DEBATING DEMOCRACY

The Effect of Chile's Democratization on Income Inequality,

A Synthetic Control Approach

by

Amber Bosma

Am2583bo-s@student.lu.se

Abstract: How does democracy affect income inequality? Most would expect democracy to reduce income inequality. There is a general consensus that indeed democratizations in Europe during the nineteenth and early twentieth century did decrease income inequality. More recent democratizations, those countries that democratized during the 1970s-1990s, however, do not seem to have had the same effect. The body of literature that examines the relationship between these so called 'third wave' democratizations and income inequality is limited, and laden with controversies. This study aims to shed light on the issue by means of a case study on Chile, one of the countries that democratized in the third wave. The novel synthetic control method is employed to estimate the effect of Chile's democratization on income inequality during 1985-2015. The results indicate that, even though income inequality has decreased since 2000, this decline is not attributable to Chile's democratization. The main reason seems to be that the disproportionately powerful Chilean elite have been able to undermine redistributive policies under the new democracy. Despite its economic success, Chile's income inequality levels remain among the highest in the world. However, there is certainly room for optimism. A new constitution is to be drafted over the following two years. For democracy to reduce income inequality, it is crucial that policymakers ensure social- economic- and political inclusion of all socioeconomic strata in the new constitution.

Keywords: Income Inequality, Chile, Third Wave Democracy, Latin America, Synthetic Control Method

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1 INTRODUCTION

The way regime types influence income inequality levels has been the subject of intense debate in the fields of political science and development economics. Particularly the way democracy influences income inequality levels has long been a topic of interest in empirical research. Democracy is frequently framed as a distributional game (Timmons, 2010). However empirical research on the subject has thus far failed to prove a robust link between the concepts. Despite the immense scholarly attention the subject has received over the past decades, the subject remains riddled with contradictory and inconclusive results. The relationship between democracy and income inequality has immense scholarly significance and important practical implications. The promotion of democracy has become a prominent feature on the international policy agenda, in part because of its supposed capacity to reduce inequality (Timmons, 2010). It is also widely recognized that low income inequality levels are conductive to a countries' economic growth (Huber & Stephens, 2012). In addition, people's voting choices rest heavily on the notion that democracy generates redistribution.

1.1 Research Problem

The relationship between democracy and income inequality has been widely researched over the past decades. Surprisingly, a robust link has not been found in empirical studies. While there is a general consensus that the democratisation of Europe in the nineteenth and early twentieth centuries has caused a reduction in income inequality, the so-called 'third wave' democratizations that took place in Eastern Europe and Latin America in the seventies, eighties and nineties do not seem to have had the same effect (Huntington, 2012). In fact, some scholars argue income inequality levels have even increased as a result of third wave democratizations (Atkinson & Micklewright, 1992; Chang, 2007). The controversial effect of third wave democratizations on income inequality levels has recently received increasing scholarly attention. The number of aggregate studies that examine the relationship in the overall eastern European or Latin American regions has grown. The body of empirical studies that examine the relationship in context-specific case studies is still very limited, however.

1.2 Aim, Scope and Contribution

This study aims to address this gap by investigating the relationship between democracy and income inequality for the case of Chile, one of the countries that democratized in the third wave. The study seeks to address the research question:

Research Question: *"What effect did Chile's democratization have on income inequality levels"*

Chile is considered the economically most successful country of Latin America. It's economic success, often referred to as 'the Chilean miracle' has brought significant reductions in absolute poverty. Surprisingly however, income inequality levels are still among the highest in the world. Unlike its Latin American neighbors, Chile has previously enjoyed an exceptionally long period of stable democratic governance. The period of political stability was brought to an end in 1973, when general Augusto Pinochet seized power during a military coup. The country was under dictatorship rule for the next seventeen years. Chile's return to democracy in 1990 makes for an interesting natural experiment to test the effect of democratization on income inequality. The specific purpose of this study is thus to examine the way in which Chile's democratization has affected income inequality during the period 1985 to 2015. Following the work of Huntington (2012), the hypothesis of this study is:

Hypothesis: *"Chile's democratization did not significantly reduce income inequality levels"*

In order to achieve this purpose, the study employs the novel synthetic control method. The recently developed method has increasingly gained attention in comparative case studies research. The method allows for the evaluation of the effect of policy interventions by constructing a counterfactual based on a weighted combination of control units.

This study makes an original contribution to the limited yet growing body of quantitative case studies that examine the effect of third wave democratizations on income inequality levels. The paper's contribution is three-fold. Firstly, this study is the first to examine the relationship between third wave democratizations on income inequality by employing the novel synthetic control method. Secondly, though such studies do exist for the broader Latin American region, to the best of the author's knowledge there exist no recent case study that quantitively examines the relationship between democracy and income inequality for the case of Chile. Thirdly, in an effort to mitigate the widely known data limitations that hinder income inequality

research, this study employs the newest available dataset on income inequality, the Standardized World Income Inequality Database (SWIID) composed in 2020 by Frederick Solt (Solt, 2020).

1.3 Outline

The paper is structured as follows. Section 2 provides an overview of the literature by discussing previous studies and their mixed findings. Section 3 discusses relevant background information regarding Chile's political landscape and its democratization process. In addition, Chile's income inequality levels are discussed and contrasted to the broader Latin American region. Section 4 describes the synthetic control method in detail, compares it to the difference-in-differences method and introduces the baseline model. Section 4 also discloses the method's limitations. Section 5 discusses the data used in this study. The outcome variable and predictor variables are introduced, and data limitations are elaborated on. Section 6 presents the results from the baseline model, discusses the significance of the results obtained by a placebo test and the robustness of the results is reviewed. Section 7 contextualizes the findings by contrasting the results to the conclusions of other studies, providing potential explanations of the results and by disclosing the studies' limitations. Finally, section 8 concludes by summarizing the findings and discussing the studies' contribution and implications. Finally, avenues for future research are proposed.

2. LITERATURE REVIEW

This section first introduces previous studies that have researched the relationship between democracy and income inequality and discusses their mixed findings. Consequently, reasons for these mixed results are posed. Specifically, the importance of the duration of democratic experience, the quality of governance and different types of democratic systems are elaborated on.

It has long been recognized that a societies' income distribution to a large extend depends on political factors. Traditionally, a more egalitarian distribution of political rights in the form of a political democracy is expected to result in a more equal income distribution (Lipset, 1959; Meltzer and Richard, 1981). This hypothesis has received widespread support in social science. Those in support of the notion that democracy reduces income inequality argue democracies have significantly higher social spending, which in turn decreases inequality. Huber and Stephens (2012) show in a pooled-OLS study using panel data from 1970 and 2007 that democratization is significantly positively correlated with increased education-, welfare- and health-spending. The provision of these types of public services benefits the poor (and middle class) relatively more than the rich, which leads to reduction in income inequality (Reuveny & Li, 2003). For example, investments in human capital development (such as public access to education) increase the ability for the poorer population to compete in the labor market and hence tends to produce a more equal income distribution (Verdier & Saint-Paul, 1993).

There is however also an array of scholars (especially more recent studies) that find no systematic relationship between democracy and inequality. Timmons (2010) replicated Reuveny and Li's (2003) study using an updated version of the original database, World Income Inequality Database (WIID). Contrary to Reuveny and Li (2003), Timmons (2010) finds that democracy does not seem to reduce inequality. Acemoglu, Naidu, Restrepo and Robinson (2015) find similar results. In a panel data study on the impact of democracy on various outcome variables, they find that democracy has little net impact on inequality, despite increasing taxation. They argue the relationship between democratization and income inequality is very complex and context specific. For example, according to their study income inequality even tends to rise after democratization in relatively nonagricultural societies. Acemoglu, Johnson and Robinson (2005) find that democracy does have a significant and robust effect on redistribution, but that this redistribution is not translated into a reduction of income inequality. Mulligan, Gil and Sala-i-Martin (2004) on the other

hand find no evidence that democratic governance results in more redistribution. They do agree with Acemoglu et al. (2005) that democracy does not tend to reduce income inequality.

Another set of scholars find an inverse U-shape relationship between democracy and income inequality. The inverse U-shape pattern of inequality was first introduced by Kuznets (1955). He argued that as countries developed, income inequality first increased, peaked, and then decreased. Empirical evidence of the existence of a such a U-shape relationship between democracy and inequality has been brought forth by Justman and Gradstein (1999). They find that initially income inequality increases due to redistribution from poor to the rich and only afterwards decreases. Lee (2005) provides a possible explanation. He argues that the institutionalisation of democracy (such as the evolution of an efficient and sound bureaucracy) is a prerequisite for redistribution policies to take effect. An inverse U-shape relationship has also been stipulated in an early book by Huntington and Nelson (1976). In a more recent empirical study, Islam (2016) also provides evidence for an inverse U-shape relationship in his study on the effect of political freedom on income inequality.

A review of the literature shows there does not seem to be a consistent and robust link between democracy and income inequality[1]. The relationship is argued to be influenced by many factors, some of which are outlined below.

In his book, Huntington (2012) researches the wave of democratizations that occurred in some thirty countries between 1974 and 1990, the so called 'third wave democratizations'. The key point he makes is that third wave democratizations differed significantly from those in earlier waves. The timing of the democratization process is hence crucial in researching the relationship between democracy and income inequality. There is a general consensus that the democratisation of Europe in the nineteenth (first wave) and early twentieth centuries (second wave) caused a significant decrease in income inequality (Acemoglu & Robinson, 2000). However, the so-called 'third wave' of democratizations that took place in Eastern Europe and Latin America in the seventies, eighties and nineties do not seem to have significantly reduced economic inequality (Huntington, 2012).

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[1] Inconclusive and mixed results may also be the result of methodological issues. Difficulty to obtain high-quality income inequality data and reverse causality are some of the barriers that hinder income inequality research. Relevant works that discuss the relationship in the opposite direction (the influence of income inequality on democracy) are Boix and Stokes (2003), Acemoglu and Robinson (2006) and Ansell and Samuels (2010).

Some scholars even argue third wave democratizations have led to a rise in income inequality. In a study on Eastern European transition economies, Atkinson and Micklewright (1992) find that income inequality levels have risen in all countries (except in the former Czechoslovakia) under the new democratic system. In his study about the effect of democratization on income inequality in a set of third-wave democracies, Chang (2007) also finds that income inequality has risen sharply in almost every third-wave democracy. In his empirical analysis he finds that different patterns of democratization and the consequences of corruption in new democracies are at the heart of explaining this controversy.

Gradstein and Milanovic (2004) offer an explanation as to why we tend to see a fall in income inequality in countries that had already democratized in the nineteenth and early twentieth century, whereas we do not see the same effect in third wave democratizations. They explain countries that democratized in the first and second wave have had much more time to develop their democratic system compared to countries that democratized in the third wave. He hence argues that 'accumulative democracy', the 'duration of the democratic experience', is a significant determinant of the capacity for democratic systems to reduce inequality levels.

Calcagnini, Sanchez-Carrera and Rombaldoni (2019) add that 'quality of democracy' is a strong determinant in whether or not democracy reduces income inequality. In their study they imply that only once quality of democracy goes beyond a certain threshold value, income inequality starts to decrease. In their study, quality of democracy is proxied by a score that incorporates ten different measures of quality of democratic systems (including political and civil rights and quality of elections).

Albertus and Menaldo (2014) provide an alternative explanation as to why redistribution occurs slowly or not at all specifically in the case of third wave democratizations. In their panel data study, they find that there is a relationship between democracy and redistribution only if elites are politically weak during a transition. He explains that elites can impose roadblocks to redistribution under democratic systems, whereas they are not able to do so in autocratic regimes. In their study on democracy and redistribution Huber, Rueschemeyer and Stevens (1993) find similar results. They argue that after an initial transition to democracy, redistribution happens only slowly (or not at all) in many developing countries because democratic parties and labor movements are not developed enough to translate distributional demands from society into a concrete social policy agenda.

A note of caution is required when drawing conclusions from the broad concept 'democracy'. Democracy is a collective term for a broad variety of regimes (Schmidt, 2002). Since democracy is an overarching concept that encompasses a wide array of difficult to measure institutions, any effort to quantify democracy

presents bias to empirical studies, not just in its relationship to inequality but also to poverty, education, economic growth etc. (Krauss, 2015). According to Abraham Lincoln, democracy means government of the people, by the people, and for the people (Schmidt, 2002). The degree to which this is lived by differs from one type of democracy to the other. Haggard and Kaufman (2016) highlight that during the third wave of democratizations, the majority of transitions did not result in 'liberal democracies' known today in the west. A review of the literature identifies many different types of democracies. For example, so-called 'hybrid democracies' (Levitsky & Way, 2010), 'illiberal democracies' (Diamond, 2009; Zakaria, 1997), 'semi-authoritarian democracies' (Ottaway, 2003), 'captured democracies' (Acemoglu & Robinson, 2008) and 'electoral authoritarian regimes' (Schedler, 2002). The aforementioned regimes are technically classified as democracies, given their governments hold elections and tolerate limited opposition, but to they are to different degrees constrained (Haggard & Kaufman, 2016). Many aggregate studies fail to take this important distinction into account, which could be an explanation as to why the existing literature is laden with contradictory hypotheses and findings (Krauss, 2015).

Many scholars have attempted to prove a structural and causal relationship between democracy and income inequality, but the inconclusive results imply that idiosyncratic differences in the contexts and types of democratic regimes do not allow for generalized conclusions. Case studies are a tool to understand what drives the interactions between democracy and income inequality in specific contexts. Though a review of previous studies shows the body of literature examining third wave democratizations is growing, empirical case studies that examine the relationship in a country-specific contexts are still scarce. This study attempts to address this gap by investigating the relationship between democracy and inequality for the Chilean case.

3. BACKGROUND

This following section provides background information regarding the context of this case study. The section begins by briefly introducing Chile. Secondly, Chile's political landscape and Chile's transition from military dictatorship to democracy are discussed. Finally, Chile's income inequality levels are discussed and contrasted to the broader Latin American region.

3.1 About Chile

Chile is a Spanish-speaking republic in South America that borders the South Pacific Sea. Its neighboring countries are Argentina, Bolivia and Peru. Inhabited by an estimated 18.95 million people, most live in urban areas (88%) with over 5.8 million (about 35%) living in the capital Santiago, located in the middle of the country (World Bank, 2019a). Classified by the World Bank as a high-income level country (GDP per capita in 2019 was $14,896 (current US$)), Chile is considered Latin America's leader in terms of economic performance (World Bank, 2019b). In 2010 Chile became the first South American country to join the OECD. Figure 1 shows the GDP per capita trajectory of Chile compared to that of Latin America's average GDP. Though Chile has managed to drastically reduce poverty rates (figure 2), Chile has not done better than the rest of Latin America in terms of unemployment levels (figure 3).

GDP per Capita in Chile and Latin America
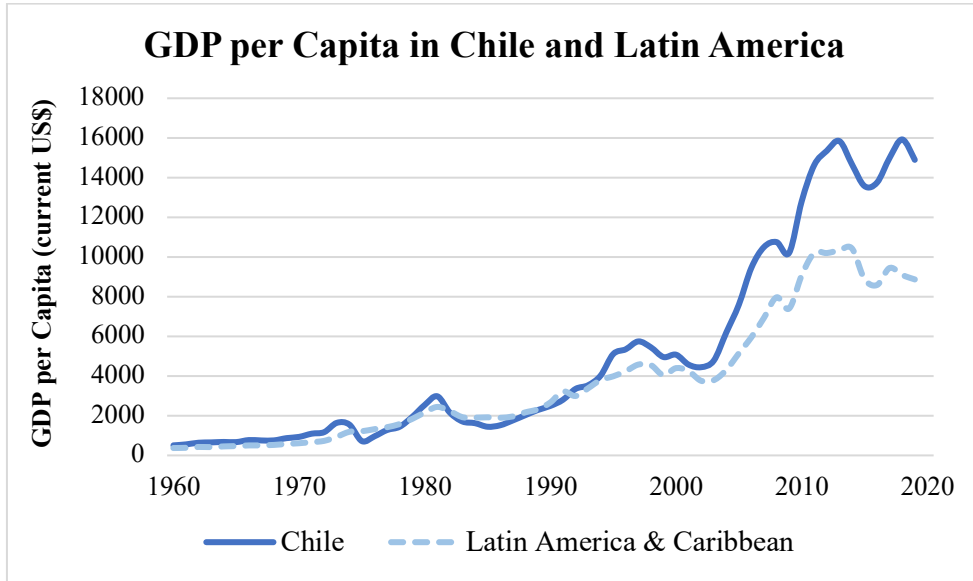

Figure 1: GDP per Capita (current US$) Chile and Latin America (World Bank, 2019b)

Poverty Headcount Ratio 1985-2020
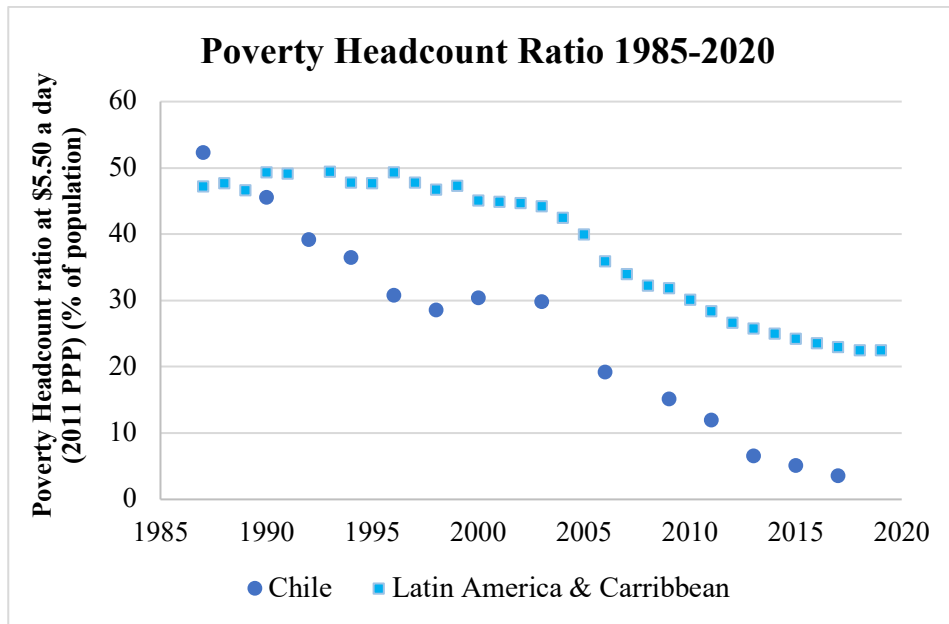
Figure 2: Poverty Headcount Ratio at $5.50 (2011 PPP) Chile and Latin America (World Bank, 2019c)
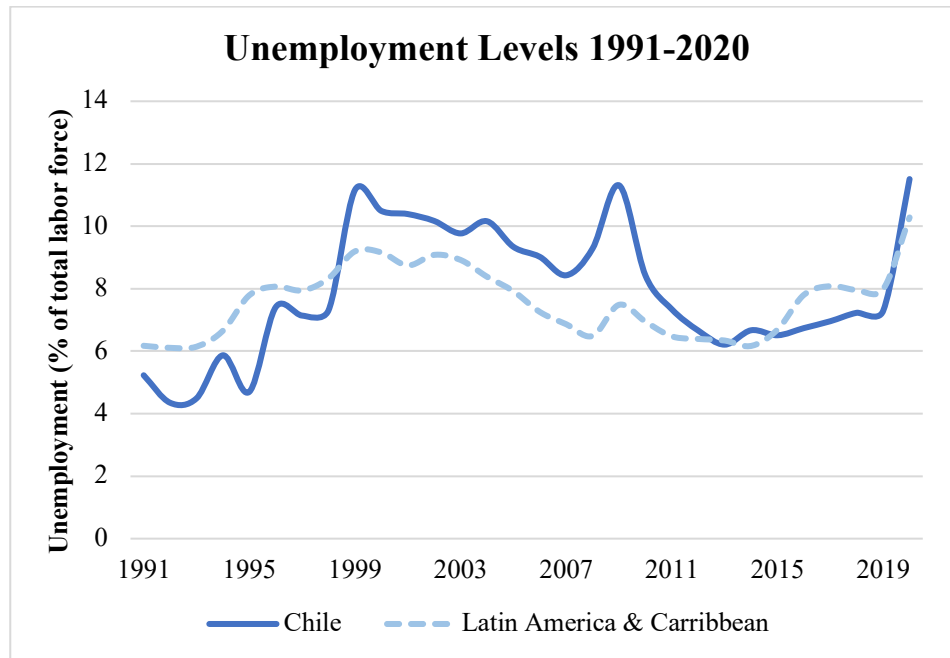
Figure 3: Unemployment (% of Total Labor Force) Chile and Latin America (World Bank, 2019d)

3.2 Political Landscape & Democratization

Aside from the North Atlantic nations, Australia and New Zealand, Chile was the only country in the world to consistently select its leaders through competitive elections from 1932 to 1973 (Keech, 2004). Before 1973, unlike other Latin American countries, Chile had been characterized by political stability, with a strong and competitive political system, independent legislature and a military that did not exert much influence in politics (Puryear, 1994). This unique democratic tradition was brought to an end in 1973, when Chile, like the majority of Latin America[2], became subject to dictatorship rule. Augusto Pinochet's military coup on 11 September 1973 replaced Salvador Allende's Marxist social-democratic rule (Silva, 1991). The military junta led by General Augusto Pinochet Chile achieved unprecedented economic growth in the wake of the early 1970s crisis. Neoliberal policies designed and executed by a group of Chilean neoliberal economists known as "the Chicago Boys" brought an end to a vicious cycle of inflationary pressures[3] (Silva, 1991). The main objectives of the economic reforms implemented by the Chicago Boys were privatization

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[2] In 1977, all but four countries in Latin America were ruled by dictators (Sanchez-Ancochea, 2017).
[3] The group was named "the Chicago Boys" because they studied Milton Friedman's neoliberal economic principles at the University of Chicago.

of state-owned businesses, stabilization of inflation and economic liberalization (Keech, 2004). Though Chile's strong and stable growth is generally attributed to its early adoption of free-market politics, the dictatorship came at the expense of extremely high inequality and segregation (Richards, 1997; Keech, 2004). The regime was guilty of systematic extreme human rights violation. Not only did the regime repress political parties and trade unions, but it also caused an enormous number of direct victims of human rights violations leaving 40.000 people tortured[4], 2.279 executed and approximately 200.000 exiled (Rodríguez Weber, 2017; Meade, 2004).

Economic progress under the dictatorship slowed down incredibly following the catastrophic debt crisis of 1982/83[5]. Poverty levels reached a striking 44.4 percent in 1987 (Weyland, 1997). The economic collapse in 1982 provoked adjustments to the neoliberal model and brought about extensive protests against Pinochet's regime (Hudson, 1994). Heavy social opposition during 1983-1986 saw the opponents of the regime gain momentum, and eventually power[6] (Hudson, 1994). The pressure for a return to democracy became unsustainable for the military regime; it was in its own interest and in the interest of its population to consider a process of democratic liberalization (Silva, 2002). Junta members and government moderates felt it would be wise to accept changes in order to alleviate tensions (Constable & Valenzuela, 1989). Ultimately in October 1988, a plebiscite was held that presented two options: the option 'yes' would mean Pinochet would continue as president of Chile for another eight years while the option 'no' implied open general elections would be held in December 1989 (Silva, 2002). Pinochet lost the referendum and a series of negotiations and bargains between the new democratic forces of the new Concertación coalition lead by Patricio Alywin and representatives of the military regime lead by Augusto Pinochet followed[7] (Silva, 2002). Democratic elections were held in December 1989, and by March 1990 democratic rule was fully restored (Silva, 2002).

The democratization process happened relatively smoothly; there were no armed confrontations, no risks of civil war and no required interventions from foreign humanitarian/political organizations (as was

[4] Although it is still not exactly known how many torture centers existed in Chile, it is believed that there were eighty-seven in Santiago alone. Amongst others torture involved exposure to electric shocks, sexual abuse and disappearace (Meade, 2004)

[5] Latin American borrowing from the US (which was done on the basis of future oil revenues) resulted in the major debt crisis following two large oil shocks during the 70s. In the middle of the 70s outstanding debts amounted to only $29 billion. By the end of 1978, the number had skyrocketed to $159 billion. By 1982, debt levels amounted to $327 billion. An abrupt cut-off in financing plunged many Latin American countries into deep recession (Curry, 1997)

[6] A paramilitary terrorist organization (FPMR) that received training and funds from Soviet and Cuban sources almost managed to assassinate Pinochet in 1986 (Hudson, 1994).

[7] Huntington (2012) compares Chile's situation with India, the Philippines and Uruguay, all of which had experienced long periods of democracy before the regime change. In all four countries, the political leaders eventually felt compelled to submit to some form of popular vote, which they lost.

required in the case of many other Latin American democratic transitions) (Silva, 2002). As a precondition for restoring democracy, Pinochet insisted on institutional safeguards guaranteeing himself and his supporters strong influence in the new democracy (Weyland, 1997). For example, this meant strict limitations on reforms that would hurt the private business sector, a set of Pinochet's senators being appointed for life and permanent military intervention in political matters (Weyland, 1997). These institutional safeguards have greatly affected Chile's democratic system, and they seem to have imposed great limitations on the capacity for the democratic system to achieve a more equitable income distribution (Delamaza, 2015). The neoliberal economic model and the existing imbalance of power in society, structurally favoring the elite, remained a key feature of successive democratic governments (Weyland, 1997).

3.3 Income Inequality

Latin America has for long been one of the most unequal regions in the world. Over the past years, income inequality has been decreasing in the region overall (Bértola & Williamson, 2017). One contributing factor was the commodity boom of 2000-2014. During this time the prices of commodities like oil, and metals, rapidly increased due to growing demand from emerging markets (particularly China and India) (Balakrishnan & Toscanini, 2018). The commodity boom increased labor participation and decreased unemployment rates in Latin America, favoring those at the bottom of the distribution and therefore reducing income inequality (Bértola & Williamson, 2017; La Torre, Messina & Silva (2017). In addition, the 1980s saw a wave of democratizations (previously referred to as third wave democratizations) across Latin America which strengthened the voice of the poor, leading to increased social spending in education, health, redistribution (through tax reforms and increased minimum wages) and the development of different labor market institutions (Bértola & Williamson, 2017).

The trend of declining inequality across Latin America is not seen to the same extent in Chile though. Despite being Latin America's leader in terms of economic performance and achieving major reductions in poverty levels, Chile's inequality levels are still among the highest in the world (Bértola & Williamson, 2017). Rodríguez-Weber (2017) has researched Chile's income inequality levels[8] in the long run and describes Chile's inequality levels as a wave-like pattern, displayed in figure 4. He explains inequality rose

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[8] Rodríguez Weber's Gini coefficients are based on pre-tax income levels. His estimates from 1860-1970 were constructed by dynamic social tables and his estimates from 1970-2009 come from household surveys.

during the first decades of the 20th century due to a period of export-led growth. Consequently, the Great Depression during the 1930s declined the income of the highest earners and undermined the political role of the elite, reducing income inequality. Between 1940 and 1970, the state increased its regulations on economic activity. The result was structural change in the economy in the form of rapid urbanization, a shift from agriculture to industry/services and increase in the number of skilled workers leading to a further decline in income inequality levels (Rodríguez-Weber, 2017). A major contributor to the declining income inequality was that the structural change declined the highly unequal agricultural sector and increased the share of industry/services in the economy; a sector where income inequality was much lower (Rodríguez-Weber, 2017). In addition, during 1950 and 1960, social programs in education, pensions and health expanded rapidly (Sánchez-Ancochea, 2017)
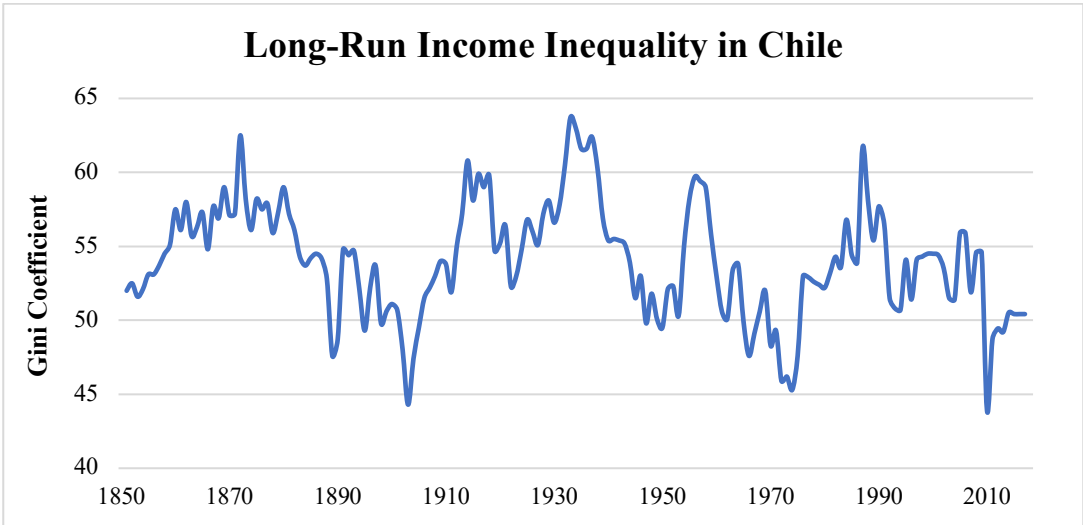
Figure 4: Long-Run Income Inequality Chile (Rodríguez-Weber, 2017)

During the military dictatorship under Pinochet, income inequality levels rose to unprecedented heights and reached its highest level since the 1930s (Rodríguez-Weber, 2017). This can be explained by the fact that the dictatorship supported an elite-based political economy model in which economic policies devised by the Chicago Boys redistributed in favor of the elite (Sánchez-Ancochea, 2017). The dictatorship suppressed trade unions and political parties which play a crucial role in distributive conflicts (Sánchez-Ancochea,

2017). In addition, two severe recessions (in 1975 and 1982/1983) caused high economic volatility[9], hitting the poorest section of the population the hardest (Rodríguez-Weber, 2017).

Since the successful democratic consolidation, Chile has experienced a period of great economic performance and reduction of absolute poverty levels (Silva, 2002). Though income inequality levels have also started to decrease after 2000, they are still strikingly high and they continued to be the source of heavy protests. Inequality is the persisting legacy of Pinochet and the Chicago boys, and is considered the main debt of Chilean democracy (Meade, 2004). Former president Michelle Bachelet[10] even expressed in her first speech after she re(took) office in 2014 "Chile tiene un solo gran adversario, y eso se llama desigualdad!", Chile has only one great adversary, and that is called inequality (Rodríguez-Weber, 2017). The military dictatorship left an institutional legacy that has influenced the democratic system in Chile up until today.

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[9] Resulting in a combination of increased unemployment, decreases in real wages and very high inflation (Rodríguez Weber, 2017).

[10] Michelle Bachelet, the only female president in the history of Chile, led Chile from 2006-2010 and from 2014-2018

4. METHOD

The following section discusses the methodological aspects of the study. Firstly, the synthetic control method is introduced. Secondly, the conditions necessary for the successful adoption of the synthetic control method are outlined. The third section provides a justification of the chosen method and introduces the baseline model of this study.

4.1 Introduction to the Synthetic Control Method

This study aims to estimate the effect of Chile's democratization on income inequality levels. To do so, actual Chile's income inequality levels are compared to income inequality levels in a counterfactual; a hypothetical Chile that did not democratize. A standard approach used in quantitative research to generate such a counterfactual is the difference-in-differences method. This method makes statistical inferences by comparing a 'treated unit' (the country that underwent the intervention) with a single 'untreated' but highly comparable unit (Bertrand, Duflo & Mullainathan, 2004). The counterfactual unit is chosen on the basis of certain requirements; the counterfactual must have the same trend in the values of the outcome variable in the pre-intervention period and the counterfactual cannot be affected by the intervention itself (Kleis & Moessinger, 2016). The main challenge and pitfall of this method is the difficulty of detecting such a counterfactual. Especially in the case of this study, it is nearly impossible to identify a single country with very similar characteristics to Chile before it democratized.

The synthetic control method offers a solution to this problem. The method is based on the premise that a combination of comparison countries does a better job at reproducing the characteristics of actual Chile than a single comparison country does (Abadie, Diamond & Hainmuller, 2015). This method was first introduced in a study by Abadie and Gardeazabal (2003) in which they evaluated the impact of terrorist conflict in the Basque country of Spain on the region's per capita GDP. The method was further developed by Abadie, Diamond & Hainmuller (2010) in a study about the impact of the Californian tobacco control program in 1988 on cigarette sales. In recent years, many prominent authors as well as development organizations[11] have used the synthetic control method to analyze and evaluate large scale policy

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[11] The World Bank frequently uses the synthetic control method to evaluate regulatory reforms (Dhungana, 2011)

interventions in various disciplines of economic research. For example, Billmeier and Nannicini (2013) studied the economic consequences of liberalization and trade openness, Montalvo (2011) examined how terrorist attacks affect election outcomes and Köhler and König (2015) investigated whether the introduction of the European Union 'stability and growth pact' in 1999 reduced public debt.

The synthetic control method does not rely on a single control unit, but instead generates a 'synthetic' counterfactual based on a weighted combination of several other countries. The countries included in the synthetic counterfactual are chosen on the basis of how well the characteristics of the other countries mimic the characteristics of the country under study in the period before the intervention (henceforth the 'pre-intervention period'). The more similar the countries' characteristics are to the country under study, the more weight is assigned to that country in the synthetic control.

In the case of this study, the synthetic control method generates a 'synthetic Chile'. This is a counterfactual for actual Chile, which represents a scenario in which Chile did not democratize but instead remained a dictatorship. Following Abadie and Gardeazabal (2003), if synthetic Chile follows the trajectory of actual Chile's income inequality levels before democratization, synthetic Chile will be an accurate representation of a situation in which Chile did not democratize. By comparing the income inequality trajectories of actual- and synthetic Chile in the period after democratization, the direct effect of democratization on income inequality can be inferred.

In order to make synthetic Chile as representative as possible for actual Chile, synthetic Chile is composed of a weighted combination of a few countries. To choose which weights will be assigned to each country in synthetic Chile, the algorithm behind the synthetic control method looks at how similar the potential control countries are to Chile in the period before democratization (in this study 1985 to 1990) on specific characteristics. Specifically, the algorithm picks the countries that are most similar to actual Chile based on a set of characteristics that are associated with the outcome variable income inequality. These characteristics are formally referred to as 'predictor variables'. The predictor variables that are used in this study are GDP per capita, inflation, population density, urbanization, population growth, industry share, absolute poverty, economic participation rate, tax revenue and unemployment. The weighted combination of countries that will form synthetic Chile are thus chosen by the algorithm based on how similar those countries' predictor variable values are to those of actual Chile in the period 1985 to 1990.

A formal description that explains the econometric techniques behind the synthetic control method is included in Appendix A.

4.2 Synthetic Control Method Conditions

For the synthetic control method to generate a representative synthetic Chile, the following set of conditions need to be satisfied:

1. There must be a significant number of years in the pre- and post-intervention period.
2. The outcome variable must have no missing data in the entire period studied.
3. The dataset must be 'strongly balanced'.
4. The synthetic control must be drawn from a reasonable set of potential control units.
5. The predictor variables must have at least one observation in the pre-intervention period.
6. The synthetic control must follow the same outcome variable trend in the pre-intervention period.
7. The countries included in the synthetic control cannot be affected by the intervention.

Each of the conditions and their implications for the baseline model are subsequently discussed.

In order to fulfill condition (1) *'there must be a significant number of years in the pre- and post-intervention period'*, year 1985 was selected to be the start date. Given that Chile democratized in 1990 (the intervention year), the model has five years before the intervention. Though preferred, due to data availability constraints it was not possible to select an earlier year[12]. Income inequality data was available until 2015, which means the post-intervention period consists of twenty-six years. The baseline model satisfies condition (1) '*There must be a significant number of years in the pre- and post-intervention period*' given the model has five years before the intervention and twenty-six years after the intervention.

In order to fulfill condition (2) *'The outcome variable must have no missing data in the entire period'*, income inequality data had to be carefully selected. The SWIID dataset used in his analysis by Solt (2020) fulfills this requirement. Even though the SWIID has no missing values included in its dataset, the range of available years did differ per country. For example, data for Brazil was available from 1960 onwards whereas data for Paraguay was only available from 1990 onwards. In order to satisfy condition (3) *'The dataset must be 'strongly balanced',* each country must contain the same number of observations at the

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[12] Both years 1973 (the year in which Pinochet came to power) and 1980 (the year in which economic progress under Pinochet started to slow down) were considered, however the number of countries that fulfilled the data requirements were too limited to apply the synthetic control method.

same time points. Hence only countries that had full data coverage for all variables from 1985 to 2015 were kept[13].

To avoid interpolation bias and the risk of overfitting, condition (4) '*The counterfactual must be drawn from a reasonable set of potential control units*' implies that synthetic Chile must be drawn from a pool of countries that are reasonably similar to the actual Chile (henceforth referred to as "the donor pool"). In order to make synthetic Chile as culturally, historically and geographically similar to the actual Chile, the donor pool includes only Latin American and Caribbean countries. Post data-cleaning procedures, the donor pool consists of eight Latin American and Caribbean countries, namely Argentina, Brazil, Colombia, Costa Rica, Mexico, Panama, Uruguay and Venezuela[14]. In this way condition (4) is satisfied, given we avoid including far-fetched country comparisons that may bias our model.

Condition (5) '*The predictor variables must have at least one observation in the pre-intervention period*' presented the biggest challenge, since many identified potential predictors did not have data available before 1990. Ten predictor variables had at least one observation in the pre-intervention period for each of the eight countries in the donor pool. The baseline model hence includes predictor variables GDP per capita, inflation, population density, urbanization, population growth, industry share, absolute poverty, economic participation rate, tax revenue, unemployment.

Condition (6) is the most crucial one, as it determines the reliability of the results. The more accurately the counterfactual represents actual Chile in the pre-intervention period, the more accurate the estimation of the effect of democratization on income inequality will be. To test whether synthetic Chile satisfies condition (6) *"The synthetic control must follow the same outcome variable trend in the pre-intervention period"*, the goodness of fit of the synthetic control is assessed. The Root Mean Square Prediction Error (henceforth "RMSPE") is a measure that assesses the goodness of fit of the synthetic control (McClelland & Gault, 2017). The score indicates how much the predictor variable values of synthetic Chile differ from the predictor variable values of actual Chile. The lower the RMSPE, the less the synthetic control deviates from the treated country in the pre-intervention period, the better the fit of the model. An RMSPE of 0 would hence mean the synthetic control would perfectly mimic the characteristics of the treated unit in the pre-intervention period. In order to make inferences from the synthetic control method, the synthetic control

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[13] Data was transformed into a 'strongly balanced panel' using the 'XTbalance' STATA package developed by Yujun (2009) https://econpapers.repec.org/software/bocbocode/s457094.htm

[14] Ideally all countries in Latin America and the Caribbean would have been included in the donor pool. Data was however not available for the majority of the countries. Most data documentation in developing countries started in 1990, however the synthetic control method requires data to be available in the entire pre-intervention period (1985-1990)

should roughly follow the trajectory of actual Chile. Synthetic Chile in this study has an RMSPE score of 0,2222, which is good compared to other studies in the field[15]. This indicates that synthetic Chile mimics the characteristics of actual Chile fairly well in the pre-intervention period, which implies that condition (6) is satisfied.

Condition (7) implies that like the difference-in-differences method, the synthetic control method requires that "*the countries included in the synthetic control cannot be affected by the intervention*" (Kleis & Moessinger, 2003). This implies that Chile's democratization process is not allowed to affect income inequality levels in the countries included in synthetic Chile. This condition is satisfied, given that other countries' income inequality levels are not expected to be significantly affected by Chile's democratization.

4.3 Comparing Synthetic Control Method and Difference-in-Differences Method

The most import condition, condition (6) stated that the counterfactual must follow the same trend in the pre-intervention period. The more similar the trend is in the pre-intervention period, the more accurate the result of the study will be. It is therefore crucial to select a counterfactual that is as representative as possible. To justify why this study chose to employ the synthetic control method rather than the difference-in-differences method, this section compares and evaluates the counterfactuals generated under both methods.

The difference-in-differences counterfactual was generated based on the average predictor variable values for all donor pool countries. The synthetic control method counterfactual, synthetic Chile, was generated by the algorithm developed by Abadie and Gardeazabal (2003). The algorithm automatically selected a weighted combination of countries from the donor pool based on which countries had the most similar characteristics to actual Chile. In this baseline model, synthetic Chile was composed of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela.

In table 1, actual Chile's predictor variable values (column 1) are compared to synthetic Chile (column 2) and to a counterfactual generated under the difference-in-differences method (column 3). A closer look at the table shows that synthetic Chile more accurately mimics actual Chile than the difference-in-differences counterfactual does. What especially stands out is that synthetic Chile is much more representative for

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[15] E.g. Kleis & Moessinger (2016) and Zeng, Zhao and Dai (2020)

actual Chile on the GDP per capita variable. Actual Chile's average GDP per capita over the period 1985 to 1990 was $1004.48. GDP per capita levels in synthetic Chile were on average $1092.82 during 1985-1990. The difference-in-differences counterfactual however had a much higher average GDP per capita level of $2777.10 during that time.

Note that synthetic Chile perfectly mimics actual Chile on variables tax revenue and industry share, whereas the difference-in-differences counterfactual does not. Not only GDP per capita, tax revenue and industry share are the most similar to actual Chile under the synthetic control method. In fact, synthetic Chile outperforms the difference-in-differences counterfactual in eight out of ten predictor variables. This means that synthetic Chile follows actual Chile's pre-intervention trend more accurately than the difference-in-differences counterfactual does. The synthetic control method is therefore preferred over the difference-in-differences method.

Table 1: Baseline Model Descriptive Statistics (Author's Computations)

Predictor Variables	(1) Actual Chile	(2) Synthetic Control Method counterfactual	(3) Difference-in-Differences counterfactual
Absolute Poverty	49.43	60.92	30.43
Economic Participation Rate	51.42	60.92	61.16
GDP per Capita	1004.48	1092.82	2777.10
Industry Share	30.32	30.32	31.83
Inflation	1.60	13.29	8.32
Population Density	23.09	37.74	49.43
Population Growth	3.14	2.53	2.00
Tax Revenue	12.40	12.40	12.25
Unemployment	7.79	4.42	6.48
Urbanization	5.06	4.27	2.56

Notes Values are averaged over the pre-intervention period (1985-1990). The donor pool consists of Latin American & Carribbean countries (Argentina, Brazil, Colombia, Costa Rica, Mexico, Panama, Uruguay and Venezuela). The counterfactual from the Synthetic Control Method, 'Synthetic Chile', is comprised of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. The RMSPE of synthetic Chile is 0.2222. The differences-in-differences counterfactual is calculated based on averages of all donor pool countries.

5. DATA

This section discusses the data used in this study. The first section introduces the outcome variable, the Gini coefficient. In addition, the section provides a justification of the choice of the measure and a critical assessment of the data source. The second section introduces the ten predictor variables used in this study.

5.1 Outcome variable

The Gini-coefficient was chosen as the best suitable measure of income inequality. The Gini-coefficient ranges from 1 to 100, the higher the coefficient, the more unevenly income is distributed among the population. The Gini-coefficient is the most widely used measure of income inequality in cross-country studies. The measure comes with its limitations though. Data limitations pose a general challenge for cross-country studies and this study is no exception; the limited number and questionable comparability of Gini-coefficients (especially for the developing world) makes drawing inferences challenging (Solt, 2009). Data on income distribution is often times heterogenous with regards to the timing of the observations, the definitions used, the duration over which the income is measured, the population studied and the nature of the data collection procedures (Gradstein & Milanovic, 2004). This makes international comparison extremely difficult. Not only the Gini-coefficient has drawbacks. All research on income inequality has been hindered by these data quality issues and the difficulties in measuring income inequality are well known (Gradstein & Milanovic, 2004). Though some progress has been achieved in recent years, obtaining accurate income inequality measures remains a challenge (Jenkins, 2015).

The biggest consideration in selecting data is that the synthetic control method employed in this study does not allow for missing values in the outcome variable. Careful consideration of different datasets that use the Gini coefficient showed that there are large discrepancies in data coverage and could hence not be used in this study. The other databases that were considered are Deininger and Squire's dataset for the World Bank, Povcalnet, Standardized Income Distribution Database (SIDD), UNU-Wider's World Income Inequality Database (WIID) and the Luxembourg Income Study (LIS). Frederick Solt (2020) has solved

the issue of missing values; he makes use of multiple imputation[16] procedures to estimate missing GINI values based on a wide set of other Gini databases[17]. These values are comprised in a comprehensive dataset called the Standardized World Income Inequality Database (in short, the SWIID). Covering 15,730 Gini Coefficients from 5,422 country-years (between 1960 and 2019) in 196 countries, the SWIID has the highest 'breadth of coverage' of all income inequality datasets, while still maintaining an as high as possible level of comparability[18] (Solt, 2020).

The SWIID includes four types of Gini variables, based on consumption and on market-, disposable- and gross income. For this study the Gini variable based on disposable household income was deemed most suitable. This indicator reports "post (direct) tax, post-transfer" income inequality and is referred to as 'gini_disp' in the dataset (Solt, 2020). Variable 'gini_disp' has the highest data coverage in the dataset relative to other measures of inequality (market income, consumption & gross income). Even more so than for its data coverage, 'gini_disp' is chosen because it represents the distribution of money actually in people's pockets, which makes it the most suitable measure to analyze differences in consumption/living standards (Solt, 2020).

5.2 Predictor variables

The synthetic control method requires the identification of so-called predictor variables. These are variables that predict income inequality levels. The synthetic control method uses these predictor variables for the construction of synthetic Chile. The countries that will be included in synthetic Chile are chosen in such a way that its match those of actual Chile before democratization. Predictor variables differ from 'regular' independent variables in the sense that there is no problem if they correlate. In normal regression models, independent variables cannot correlate because that would cause multicollinearity in the model. In the

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[16] Multiple imputation predicts missing values by using existing values from other variables. The predicted values, called "imputes", are substituted for the missing values, resulting in a full data set called an "imputed data set." This is carried out multiple times, generating multiple imputed data sets (therefore it is called "multiple imputation"). Standard statistical analysis is then performed on every imputed data set, producing multiple analysis results. Finally, these analysis results are combined to produce one overall analysis. (Wayman, 2003)

[17] The estimates are based on thousands of reported Gini values from hundreds of published sources. The sources are openly accessible through Solt's website (Solt, 2020)

[18] Maximum comparability is ensured by using the Luxembourg Income Study (LIS) as his primary source of data. The LIS is deemed the Gini data source with the highest comparability of all income inequality datasets (Solt, 2020);

synthetic control method this is not the case. In fact, the more variables that are associated with income inequality are included in the model, the better (Abadie, Diamond & Hainmuller, 2010).

One crucial predictor of the outcome variable is the so-called 'lagged outcome variable' (Abadie & Gardeazabal, 2003). It avoids the problem of leaving out important predictors' effects, since the lagged outcome variable includes the effects of any predictor variables whether or not they are separately added in the model. Using the lagged outcome variable for some pre-intervention years is therefore recommended. It may be tempting to include lagged outcome variables for all years in the pre-intervention period, however doing so will likely eliminate all other predictors' effects (Kaul, Pfeifer, Schieler & Klößner, 2015). Therefore, three lagged variables of income inequality are included as predictors, namely gini_disp in 1986, gini_disp in 1987 (in the middle of the pre-intervention period) and gini_disp in 1989 (the last year before democratization).

A thorough review of the literature led to the identification of a wide set of other predictors. Data availability constraints however restricted the number of variables that were suitable for the final model. Studies using the synthetic control method should have a relatively large number of predictors compared to the number of countries in the donor pool[19] (Hahn & Shi, 2016). In addition, the synthetic control method requires there to be least one observation available in the pre-intervention period (before Chile's democratization). Many countries, particularly developing countries, lack data collection before 1990. Ten predictor variables that were identified satisfied the data requirements, these were GDP per capita, inflation, population density, urbanization, population growth, industry share, absolute poverty, economic participation rate, tax revenue, and unemployment. The predictors were drawn from World Bank open database (Azevedo, 2020) and from CEPALSTAT database constructed by the Economic Commission for Latin American and the Caribbean (ECLAC, 2021). An overview of the variables and their respective sources and definitions is provided in Table 2. Due to data availability limitations, some of the important predictors identified in the literature (e.g. top income tax rates, social spending, trade openness, human capital and educational attainment) could not be included in the model. The inclusion of these additional predictor variables would likely have increased the goodness of fit of the model.

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[19] This may seem counterintuitive to researched worried about degrees of freedom, but in the synthetic control method it improves the choice of weights assigned to each country (Hahn & Shi, 2016).

**Table 2:** Main Sources of Data (Solt, 2020; ECLAC, 2021; Azevedo, 2020)

	Variables	Dataset	Description
Dependent Variable	Gini Coefficient	SWIID v9.0 (Solt, 2020)	Income inequality measure Gini coefficient based on disposable household incomes
Independent Variables	Absolute Poverty	CEPAL Stat (ECLAC, 2021)	% of people living on $5.50 or less a day (2011 PPP)
	Economic Participation Rate	CEPAL Stat (ECLAC, 2021)	% of people in active labor force
	GDP per Capita	WBOPENDATA (Azevedo, 2020)	GDP per capita (current US$)
	Industry Share	WBOPENDATA (Azevedo, 2020)	Industry, value added as a % of GDP
	Inflation	WBOPENDATA (Azevedo, 2020)	Inflation, GDP deflator (annual %)
	Population Density	WBOPENDATA (Azevedo, 2020)	Population density measured by the amount of people per sq. km of land area
	Population Growth	WBOPENDATA (Azevedo, 2020)	Population growth (annual %)
	Tax Revenue	CEPAL Stat (ECLAC, 2021)	Tax revenue as a % of GDP
	Unemployment	WBOPENDATA (Azevedo, 2020)	% of total labor force that is unemployed (national estimates)
	Urbanization	WBOPENDATA (Azevedo, 2020)	Urban population growth (annual %)

6. RESULTS

The following section presents the results of the study. Firstly, the results of the baseline model are presented. Secondly, the significance of the results is assessed by means of a placebo test. The final section analyzes the robustness of the results by means of two models with alternative specifications.

6.1 Baseline Model Results

A graphical representation of the baseline model is presented in figure 5. Actual Chile- (solid line) and synthetic Chile's (dashed line) income inequality level trajectories are displayed for the period 1985-2015. The year in which Chile democratized is represented by the vertical dashed line.
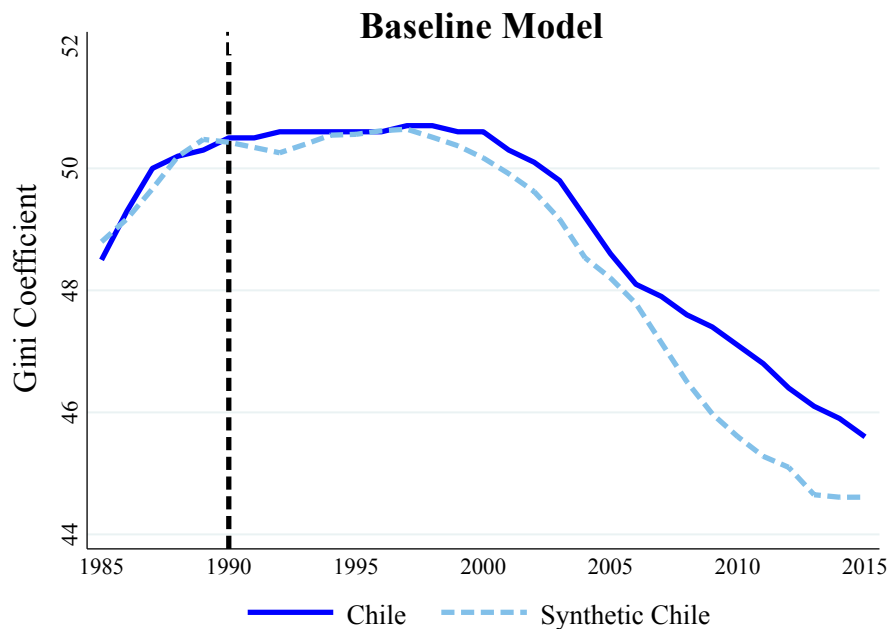
Baseline Model

Notes: Synthetic Chile is comprised of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. The RMSPE is 0.2222.

Figure 5: Baseline Model (Author's Computations)

To be able to draw inferences from the model, condition (6) needs to be satisfied. Condition (6) implied that synthetic Chile closely mirror actual Chile's income inequality trajectory in the period before democratization. A visual analysis of figure 5 shows that indeed the trajectories of actual- and synthetic Chile match very well from 1985 to 1990. An analysis of the quantitative 'goodness of fit' measure, the root mean squared prediction error (RMSPE) confirms this. The RMSPE of 0.2222 is good compared to other recent studies in the field[20].

A closer look at figure 5 shows that income inequality levels in (actual) Chile were rather stagnant from 1990 to 2000 and consistently decreased in the period 2000 to 2015. This study aims to examine whether this initial stagnation and subsequent decline in income inequality is attributable to Chile's democratization. The direct effect of democratization on income inequality is represented by the difference between synthetic Chile and actual Chile in the period after democratization. If the actual- and synthetic Chile diverge away from each other, the model thus suggests that there is an effect of democratization on income inequality.

A visual analysis of figure 5 shows that in the first ten years after democratization, the lines do not seem to diverge. In practice this means that from 1990 to 2000, income inequality was as high under democracy as it would have been under dictatorship. That implies that democratization did not have an effect on income inequality levels. This result is in line with the hypothesis.

After 2000 the lines do start to diverge. This signals that democratization did seem to have an effect on income inequality after 2000. This result goes against the hypothesis. A closer look at figure 5 reveals that in practice, income inequality levels were higher under democracy than they would have been under dictatorship. The result that Chile would have lower inequality levels under dictatorship than under democracy seems very controversial. In order to validate whether the result can actually be interpreted in that way, significance tests are required.

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[20] There does not exist a benchmark value for the RMSPE. This makes the evaluation of the measure relatively subjective. This drawback is mitigated by comparing the RMSPE of this study's baseline model to the models used in other recent prominent articles that employ the synthetic control method, for example Kleis and Moessinger (2016) and Zeng, Zhao and Dai (2020)

6.2 Placebo Test

The synthetic control method itself does not generate confidence intervals and tests of significance. This deficiency can be addressed by generating a so-called 'placebo test', in which a significance level is calculated[21].

The placebo effect is widely known in the scientific world. For example, in a study on the effect of a new drug on cholesterol levels one group is administered the new drug, and another so-called 'control' group is administered a drug that looks exactly like the real drug but has no actual medicinal components: a placebo (Kienle & Kiene, 1997). To determine the effectiveness of the new drug, researchers compare the effects of the real drug and the placebo. If the placebo shows a treatment effect as large or larger than the real drug does, the real drug was not effective. In that case, the effect of the real drug on cholesterol levels is insignificant.

In the synthetic control method, the placebo test works in a similar fashion. To determine the 'effectiveness' of democratization in reducing income inequality, the placebo test compares the effect found in Chile with the effect found in a set of placebos. If the placebo's show an effect as large or larger than Chile, it means that the effect of Chile's democratization on income inequality levels is insignificant.

To generate the placebos, all other countries in the donor pool are exposed to the same intervention as Chile. For example, Mexico is pretended to have democratized in 1990 and a 'synthetic Mexico' is created in order to see whether Mexico's hypothetical democratization had an effect on income inequality. This process is repeated for each of the eight countries in the donor pool.

Figure 6 shows a visual representation of the placebo test. Chile is represented by the thick blue line, and the placebos are represented by the thin blue lines. As visible in the figure, many placebos show an effect as large or larger than Chile. The p-value of the model is 0.875. This means that the effect of Chile's democratization on income inequality was insignificant.

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[21] The placebo test was generated using the 'Synth-Runner' package developed by Galiani and Quistorff (2017) as an extension to Abadie and Gardeazabal (2003) 'Synth' package.
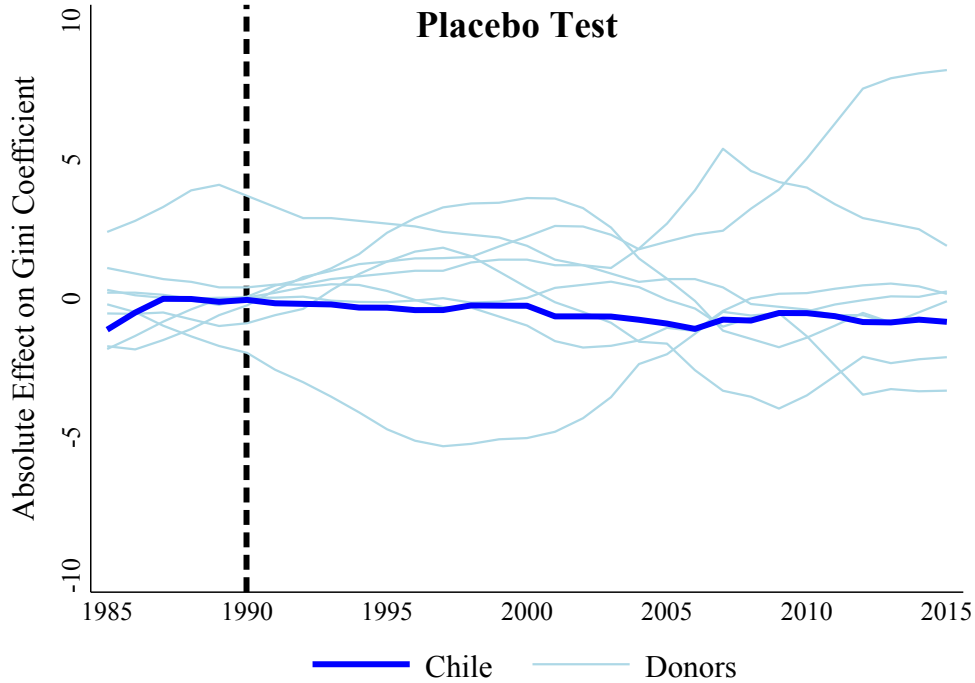
Figure 6: Placebo Test (Author's Computations)

Though the visual interpretation of figure 5 seemed to imply democratization did have an effect on income inequality between 2000 and 2015, the significance test indicates that this effect was not significant. Therefore, it can be concluded that overall it seems that democratization did not have a significant effect on income inequality. This result is in line with the hypothesis, which stated that Chile's democratization did not significantly reduce income inequality levels.
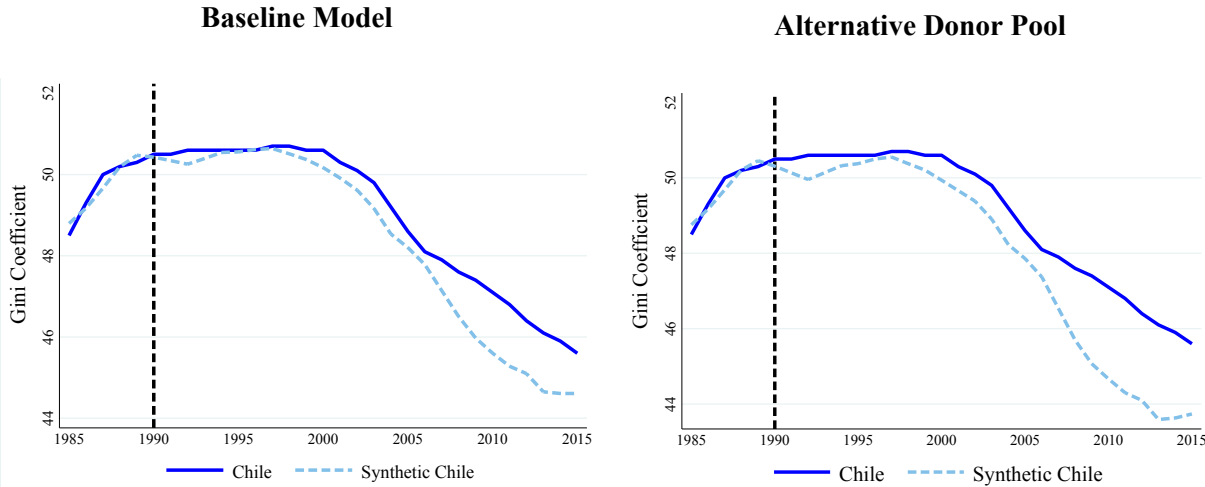
6.3 Robustness Tests

To assess the robustness of these result, the baseline model was compared to two models with alternative specifications.

In research there is a tradeoff between comparability and sample size. A higher sample size increases the statistical power of results and the external validity, this is why all countries in Latin America and the

Caribbean that fulfilled the data requirements were included in the baseline model. Higher comparability increases how representative the sample is, and therefore increases internal validity. In order to test the robustness of the baseline results, a robustness test is performed in which synthetic Chile is drawn from an arguably more representative donor pool; a donor pool of only South American countries (Argentina, Brazil, Colombia, Uruguay and Venezuela). Figure 7 displays a visual comparison between the baseline model (on the left) and the first robustness test (on the right). The descriptive statistics of the model are displayed in table 4 in Appendix B.

Comparison Baseline Model and Robustness Test 1

Notes In the baseline model synthetic Chile is composed of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. In robustness test 1, synthetic Chile is composed of 69.3% Brazil and 30.7% Venezuela. The models have similar goodness of fit measures, respectively 0.2222 for the baseline model and 0.2023 for robustness test 1.

Figure 7: Comparison Baseline Model and Robustness Test 1 (Author's Computations)

The results of robustness test 1 almost exactly mirror the baseline model. In robustness test 1, synthetic Chile is composed of 69.3% Brazil and 30.7% Venezuela[22]. In the baseline model synthetic Chile was

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[22] The algorithm has automatically picked this weighted combination of countries from the donor pool based on how similar their predictor variable values were to actual Chile in the pre-intervention period.

composed of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. An overview of the differences in similarities between the different models is visible in Table 3. The main difference between the models is that Mexico, which received considerable weight in the baseline model, has made place for more emphasis on Venezuela. This has in fact improved the fit of the model. The RMSPE went from 0.2222 in the baseline model to 0.2023, which signals a slight improvement in fit. This was expected, given the donor pool is arguably more representative for Chile. Countries in South America are more similar geographically, culturally and historically than the overall Latin American and Caribbean region. Given the model with alterative specifications is very similar to the baseline model, the baseline conclusions are robust to alternative specifications of the donor pool.

Table 3: Weight Received by Each Country in Different Synthetic Controls (%) (Author's Computations)

Country	Baseline Model	Robustness Test 1	Robustness Test 2
Argentina	1.5	0	0
Brazil	59.3	69.3	61.6
Costa Rica	6.3	0	0
Mexico	18.7	0	14.3
Venezuela	14.2	30.7	24.1

In the second robustness test the donor pool remains the same as in the baseline model (Latin America and Caribbean) but the set of predictors variables was altered to include only those predictor variables that are significant in a fixed effects regression. The synthetic control method does not require for all predictor variables to be significant predictors. Predictor variables are simply required to affect income inequality. However, a model based on only those characteristics that predict income inequality the best can be argued to result in a more representative synthetic Chile. The countries included in synthetic Chile are expected to more accurately mimic the characteristics of actual Chile, than if predictors are included that are not significant. Five predictors were significant in the fixed effects regression, namely absolute poverty,

economic participation rate, GDP per capita, population growth and unemployment[23]. Figure 8 displays a comparison between the baseline model (on the left) and the second robustness test (on the right). Table 5 in Appendix C displays the regression output and Table 6 in Appendix C displays the descriptive statistics of the model.

Comparison Baseline Model and Robustness Test 2
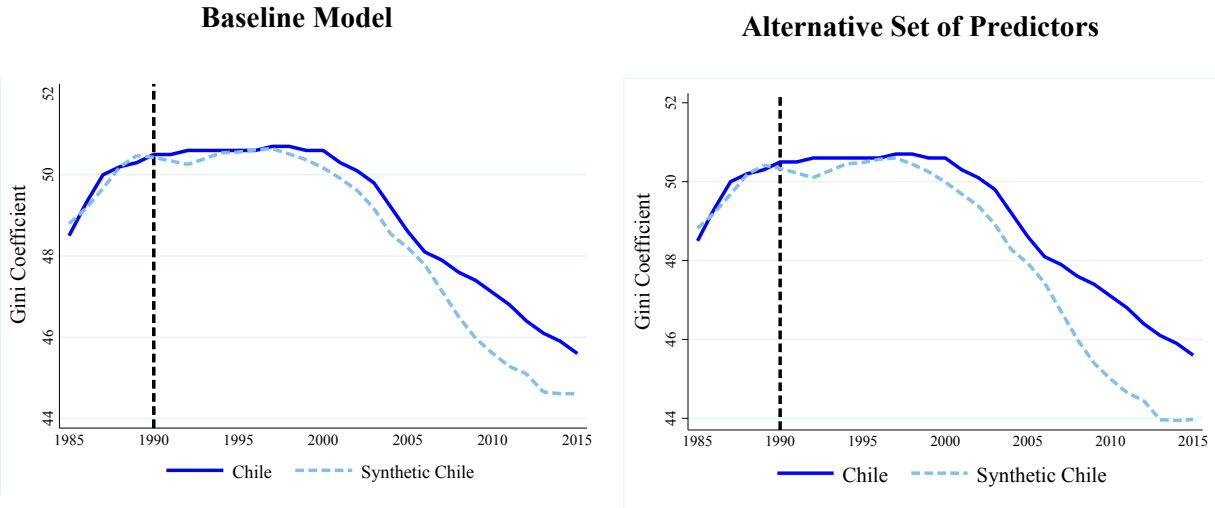
Notes In the baseline model synthetic Chile is composed of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. In robustness test 2, synthetic Chile is composed of 61.6% Brazil, 14.3% Mexico and 24.1% Venezuela. The models have similar goodness of fit measures, respectively 0.2222 and 0.2117

Figure 8: Comparison Baseline Model and Robustness Test 2 (Author's Computations)

[23] It is important to note that this regression suffers from omitted variable bias given set of identified predictor variables are not mutually exclusive and collectively exhaustive. The regression coefficients are not intended to be used for causal inference. Therefore, omitted variable bias is not an issue. The regression output is only used to get an indication which predictors are, relative to all other predictor variables in the model, the most important predictors of income inequality.

Again, the results of robustness test 2 mirror the baseline model very well. In fact, a closer look at both robustness tests shows that they are almost indistinguishable. There is only a slight difference in the trajectory of synthetic Chile between 2012 and 2015. In robustness test 2 synthetic Chile is comprised of 61.6% Brazil, 14.3% Mexico and 24.1% Venezuela. In the baseline model synthetic Chile was composed of 1.5% Argentina, 59.3% Brazil, 6.3% Costa Rica, 18.7% Mexico and 14.2% Venezuela. The composition under both models is very similar. The only main difference is that Argentina and Costa Rica, which received a little bit of weight in the baseline model, do not show in robustness test 2. Instead, Venezuela receives more weight. An overview is visible in Table 3. Despite the number of predictors being reduced from ten to five, the graphical representation of robustness test 2 is very similar to the baseline model. In fact, the fit of the model improved slightly as expected (the RMSPE decreased from 0.2222 in the baseline model to 0.2117). This highlights the robustness of the results from the baseline model. The baseline results also seem to be robust to alternative sets of predictors.

7. DISCUSSION

The following section discusses the results. Firstly, the findings are compared to other studies on third wave democratizations and potential explanations are posed. Consequently, the results are discussed in light of Chile's current events. The final section discusses the limitations of this study.

7.1 Comparison to other studies & potential explanations

This study aimed to address the question '*What effect did Chile's democratization have on income inequality levels?'.* Though an initial visual interpretation of the baseline model showed mixed results, a subsequent assessment of the significance level of the results indicated that overall, Chile's democratization did not have a significant effect on income inequality.

This result confirms the hypothesis, which stated that Chile's democratization did not reduce income inequality levels. This conclusion is in line with Huntington (2012) who argued that, as distinct from earlier waves of democratizations, third wave democratizations did not significantly reduce income inequality. The findings are not in line with Chang (2007) and Atkinson & Micklewright (2016), who argued that third wave democratizations resulted in an increase of income inequality.

Apart from the aggregate studies that have analyzed third wave democratizations as a whole, the results of this study should be compared to studies on the relationship between democracy and income inequality in Chile specifically. However, as indicated previously, there are surprisingly little studies that have quantified the impact of democratization on income inequality. The only other scholar that has done so, albeit with a different method, is Hojman (1996), who analyzed the relationship in the first six years after democratization. Hojman (1996) found that income inequality did not drop significantly as a result of re-democratization. He found that the new democracy, with its blend of democratic politics and neoliberal economics, was extremely beneficial for the middle-income earners, and reduced the gap between the highest- and middle-income earners. The redistributive policies of the new democracy did not benefit the lowest income earners however. The results of this study are therefore in line with Hojman (1996).

Albertus & Menaldo (2014) argued that democratization leads to significant redistribution only if elites are politically weak during a transition. Their argument is a plausible explanation behind the inability for Chile's democratization to reduce income inequality. Chile is characterized by a large imbalance of political and economic power skewed towards the elite. The elite has consistently put constraints on equity-enhancing reforms of Chile's democratic governments.

Acemoglu, Johnson and Robinson (2005) introduce that political actions are shaped by two types of power: 'de jure' and 'de facto' power. 'De jure' power refers to the power allocated by constitutions or electoral systems. 'De facto' power does not come from power obtained through de jure institutions such as voting legislation or elections, but rather power that is obtained by a particular social group as a result of wealth, violence, economic superiority or other means (Bertocchi & Dimico, 2012). This implies that even though democracy alters the distribution of de jure power in society, particular groups can still enjoy high 'de facto' power through which they can influence political decisions (Acemoglu, Johnson & Robinson, 2005).

In the case of Chile, the elite enjoy disproportionately high 'de facto' power that allows them to put constraints on equity-enhancing reforms of democratic governments by imposing formal and informal rules that undermine redistributive policies (Rodríguez-Weber, 2017). Following Acemoglu and Robinson (2008), this leads to a so-called 'constrained democracy'. The high degree of 'de facto' control over the state allows the Chilean elite to exert influence on the political agenda of democratic parties (Acemoglu et al. 2015). Practical examples evident from the Chile today are the persistence of fiscal loopholes representing an estimated 4% of GDP[24], extremely low taxes on natural resource rents (for example on copper, Chile's most important natural resource) and strikingly low effective tax rates for the top 1% income earners[25] (Sanchez-Ancochea, 2017; Rodríguez-Weber, 2017). Although elites are not representative of society, the distribution of power in their favor means that the Chilean elite is the engine of inequality[26] (Kahn, 2012). The corrupted system disproportionately enriches a particular part of the population at the cost of the whole society, and hence leads to greater income inequality (Chang, 2007)

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[24] This is more than any other OECD country except Mexico (Sánchez-Ancochea, 2017).
[25] The effective tax rate for the top 1% is 16%, in contrast to a rate of 24% in the US and much higher in other OECD countries (Sánchez- Ancochea, 2017).
[26] This does not only apply to Chile, but also to the rest of Latin America. Compared to the rest of the world, Latin America has traditionally been characterized by high concentration of incomes at the top and high political influence of the elite (Piketty, 2014; Sanchez-Ancochea, 2017).

7.2 Current events

Another aspect that constrains Chile's democratic system in its abilities to reduce income inequality is the fact that Chile still operates under a constitution that has been imposed by Pinochet in 1980 under the military dictatorship (Siavelis, 2000). The 1980 constitution was imposed as a way to ensure that if Chile was ever to democratize, it would be a "protected democracy". The constitution is characterized by many antidemocratic features, including the requirement of supermajorities for the approval of educational- and healthcare bills, the appointment of a number of non-elected senators, an electoral system designed so that no political group can attain a majority in congress (Weyland, 1997; Curry, 1997). The military regime realized sooner or later the dictatorship will have to make place for democratization, and precisely for that reason the rigid constitution was put in place to ensure that all the 'advances' made by Pinochet's government would not be dismantled once democratic rule was restored (Curry, 1997). Though a series of constitutional amendments have been introduced over the course of the past thirty years, many aspects of the authoritarian constitutional framework are still in place today[27] (Calcagnini, Sanchez-Carrera & Rombaldoni 2019). The 1980 constitution, Pinochet's legacy, continues to restrict democratic governments' ability to achieve a more equitable income distribution. Albertus and Menaldo (2014)'s findings emphasize that redistribution is greater if a democratic regime can avoid operating under a constitution written during a period of autocracy.

In fact, 2021 brings renewed hope for Chile. A new constitution is due to be composed over the next two years following heavy social protests that came to a boiling point in October 2019. As a result of the heavy protests, a national plebiscite was held in October 2020 regarding whether the current neoliberal constitution should remain in place, or if it should be replaced by a new constitution (Jimenez, 2000). 78% voted for the composition of a new constitution. The new constitution presents an opportunity for change in Chile's elitist democratic structure.

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[27] Even though non-elected senators were abolished by the amendment in 2005, the binominal electoral system and the requirement of supermajorities to pass important bills (mainly regarding social spending) remain in place (Aninat, Benevente, Briones, Eyzaguirre, Navia & Olivari, 2010)

7.3 Limitations

The most important limitation of this study has been the limited availability of data for developing countries. Every study on income inequality is hindered by data limitations. This study has made a strong attempt at minimizing this, by employing the latest, arguably most accurate income inequality dataset to date, the SWIID composed by Fredrick Solt in 2020 (Solt, 2020). The main problem lies in the lack of available data for predictor variables. This study would have greatly benefited from the inclusion of predictor variables on top income taxes, trade openness, social spending and educational attainment. These important variables however lacked sufficient data availability and could hence not be included in the model. Though the inclusion of such variables would have increased the fit of the model, the reliability of the current results are not compromised by this matter because the goodness of fit of the baseline model (the RMSPE) was sufficiently good to draw inferences. The reason is that the synthetic control method is composed in such a way that it cannot suffer from omitted variable bias due to the inclusion of lagged outcome variables. Increased data availability for developing countries would also allow for the increase of the donor pool. This would likely lead to the composition of a more representative synthetic Chile, a better goodness of fit. This would strengthen the reliability of the results, given the accuracy of the measured effect in the synthetic control method depends on how closely synthetic Chile follows the trajectory of actual Chile in the pre-intervention period.

8. CONCLUSION

The following section concludes the paper. The first section summarizes the results in light of the research question and hypothesis. Subsequently, this paper's contribution, practical implications and avenues for future research are discussed.

8.1 Research Aims

The aim of this study was to assess the relationship between democracy and income inequality for the case of Chile. The body of case studies that examine the effect of third wave democratizations on income inequality is very limited this far. To address this gap, the purpose of this study was to examine the effect of Chile's democratization on income inequality levels. The research question of this study was therefore

RQ: What effect did Chile's democratization have on income inequality levels?

Following the current literature on third wave democratizations, the hypothesis of this study was that Chile's democratization did not have a significant effect on income inequality. To test this hypothesis, the synthetic control method was employed, using the most recent data on income inequality (Solt, 2020). The synthetic control method allowed for the construction of a counterfactual for the case that Chile did not democratize; so-called 'synthetic Chile'. The direct effect of Chile's democratization on income inequality was subsequently inferred by comparing the income inequality trajectories of actual- and synthetic Chile. Even though income inequality levels have decreased since the year 2000, the results of the analysis showed that this decrease was not attributable to democratization. These findings were robust to alternative specifications of the donor pool and of the set of predictors included in the model.

The results confirm the hypothesis that democratization did not cause a significant reduction of income inequality in the period under study. The results are in line with Huntington (2012), who argued that unlike first and second wave democratizations in the nineteenth and early twentieth century, third wave democratizations did not significantly reduce income inequality.

Following Acemoglu and Robinson (2008) and Albertus and Menaldo (2014), this study proposed that a plausible reason why Chile's democratic system has not been able to significantly reduce income inequality is that Chile's democratic system is constrained by the elite. The elite enjoy disproportionately high 'de facto' political power through which they impose formal and informal rules that undermine redistributive policies of the new democracy.

8.2 Contribution and Practical Implications

This paper's contribution is three-fold. Firstly, this study is the first to examine the relationship between third wave democratizations on income inequality by employing the novel synthetic control method. Secondly, though such studies do exist for the broader Latin American region, to the best of the author's knowledge there exist no recent case study that has quantitatively examined the effect of democratization on income inequality for the case of Chile specifically. Thirdly, data limitations pose a serious challenge for studies on income inequality. In contrast to older quantitative studies in the field, this study uses the most recent, and arguably most representative dataset on income inequality that has been composed to date.

Various practical policy implications follow from the results of this study. Particularly this thesis relates to Sustainable Development Goal number 10: *'Reduce inequality within and among countries'* (United Nations, 2021). Though some progress has been made with regards to reducing inequality within Chile (the Gini coefficient fell from roughly 50 to 46 during the period 2000-2015), income inequality in Chile is still amongst the highest in the world. One of the crucial factors in this is the disproportionately high power of the elite. Target 10.2 of the Sustainable Development Goals states: '*By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, race, ethnicity, origin, religion or economic status'* (United Nations, 2021). This year is a crucial year for policymakers, given the new constitution is to be drafted. This study has highlighted that thus far, Chile's democratic system has not been beneficial in the quest to reduce income inequality. Chilean policymakers should pay extra attention to ensure the social, economic and political inclusion of all socioeconomic strata. This also ties in with Sustainable Development Goal number 8: *'Promote sustained, inclusive and sustainable economic growth'*. Reducing income inequality is crucial for the achievement of inclusive economic growth.

8.3 Avenues For Future Research

Firstly, the reader should bear in mind that this study has examined the effect of democracy on income inequality in the context of Chile. Future research could examine whether similar conclusions can be drawn for other countries that democratized in the third wave. Secondly, this thesis has focused on studying the effect of democracy on income inequality. Future research could be directed towards examining the effect of democracy on other types of inequality, such as gender inequality and equality of opportunity. Thirdly, recent events regarding Chile's constitution signal major changes are going to be made in the Chilean democratic system. Following heavy social protests that came to a boiling point in October 2019, Chile's constitution is to be rewritten completely over the following two years. Whether Chile's democratic system will be able to reduce income inequality levels under the new constitution is an interesting avenue for future research. Finally, while there exists a large body of qualitative research that assesses the role of elite power in the relationship between democracy and inequality, quantitative evidence is still lacking. Future research could be directed towards quantifying the role of elite power in the relationship between democracy and income inequality.

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APPENDIX A

Formal Method Description

Formally stated, suppose there are J+1 countries, and only the first country is exposed to the intervention of interest (Chile). *J* countries remain that act as potential controls, also referred to as 'the donor pool'. Let Y_{it}^N be the income inequality level for a country *i* at time *t* without intervention for countries *i = 1, ..., J + 1*, and time periods *t = 1, ..., T*. Let T_0 be the number of pre-intervention periods, with $1 \leq T_0 < T$. Let Y_{it}^I be the income inequality level that would be observed for country *i* at time *t* if country *i* underwent the intervention in periods $T_0 + 1$ to T. It is assumed that Chile's democratization had no effect on the outcome variable income inequality before implementation. An attempt is made to estimate the effect of (re) democratization in Chile denoted by $\alpha_{1t} = Y_{1t}^I - Y_{1t}^N = Y_{1t} - Y_{1t}^N$. Note that Y_{1t}^I is observed (this represents 'actual Chile' after democratization). Note that Y_{1t}^N is estimated (this represents 'synthetic Chile' after democratization) by a weighted vector of covariates that were not affected by the intervention. Abadie, Diamond and Hainmuller (2010) present a detailed description of the selection of weights and further derivations of the synthetic control method.

APPENDIX B

Robustness Test 1 – Alternative Donor Pool

Table 4: Robustness Test 1 Descriptive Statistics (Author's Computations)

Predictor Variables	(1) Actual Chile	(2) Synthetic Control Method counterfactual	(3) Difference-in-Differences counterfactual
Absolute Poverty	49.43	47.20	30,07
Economic Participation Rate	51.42	62.40	62,08
GDP per Capita	1004.48	685.87	2642,48
Industry Share	30.31	32.59	34,26
Inflation	1.60	13.40	6,58
Population Density	23.09	63.94	64,68
Population Growth	3.14	2.26	1,90
Tax Revenue	12.40	14.24	13,18
Unemployment	7.79	2.99	6,31
Urbanization	5.06	4.26	2,33

Notes Values are averaged over the pre-intervention period (1985-1990). The donor pool consists of South American countries (Argentina, Brazil, Colombia, Uruguay and Venezuela). The counterfactual from the Synthetic Control Method, 'Synthetic Chile', is comprised of 69.3% Brazil and 30.7% Venezuela. The differences-in-differences counterfactual is calculated based on averages of all donor pool countries. The RMSPE is 0.2023

APPENDIX C

Robustness Test 2 – Alternative Set of Predictors

Table 5: Fixed Effects Regression (Author's Computations)

Absolute Poverty	0.0987***
Economic Participation Rate	0.0329**
GDP per Capita	-0.0005***
Industry Share	0.0051
Inflation	0.0102
Population Density	-0.0134
Population Growth	2.9671**
Tax Revenue	0.1291
Unemployment	0.5112***
Urbanization	-0.2863

Notes * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 6: Robustness Test 2 Descriptive Statistics (Author's Computations)

	(1)	(2)	(3)
Predictor Variables	Actual Chile	Synthetic Control Method counterfactual	Difference-in-Differences counterfactual
Absolute Poverty	49.43	46.64	30.45
Economic Participation Rate	51.42	61.47	61.17
GDP per Capita	1004.48	1004.41	2777.09
Population Growth	3.13	2.44	2.02
Unemployment	7.79	4.13	6.40

Notes Only those predictors that are significant in a FE regression were included. Values are averaged over the pre-intervention period (1985-1990). The donor pool consists of Latin American & Carribbean countries (Argentina, Brazil, Colombia, Costa Rica, Mexico, Panama, Uruguay and Venezuela). The counterfactual from the Synthetic Control Method, 'Synthetic Chile', is comprised of 61.6% Brazil, 14.3 % Mexico and 24.1% Venezuela. The differences-in-differences counterfactual is calculated based on averages of all donor pool countries. The RSMPE is 0.2117