinochet began introducing several revolutionary reforms to the economy following the recommendations of the "Chicago Boys," a group of Chilean economists trained under Milton Friedman at the University of Chicago. In 1973, the Chicago Boys published *El Ladrillo*, a book that diagnosed the problems of Chile's struggling economy in the previous decades, analyzed the reasons for their creation and persistence, and provided policy recommendations (Brender, 2010). The dictatorship, which had no checks on its power and wanted to build a new version of Chile, rapidly implemented these changes (Hudson, 1994).

Pinochet instituted various economic reforms that transformed the isolated, protectionist economy with strong government intervention into a globally connected, market-driven economy. Many scholars characterize the reforms into different periods: one of revolutionary military rule and reforms that rapidly transformed Chile into a free-market economy, one of economic crisis, and one of reform consolidation and a "golden period" of growth (Ffrench-Davis, 2001); (Caputo & Saravia, 2018); (Hudson, 1994); (Gallego & Loayza, 2002).

The first period was a strict, rapid implementation of the principal neoliberal reforms laid out in *El Ladrillo*, including the "abolition of price controls; across the board import

liberalization; financial market deregulation;…reduction of the public sector and restrictions on the activities of public enterprises; the return of expropriated businesses and lands to their former owners; privatization of traditional public enterprises; suppression of most current labor union rights; and tax reform" (Ffrench-Davis, 2010). Pinochet implemented all of these main reforms within just a few years of seizing power (Muchnik, 1997).

Several significant achievements followed the implementation of these reforms: "inflation was reduced greatly, the government deficit was virtually eliminated, the economy went through a dramatic liberalization of its foreign sector, and a strong market system was established" (Hudson, 1994). Chile had a surplus of 3.1 percent in 1980, while the rest of Latin America was running fiscal deficits. However, unemployment was still rising, and Chile still had problems with its balance of payments. Finally, there was a substantial inflow of commercial bank credit to the Chilean economy after Chile fixed the peso to the U.S. dollar in 1979, which would later cause a debt problem in the country (Margitich, 1999).

Despite the initial success of the Chilean economy, the financial system collapsed in the early 1980s in the face of a world recession and the international debt crisis, when the international banking community cut back loans to Chile. Real GDP per capita fell 20 percent, inflation nearly tripled from 10 to 27 percent, and unemployment rose above 20 percent. In an attempt to ease the crash, the government intervened in the banking system, providing subsidies and strengthening banking regulations (Caputo & Saravia, 2018). Muchnik (1997) argues that this crisis was not a failure of the new economic system but the opposite, that the drastic economic reforms introduced in the 1970s "laid a foundation that helped Chile pull itself out of [the] unexpected slump."

After the crisis, Pinochet replaced his entire cabinet, including the Chicago Boys, with a group of pragmatic, free-market economists under Hernán Büchi. Under this new guidance, the government introduced debt-management policies and consolidated the structural reforms of the 1970s with goals to rebuild the financial sector, reduce import tariffs, and promote exports (Hudson, 1994). It aimed to "put the country back on the growth path and fortify the financial system" (Caputo & Saravia, 2018). Under these policies, Chile converted most of its debt into equity in Chilean companies, which alleviated the debt crisis and promoted the investment of foreign direct investment (Ffrench-Davis, 2001)

Importantly, the only significant changes to economic policy in the 1980s were the abandonment of the fixed exchange rate, the reduction of import tariffs to a 15 percent uniform level, and stricter regulations of the financial sector (Hudson, 1994); (Caputo & Saravia, 2018). Only the last policy was a slight tweak from the package of reforms introduced in the previous decade—the first two were a return to the policies introduced in the previous decade.

The economic foundation created by Pinochet's initial policies and the new reforms in the light of an international crisis were followed by a strong, sustained recovery of the economy starting in 1986. In just two years, GDP rose by 22 percent (Ffrench-Davis, 2002). A key part of the growth was a sharp increase in export volume, especially non-traditional exports, that was "only possible because of investments begun almost ten years before" (Hudson, 1994). Hudson (1994) asserts that "the success of the post-1985 period was rooted in the early reforms".

After recovering from the debt crisis, the Chilean economy did not stagnate like most other countries in Latin America—it maintained high growth rates for the next few decades (Sims & Romero, 2013). This period is often referred to as Chile's "golden period" of growth, which lasted from 1985 to 1998. Over these years, its growth rate was in the top four worldwide,

a sharp difference from its past. Moreover, this high growth was stable and sustained: "the volatility of its growth rate was small compared with a worldwide sample of countries" (Gallego & Loayza, 2002). The average annual GDP per capita growth during this period was 4.98 percent ("GDP per Capita (Constant 2015 US$)," 2021).

Throughout this golden period of growth, several amendments were added to the constitution, including specific provisions for a transition to civilian government. After a presidential plebiscite in 1988, voters rejected Pinochet, and in 1989, Christian Democrat Patricio Aylwin was chosen to be the first democratically elected president since Allende. In 1990, Chile fully transitioned from a military dictatorship under Pinochet to a democracy. (*Chile - The Military Dictatorship, from 1973*, n.d.).

While this government transition represents a stark difference in political systems, "the government decided to avoid a radical change in existing economic policy, instead seeking 'a change in continuity'" (Ffrench-Davis, 2010). Angell (1993) characterizes it as a successful transition because the new government chose to continue with the successful policies introduced by Pinochet's government. Despite the coalition's "left-leaning tendencies, it…embraced the fundamental market-based economic principles that had been imposed during the authoritarian military rule of Pinochet," but the government now emphasized the goal of reducing inequality in the country (Muchnik, 1997). It introduced a package of funding for social programs and a reform of the labor law, which, according to the government, were "the *only* important changes to the economic model of the military government" (Sapelli, 2000)

Although the years 1985 to 1998 are characterized as the golden period of growth, Chile sustained growth rates that were higher than the Latin American average for the next two decades and higher than the world average for the next decade. From 1999 to 2019, Chile's

average annual GDP per capita growth rate was 2.42 percent, compared to the Latin American average of 1.24 percent and the world average of 1.85 percent ("GDP per Capita Growth (Annual %)," 2021). Growth was significantly slower from 2014 onward, but Chile's GDP per capita was already substantially higher than countries in the region. In 2015, Chile's GDP per capita was 13,574.17 USD, compared to an average GDP per capita of 8,630.86 for countries in Latin America and the Caribbean ("GDP per Capita (Constant 2015 US$)," 2021).

It was only around 2014 that growth rates significantly slowed. Annual growth rates in GDP per capita from 2014 to 2019 averaged only 0.65 percent, and it was the first time in decades that they fell below the world average ("GDP per Capita Growth (Annual %)," 2021). This slowdown coincided with socialist president Michelle Bachelet's second term, which started in 2014. During her second term, Bachelet "abandoned the more moderate policies of her first term when she had largely supported Chile's successful market-based institutions" (Roberts, 2018). This change in direction was the most significant change from the economic foundation since it was originally introduced by Pinochet about four decades earlier.

While a period of record growth followed Pinochet's rule, it is still disputed what exactly fueled it. Some attribute the growth miracle to Pinochet's structural changes of the economy under the guidance of the Chicago Boys, while others cite copper prices, good luck in terms of the external economic environment, and political liberalization over time (Muchnik, 1997); (Hudson, 1994); (Jadresic & Zahler, 2000); (Gallego & Loayza, 2002). As mentioned, I will use the synthetic control method to estimate how the Chilean GDP per capita would have evolved in the absence of Pinochet and his structural reforms to the economy.

Methodology

I will follow the synthetic control method introduced by Abadie and Gardeazabal (2003) to estimate the effects of Pinochet's economic reforms on the GDP per capita in Chile. Using synthetic controls, we can compare the economic evolution of Chile during Pinochet's rule with a weighted combination of countries that resemble Chile's economic characteristics before the coup. This weighted combination of countries represents a "synthetic" Chile without Pinochet or his reforms that we can compare to the actual Chile to estimate how GDP per capita would have evolved in their absence.

Suppose that we have data for $J + 1$ countries, $j = 1, 2, \ldots, J + 1$, where the first country is the treated unit, the only unit affected by the intervention of interest. I am analyzing the effect of Pinochet's reforms in Chile, so country $j = 1$ is Chile, and the intervention of interest is Pinochet's coup in 1973. The remaining J countries form the "donor pool", the control countries that will be used as potential comparison units for the synthetic control. Countries in the donor pool are untreated: that is, they are not affected by the intervention.

The data span T years, $t = 1, 2, ...$, so we observe the outcome of interest, Y_{jt}, for every country, j, and every year, t. The first T_0 years are those years before the intervention: the pre-intervention period, and the rest of the years, $t > T_0$, are the years after the intervention: the post-intervention period. We also have a vector of k predictors, $X_{1j}, \ldots, X_{kj}$, for each country j. This set of predictors can include pre-intervention values of the outcome of interest, Y_{jt}. For each country, we have a vector of size $k \times 1$. Together, the J vectors of k predictors of the countries in the donor pool form a $k \times J$ matrix that is denoted by $\boldsymbol{X_0} = \left[\boldsymbol{X_2} \ldots \boldsymbol{X_{J+1}}\right]$. This matrix holds the values of the predictors for the J untreated units in the data. Similarly, the vector $\boldsymbol{X_1}$ holds the values of the predictors for the treated unit (since there is only one treated unit, it is not a matrix).

Let Y_{jt}^{N} be the outcome of interest for country j in year t without intervention and let Y_{1t}^{I} be the outcome of interest for country $j = 1$, the country that was exposed to the intervention of interest. The effect of the intervention for the treated country in year $t > T_0$, then, is the difference between its outcome with intervention and its outcome without intervention:

$$\tau_{1t} = Y_{1t}^{I} - Y_{jt}^{N}$$

Note that $Y_{1t}^{I} = Y_{1t}$ for years $t > T_0$, since country $j = 1$ is exposed to the intervention for these years. Thus, we observe the values of Y_{1t}^{I}. However, we are interested in the values of Y_{1t}^{N} for $t > T_0$, the outcome of interest without intervention for country $j = 1$ in the post-intervention period. Since the treated country was exposed to intervention in this period, though, this is a counterfactual outcome, so it is not observed in the data.

The goal of the synthetic control, then, is to estimate Y_{1t}^{N}: the GDP per capita that would have been observed in Chile without Pinochet and his reforms. To do this, the synthetic control produces a weighted average of the outcomes of countries with values of predictors that resemble the treated country in the pre-intervention period. As Abadie (2021) mentions, "a combination of units in the donor pool may approximate the characteristics of the affected unit substantially better than any unaffected unit alone." Thus, the synthetic control gives us a $J \times 1$ vector of country weights, $\boldsymbol{W} = (w_2, \ldots, w_{J+1})'$, that most accurately reconstructs Chile's pre-intervention predictors. The weights in this vector sum to one.

There are various ways to choose the synthetic control, $\boldsymbol{W}^{*} = (w_2^{*}, \ldots, w_{J+1}^{*})'$, but the most common is the method proposed by Abadie and Gardeazabal (2003): to minimize the vector $X_1 - X_0 W$, the difference between the preintervention characteristics of the treated unit and the synthetic control. The resulting synthetic control will be the one that provides the closest

match to the treated unit's pre-intervention predictor values. To find this set of weights, Abadie and Gardeazabal (2003) choose $\boldsymbol{W} *$ to minimize:

$$\sum_{m=1}^{k} v_m (X_{1m} - X_{0m}\boldsymbol{W})^2$$

where v_m is the weight assigned to predictor m. These weights form $\boldsymbol{V} = (v_1, \dots, v_k)$, a $k \times 1$ vector that shows the relative importance of each predictor.

There are different methods to select the predictor weights, $\boldsymbol{V}^* = \left(v_2^*, \dots, v_{J+1}^*\right)'$, but I will use the standard method proposed by Abadie and Gardeazabal (2003) as it is the safest choice (McClelland & Gault, 2017). Abadie and Gardeazabal (2003) choose $\boldsymbol{V}^*$ to minimize the mean squared prediction error (MSPE) of the synthetic control:

$$\sum_{t \in \mathrm{T}_0} \left(Y_{1t} - w_2(\boldsymbol{V})Y_{2t} - \cdots - w_{J+1}(\boldsymbol{V})Y_{J+1t}\right)^2$$

where $\mathrm{T}_0 \subseteq \{1,2, \dots, T_0\}$ is a set of pre-intervention years chosen to be used as the "training" period. The remaining pre-intervention years are used as the "validation" period to assess the predictive power of the synthetic control.

After finding the set of weights, $\boldsymbol{W} *$, to be used for the synthetic control, the estimated value of the outcome without intervention can be calculated as:

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j^* Y_{jt}$$

and the difference between the outcome of interest for the treated unit with and without intervention, then, is:

$$\hat{\tau}_{1t} = Y_{1t} - \hat{Y}_{1t}^N$$

which is the estimated effect of the intervention in year t. If this value is positive, we estimate that the intervention had a positive effect on the outcome of interest, and if this value is negative, we estimate the opposite. A value of zero means that the intervention had no effect.

The synthetic control method has several assumptions that must be met to ensure accurate estimates. First, the outcome variable of interest should not be highly volatile. Second, the donor pool must be a suitable comparison group. For this condition to be true, units in the donor pool should not experience an intervention like the treated unit or any large idiosyncratic shocks to the outcome. They also must have characteristics similar to the treated unit. Third, there should be no anticipation of the intervention that allows for preemptive changes in behavior.

Fourth, there should be no interference across units. Outcomes should be independent across all units. Fifth, the treated unit's predictor values should not be extremes in the data: in other words, they should not be outside any linear combination of predictor values from the donor pool. Finally, there should be enough time periods in the data for the effect of the intervention to be detected (Abadie, 2021).

For all calculations of the synthetic control mentioned in the methodology, I will use the R package *Synth*. Abadie, Diamond, and Hainmueller (2010) openly published their source code that they used in their synthetic control study as an R package that implements all calculations of the synthetic control method. I specify the treated unit, countries in the donor pool, outcome of interest, predictors, treatment year, time period, training period, and validation period.

Data and Sample

To construct the synthetic control, I will use a cross-country data set from 1960 to 2019. All data comes from The World Bank's World Development Indicators (WDI). The earliest year available is 1960, and the most recent is 2020. I excluded the year 2020 because of the COVID-19 pandemic, an unexpected shock to the economy that the synthetic control method cannot account for. I chose 1974 as the year of intervention because Pinochet's coup was at the end of 1973, so 1974 is the first full year with the effects of the takeover. An intervention year of 1973 leaves 14 years in the pre-intervention period and 46 years in the post-intervention period.

As I am analyzing the effect that Pinochet's takeover and structural reforms had on Chile's GDP per capita, I will use GDP per capita as the outcome of interest. This variable, Y_{jt}, is the GDP per capita in country j in year t. GDP is measured in constant 2015 U.S. dollars to avoid differences due to inflation and allow for comparison over time.

The first step of constructing a data set is identifying predictors of the outcome variable. This collection of variables will represent the X_0 and X_1 matrices. Most obviously, the GDP per capita of countries in the donor pool should help predict the country of interest's if we believe that it co-moves across countries with similar characteristics. I also included life expectancy in years, which has a strong, positive relationship with GDP per capita.

Next, I added variables that measure the size of economic sectors, important characteristics of an economy that can affect growth and reflect a country's economic development. Specifically, these predictors are the share of value added from agriculture, forestry, and fishing as a percentage of GDP and the share of value added from manufacturing as a percentage of GDP. Finally, I calculated a measure of trade openness by dividing the sum of

imports and exports by the GDP to represent how well integrated the country's economy is in international markets.

Since the donor pool should be a group of potential units that are similar to the treated unit, I started with all countries in Latin America (excluding the Caribbean): Argentina, Belize, Bolivia, Brazil, Costa Rica, Colombia, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela. I did not include Caribbean countries because most are small island nations, which likely gives them peculiarities in their economies, especially when compared to Chile. Moreover, I chose to exclude Belize, Guyana, and Suriname due to their small sizes, different colonial histories, and much later independence dates (*The Independence of Latin America*, n.d.).

While there are differences between these countries, most share a common colonial history from the Spanish, and most achieved their independence around the same time (*The Independence of Latin America*, n.d.). Moreover, they are geographically the closest countries to Chile. Thus, we might expect Chile's characteristics and economy to be most similar to this group of countries. While it could be argued that Central American countries are not representative of Chile due to their distance and different geography, including them gives the synthetic control method more possibilities to match Chile's economic characteristics and produce a better fit. Regardless, I test a model that excludes them when checking robustness.

Next, I restrict the sample to countries for which data is available. Data for the dependent variable, GDP per capita, are not available for Venezuela. Data for the predictors primary sector as a percentage of GDP and industry as a percentage of GDP are not available for Nicaragua and Uruguay. I chose to remove the two countries rather than the two variables because it leaves more data for all other countries, and the synthetic control is a much closer fit when they are

included. Moreover, the synthetic control method considers the predictors to be important when included. Finally, the two countries obtain zero weights in the synthetic control when constructed after excluding the missing predictors, so excluding them does not affect the results.

This exclusion leaves a final donor pool of Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Panama, Peru, and Paraguay, and a final set of predictors that includes GDP per capita, life expectancy, primary sector value added as a share of GDP, secondary sector value added as a share of GDP, resource rents as a share of GDP, and trade openness. I experimented with several other standard economic growth predictors such as inflation, education, illiteracy, and investment rate, but their inclusion would have required the exclusion of several countries due to a lack of data. Moreover, when I dropped those countries and included the variables, the synthetic control method assigned them little to no weight.

Analysis

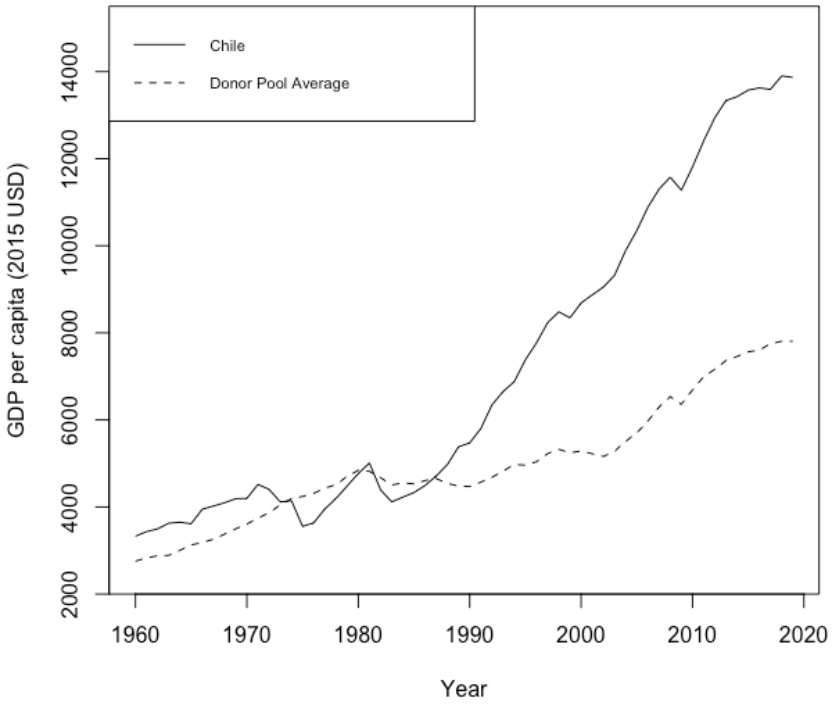
Even before Pinochet's takeover, Chile's economic characteristics differed greatly from the rest of Latin America. It had a higher GDP per capita and life expectancy, a higher percentage of GDP from resource rents and industry, a lower percentage of GDP from the primary sector, and a lower trade openness than the average country in the donor pool. Since directly comparing Chile's economic performance to other Latin American countries would include the effect of these existing differences, it would not be clear what part of the difference is attributable to Pinochet's policies.

For example, see Figure 1, which shows the GDP per capita of Chile compared to a simple average of the countries in the donor pool. They have different trends in the pre-

intervention period, so we cannot expect a simple average to provide accurate predictions about the post-intervention period.

Figure 1

GDP per Capita in Chile versus Donor Pool Average



Note. Author's calculations using data from The World Bank.

To separate these effects, I construct a synthetic Chile based on a weighted average of other countries in Latin America that resemble Chile before Pinochet came to power. Using the synthetic Chile, we can estimate how the GDP per capita would have evolved in the absence of Pinochet. We can compare this predicted counterfactual to the historical path of Chile to estimate how the intervention, Pinochet's takeover, affected the economy. If the actual GDP per capita is higher than the actual one, we can say that the intervention had a positive effect, and if it is lower, we can say the opposite.

Given that there is data from 1960 to 2019, and Pinochet took over at the end of 1973, I will use 1960 to 1973 as the pre-treatment period. According to the synthetic control method, I divide the pre-treatment period into a training period and a validation period. Half of it, from 1960 to 1966, will be the validation period, and the other half, from 1967 to 1973, will be the training period. In doing so, we can create a synthetic Chile with the training data and assess how closely it follows the actual one in the years before the intervention using the validation data, which gives us an idea of the model's accuracy in the post-intervention period.

Table 1 shows the country weights calculated by the synthetic control method. The optimal weights vector, $\boldsymbol{W}^*$, chooses three countries to construct the weighted average for synthetic Chile: Peru, Argentina, and Costa Rica. This combination is understandable as the average pre-intervention characteristics for the three countries, shown in Table 2, are relatively similar to those of Chile. The characteristics of synthetic Chile, given in column 2 of Table 3, are somewhat comparable to the actual characteristics, though they cannot be perfectly fitted. Chile had the highest resource rents as a percentage of GDP, the highest industry as a percentage of GDP, and the lowest primary sector as a percentage of GDP, so a linear combination of the other countries cannot reproduce these values. Note, furthermore, that this weighted average provides a closer approximation for all predictors but life expectancy than a simple average of the countries in the donor pool, shown in the last column of Table 3.

Table 1

Synthetic Weights for Chile without Pinochet

Country	Synthetic Control Weight
Argentina	0.107
Bolivia	0.000
Brazil	0.000
Colombia	0.000
Costa Rica	0.099
Ecuador	0.000
Guatemala	0.000
Honduras	0.000
Mexico	0.000
Panama	0.000
Peru	0.794
Paraguay	0.000

Note. Author's calculations using the *Synth* package and data from The World Bank.

Table 2

Predictor Averages of Positive Weight Donors before Pinochet's Takeover

	Chile	Peru	Argentina	Costa Rica
GDP per capita	4,220.10	3,462.45	5,301.32	4,686.58
Life Expectancy	62.3	54.19	61.42	65.89
Resources	7.5	3.46	1.1	4.44
Agriculture	7.57	16.02	11.39	21.84
Industry	40.35	28.48	28.85	24.75
Openness	0.2	0.31	0.16	0.31

Note. Author's calculations using data from The World Bank.

Table 3

Predictor Averages of Synthetic Chile before Pinochet's Takeover

	Chile	Synthetic Chile	Donor Pool Average
GDP per capita	4,220.10	4,190.41	3,628.33
Life Expectancy	62.3	56.67	59.07
Resources	7.5	3.25	2.17
Agriculture	7.57	15.98	20.41
Industry	40.35	29.94	27.45
Openness	0.2	0.287	0.427

Note. Author's calculations using the *Synth* package and data from The World Bank.

The optimal predictor weights chosen for the synthetic control, V^*, are greater than zero for all variables, which means that they are all used to construct synthetic Chile. Table 4 lists the weights calculated by the standard method. The predictors, from most to least important, are GDP per capita, primary sector value added as a share of GDP, trade openness, resource rents as a share of GDP, life expectancy, and industry value added as a share of GDP.

Table 4

Synthetic Chile Predictor Weights

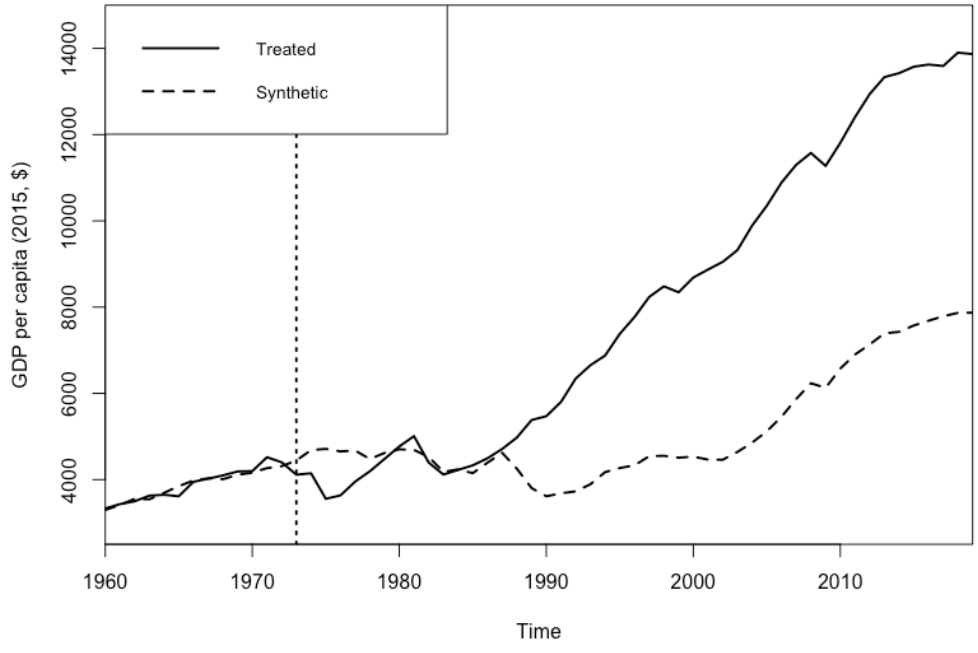
Predictor	Weight
GDP per Capita	0.330
Life Expectancy	0.053
Resources	0.134
Primary	0.316
Industry	0.023
Openness	0.143

Note. Author's calculations using the *Synth* package and data from The World Bank.

Figure 2 shows the paths in GDP per capita for the synthetic compared to the actual, "treated" Chile. The synthetic control almost perfectly matches Chile's historic GDP per capita from 1960 to 1966, the validation period, as well as from 1967 to 1973, the training period, both in level and trajectory. The close fit of the GDP per capita and the relatively close fit of the predictors is evidence that the synthetic control is a good reproduction of Chile before Pinochet's takeover, especially when compared to a simple average of countries in the donor pool. Thus, it should be able to provide insights into how Chile's GDP per capita may have developed in the absence of an intervention.

Figure 2

GDP per Capita in Actual versus Synthetic Chile



Note. Author's calculations using the *Synth* package and data from The World Bank.

After Pinochet's takeover, actual Chile's GDP per capita falls and stays below synthetic Chile's until around 1980. However, notice that in the synthetic control, there was no economic downturn in the mid-1970s. This difference shows evidence of an initial shock due to Pinochet's policies, which makes sense. After a coup and a complete redesign of the structure of the economy, it can be expected that GDP per capita will fall. For example, recall that after the government privatized the previously state-subsidized companies, there was a shock as the inefficient and non-competitive ones went bankrupt and shut down (Ffrench-Davis, 2010). Thus, we would expect a decline in the years immediately following the coup. Without any intervention, however, we would expect the Chilean economy to follow a similar trend as in the previous years. This occurs in Figure 2, which increases the credibility of the findings.

After the Chilean economy recovered from the initial shocks of Pinochet's takeover and reforms, the synthetic control and actual GDP per capita paths converge and very closely track each other during the debt crisis and banking crisis of the 1980s, even though the synthetic control is only a prediction. Recall that the synthetic control method only uses data from the pre-intervention period to construct its estimates—none from the post-intervention period. Thus, all values for GDP per capita after 1973 are blind estimates of the future. Since the estimates in the 1980s follow the actual values, there is more evidence that the model provides a good fit and has some degree of predictive power.

They follow each other until the late 1980s, when synthetic Chile falls into another recession that is even worse than the previous one. This decade is often referred to as the "lost decade" of Latin America, a period of crisis and severe recession in most Latin American countries. The recession was most severe in the early 1980s and was worse in Chile than in any other country (Ffrench-Davis, 2002). After a period of recovery from 1984 to 1987, most

countries experienced another recession (Sims & Romero, 2013). However, actual Chile avoided this second recession altogether. It was one of the "few countries [that was] able to put their economies back onto a stable growth path in the second half of the 1980s" (Ocampo, 2014).

Many researchers agree that Pinochet's earlier structural reforms were crucial in Chile avoiding the recession that the rest of Latin America faced. For example, a country study of Chile published by the Library of Congress explains that "the success of the post-1985 period was rooted in the early reforms" (Hudson, 1994). In an article about Chile's consistent economic growth, Muchnick (1997) asserts that "the reforms of the 1970s and the adjustments in the mid-1980s made it possible for Chile to recover from the dire economic crisis of the early 1980s". Finally, according to Gallego and Loayza's (2002) analysis of Chile's "golden period" between 1985 and 1998, "for Chile, the 1980s did not represent a lost decade, as it did in most of Latin America…the facts suggest that the jump in growth was driven by policies and macroeconomic conditions that affected the economy's overall productivity".

After actual Chile's path in GDP per capita diverges from the synthetic control in the late 1980s, it consistently grows at rates that are among the highest in the world, leaving synthetic Chile far behind. Most remarkable about this growth is how strong a break it is from the economy's almost stagnant past. "The *change* in Chile's per capita GDP growth rate between 1985-1998 and the previous fifteen years was, by far, the highest in the world" (Gallego & Loayza, 2002). It continues growing rapidly until about 2010, after which growth rates are still positive but lower than in the previous two decades.

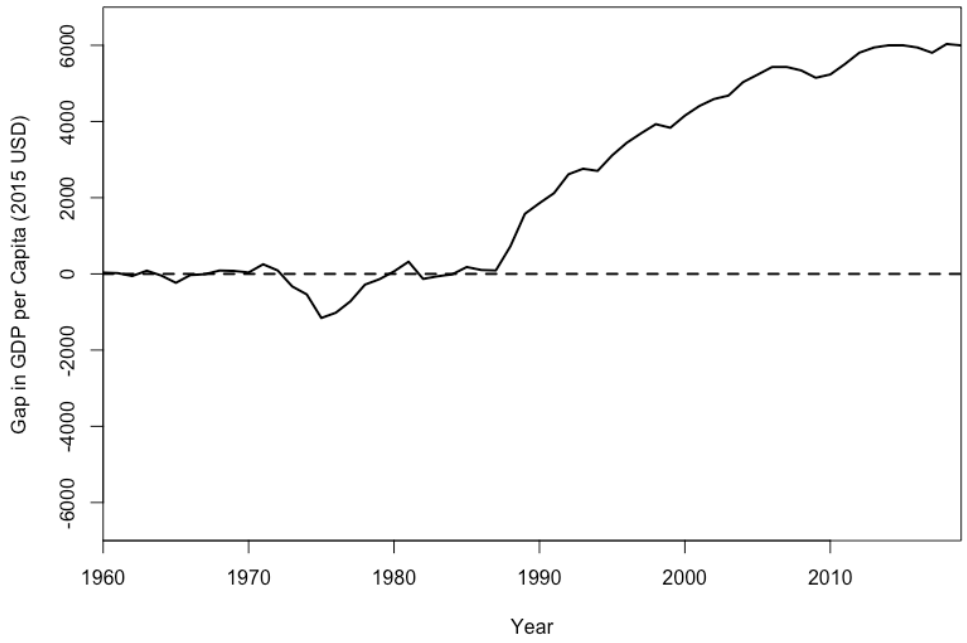
In 2019, the synthetic control's estimate of GDP per capita is 7,870.52 USD. This figure was 13,866.96 USD in the actual Chile, 76.19 percent higher than the synthetic control's estimate. Synthetic Chile's average GDP per capita in the post-intervention period is 5,782.03

USD, compared to actual Chile's average GDP per capita of 8,161.06 USD. Given the significantly higher values of the Chile with intervention, the results support the conclusion that Pinochet's reforms had a significantly positive and long-lasting effect on the economy.

Figure 3 depicts the gap in GDP per capita between the actual and synthetic Chile, the estimated treatment effect, to illustrate its evolution over time more clearly. We see a negative treatment effect in the years immediately following Pinochet's takeover, but it returns to zero after about a decade and remains zero for roughly another decade during the financial crisis. It is only around 1990 when the reforms start having a positive effect on the GDP per capita. The gap steadily widens until slightly after 2010, when growth in both actual and synthetic Chile slows. Thus, we see that the gap begins around 1990 and grows over time, but the positive effect of the intervention levels off after some time.

Figure 3

Gap in GDP per Capita between Actual and Synthetic Chile



Note. Author's calculations using the *Synth* package and data from The World Bank.

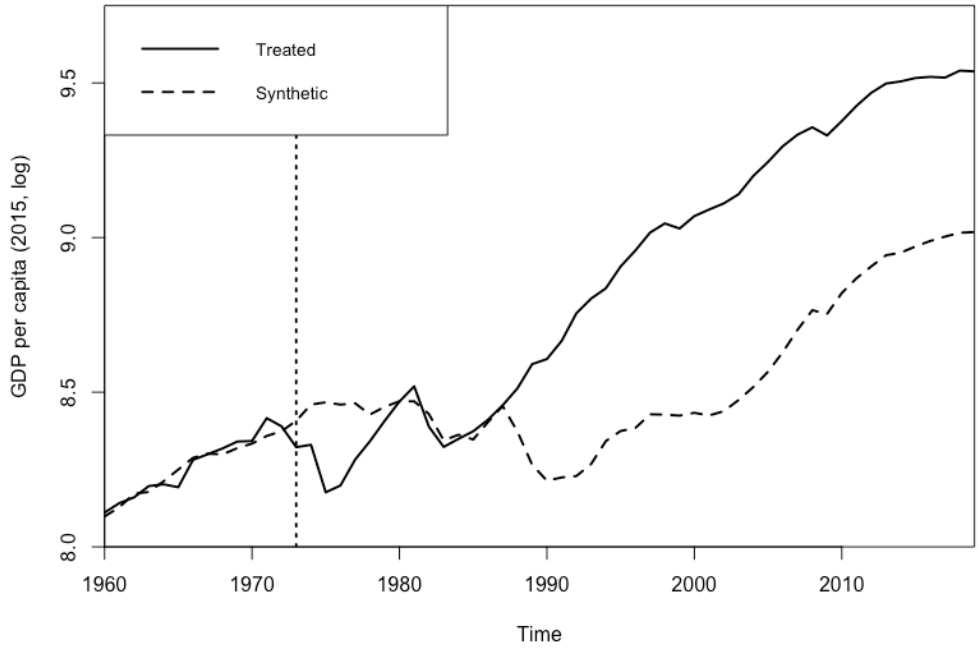
Notice, though, that the *trend* in GDP per capita is almost the same in synthetic Chile as in actual Chile from the early 2000s to 2019. Figure 4 shows the results of Figure 2 in log scale (where the slope is the growth rate) to facilitate this comparison. From 2000 to 2019, synthetic Chile has a slightly *higher* average growth rate. Actual Chile experiences a rapid period of growth from the late 1980s to the early 2000s that secures its higher level of GDP per capita, but from that point on, there seems to be no significant difference in growth rates between it and the synthetic control. Thus, it appears that Pinochet's structural reforms enabled a rapid period of growth that is responsible for the high GDP per capita that Chile has today.

Interestingly, this rapid period of growth begins at about the same time that Chile transitioned from a military dictatorship to a democracy under Patricio Aylwin. Given that the government transition occurred in 1990, and the treatment effect of the intervention only becomes positive around this year, it is possible that the repression of the dictatorship prevented Chile from realizing the benefits of the earlier reforms. The policies may have laid a foundation that would allow the economy to prosper, but the poor quality of the political system may have restricted any growth in GDP per capita.

The transition to a democracy alleviated this problem and increased the quality of the government, which could be what allowed the economy to fully benefit from Pinochet's policies. According to the financial minister of the new government, Alejandro Foxley, "We may not like the government that came before us. But they did many things right. We have inherited an economy that is an asset" (Packenham & Ratliff, 2017).

Figure 4

GDP per Capita (log scale) in Actual versus Synthetic Chile



Note. Author's calculations using the *Synth* package and data from The World Bank.

Robustness Checks

Donor Pool Leave-One-Out

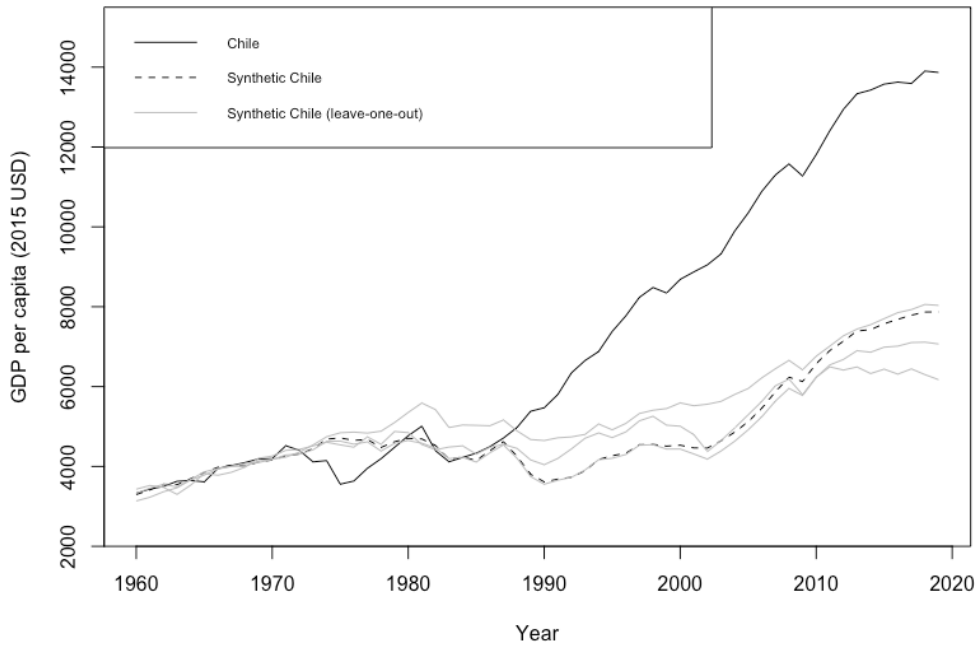
To check the robustness of the previous results, I will conduct a leave-one-out re-analysis of the data. Assuming the synthetic control accurately reproduced the economic predictors of pre-intervention Chile and the post-intervention path of GDP per capita, the main conclusion of a positive estimate of Pinochet's policies "should be robust to the exclusion of any particular country" (Abadie, 2021). That is, when excluding every country that contributes to the synthetic control one at a time and reconstructing it, the fit and results should not be significantly different. If the results are robust, the synthetic control method should be able to create a new synthetic

Chile that is similar to the original synthetic control even with slight changes to the donor pool. Discrepancies may represent "the effects of other interventions or…particularly large idiosyncratic shocks on the outcome of the excluded untreated unit." (Abadie, 2021).

Figure 5 shows the paths of the synthetic control using the entire donor pool and the leave-one-out estimates. All the leave-one-out estimates closely match pre-intervention Chile's GDP per capita, both in the training and validation periods, which is evidence that they still construct a synthetic Chile that resembles the actual pre-Pinochet Chile. Furthermore, two of them track Chile's GDP per capita for several years in the post-intervention period, even though they are only predictions. All leave-one-out estimates are similar to each other and the original synthetic control, showing that the results are not driven by any single country in the donor pool.

Figure 5

Leave-One-Out Donor Pool Estimates of GDP per Capita



Note. Author's calculations using the *Synth* package and data from The World Bank.

We see that all estimates are far below Chile's GDP per capita, which indicates that the estimate of a positive effect of Pinochet's policies is robust to what countries are used to construct the synthetic control. The leave-one-out estimate that excludes Argentina has the most significantly different trends from the synthetic control constructed using the entire donor pool. It diverges from its path in the mid-1970s and remains higher until about 2010, when the two paths converge again. After converging, however, this synthetic control ends up producing the estimate that is closest to the original one.

The synthetic control that excludes Argentina is also the one that estimates the smallest positive effect of Pinochet's takeover. However, this effect is still extremely large: in 2019, this leave-one-out estimate of GDP per capita is 8,033.93 USD, compared to Chile's actual GDP per capita of 13,866.96 USD. Thus, the smallest difference estimated still shows an actual GDP per capita that is 72.60 percent higher than the synthetic control.

Predictor Choice

I will also conduct a leave-one-out analysis of the data excluding each of the predictors because all of them contributed to the synthetic control. While this check is not conventional in synthetic control studies, it will ensure that the results are not driven by any single predictor and that they are robust to the choice of predictors. As Abadie explains, one important way "the design of a study may influence results [is] the choice of predictors of the outcome variable" (Abadie, 2021). Thus, we do not want to see significantly different results when leaving out any particular predictor.

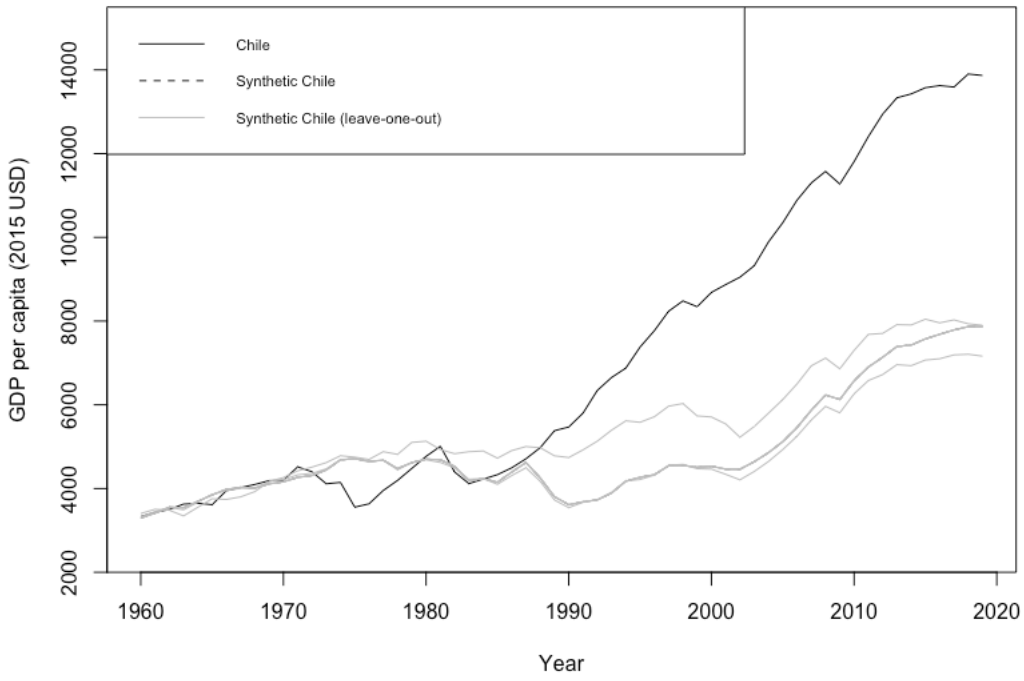
Moreover, this check is important given that the synthetic control struggled to reproduce actual Chile's economic characteristics. According to Abadie, "the fact that the value of a

particular predictor for the treated cannot be closely approximated by the synthetic control may be less of a concern if the synthetic control closely tracks the trajectory of the outcome variable for the unit affected by the intervention during a hold-out validation period" (Abadie, 2021). Holding each variable out and reconstructing the synthetic control one at a time allows us to check if we should be concerned about the synthetic control's inability to exactly reproduce Chile's economic characteristics (see Table 3).

Figure 6 shows the paths of the synthetic control using the entire predictor pool and the leave-one-out estimates. Most importantly, they track actual Chile's GDP per capita in the pre-intervention period, which is evidence that the leave-one-out synthetic controls resemble actual Chile. Remarkably, all leave-one-out estimates but one almost perfectly match the synthetic control that was constructed using all predictors. The estimate that excludes resource rents as a percentage of GDP produces a higher estimate that diverges from the original synthetic control in the late 1970s and remains greater in the following decades. However, by 2019, the two converge. The leave-one-out estimate is 7,899.22 USD, which is only 0.36 percent higher than the original synthetic control's estimate of 7,870.52 USD. These results show that the conclusion of a positive estimate of Pinochet's policies is also robust to the choice of predictors used.

Figure 6

Leave-One-Out Predictor Estimates of GDP per Capita



Note. Author's calculations using the *Synth* package and data from The World Bank.

Different Donor Pools

According to Abadie, another way the design of a synthetic control study can influence results is through "the choice of units in the donor pool" (Abadie, 2021). "It is important to restrict the donor pool to units with characteristics similar to the treated unit," so I will construct synthetic controls using a few different donor pools, taking care to only include the most representative countries (Abadie et al., 2015). I will use three different ideas of similarity.

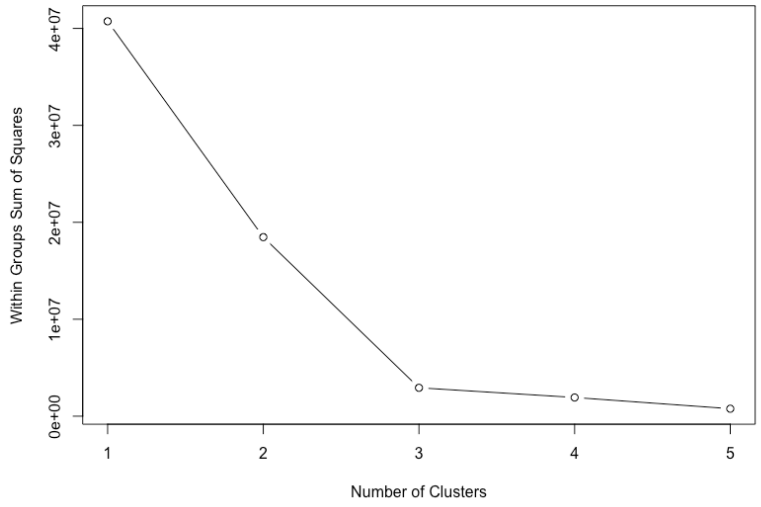
First, I will restrict the donor pool to countries in South America. Central American countries, while they provide more data and opportunities to create a representative synthetic Chile, may mislead the results due to their small size, different geography, and distance from

Chile. Next, I will restrict the donor pool to Chile's immediate neighbors. These are likely the countries with the most similar geographic characteristics and locations: their proximity to Chile may make them better representations. Finally, I will create a synthetic control using only countries with the most similar pre-intervention economic characteristics, which is the best choice according to the synthetic control method.

To mathematically find the most representative countries, I will use k-means clustering on the average predictor values of the pre-intervention period and include only countries from Chile's cluster in the donor pool. This method divides the data into groups that are similar based on patterns in the data, so the countries in Chile's group should have the most similar economic characteristics. Figure 7 plots the within groups sum of squares for several values of k. I use the elbow method to choose k, which results in three optimal clusters. Chile's cluster contains Brazil, Costa Rica, Mexico, Panama, and Peru, so I will use these countries as the donor pool.

Figure 7

Within Groups Sum of Squares

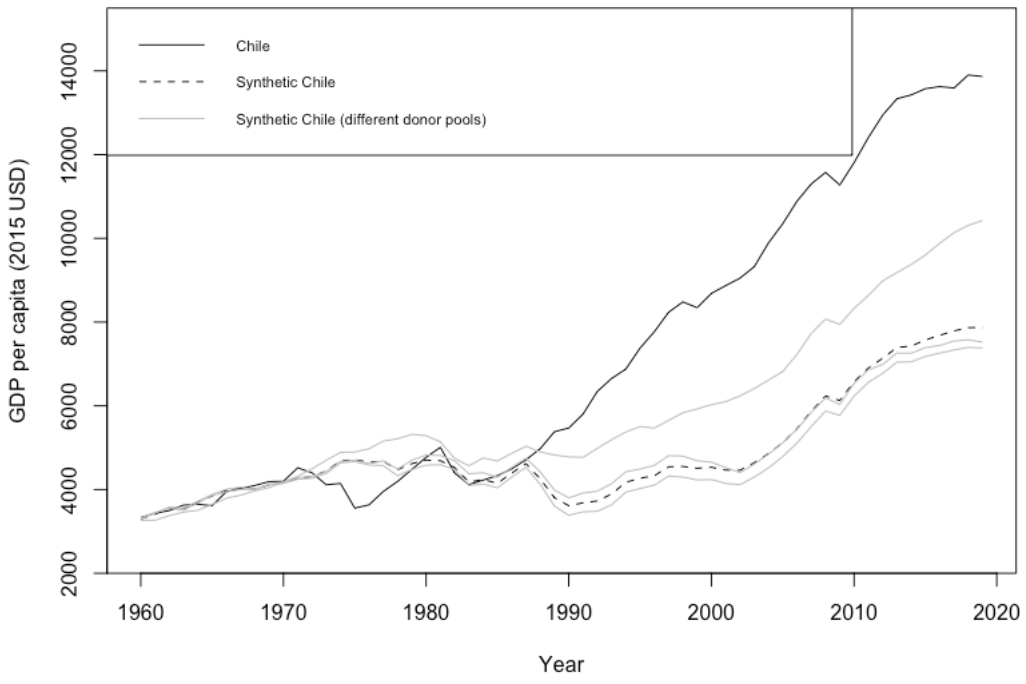


Note. Author's calculations using data from The World Bank.

Figure 8 shows paths in GDP per capita for actual Chile, the synthetic control using the entire donor pool, and the three previously mentioned specifications. The synthetic controls that use the South America donor pool and the neighbor donor pool closely track the original synthetic control. The South America synthetic control has a slightly higher estimate of GDP per capita than the neighbor synthetic control, but both are below the original: that is, they estimate a greater effect of the intervention.

Figure 8

Synthetic Controls Based on Different Concepts of Similarity



Note. Author's calculations using the *Synth* package and data from The World Bank.

However, the synthetic control created from the most similar donor pool has a different path. It diverges from the other two specifications in the early 1970s and remains higher, with the

difference growing over time. In 2019, its estimate of GDP per capita is 10,425.39 USD, compared to Chile's actual GDP per capita of 13,866.96 USD. While this estimate is much higher than the original synthetic control, and it estimates the smallest effect of Pinochet's takeover of all controls created, Chile's actual GDP per capita is still 33.01 percent higher than the synthetic control's estimate—still a substantially positive estimate.

While the trend of the synthetic control created from countries in Chile's k-means cluster differed from the others, the three synthetic controls using donor pools based on different concepts of similarity have the same conclusion: a positive estimate of Pinochet's structural reforms. The choice of units in the donor pool does not change the main findings, so there is even more evidence of robustness to changes in the study design.

Placebo Study

Another way to evaluate the credibility of the results of a synthetic control is to conduct placebo studies, where the affected unit's treatment is reassigned to a comparison unit. In using the synthetic control method, we assume that Pinochet's reforms only affect Chile, so we do not want to see similar results when reassigning the treatment to other countries and estimating synthetic controls for them. A large placebo effect would indicate a lack of predictive power and indicate that the gap observed in Figure 2 may not be attributable to Pinochet's reforms, but rather a poorly fitted model or wider trends in the region that affect multiple countries.

For the placebo study, I construct a synthetic control when Pinochet's takeover is assigned to Peru, the country with the largest weight in the synthetic control. Peru was the country that the synthetic control algorithm found most similar and representative of Chile in the pre-intervention period. Since Pinochet's takeover was localized within Chile, assigning it to

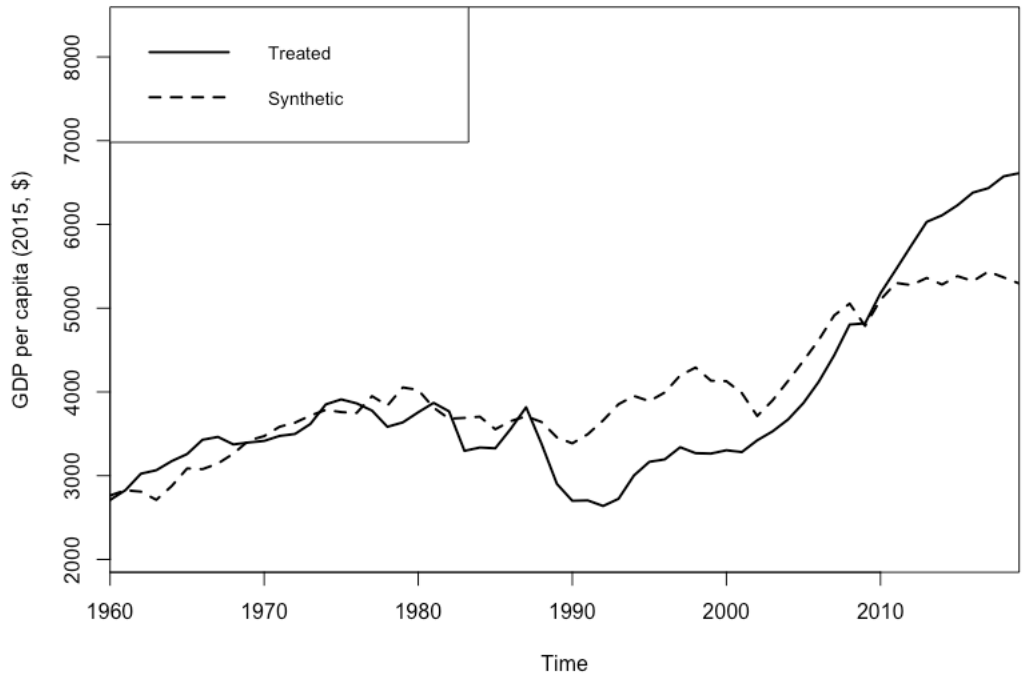
Peru should not produce estimates of GDP per capita that are significantly different from the actual values. However, if the model estimates substantial, positive effects from the 1974 treatment (i.e., we see trends similar to those in Figure 2), it will undermine the credibility of the previous results, as they would not be unique to Chile.

Figure 9 shows Peru's actual GDP per capita compared to a synthetic control estimate constructed from the other countries in the donor pool. Note that Chile, being the treatment unit, is excluded. The two roughly track each other until the late 1980s, when actual Peru falls below the synthetic control's estimates and remains lower until about 2010, when it surpasses the synthetic control. In 2019, actual Peru and the synthetic control had a GDP per capita of 6,611.49 USD and 5,294.72 USD, respectively, representing a positive treatment effect estimate of 24.87 percent. This estimate is substantially lower than Chile's estimate of 76.19 percent, providing some confidence in the significance of the positive effects of Pinochet's reforms. However, there is still a large placebo estimate when looking only at the final year, which signals a "potential lack of predictive power of the synthetic control" (Abadie et al., 2015).

When considering a longer period of time, though, the placebo study leads to a different conclusion. Across the entire pre-intervention period, actual Peru's GDP per capita was 4,079.35 USD. Synthetic Peru's was 4,218.84 USD, giving an average estimated treatment effect of -3.31 percent. In Chile, these values were 8,161.06 USD and 5,782.03, respectively, representing an average treatment effect of 41.15 percent. The synthetic control created in placebo study of Peru loosely follows historical GDP per capita and yields a treatment effect that is close to zero (and is even slightly negative), which supports the conclusion of a positive treatment effect of Pinochet's policies.

Figure 9

GDP per Capita in Peru versus Synthetic Peru



Note. Author's calculations using the *Synth* package and data from The World Bank.

Conclusion

In 1970, Chile's GDP per capita was similar to the average country in Latin America. However, after experiencing decades of some of the highest growth rates in the world, it is now one of the highest in the region ("GDP per Capita (Constant 2015 US$)," 2021). While it is unclear what caused the Chilean growth miracle, many researchers attribute it to structural reforms to the economy implemented by Pinochet in the early 1970s. These researchers use several different methods, but none have used the synthetic control method. I used this method to estimate the counterfactual of Pinochet's Chile, how Chile's GDP per capita would have evolved in his absence, to estimate the effects of his reforms.

My findings indicate a large, positive effect of Pinochet's reforms. The synthetic control estimates a GDP per capita of 7,870.52 USD, compared to the actual value of 13,866.96 USD. Thus, Chile's actual GDP per capita is 76.19 percent higher than the estimated counterfactual. The treatment effect does not appear until around 1990, and after it does, it steadily grows over time until slightly after 2010, when it levels off.

Interestingly, the growth in GDP per capita is about the same in actual and synthetic Chile from the early 2000s and on. The results suggest that Pinochet's reforms sparked a rapid period of growth that was crucial for Chile's success. This period of growth boosted Chile's GDP per capita well above the rest of the region and appears to be responsible for the difference that exists today. This conclusion is consistent with the finding of several other researchers that the earlier reforms caused Chile's "golden period" of growth.

The robustness checks support this conclusion. All donor pool leave-one-out estimates are significantly lower than Chile's actual GDP per capita. The leave-one-out estimate that estimates the smallest effect of Pinochet's reforms still represents a positive effect of 72.60 percent. Similarly, for the predictor leave-one-out estimates, the smallest estimated treatment effect is still positive 75.55 percent.

Finally, the synthetic controls based on different concepts of similarity—the same continent, immediate neighbors, and k-means clusters—all point to the same conclusion. The synthetic control that was constructed from the donor pool of the most similar countries according to clustering estimated the smallest effect of all robustness checks. This effect, however, was still substantial: in 2019, treated Chile's GDP per capita was 33.01 percent higher.

Another important characteristic of the robustness checks is that all synthetic controls closely track Chile's GDP per capita throughout the entire pre-intervention period. All were

created using only data from 1967 to 1973, the training period, but still accurately estimate GDP per capita from 1960 to 1966, the validation period. We see that changing the study design has no significant effect on the conclusion or fit of the model. Thus, the robustness checks show that the conclusions are robust to several variations in the study design, which further boosts the credibility of the results.

The placebo study also somewhat supports the conclusion of a positive treatment effect from Pinochet's reforms, but it calls into question the credibility of the results. When reassigning the intervention to Peru, a country that was not affected by it, we observe a treatment effect of 24.87 percent. While this is much lower than the treatment effect of 76.19 observed for Chile, it is still a substantially large placebo effect. Since the effects of Pinochet's reforms should not affect Peru, the synthetic control's estimates of GDP per capita should match the actual values. The fact that there is a significant difference between the two may signal a lack of predictive power of the synthetic control.

The results of this paper indicate that the Chilean economic model introduced by Pinochet may be useful for countries in the region to achieve a higher standard of living, but that it does not permanently ensure growth. It appears that the reforms caused a temporary period of growth that significantly boosted GDP per capita, but then growth rates returned to pre-intervention levels. Interestingly, the start of this period of growth and the beginning of a positive treatment effect of the intervention coincide with Chile's transition to a democracy. One possible explanation is that the poor quality of the political system under the military dictatorship restricted Chile from realizing the benefits of the earlier policies, and after this problem was alleviated by the switch to a democracy, the economy prospered.

However, it is not clear which reforms were responsible for the rapid growth that occurred. The reforms affected several aspects of the economy, including trade policy, financial markets, the public sector, labor rights, and fiscal policy. All these changes could have different effects on the GDP per capita. I simply analyzed the effects of the entire package of reforms, which were not significantly changed until last decade. Future research could attempt to separate the effects of the different reforms introduced.

Interestingly, the slowdown in growth of the early 2010s coincided with socialist president Michelle Bachelet's second term. Under Bachelet, the government undertook the most significant departure from the original economic foundation since it was originally introduced by Pinochet. The coincidence of the shift in government policy and the slowdown in growth may be further evidence of a positive effect of the 1970s reforms. It may be interesting to research if the slowdown was caused by the departure from the earlier economic model, a change in government, or changes in the external economic environment.

References

Abadie, A. (2021). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. *Journal of Economic Literature*, *59*(2), 391–425. https://doi.org/10.1257/jel.20191450

Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. *Journal of the American Statistical Association*, *105*(490), 493–505. https://doi.org/10.1198/jasa.2009.ap08746

Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, *59*(2), 495–510. https://doi.org/10.1111/ajps.12116

Abadie, A., & Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case Study of the Basque Country. *American Economic Review*, *93*(1), 113–132. https://doi.org/10.1257/000282803321455188

Angell, A. (1993). The Transition to Democracy in Chile: A Model or an Exceptional Case? *Parliamentary Affairs*, *46*(4), 563–578. https://doi.org/10.1093/oxfordjournals.pa.a052442

Brender, V. (2010). ECONOMIC TRANSFORMATIONS IN CHILE: THE FORMATION OF THE CHICAGO BOYS. *The American Economist*, *55*(1), 111–122. http://www.jstor.org/stable/40657832

Caputo, R., & Saravia, D. (2018). The Monetary and Fiscal History of Chile: 1960-2016. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3238188

Chile—The military dictatorship, from 1973. (n.d.). Britannica. Retrieved April 24, 2022, from https://www.britannica.com/place/Chile/The-military-dictatorship-from-1973

Ffrench-Davis, R. (2001). *Reformas, crecimiento y políticas sociales en Chile desde 1973*. CEPAL. https://www.cepal.org/es/publicaciones/1698-reformas-crecimiento-politicas-sociales-chile-1973

Ffrench-Davis, R. (2002). *Economic Reforms in Chile*. University of Michigan Press. https://www.press.umich.edu/17208/economic_reforms_in_chile/?s=look_inside

Ffrench-Davis, R. (2010). Economic development in Chile since the 1970s. In R. Ffrench-Davis & B. Stallings (Eds.), *Economic Reforms in Chile: From Dictatorship to Democracy* (pp. 3–49). Palgrave Macmillan UK. https://doi.org/10.1057/9780230289659_1

Gallego, F. A., & Loayza, N. (2002). *The Golden Period for Growth in Chile: Explanations and Forecasts* (SSRN Scholarly Paper ID 301294). Social Science Research Network. https://doi.org/10.2139/ssrn.301294

GDP per capita (constant 2015 US$). (2021). [Data set]. In *World Bank Open Data*. https://data.worldbank.org/indicator/NY.GDP.PCAP.KD

GDP per capita growth (annual %). (2021). [Data set]. In *World Bank Open Data*. https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?locations=CL

Hudson, R. (1994). Chile: A Country Study. In *Chile—The Debt Crisis: Further Reforms and Recovery*. Federal Research Division, Library of Congress. http://countrystudies.us/chile/67.htm

Jadresic, E., & Zahler, R. (2000). Chile's Rapid Growth in the 1990s: Good Policies, Good Luck, or Political Change? *IMF Working Papers*. https://www.imf.org/external/pubs/ft/wp/2000/wp00153.pdf

Margitich, M. (1999). The 1982 Debt Crisis and Recovery in Chile. *Perspectives on Business and Economics at Lehigh Preserve*, *Volume 17-Chile in Transition (1999)*, 12.

McClelland, R., & Gault, S. (2017). *The Synthetic Control Method as a Tool to Understand State Policy* (p. 46). Urban Institute.

Muchnik, E. (1997). Decades-old reforms drive Chile's economy. *Forum for Applied Research & Public Policy*, *12*(1), 98. https://login.pallas2.tcl.sc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=566235&site=ehost-live

Ocampo, J. A. (2014). The Latin American Debt Crisis in Historical Perspective. In J. E. Stiglitz & D. Heymann (Eds.), *Life After Debt: The Origins and Resolutions of Debt Crisis* (pp. 87–115). Palgrave Macmillan UK. https://doi.org/10.1057/9781137411488_4

Packenham, R., & Ratliff, W. (2017). *What Pinochet Did for Chile*. Hoover Institution. https://www.hoover.org/research/what-pinochet-did-chile

Roberts, J. M. (2018). *Chile's Economic Freedom Slumped Under Socialism—President Piñera's Plan Will Revitalize It*. The Heritage Foundation. https://www.heritage.org/international-economies/report/chiles-economic-freedom-slumped-under-socialism-president-pineras

Sapelli, C. (2000). The Political Economy of The Chilean Transition to Democracy. *Cuadernos de Economía*, *37*(112), 537–556. https://doi.org/10.4067/S0717-68212000011200005

Sims, J., & Romero, J. (2013). *Latin American Debt Crisis of the 1980s*. Federal Reserve History. https://www.federalreservehistory.org/essays/latin-american-debt-crisis

The Allende Years and the Pinochet Coup, 1969–1973. (n.d.). In *Milestones in the History of U.S. Foreign Relations*. United States Department of State Office of the Historian. Retrieved March 14, 2022, from https://history.state.gov/milestones/1969-1976/allende

The Independence of Latin America. (n.d.). Britannica. Retrieved April 2, 2022, from https://www.britannica.com/place/Latin-America/The-independence-of-Latin-America