

THE POLITICAL ECONOMY OF MACROECONOMIC POLICY

By

Hyunwoo Kim

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ABSTRACT

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In three essays, my dissertation analyzes the political economy of macroeconomic policies and outcomes in democratic settings. Chapter 2 seeks to identify and document the micro-foundations of inflationary policy, with a focus on the role of economic inequality. Previous work on the politics of monetary policy has concentrated on the role of distributive motives stemming from individual characteristics such as income levels or factoral/sectoral interests in formation of monetary policy preferences of citizens. This work pays little attention to how a country's overall distributive context, namely its economic inequality level, affects their preferences vis-a-vis price stability and employment. My research argues that as inequality pushes more citizens below the average income of a society, they are more likely to demand redistribution through higher employment (and thus more competitive wages) and more fiscal spending, each of which can be better supported by expansionary monetary policy. In terms of inflation aversion, this means that inequality renders citizens more tolerant of inflation. Tests on 483,557 respondents from 33 countries (1976-2016) using the International Social Survey Program and the Eurobarometer demonstrates that inequality significantly moderates citizens' inflation aversion.

Chapter 3 examines how central bank independence (CBI) as an institutionalized form of monetary technocracy, undermines elected governments' democratic accountability for economic outcomes. CBI implies that elected governments delegate monetary policy to technocrats in central banks. I argue that given the substantial influences of monetary policy through manipulation of interest rates on consumption, investments, exchange rates, capital flows and government spending,

all of which critically determine the performance of the economy, CBI can blur the line of responsibility for economic performances between elected governments and central banks. It can thereby weaken voters' ability and willingness to electorally punish (or reward) governments on the basis of those outcomes. Utilizing data from the Comparative Study of Electoral Systems, I test how CBI conditions the effects of both voters' subjective evaluation of the economic outcomes and objective macroeconomic performances on voting for incumbents in 38 countries from 1996 to 2016. The result shows that CBI significantly attenuates the reward and punishment mechanism of elections based on economic records.

Chapter 4, co-authored by Cristina Bodea and Christian Houle, investigates the impact of financial crises on income inequality. Important evidence has emerged that in the aftermath of crises, politics becomes polarized and economists have linked this to greater gaps in income due to crises. The evidence however on whether crises can be linked to divergent incomes is weak and plagued by 1) the possibility of a reverse effect going from great disparity in incomes to major economic crises; 2) the persistent nature of income inequality; and 3) important measurement error in both the dependent and independent variables. We use the longest time stretch of available data on crises and types of crises (Reinhart and Rogoff 2011) and income inequality (Solt 2009), as well as General Method of Moments and Error Correction Models to more credibly tackle the complex theoretical and empirical relationship between crises and inequality. We find strong evidence that currency, banking, inflation and debt crises increase inequality, particularly in the long run.

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To My Family

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CHAPTER 1 INTRODUCTION

My dissertation starts from the same assumption on which 33 years ago, Douglas Hibbs (1987) built his seminal work, “The American Political Economy”, that “macroeconomic policies pursued by political administrations operating in a democratic setting rarely originate with idealized, apolitical, “golden rule” norms.” This assumption is rooted in the two stylized facts regarding the politics of macroeconomic policy. The first fact is that the consequences of macroeconomic policy (e.g. inflation or unemployment) are quite distributive. A certain macroeconomic policy can benefit some more than others, or it can benefit some even at the expense of others, creating winners and losers. The second fact is that voters, to a certain degree, hold their governments accountable for the outcomes of macroeconomic policy. They punish governments in elections when they perceive that the economy is doing poorly, but they reward those governments with more votes when they believe the economy is doing well. Together, the two facts indicate that the politics and macroeconomic conditions strongly interact each other.

In this dissertation, I tried to explain how key features of democracy, such as electoral competition and political participation, combined with citizens’ distributive concerns, shape and are shaped by macroeconomic policy. Chapter 2 raises the question of how inequality affects citizens' views regarding the trade-off between price stability and full employment, particularly at a time when low inflation is generally accepted as the top priority of central banks. The existing literature has attributed macroeconomic volatility, often characterized by high inflation, to economic inequality and the populist politics that follow. In particular, previous studies often rely on the assumption that the popular preference for inflationary policy is rooted in rising inequality. Yet, this key assumption has not to this point been substantiated empirically at the individual level. This chapter thus examines the effects of inequality on the monetary policy preferences of citizens

that manifest as inflation aversion. It argues that as inequality pushes more citizens below the average income in a country, they are more likely to demand redistribution through higher employment (and thus more competitive wages) and more fiscal spending, each of which can be better supported by expansive monetary policy. In terms of inflation aversion, this means that inequality renders citizens more tolerant of inflation as a potential outcome of expansive monetary policy. Drawing on the most comprehensive and up-to-date dataset of individual inflation aversion, which I created using survey data from the International Social Survey Programme and the Eurobarometer, I find that inequality substantially moderates citizens' aversion to inflation and thus their preference for anti-inflation monetary policy.

Chapter 3 examines how monetary restraints on elected governments imposed by central bank independence (CBI) reform affects democratic accountability. The CBI literature has convincingly shown that central banks emerged as a strong countervailing force against elected governments in the area of macroeconomic policy by shedding light on the robust policy constraints which CBI can impose on governments and the substantial influence central banks can directly have on the economy. In doing so, the CBI literature has challenged traditional notions about 'who is in charge' of the economy. I argue, however, that the shift in perceptions of who is in charge of the economy has not led to a serious discussion on who is more or less 'accountable' for economic outcomes in democratic settings. This chapter demonstrates that the dominant authority of independent central banks over monetary policy significantly undermines the governments' accountability for economic outcomes. In particular, this chapter documents that the patterns of reward and punishment mechanism of elections on the basis of economic performances tends to be moderated in countries where monetary policy constraints are strongly institutionalized in the form of CBI.

The last chapter explains the impact of economic crises on income inequality. A significant amount of evidence reveals that financial crises stoke political upheaval. In particular, such crises have been shown to reduce support for incumbent politicians and increase electoral volatility (Bartels and Bermeo 2014; Crespo-Tenorio, Jensen, Rosas 2014; Echegaray 2005; Keefer 2007; Remmer 1991), increase polarization (Mian, Sufi and Trebbi 2014) or lead to regime breakdown (Pepinsky 2009). One mechanism contributing to such political upheaval is the rising economic inequality that results from the macroeconomic effects of and political responses to financial crises (Bordo and Meissner 2015; McCarthy, Poole, and Rosenthal 2006; Reinhart and Rogoff 2009; Rosas 2006). Yet the link between financial crises and income inequality lacks firm empirical support. The mixed findings, we argue are due to the literature's failure to address convincingly key threats to inference that afflict this relationship: reverse causality, the slow moving nature of inequality and significant measurement error for both the independent and dependent variables. This chapter critically reviews the literature on the effects of economic crises on income inequality, discusses the major threats to causal inference and offers an estimation strategy that credibly deals with the empirical faults it identifies in the literature.

CHAPTER 2 THE MICROFOUNDATION OF MACROECONOMIC POPULISM

The Effects of Economic Inequality on the Public Inflation Aversion

2.1 Introduction

With economic inequality on the rise, policymakers responsible for managing the national economy are increasingly held to account for such growing disparities.¹ Unelected central bankers in charge of running monetary policy are no exception; since the Great Recession that brought the increasing inequality to the fore, the heads of major central banks including the Federal Reserve and the European Central Bank have also been publicly questioned about their responsibility for the widening economic gap at hearings and press conferences.² Further, popular discontent with monetary authorities caused by the intensifying inequality was sometimes directly channeled into political discourse. In the United States, for instance, during the 2015 primary season, several Republican candidates, particularly Senator Rand Paul, blamed the Fed's expansive monetary

¹ Income inequality, especially in industrial countries, has been growing since the 1980s. For instance, countries in the Organization for Economic Cooperation and Development (OECD) saw about a 10% increase (from 0.29 to 0.316) in the average Gini coefficient from the mid-1980s to the late 2000s (OECD, 2011).

² For instance, in her first hearing at Financial Service committee alone, Janet Yellen was asked about her perspective on the rising inequality six times by different committee members (*House hearing on Monetary Policy and the State of the Economy*, February 2014). Also, when she announced the Federal Open Market Committee (FOMC)'s decision to remain at the current interest rate at the press conference, she was asked whether the Fed's low interest rate policy was exacerbating the wealth gap (*Transcript of Chair Yellen's press conference*, September 2015).

policy for raising inequality.³ In the same year, Senator Bernie Sanders, on the other side of the aisle, condemned the Fed when the bank raised the still low interest rate by 0.25%.⁴ He criticized that the tighter monetary policy would only help big bankers at the expense of average workers who want more employment and wage increases.

At first glance, the popular pressure on central bankers to prevent economic distribution from deteriorating seems misplaced since their monetary policy mandates are generally limited to maintaining a stable macro-economy by manipulating the balance between inflation and unemployment, rather than directly implementing redistributive policies. However, given that the impacts of monetary policy are, at least indirectly, distributive in nature by virtue of their effects on various prices (e.g. wages and asset prices) and job opportunities in the economy, holding those in charge accountable for the state of the economic distribution does not seem unreasonable. In particular, after the public witnessed the dramatically increased economic clout of central banks through the large-scale operation of the unconventional monetary policy during the recent crisis, it became apparent that they could no longer remain as innocent bystanders in the public's eye.

Yet, despite the rising social demand to take the distributive context into account, the precise alternative monetary policy that citizens would most prefer in order to achieve more inequality is not yet clear. For example, under the conditions of high inequality, do citizens prefer more expansionary policy that fights unemployment even at the expense of extra inflation or

³ Ylan Mui. "This is one issue that the Republican presidential candidates agree on," *The Washington Post*, November 11 2015.

⁴ Bernie Sanders, "Bernie Sanders: To rein in Wall Street, fix the Fed," *The New York Times*, December 23 2015.

contractionary policy that has the opposite effect?⁵ At a time when price stability is generally accepted as the top priority of monetary policy over full employment, how does inequality affect citizens' views regarding this trade-off? Can people's support for anti-inflation policy remain strong even when inequality leads them to push for greater redistribution through higher employment and more fiscal spending? This study examines these puzzles using the concept of the public inflation aversion. Public inflation aversion, according to Scheve (2004), is defined as the "public's assessment on the relative costs and benefits of inflation" against unemployment, given a short-term tradeoff between these two macroeconomic outcomes. This 'relative' dislike of inflation, compared to that of unemployment, has been considered as the standard measure of a society's overall macroeconomic policy preference and thus the most important parameter in a social welfare function that determines the direction of optimal monetary policy (Barro and Gordon 1983).

In the previous literature, there has been much discussion regarding how economic inequality affects the popular attitudes toward governments' fiscal policy, including tax and

⁵ Ben Bernanke (2015), the former Chair of Federal Reserve once posed a similar question when he defended a quantitative easing (QE) in terms of its implications on inequality during the Great Recession. Although my puzzle focuses on a tradeoff between inflation and unemployment in determining monetary policy, his question highlights a tradeoff between inflated asset prices and low unemployment. Specifically, against the notion that the current QE was worsening inequality by boosting asset prices (e.g. stock prices), he asked "if the average working person were given the choice of the status quo (current Fed policies) and a situation with both a weaker labor market and lower stock prices (tighter Fed policies), which would he or she choose?".

transfers following the Meltzer-Richard model.⁶ Yet, little, if any, attention has been paid to the effects of inequality on the public opinion regarding monetary policy that determines price and employment levels in the economy. Moreover, though a number of studies have explained the relationship between inequality and inflation at the aggregate level with citizens' macroeconomic policy preferences as an important causal mechanism, no study has actually examined those preferences at the individual level. That is, the microfoundations of inflation's link to inequality are simply not substantiated in past work. This study attempts to fill this gap; it explains that with high economic inequality, citizens' support for anti-inflation policy diminishes while expansionary policy that often causes higher inflation is viewed more favorably. I expect that as inequality pushes more citizens below the average income of a country, they are more likely to demand redistribution through higher employment (and thus more competitive wages) and more fiscal spending, each of which can be better supported by expansive monetary policy. In terms of inflation aversion, this means that inequality renders citizens more tolerant of inflation as the potential outcome of looser monetary policy.

Empirical findings from the main analyses of 30,181 respondents from 20 OECD countries (from 1976 to 1997) based on the two cross-national surveys - the International Social Survey Program (ISSP) and the Eurobarometer - show that citizens' aversion to inflation is negatively associated with inequality. Furthermore, an additional test on 453,376 respondents in 27 European countries (from 2007 to 2016) using an alternative measure of inflation aversion offers the interesting finding that inequality significantly weakens inflation aversion only in non-Eurozone countries where national governments still retain monetary policy autonomy. Finally, in order to

⁶ See Alt and Iversen 2017; Ballard-Rosa, Martin, and Scheve 2017; Boudreau and MacKenzie 2018; Franko 2016 for the latest discussion.

check the validity of the causal mechanism in the hypothesis, I take advantage of questions from the same surveys that measure citizens' attitudes toward government redistribution. I find that citizens' preference for more redistribution substantially moderates their aversion to inflation, as the theoretical discussion presumes.

This research offers several contributions. First, I depart from extant studies' exclusive focus on inequality's implications for citizens' attitudes regarding taxes and transfers and instead analyze citizens' inequality-contingent preferences toward price stability and employment. In doing so, I show that inequality not only affects popular preferences over fiscal policy, but also over monetary policy. In particular, by directly testing the effects of inequality on inflation aversion, I clarify that the political dynamics that incorporates the popular demand for redistribution lies behind high inflation in unequal countries. Second, my work also diverges from research traditions that rely on distributive motives stemming from individual characteristics such as income levels, partisanship, or factoral/sectoral interests in order to account for the macroeconomic policy preferences (Bearce and Tuxhorn 2017; Broz, Frieden, Weymouth 2008; Hibbs 1979). I show that in addition to those 'individual-level' traits, the 'country-level' distributive context also shapes the micro-foundation of macroeconomic policy. Lastly, this research speaks to the burgeoning literature in macroeconomics that examines the implications of inequality in formulating optimal monetary policy, in terms of aggregate social welfare (Areosa and Arosa 2016; Dressler 2016; Kaplan, Moll, and Violante 2018; Kaplan and Violante 2018). Considering that a society's inflation aversion is an essential parameter in the determination of optimal levels of inflation, my research on inflation aversion as a function of inequality can add to the ongoing debate, particularly by offering a political dimension of the topic.

This research is organized as follows. The next section reviews the previous literature on the relationship between inequality and inflation and discusses their limitations in examining

citizens' preferences of macroeconomic policy at the individual level. I then develop a theoretical framework on the effects of inequality on inflation aversion in the third section. Finally, I present the empirical outcomes and conclude.

2.2 Literature Review

An important body of research has attempted to explain the relationship between economic inequality and inflation at the aggregate-level, with the macroeconomic policy preference of citizens as an important causal link. For example, Simmons argues that the inflationary pressure that weakened democratic countries' commitment to the gold standard during the interwar period came from newly enfranchised labor demanding more income shares against capital through full employment and a strong welfare state (Simmons 1997). She writes that (the combination of) "democracy and inequality signaled markets that the gold standard was no longer inviolable", which suggests that the price stability achieved by suppressing the popular demand for redistribution can hardly be sustained in unequal democracies. Desai, Olofsgard, and Yousef (2003) also suggest that the interaction between "the institutional features of democracy", such as electoral competition as well as political participation, and inequality opens a door to governments' frequent use of an inflation tax for redistributive purposes. Moreover, Sachs (1989) and Dornbusch and Edwards (1989) focus on "macroeconomic populism" in the extremely unequal Latin American countries. They explain that several episodes of high inflation in those countries were attributable to governments attempting to increase the real wages of poor urban classes and the profits of the relatively backward non-tradable sectors, through increased market demand artificially created by monetary and fiscal expansion, in response to the populist demand for redistribution.

On the contrary, other studies posit the exact opposite causal mechanism underlying the relationship between inequality and inflation (Albanesi 2007; Crowe 2006). In contrast to the populist explanation, such work argues that the politics of exclusion created under the conditions

of high inequality marginalizes the preferences of citizens who are generally averse to inflation, thus generating unpopular high inflation. The assumption is that, as the number of citizens whose incomes are less than the social average increases with rising inequality, more citizens oppose a flat inflation tax and prefer a progressive income tax as the main source of government revenues. Therefore, inequality renders society as a whole more inflation-averse. In addition, these studies suggest that vulnerability to an inflation tax is negatively related to income levels primarily due to "financial market imperfections", whereby access to inflation-proof financial assets is limited to the rich segments of a society. As a result, while rich elites can readily avoid an inflation tax by hedging their wealth with these assets, the rest of the citizenry must face the direct risk of inflationary erosion of their cash portfolios. The implication is that, as inequality concentrates more of such assets to a few while creating more asset-less citizens, a society in general would be more averse to inflationary policy that shifts disproportionate fiscal burdens to the latter.

The existing aggregate-level studies have thus implicitly assumed contradictory expectations regarding citizens' preferences vis-a-vis macroeconomic policy in order to account for the observed positive correlation between inequality and inflation. Even though those assumptions respectively imply the exactly opposed theories about the political foundation of inflation - the populist politics on the one hand and the politics of exclusion on the other - no research has actually examined the validity of the assumptions, based on concrete empirical evidence. Even theoretically, little systematic framework exists regarding the effects of inequality on citizens' monetary policy preference. This research fills these gaps in the extant literature by offering a comprehensive theoretical framework, and a strict empirical test, of the macroeconomic policy preferences of citizens, manifested as inflation aversion, under the conditions of inequality.

2.3 Theory

Many studies suggest that the public inflation aversion matters, since it represents "an essential political input" in macroeconomic policymaking in democracies (Di Tella, MacCulloch and Oswald 2001; Ehrmann and Tzamourani 2012; Lelyveld 1999; Scheve 2004). The loss function from the widely-used Barro-Gordon model explains the underlying intuition (Barro and Gordon 1983):

$$L = a(U_t - kU_t^n)^2 + b(\pi_t)^2$$

In this model U_t represents the unemployment rate; U_t^n the natural unemployment rate; k represents distortions in the economy that increase U_t^n ; and π_t is the rate of inflation. While a expresses society's cost as unemployment increases beyond its targeted rate, kU_t^n , b is the social cost of an inflation rate that departs from zero. In the loss function, both high inflation and unemployment decrease the utility of policymakers. What is critical here, in terms of the tradeoff implied by the Phillips curve, is the relative cost of a unit increase in inflation, compared to that of a unit increase in unemployment in the function, especially in terms of the ratio of a to b , which is society's inflation aversion. The structure of the loss function implies that as a society's average inflation aversion attenuates, for instance, the optimal policy will be to give more weight to reducing unemployment than to keeping down inflation, which will ultimately result in relatively lower unemployment but higher inflation in the economy. Hayo (1998) and Neuenkirch (2014) show that the level of inflation and interest rates set by central banks systematically vary according to the inflation aversion in a country. Other studies further suggest that in addition to its effect on macroeconomic outcomes, inflation aversion can even affect a country's "choice of monetary institutions" and "the extent of international monetary cooperation" (Collins and Giavazzi 1992;

Hancke and Vlandas 2017; Scheve 2004).⁷ Given this pivotal importance, numerous studies have explored the underlying determinants of a society's relative inflation aversion.⁸ Missing from those studies, however, is an explanation of how a country's level of inequality can shape its degree of inflation aversion.⁹

My research links economic inequality to inflation aversion by combining the implication of the well-known Meltzer-Richard model with the extant research on the distributive effects of monetary policy. The crucial expectation of the Meltzer-Richard model is that rising inequality makes 'public opinion' more supportive of redistribution.¹⁰ While the existing studies derived from

⁷The success of the EMU (Collins and Giavazzi 1992) and the global spread of low inflation regimes (Hancke and Vlandas 2017).

⁸ See Di Tella, MacCulloch and Oswald 2001. Ehrmann and Tzamourani 2012. Howarth and Rommerskirchen 2016. Lelyveld 1999. Scheve 2004.

⁹ Lelyveld 1999 includes an individual's redistributive preference in his regression model as a control variable and shows its relationship to inflation aversion. Yet, his study only focuses on the individual trait and does not explain how 'the distributive context of the economy' affects an individual's preference toward inflation. Thus, the role of a country's inequality level is missing in his study.

¹⁰ Meltzer and Richard (1981). It is well known that as theoretically compelling and elegant as it may be, the Meltzer-Richard model's empirical bases have been argued to be weak. A group of studies even suggests the exact opposite that economic inequality tends to discourage public demand for redistribution and thus, actual redistributive policies by governments, which is called Robin Hood paradox (e.g., Georgiadis and Manning 2012; Iversen and Soskice 2009; Lindert 2004; de Mello and Tiongson 2006). Yet, more recent studies have increasingly found that the Meltzer-

the model typically explore the implications of citizens' redistributive demands for taxation and transfers, I focus on the influence of those demands on citizens' preferences over price stability vis-a-vis employment. Relying on the empirical findings regarding the progressive effect of expansionary monetary policy, I theorize that citizens under conditions of high inequality become more tolerant of inflation as the potential outcome of redistributive monetary policy and, thus, less inflation-averse. In particular, I expect that citizens recognize the redistributive benefits of expansive monetary policy through its anti-unemployment property and its role in supporting governments' expanded fiscal activities. Moreover, inflation's progressive impact on financial assets and liabilities is also expected to positively affect citizens' tolerance of inflation when inequality is high. The following subsections explain the equalizing nature of expansionary monetary policy and inflation more specifically.

Richard model holds empirically, revealing methodological problems involved with the prior studies that argue otherwise (see Aleman and Woods 2018; Dion and Birchfield 2010; Franko, Tolbert and Witko 2013; Houle 2017; Jaeger 2013; Kerr 2014; Moldogaziev, Monogan, and Witko 2018; Schmidt-Catran 2014; Tor 2018). Further, despite the ongoing debate on its empirical grounds, the invaluable role of the Meltzer-Richard model as a theoretical springboard for studies on redistributive policies or income inequality has rarely been doubted (see many studies that use the Meltzer-Richard model as a main premise, e.g., Bradley et al 2003; Cusack, Iversen, and Rehm 2006; Iversen 2005; Iversen and Soskice 2001, 2006; Kenworthy and Pontusson 2005; Moene and Wallerstein 2001, 2003).

2.3.1 Low unemployment

Economic inequality implies a significant gap between the median and the average income of a society (Meltzer and Richard 1981). Thus, as inequality increases, more citizens earn less than the average income and thus would demand redistribution to compensate for the income difference. I argue that because expansionary monetary policy - which has full employment as an objective - can play a significant role in redistribution, inflation as a result of the anti-unemployment policy becomes more tolerable to citizens under inequality.

First, expansive monetary policy can generate general wage increases in the economy by lowering unemployment, which is what the Phillips curve basically suggests (Krugman and Wells 2015; Phillips 1958).¹¹ As inequality produces more citizens whose incomes are below the average and thus who desire higher wages, I expect that a society as a whole will be more likely to demand monetary policy that targets full employment and thus that can ultimately achieve more competitive wages through a tighter labor market. For example, Katz and Krueger estimate that a median wage earner should see the unemployment rate at lower than 5.4% just to avoid a real wage

¹¹ The validity of the Phillips curve has been recently questioned, especially after the global financial crisis in 2008. For example, in the U.S., it has been observed that during the crisis, the inflation level did not seem to decrease as much as the substantial increase in the unemployment rate. Moreover, during the recovery periods, inflation did not seem to increase as much as the significant decrease in unemployment rate. Despite the doubts on the usefulness of Phillips curve following the recent anecdotal evidence, the several economists empirically confirmed that the Phillips curve and its policy implications still hold (Blanchard 2016; Blanchard, Cerutti, and Summers 2015; Hindrayanto, Samarina, and Stanga 2019; Laseen and Sanjani 2015).

decrease (Katz and Krueger 1999).¹² It can thus be expected that, to the extent that inequality makes a median wage earner to desire higher wages, the unemployment rate preferred by a majority in a society will be lower than 5.4%, which requires much looser monetary policy.

Moreover, considering the regressive nature of unemployment,¹³ monetary policy that addresses unemployment will appear desirable to more citizens as rising inequality deteriorates their relative income positions. The extant research on the distributive effects of monetary policy suggests that unemployment first hits those positioned at the lowest end of the income spectrum, who often have relatively low skills. The negative effects then begin to reverberate along the income scale as the level of unemployment rises. For instance, Blanchard (1995) suggests that the incidence of unemployment starts among the population "on lower rungs of the occupational ladder" and then spreads to higher rungs, which he terms "ladder effects."¹⁴ More recently, Bredemeier and Winkler (2017) also show that average unemployment rates were inversely associated with wage levels during the Great Recession. Furthermore, Sum, Khatiwada, and Palma (2010) similarly characterize the heterogeneous labor market condition under the Great Recession as "a truly Great Depression among the nation's low-income workers amidst full employment among the most affluent." Thus, from the ample evidence on the regressive effects of unemployment, it can be inferred that in an unequal economy where more citizens are concentrated in the bottom-half of the income spectrum and thus vulnerable to unemployment, expansive monetary policy will be socially preferred.

¹² Bivens (2015) suggests that this rate fell below 5.4% in the 2000s.

¹³ Blinder and Esaki (1978) suggest that "Of all our findings, the one unequivocal message seems to be that the incidence of unemployment is quite regressive"

¹⁴ See also Blanchard and Katz (1997).

Additionally, it should be emphasized that the damage caused by unemployment is often more substantial among wage earners without any financial assets for capital income or those with net liabilities. Since the greatest portion of such individuals' incomes comes from wages, when they lose jobs, they lose most of their income, which puts them directly in poverty. Even if they retain their jobs during economic slowdowns, as I suggested above, labor market slack caused by increasing unemployment can suppress meaningful wage increases. This dampening effect on wages can disproportionately hurt those whose sole income source is wages. As Beetsma and Ploeg (1996) put it, if inequality implies "heterogeneity in nominal debt holding" in which most citizens are asset-less or in a net liability position (while only a few of people own most debt assets in the economy), as inequality rises, there will be more asset-poor citizens who will be deeply distressed by the harm of unemployment. Therefore, I argue that inequality creates more citizens who are averse to increases in unemployment, and, conversely, more tolerant of inflation that can be caused by the anti-unemployment policies.

2.3.2 Fiscal expansion and accommodative monetary policy

Inflation is often attributed to governments' fiscal expansion which raises budget deficits and the accommodative monetary policy that helps sustain them. I expect that since government spending generally plays a pivotal role in compensating for market inequality, citizens who experience high levels of inequality become more tolerant of inflation, particularly as a consequence of the accommodative policy that supports the increasing fiscal redistribution. Many empirical studies offer evidence that greater fiscal expenditures generally lead to reduced inequality.¹⁵ Salotti and Trecroci (2018), for instance, show that governments' indebtedness and their fiscal size are

¹⁵ See Afonso, Schuknecht, and Tanzi 2010. Atkinson, Rainwater, Smeeding 1995. Goni, Lopez, and Serven 2008. Kenworthy 2004. Salotti and Trecroci 2018. Wolff and Zacharias 2007.

negatively related to inequality. A 1% increase in government debt, according to them, is associated with up to a 0.13% decrease in the Gini index, whereas a 1% increase in government spending reduces the Gini index by up to 0.55%. They explain that fiscal transfers cause such redistributive impacts by raising incomes, developing human capital, and improving health conditions of the lower- and middle-income classes.

Despite its redistributive benefits, excessive or persistent fiscal expansion can hardly be justified, given the risks of chronic budget deficits and consequently high inflation. In particular, expansionary fiscal policy can create inflationary pressure when it interacts with accommodative monetary policy (Neyapti 2003; Sargent and Wallace 1981; Treisman 2000). Broadly, monetary authorities can accommodate fiscal expansion in two ways: central banks can either purchase governments' securities directly or allow private investors to buy those securities but keep interest rates low through their open market operations, so that governments can continue to finance their spending at low rates. Either way, monetary accommodation of fiscal policy tends to result in increasing quantities of money in circulation and ultimately higher inflation. To the extent that this accommodation generates added inflation, citizens will be taxed through the decreased real value of the money that they hold.

For citizens, this inflation tax should be as unpleasant as any other non-monetary taxes, because inflation decreases the purchasing power of their cash assets. However, I posit that as inequality leads more citizens to prefer fiscal redistribution and thus more revenues, their aversion to an inflation tax becomes relatively weaker. I suggest that this is particularly likely as they find that the political polarization and instability that usually accompany by economic inequality often frustrate any practical political compromises to raise revenues, such as legislating higher income taxes, as those efforts become time-consuming and contentious (Desai, Olofsgard, and Yousef

2003). Rather, citizens will more willingly to accept an inflation tax as a politically viable solution, as the desperate need to deal with rising inequality pushes them to embrace such measures.

2.3.3 Savings redistribution

Finally, I suggest that when inequality is high, citizens find inflation more tolerable due its own progressive influence. Most importantly, inflation redistributes wealth from creditors who own nominal assets to debtors who have nominal liabilities. Since nominal assets (liabilities) are denominated by fixed currency values, their real values are discounted by an increase in general price level. That is, as inflation increases, the amount of goods and services that can be purchased by the nominal assets (liabilities) decreases. Thus, inflation decreases the real values of the nominal assets and liabilities, thereby reducing both the real capital gains of asset owners from sales of these assets and the real debt burdens of debtors.

Moreover, capital incomes (e.g., interest and dividends) coming from nominal assets are susceptible to inflationary erosion just as interest payments for nominal liabilities are discounted by inflation. Again, inflation reduces incomes of asset owners while also decreasing the financial costs of debtors, creating sizable redistribution among them. Inflation can therefore be expected to cost the small number of asset-rich wealthy citizens but to benefit a majority of asset-less or debt-ridden citizens in the unequal economy.¹⁶ Therefore, I expect that this redistributive aspect of inflation serves as an additional reason why citizens would be less inflation-averse under conditions of inequality.

¹⁶ Beetsma and Ploeg (1996) point out that economic inequality implies "heterogeneity in nominal debt holding", which means that in unequal economy, more citizens owe debts owned by fewer.

Thus far, I have relied only on the 'direct' impact from the redistributive benefits of expansionary monetary policy and inflation on an individual's pocket economy to theorize the effects of inequality on inflation aversion. Yet, it is also plausible that inequality can induce an individual to prefer the progressive monetary policy due to negative social externalities that the deepening economic gap generates, regardless of their individual conditions. Dimick, Rueda, and StegmueLLer (2018) suggest that individuals in an unequal society may demand redistributive policy because of the side effects of inequality that reduce social welfare, such as "an increase in crime, political dysfunction, macroeconomic instability, worsening public health, and lower social mobility". Since the costs of these by-products are often quite substantial even for those who do not directly suffer from inequality, I emphasize that the social demand for the expansionary monetary policy, which can help prevent rising inequality can also be caused by this more indirect motive.

To summarize, I argue that as economic inequality impoverishes more citizens below the society's average, they become more tolerant of inflation as the outcome of expansionary monetary policy that brings significant redistributive benefits through low unemployment, fiscal expansion, and savings redistribution. Based upon this theoretical expectation, I posit the following hypothesis.

Hypothesis 1: *Increasing economic inequality makes more citizens in a country more tolerant of inflation, or, in other words, reduces society's inflation aversion.*

I also posit a second hypothesis to test the causal mechanism of the theory that 'redistributive preferences' caused by inequality lower the inflation aversion.

Hypothesis 2: *The higher the citizens' demand for redistribution, the less likely they are to be inflation-averse.*

2.4 Empirical Analysis

2.4.1 Data and econometric models

2.4.1.1 Dependent variable

The objective of this research is to explain inflation aversion as a preference of macroeconomic policy. In order to maximize the validity of the measurement, two points must be considered. First, a direct measurement of it should be more preferred to an indirect one. The past literature has often suggested the use of indirect measurements. For example, Di Tella, MacCulloch, and Oswald (2001) measure the public inflation aversion by observing how citizens' opinion on happiness respond to fluctuations in inflation while Hibbs, Rivers, and Vasilatos (1982) do so by considering how the popularity of governments is associated with changes in inflation. Yet, given the purpose of this research, the more appropriate approach is to directly measure how respondents express their opinions about 'macroeconomic policy priority' between anti-inflation and anti-unemployment. Thus, rather than using the measurements that require an extra step of inference to link respondents' happiness or support for a government to their preference toward alternative macroeconomic policy, using a survey question that directly asks respondents' opinions on the policy would be preferable in order to minimize a potential measurement error.

Secondly, the measurement must explicitly specify the tradeoff between the two macroeconomic policies of reducing inflation and reducing unemployment, as suggested by the Phillips curve, clearly pitting one against the other. Such a measure informs respondents, at least implicitly, that fighting inflation is costly in terms of unemployment and vice versa. Further, it reflects respondents' conflicting preferences that revolve around the distributive implications of the two policies. Otherwise, an anti-inflation policy can be viewed as 'a free lunch' by respondents.

As Keech (2013) points out that no one will oppose to keeping inflation down, *ceteris paribus*. Thus, the measure should clearly indicate to respondents that, in fact, "other things are not equal" and that price stability comes at the cost of increasing unemployment (Keech 2013). Despite the importance of the trade-off, several previous studies have employed cross-national surveys that are not properly designed to make the policy of price stability and that of unemployment stabilization compete directly with one another. For instance, Howarth and Rommerskirchen (2016) use a survey question from the Eurobarometer (2002-2010) that asks, "What do you think are the two most important issues facing (our country) at the moment?." Among a variety of potential responses, both "rising prices" and "unemployment", are included as options,¹⁷ which suggests that respondents are allowed to choose both at the same time. Furthermore, the survey design allows preferences regarding macroeconomic policy to compete with other economic and non-economic policy preferences¹⁸, which renders interpretation of responses quite complex. Since the objective of their study is to explain inflation aversion as a matter of economic culture rather than as a policy preference, the use of the measurement can be justified in that particular context.¹⁹ Yet it would not be very optimal for the purposes of this research.

¹⁷ If a respondent chooses "rising prices" as one of two issues, he or she would be assumed to be inflation-averse.

¹⁸ Those answers include crime, economic situation, taxation, terrorism, foreign affairs, housing, immigration, health care, education, pensions, environment, and energy.

¹⁹ Also, they point out a problem of data availability. They suggest that "Contemporary data that pits inflation explicitly against unemployment, similar to Scheve (2004) is unfortunately not available for our purposes given that we are interested, first, in the post-2001 period and, secondly, in tracking inflation aversion across all EU members over time."

In view of the above conditions, I choose to utilize questions from a particular set of cross-national surveys that includes the ISSP (1985, 1990, and 1996) and the Eurobarometer (1976 and 1997). I argue that the questions in these surveys offer a unique opportunity to correctly measure inflation aversion and thus provide the most appropriate setup for testing how it is affected by inequality. In a general form, those surveys ask the following question:

If the government had to choose between keeping down inflation or keeping down unemployment to which do you think it should give highest priority?

This survey question satisfies the two aforementioned essential conditions of a valid measurement. It directly asks respondents' preferences regarding macroeconomic policy, and it requires respondents to choose either of two mutually exclusive macroeconomic policies. I assume a respondent to be inflation averse if he or she chooses the option of "Keeping down inflation" and thus code the dependent variable as 1 in those cases. On the contrary, if a respondent's answer is "Keeping down unemployment", the dependent variable is coded as 0.²⁰ Using this first dataset, I conduct the key test on 20 OECD countries (30,181 respondents), a sample group that shares broad similarities in political regime type and levels of economic development among the countries in

²⁰ Respondents who answer "Do not know (DK)" are excluded from observations. This is different from how Scheve codes his dependent variable. He deals with DK observations by using multiple imputations. I replicated the main regression model by using his dataset with DK observations and found that the result still holds. The replicated regression outcome is in the appendix (Table 2-8).

the surveys.²¹ Table 2-4 in appendix lists the countries in the sample. The time period of the test ranges from 1976 to 1997, since the above question that satisfies the two important criteria was asked only on five particular surveys that were administered during this time period.

Despite the fact that using these surveys can maximize the validity of the measurement, a critical limitation is that they do not offer the most recent data on inflation aversion. In order to explore up-to-date inflation aversion data, I relax the above two criteria and use the survey questions from the Eurobarometer (which follows the model of Howarth and Rommerskirchen 2016) as an additional test. In the survey, respondents are asked the following questions:

What do you think are the two most important issues facing (our country) at the moment?

Following Howarth and Rommerskirchen (2016), I assume a respondent to be inflation averse if he or she mentions "rising prices" as one of the two most important issues in his or her country. Otherwise, the observation is coded as zero. Respondents who answer both "rising prices" and "unemployment" are removed from the sample. This additional test covers 27 European countries (453,376 respondents) over the decade from 2007 to 2016.²² As I emphasized before, this test is less than ideal since the survey question is not designed to pit one macroeconomic policy against the other. Other potential responses can also complicate the interpretation of responses in critical ways. Furthermore, questions that would provide measures for necessary control variables that I include in the main test are missing from the Eurobarometer during this period. For example,

²¹ The sample countries are consistent with those in Scheve 2004.

²² Due to data availability of an independent variable (Economic inequality) which is limited to 2016, the most recent survey data that can be used is 2016.

control variables for income levels and political ideology are dropped in the additional test. Despite these limitations, I include the additional test as a means of tracking the effects of inequality on inflation aversion in the most recent decade.

2.4.1.2 Independent variable

Inequality

As a measure of economic inequality, I use the Gini index for household income inequality before taxes and transfers (market Gini), from the Standardized World Income Inequality Database (SWIID) (Solt 2016). The range of the market Gini index is from 0 to 100, with higher values indicating greater income inequality before taxes and transfers in a country. The use of the 'market Gini index' rather than the 'net Gini index', which measures income inequality after taxes and transfers, is appropriate, given the Meltzer-Richard model's stress on the role of 'market inequality' in generating the public demand for government redistribution (Meltzer and Richard 1981). Solt constructed his data by combining data from the Luxembourg Income Study (LIS) and those from the United Nations University (UNU-WIDER). Compared to other past Gini measures, Solt's data are considered to offer the highest comparability and the widest coverage.²³

In order to test the robustness of the empirical results, I also use the Gini index from the Estimated Household Income Inequality (EHII). Galbraith and Kum (2005) created the measure by combining industrial pay inequality data from the University of Texas Inequality Project and income inequality data from Deininger and Squire (1996). Along with Solt's SWIID data, EHII data are often described as "the most precise and extensive source of information on international income distribution to this date" (Gimet and Lagoarde-Segot 2011). Lastly, income shares of the

²³ See Acemoglu et al 2015, Jenkins 2015.

top 1% and 5% from the World Top Income Database (WTID) are used as additional measures of economic inequality in the analysis (Atkinson, Piketty, and Saez 2013).

The public demand for redistribution

I create variables for the public demand for redistribution by using four questions in the surveys. The first question asks whether respondents agree with the statement that "it is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes". Answers to this question range from "Agree strongly" to "Disagree strongly." I assume that the more a respondent agrees with the statement, the higher his or her demand for redistribution is, and I code the variable accordingly (*Redistribution 1*). The second question asks respondents the following: "On the whole, do you think it should be or should not be the government's responsibility to reduce income differences between the rich and poor?" I assume that the more a respondent agrees that it should be the government's responsibility, the higher his or her demand for redistribution (*Redistribution 2*). The third question asks respondents whether "those with high incomes should" pay a larger or smaller proportion of their earnings in taxes. I assume that the larger proportion a respondent wants high income earners to pay as taxes, the higher his or her demand for redistribution (*Redistribution 3*). The last question asks whether current levels of taxes for high income earners are too high or too low. A respondent is assumed to have higher demand for redistribution if he or she thinks the status quo levels of taxes on the rich are too low (*Redistribution 4*). Please see the appendix for more specific operationalization of these variables.

2.4.1.3 Control variables

A series of national-level and individual-level control variables are used to isolate the effects of economic inequality on the public inflation aversion. Most importantly, I include both contemporary inflation and unemployment rates in the analysis. It must be emphasized that, as the Barro-Gordon model suggests, inflation aversion reflects the relative costs of inflation against unemployment, 'given levels of present inflation and unemployment'. That is, since inflation and unemployment rates are explicitly included as arguments in the loss function, they should be controlled for to measure inflation aversion (Scheve 2004). This implies that determinants of inflation aversion must be explored, controlling for current inflation and unemployment levels. To do so, I use the log of annual growth of the harmonized consumer price index (CPI) from OECD's "Key short-term indicators" as a measure of inflation (*Log Inflation*). I also use the annual unemployment rate from the annual macro-economic database (AMECO) (as a measure for the unemployment rate (*Unemployment*)).

Other national-level control variables such as levels of government expenditure and government debt, trade openness, and the size of the financial sector are included in the empirical analysis.²⁴ The extant literature suggests that if the public's preference for government spending, which is mainly derived from given "tastes for public service and current or past military needs", is high, its toleration level of an inflation tax will also be high, especially when the availability of a non-distortionary tax is limited. Therefore, it is argued that the two indicators reasonably representing the public's preference for fiscal spending - total government expenditures and total government debt - must be associated with lower public inflation aversion. Given this relationship,

²⁴ I follow the model specifications of Scheve (2004) whose study offers the most comprehensive empirical analysis of the public inflation aversion as a macroeconomic policy preference to date.

I include final government consumption expenditures as a percentage of GDP from the World Bank's World Development Indicators and gross general government debt as a percentage of GDP from OECD Economic Outlook No.96 (*Government expenditure and Government debt*).

Moreover, the public tends to be more averse to inflation when the national economy's dependence on the global market is high since inflation hikes might cause large volatilities in exchange rates, which can, in turn, disrupt international transactions. Thus, in order to control for the influence of openness to the global economy, a total of imports and exports as a percentage of GDP, from the Penn World Table, is included in the analysis (*Openness*). Similarly, given that inflation tends to decrease the profitability of financial assets, it seems plausible that as financialization of the national economy increases, the public may give more weight to low inflation as the objective of macroeconomic policy. I thus control for the size of the financial sector in a country by including in the analysis the amount of domestic credits as a percentage of the GDP (*Domestic credit to GDP*).

Individual-level control variables include gender, political ideology, age, income, employment status, and education. These factors are closely related to individuals' positions in the labor market, ownership of nominal assets and liabilities, and political orientation, all of which can meaningfully affect the relative costs of inflation against unemployment (Scheve 2004). Gender is equal to 1 (0) if a respondent is a male (female) (*Gender*). I constructed a *Political ideology* variable ranging from 1 (far left) to 5 (far right), based on a respondent's left-right ideological self-placement. The value of Age is equal to a respondent's exact age (*Age*). An income quartile variable records a respondent's position in the income distribution of his or her country; its value ranges from 1 (first quartile) to 4 (fourth quartile) (*Income quartile*). *Unemployed* is a dummy variable coded 1 for respondents not currently unemployed. *Education* measures the years that a respondent spent in formal education.

2.4.1.4 Econometric models

Given the binary nature of dependent variable, I employ logistic regression to estimate the effects of economic inequality on a respondent's inflation aversion. Given the hierarchical structure of the data in which individual-level observations interact with national-level variables, the assumption of independent disturbances can hardly hold. As Moulton (1990) suggests, the correlation of disturbances within a country can cause standard errors from maximum likelihood estimation to be significantly underestimated. To correct for this, I cluster standard errors by country. I also include country-fixed effects to control for unobserved country heterogeneity and to observe the within-country effects. In addition, I include year-fixed effects to account for year-specific shocks. Finally, I estimate a multilevel logistic regression as another means of preventing potential underestimation of standard errors derived from the intra-country dependence of the observations in the hierarchical data structure, and to allow random intercepts at both the individual- and country-levels.

2.4.2 Results and discussions

2.4.2.1 The effects of economic inequality on the public inflation aversion

Table 2-1 presents outcomes estimated using the main logistic regression models. The results are consistent with my hypothesis throughout all models. In Model 1, I employ the clustered standard errors, and I add country- and year-fixed effects in Model 2. In both models, the coefficient on the market Gini variable has a statistically significant negative sign, suggesting that high economic inequality causes citizens to be less likely to prioritize a policy of lowering inflation. In short, inequality renders them less inflation-averse. On the other side of the same coin, the outcomes also show that citizens become more likely to demand a policy of combating unemployment as inequality increases (more unemployment-averse).

Using the Clarify program²⁵, I calculate the predicted probability of a respondent being inflation- averse, holding all other variables at their means. The cross-country analysis (Model 1) suggests that a change in the market Gini index from one standard deviation below its average to one standard deviation above its average decreases the probability of a respondent being averse to inflation by 7% (See Figure 2-1). According to the within-country analysis (Model 2), the same shift in the market Gini index lowers the probability of having inflation aversion by a substantial amount of 24% (See Figure 2-2).

The multilevel analysis of Model 3 shows that the impact of economic inequality is still statistically significant even after controlling for potential underestimation in the standard errors caused by the hierarchical data structure. In Model 4, where I replace the market Gini with the net Gini, the influence of economic inequality is, again significant and its magnitude is even larger. That is, in contrast to the Meltzer-Richard model, citizens seem to respond to income distribution after taxes and transfers more sensitively than before any such redistribution. Specifically, a change in the net Gini from one standard deviation below its average to one standard deviation above its average decreases a respondent's probability of preferring curbing inflation over lowering unemployment by about 17% (See Figure 2-3). Additional analyses indicate that the main finding is found to be robust to the exclusion of influential observations and outliers.²⁶ For example, the exclusion of observations whose market Gini index is below the 5th percentile or above the 95th percentile does not change the outcomes. Furthermore, I exclude observations whose Pregibon's dbeta values are above the 90th percentile. The significance of the effect of economic inequality remains.

²⁵ Tomz, Wittenberg, and King 2001.

²⁶ I include these outcomes in the appendix. See Table 2-7 in the appendix.

Table 2-2 (Model 8 - Model 11) shows how citizens' preference for redistribution influence their inflation aversion. As I hypothesized, all four indicators of the redistributive preference are found to have statistically significant negative signs, which suggests that the more citizens desire governments to become involved in redistribution to decrease inequality, the lower their inflation aversion. Again, using the Clarify program here, I estimate the substantive effect of each variable from *Redistribution1* to *Redistribution4*. First, it is found that as a respondent's opinion moves from "strongly disagree" with redistribution as governments' responsibility to "strongly agree" with such responsibility, the probability of the respondent being inflation-averse decreases by 19% (*Redistribution1*). Second, compared to a respondent who agrees that it should definitely not be the governments' duty to narrow the gap between the rich and the poor, a respondent who strongly disagrees with that view is 20% less likely to prioritize a policy of anti-inflation over that of anti-unemployment (*Redistribution 2*). Third, a respondent who answers that high-income earners should pay a much larger share of their incomes in taxes is 27% less likely to have inflation aversion than the one who answers with a much smaller share. Fourth, when a respondent considers current levels of taxes on the wealthy as being much too low, he or she is 7% less likely to prefer fighting inflation than the one who thinks that they are much too high. (See Figures from 2-5 to 2-8 in the appendix for more information) The above evidence supports the argument that economic inequality attenuates public inflation aversion, with demand for redistribution as the causal mechanism.

Finally, the results from the additional test on 27 European countries from 2007 to 2016 are presented in Table 2-3. Unlike the main test, after conducting a regression on the whole sample of countries, I separate those countries into two groups by their use of a common currency, the Euro, and conduct additional regressions. This disaggregation serves two purposes. First, since

Table 2-1 : The Effect of Economic Inequality on Inflation Aversion (1976-1997)

Models	1	2	3	4	5	6	7
		Fixed Effects	Multilevel	Net Gini	EHII	Top1%	Top5%
Market Gini	-0.0504* (0.0271)	-0.163*** (0.0516)	-0.147*** (0.0156)				
Net Gini				- 0.0943*** (0.0366)			
EHII					-0.167*** (0.0472)		
Top 1%						-0.146*** (0.0413)	
Top 5%							-0.140*** (0.0301)
Gender	0.248*** (0.0382)	0.242*** (0.0344)	0.236*** (0.0256)	0.242*** (0.0394)	0.263*** (0.0514)	0.318*** (0.0631)	0.322*** (0.0684)
Political ideology	0.138** (0.0618)	0.197*** (0.0512)	0.171*** (0.0125)	0.140** (0.0606)	0.142** (0.0674)	0.112 (0.0804)	0.157* (0.0836)
Age	0.00249 (0.00207)	0.00326 (0.00232)	0.00321*** (0.000800)	0.00251 (0.00204)	-0.000461 (0.00211)	0.000204 (0.00314)	0.000337 (0.00345)
Income quartile	0.0701*** (0.0235)	0.0492** (0.0196)	0.0646*** (0.0114)	0.0669*** (0.0233)	0.0575** (0.0233)	0.0621** (0.0277)	0.0526* (0.0319)
Unemployed	-0.250*** (0.0603)	-0.174** (0.0753)	-0.205*** (0.0679)	-0.235*** (0.0686)	-0.324*** (0.0660)	-0.350*** (0.0927)	-0.331*** (0.123)
Education	-0.0124** (0.00486)	0.000436 (0.00262)	- 0.00487*** (0.00135)	-0.0121** (0.00480)	-0.0128*** (0.00375)	-0.000291 (0.00331)	0.000724 (0.00330)
Log Inflation	0.449*** (0.153)	-0.217 (0.214)	0.279*** (0.0562)	0.558*** (0.158)	0.409*** (0.128)	0.403* (0.223)	0.543*** (0.188)
Unemployment	0.00505 (0.0410)	0.0415 (0.0630)	0.0442*** (0.0142)	0.00680 (0.0310)	-0.0192 (0.0371)	-0.0884 (0.0643)	-0.108*** (0.0401)
Government expenditure	-0.0767* (0.0420)	-0.273*** (0.0643)	-0.255*** (0.0242)	-0.157** (0.0615)	-0.189*** (0.0352)	-0.170*** (0.0449)	-0.107 (0.0665)
Openness	-0.00187 (0.00334)	-0.0279* (0.0146)	-0.0273*** (0.00403)	-0.00551 (0.00405)	-0.00366 (0.00230)	- 0.00858** (0.00410)	- 0.0172*** (0.00490)
Financial sector	0.00946** (0.00385)	0.0225*** (0.00617)	0.0164*** (0.00131)	0.00916** (0.00380)	0.00990*** (0.00330)	0.00323 (0.00760)	0.00520 (0.00714)
Government debt	-0.00973* (0.00548)	-0.00143 (0.00712)	-0.0114*** (0.00220)	-0.00821 (0.00572)	-0.00593 (0.00406)	0.00500 (0.00906)	0.0122 (0.0105)
Constant	1.847 (1.680)	8.960*** (2.681)	10.28*** (1.291)	3.857* (2.290)	7.932*** (2.192)	3.287* (1.713)	3.417** (1.450)
Observations	30,181	30,181	30,181	30,181	25,663	16,264	13,880
Pseudo-R2	0.0746	0.117	.	0.0778	0.0955	0.0999	0.128

Note: Logit regression. Robust standard errors clustered by country in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 2-1: The Effect of Economic Inequality on Inflation aversion

(Market Gini: Cross-national)

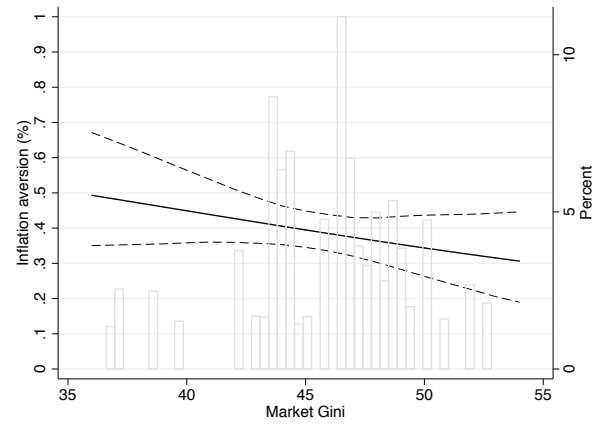


Figure 2-2: The Effect of Economic Inequality on Inflation Aversion

(Market Gini: Within-country)

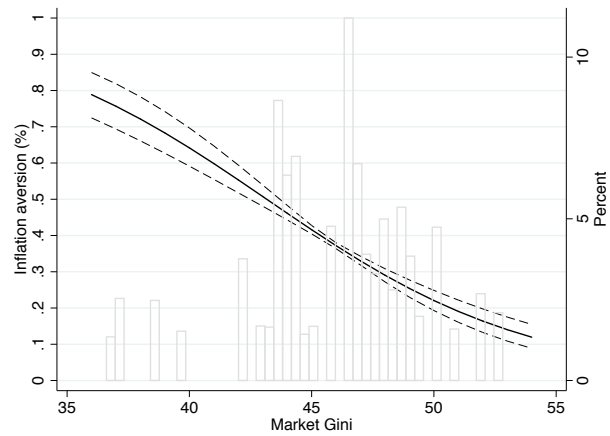


Figure 2-3: The Effect of Economic Inequality on Inflation Aversion

(Net Gini: Cross-national)

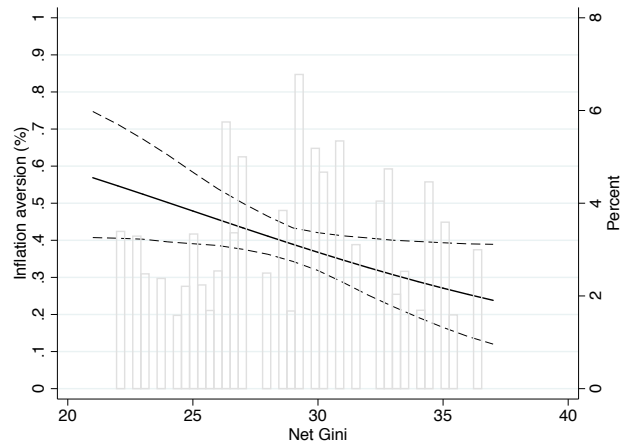


Table 2-2: The Effect of Demand for Redistribution on Inflation Aversion

Models	8	9	10	11
Redistribution1	-0.194*** (0.0244)			
Redistribution2		-0.276*** (0.0337)		
Redistribution3			-0.278*** (0.0735)	
Redistribution4				-0.0824** (0.0347)
Gender	0.258*** (0.0233)	0.259*** (0.0245)	0.188*** (0.0536)	0.344*** (0.0629)
Political Ideology	0.253*** (0.0348)	0.241*** (0.0335)	0.356*** (0.0489)	0.250*** (0.0777)
Age	0.000433 (0.00340)	0.000674 (0.00351)	0.00164 (0.00231)	0.000609 (0.00441)
Income quartile	0.0410** (0.0179)	0.0362** (0.0170)	0.0639*** (0.0198)	0.0662* (0.0339)
Unemployed	-0.213** (0.103)	-0.177* (0.0953)	-0.230* (0.139)	-0.170 (0.139)
Education	-0.00630 (0.00416)	-0.00725* (0.00416)	-0.00994*** (0.00248)	0.00685 (0.00793)
Log Inflation	0.137 (0.126)	0.161 (0.124)	-0.230*** (0.0670)	0.211 (0.323)
Unemployment	-0.0151 (0.0747)	-0.00842 (0.0750)	0.0560*** (0.0155)	-0.0372 (0.0518)
Government expenditure	-0.0443 (0.0480)	-0.0388 (0.0484)	-0.355*** (0.00993)	0.0616 (0.153)
Openness	0.00508 (0.00342)	0.00640* (0.00345)	0.00883*** (0.000611)	0.0142 (0.0134)
Financial sector	0.00795 (0.00503)	0.00884* (0.00508)	0.00895*** (0.000778)	0.0157 (0.0154)
Government debt	-0.0135 (0.00929)	-0.0144 (0.00937)	-0.0427*** (0.00226)	-0.0246 (0.0239)
Constant	-1.139 (1.342)	-1.482 (1.360)	5.510*** (0.330)	-3.171 (4.137)
Observations	14,391	14,391	8,179	6,212
Pseudo-R2	0.0536	0.0558	0.0703	0.0434

Note: Logit regression. Robust standard errors clustered by country in parentheses

*** p<0.01, ** p<0.05, * p<0.1

countries that adopted the common currency completely lost their monetary policy autonomy and thus their ability to microtarget inflation levels, citizens in those countries may not consider the problem of price stability as an issue that 'national' governments must (and can) address.²⁷ Thus, inflation aversion that is measured by citizens' perception of rising prices as the most important 'national' issue may differ systematically between the group of Eurozone countries and the other group of non-Eurozone countries. I, thus, test how the effects of inequality on inflation aversion vary according to the use of the common currency with the separate regressions for these groups. Second, the inflation aversion of citizens in some countries that decided to delegate monetary authority to the ECB, which is known for its strong preference for low inflation, may plausibly differ from those in countries that chose not to do so. For example, Hayo (1998) and De Haan and Van'thag (1995) explain that the decision to adopt an independent central bank that serves as an inflation hawk is closely associated with a society's "inflation culture" and historical experiences with hyperinflation that ultimately leads to its "anti-inflation preference". Thus, important group heterogeneity that can complicate the impact of inequality on inflation aversion may exist between the two groups, which again requires the separate tests.

In Table 2-3, Models 12, 13, and 14 employ clustered standard errors, while Models 15 and 16 add a country-fix effects to it. The outcome of Model 12 shows that market inequality does not significantly affect citizens' preferences regarding inflation when the sample includes all 27 countries. It has a positive effect and is also insignificant in Model 13, which uses only the sample of the Eurozone countries. On the other hand, in Model 14, which uses only the non-Eurozone sample, the coefficient on the independent variable has a negative sign as hypothesized but is again

²⁷ The survey question asks respondents to name the two most important issues their country faces.

statistically insignificant.²⁸ Because in the non-Eurozone countries, the expected sign is observed, I continue to test inequality's within-country effect by adding country-fixed effects in Model 15. In this model, market inequality significantly decreases public inflation aversion. Moreover, the significance of the impact remains when I replace the market Gini with the net Gini in Model 16. I suggest that the results from these models indicate that the within-country effect of economic inequality on inflation aversion exists in those countries whose governments still retain monetary authority to manipulate monetary policy and thus the level of inflation. A different interpretation may be that citizens still consider expansionary policy to be a viable means of redistribution only in those countries whose anti-inflation culture is so weak that they chose not to delegate their monetary authority to the supranational central bank whose strictest mandate is to keep inflation low.

²⁸ Since these three models only use the cluster standard errors, their regression outcomes indicate no significant cross-country effects of economic inequality.

Table 2-3: The Effect of Economic Inequality on Inflation Aversion (2007-2016)

Models	12	13	14	15	16
	All	Euro	Non-Euro	Non-Euro (Country fix)	Non-Euro (Country fix)
Market Gini	0.00228 (0.0244)	0.0559 (0.0347)	-0.0275 (0.0408)	-0.212** (0.0851)	
Non-Euro	-0.376** (0.159)				
Net Gini					-0.374*** (0.106)
Unemployed	-0.260*** (0.0389)	-0.250*** (0.0431)	-0.325*** (0.0742)	-0.332*** (0.0724)	-0.335*** (0.0740)
Education	-0.00506*** (0.000669)	-0.00456*** (0.000927)	-0.00435*** (0.000595)	-0.00366*** (0.000606)	-0.00367*** (0.000594)
Gender	-0.116*** (0.0152)	-0.117*** (0.0195)	-0.105*** (0.0204)	-0.0819*** (0.0226)	-0.0799*** (0.0234)
Age	-0.00469*** (0.00132)	-0.00341** (0.00170)	-0.00508*** (0.00178)	-0.00433** (0.00169)	-0.00434*** (0.00167)
Log inflation'	-6.120*** (0.890)	-6.739*** (1.031)	-6.477*** (1.115)	-4.111*** (1.165)	-3.075*** (0.794)
Unemployment	-0.0612*** (0.0155)	-0.0652*** (0.0175)	-0.0850** (0.0373)	-0.0962*** (0.0315)	-0.0957*** (0.0260)
Government debt	0.00151 (0.00304)	-0.00184 (0.00274)	0.0224*** (0.00812)	0.0153*** (0.00516)	0.0169*** (0.00508)
Financial sector	-0.0124** (0.00538)	-0.00756 (0.00476)	-0.0198** (0.00825)	-0.0165* (0.00937)	-0.0110 (0.00794)
Government expenditure	-0.0465*** (0.0157)	-0.0217 (0.0146)	-0.102*** (0.0159)	-0.00664 (0.0302)	-0.00165 (0.0164)
Openness	-3.39e-07 (2.08e-07)	-3.82e-07** (1.89e-07)	-1.30e-06*** (2.87e-07)	-4.08e-06*** (1.31e-06)	-5.09e-06*** (1.91e-06)
Constant	29.56*** (4.400)	28.85*** (4.894)	34.08*** (6.429)	31.70*** (5.566)	28.82*** (3.663)
Observations	453,376	310,239	143,137	143,137	143,137
Pseudo-R2	0.0521	0.0554	0.0742	0.0888	0.0901

Note: Logit regression. Robust standard errors clustered by country in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2.5 Conclusion

The previous literature has attributed macroeconomic volatility which is often characterized by high inflation to economic inequality and the populist politics that follows. In particular, the past studies have relied on the assumption that the growing popular preference for inflationary policy has deep roots in rising inequality. Yet, this key assumption has so far not been substantiated empirically. Given the intense research focus on the effect of inequality on citizens' preferences over fiscal policy, an examination of their inequality-contingent preferences vis-a-vis inflation and employment has been long overdue.

This research demonstrates that inequality significantly moderates citizens' aversion to inflation and thus their preference for anti-inflation policy. By doing so, it illuminates the micro foundation of the political dynamics that links inflation to inequality. With rising economic disparities and the recent global resurgence of the populist politics, I suggest that this research can stimulate more academic discussions on the implications of those trends. Future research, for instance, can explore how weakened inflation aversion in a country under the conditions of inequality affects the independence of its central bank. Given that more than a few economists have already raised serious concerns that the recent advent of populism may have negative impacts on "the consensus in favor of central bank independence," the question seems timely (Masciandaro and Passarelli 2018). Future work can also investigate the influence of anemic public preference for low inflation caused by an intensifying economic gap on political parties' monetary policy stances, which have converged around the neoliberalist emphasis on price stability across a number of countries over the past decade.

APPENDIX

Table 2-4: Sample countries

	ISSP and Eurobarometer (1976-1997)	Eurobarometer (2007-2016)
1	Australia	Austria
2	Austria	Belgium
3	Belgium	Bulgaria
4	Canada	Croatia
5	Denmark	Cyprus
6	Finland	Denmark
7	France	Estonia
8	Germany	Finland
9	Greece	France
10	Ireland	Germany
11	Italy	Greece
12	Japan	Hungary
13	Netherlands	Ireland
14	New Zealand	Italy
15	Norway	Latvia
16	Portugal	Lithuania
17	Spain	Luxembourg
18	Sweden	Malta
19	United Kingdom	Netherlands
20	United States	Poland
21		Portugal
22		Romania
23		Slovak Republic
24		Slovenia
25		Spain
26		Sweden
27		United Kingdom

Table 2-5: Summary statistics I
ISSP and Eurobarometer (1976-1997)

VARIABLES	Mean	SD
Inflation aversion	0.386	0.487
Gender	0.499	0.500
Political ideology	3.072	1.065
Age	45.34	17.05
Income quartile	2.529	1.148
Unemployed	0.0428	0.202
Education	13.54	14.86
Net Gini	29.15	4.009
Market Gini	45.92	3.172
Government expenditure	19.54	2.707
Financial sector	79.09	33.04
Openness	59.41	28.80
Inflation	5.071	4.575
Government debt	58.39	23.69
Deficit (overall balance) as % GDP	-2.726	2.348
Unemployment	7.518	2.986
EHII	35.48	2.706
Top 1%	7.938	2.526
Top 5%	20.66	4.198
Financial sector	89.58	41.83

Table 2-6: Summary statistics II
Eurobarometer (2007-2016)

VARIABLES	Mean	SD
Inflation aversion	0.189	0.416
Unemployed	0.0806	0.272
Education	25.85	22.45
Gender	0.463	0.499
Age	49.33	18.20
Inflation	96.04	5.309
Unemployment	9.615	4.708
Government debt	65.80	35.85
Financial sector	5.213	9.745
Government expenditure	46.18	6.526
Openness	334,882	435,583
Net Gini	29.72	3.442
Market Gini	47.99	3.801

Table 2-7: Outcomes excluding outliers and influential observations

VARIABLES	Without Outliers	Without Influential Obs
Market Gini	-0.369*** (0.102)	-0.624*** (0.151)
Gender	0.249*** (0.0336)	0.332*** (0.0323)
Political ideology	0.201*** (0.0563)	0.247*** (0.0412)
Age	0.00363 (0.00238)	0.00488* (0.00271)
Income quartile	0.0341* (0.0201)	0.0653*** (0.0222)
Unemployed	-0.214*** (0.0625)	-0.281*** (0.0971)
Education	0.000778 (0.00212)	0.00370* (0.00204)
Log Inflation	-0.511 (0.645)	-0.116 (0.297)
Unemployment	0.195** (0.0846)	0.683*** (0.191)
Government expenditure	-0.512*** (0.150)	-0.928*** (0.199)
Openness	-0.0399* (0.0230)	-0.111*** (0.0380)
Financial sector	0.0291*** (0.00480)	-0.00534 (0.0196)
Debt	0.0165 (0.0151)	-0.113*** (0.0406)
Constant	21.01*** (6.154)	47.49*** (14.11)
Observations	26,567	26,347
r ² p	0.106	0.194

Note: Logit regression.

"Without Outliers" model excluded observations whose market Gini value are either below the 5th percentile or above 95th percentile.

"Without Influential Obs" model exclude observations whose are above 90th percentile. Robust standard errors clustered by country in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2-8: Replication results with Scheve (2004)'s original dataset

VARIABLES	Market Gini	Net Gini
Market Gini	- 0.0691*** (0.00972)	
Net Gini		-0.105*** (0.0149)
Gender	-0.231*** (0.0226)	-0.231*** (0.0226)
Political Ideology	0.0800*** (0.00566)	0.0802*** (0.00570)
Age	0.00296** (0.00139)	0.00294** (0.00142)
Income quartile	0.0668*** (0.0170)	0.0663*** (0.0169)
Unemployed	-0.251*** (0.0319)	-0.252*** (0.0318)
Education	0.000813 (0.00673)	0.00135 (0.00666)
Inflation	0.0479* (0.0261)	0.0456* (0.0255)
Unemployment	-0.0439 (0.0293)	-0.0678** (0.0291)
Government spending	-0.101*** (0.0148)	-0.119*** (0.0176)
Openness	-0.00669 (0.00794)	-0.00251 (0.00723)
Financial sector	0.249*** (0.0675)	0.288*** (0.0738)
Government debt	-0.00315 (0.00511)	-0.00479 (0.00461)
Constant	4.659*** (1.314)	5.231*** (1.236)
Observations	55,194	55,194
Pseudo-R2	0.0542	0.0542

Note: Logit regression

Robust standard errors clustered by country
in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 2-4 Mean inflation aversion and market inequality

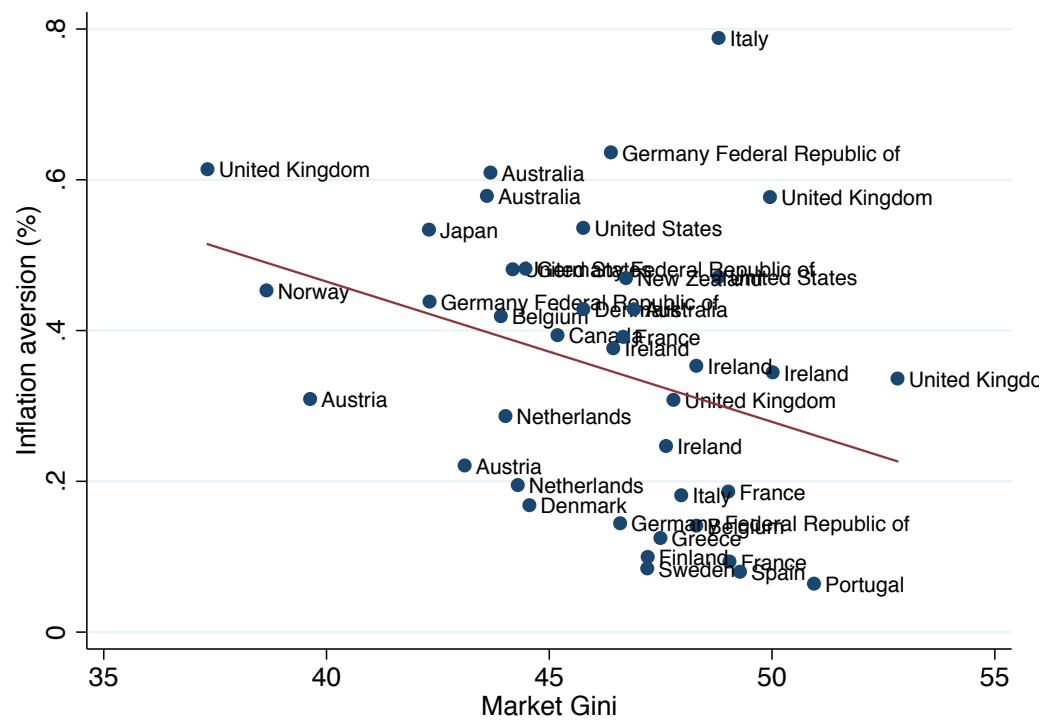
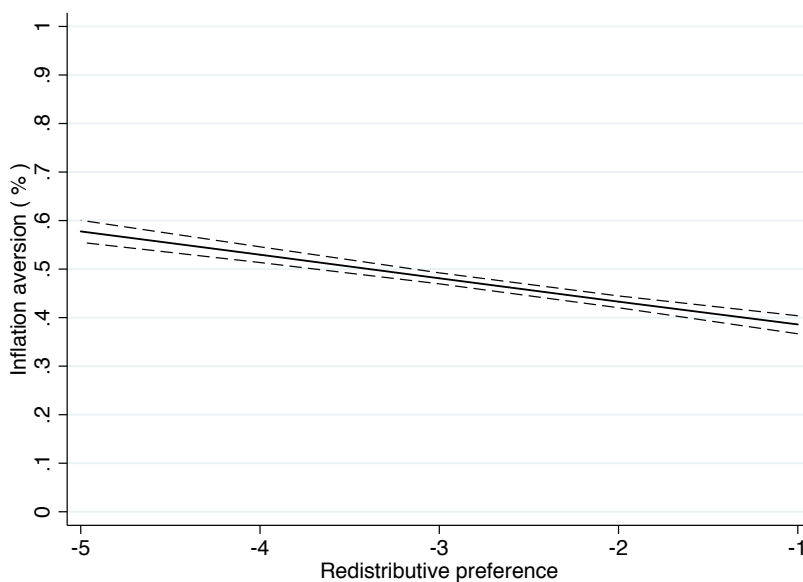
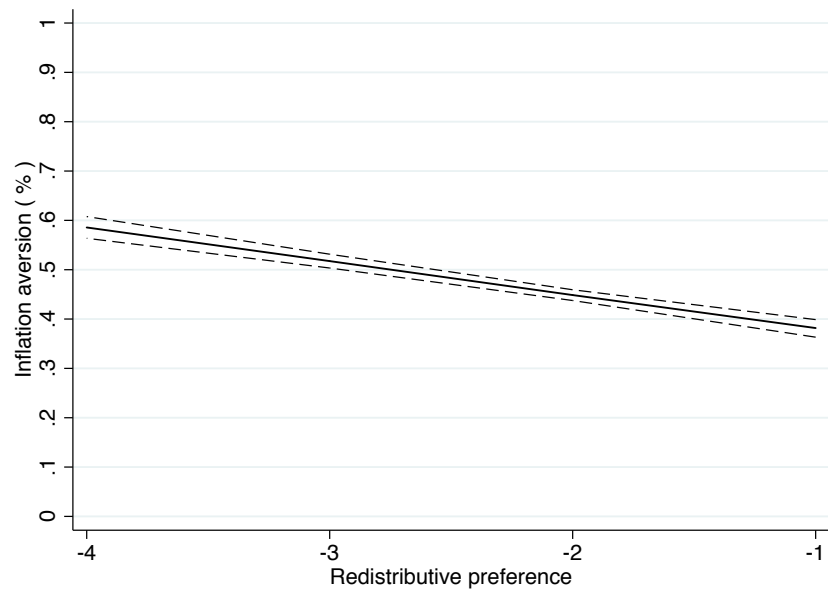


Figure 2-5 Redistribution 1



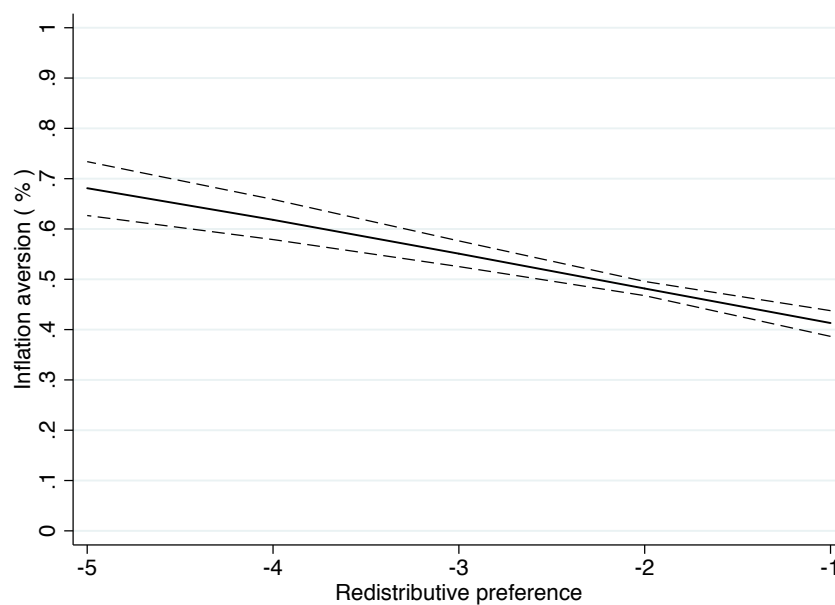
Note: A respondent was asked whether he/she agrees with the statement that "it is the responsibility of the government to reduce the differences in income between people with high incomes and those with low incomes." The higher the value, the more the respondent agrees with the statement.

Figure 2-6 Redistribution 2



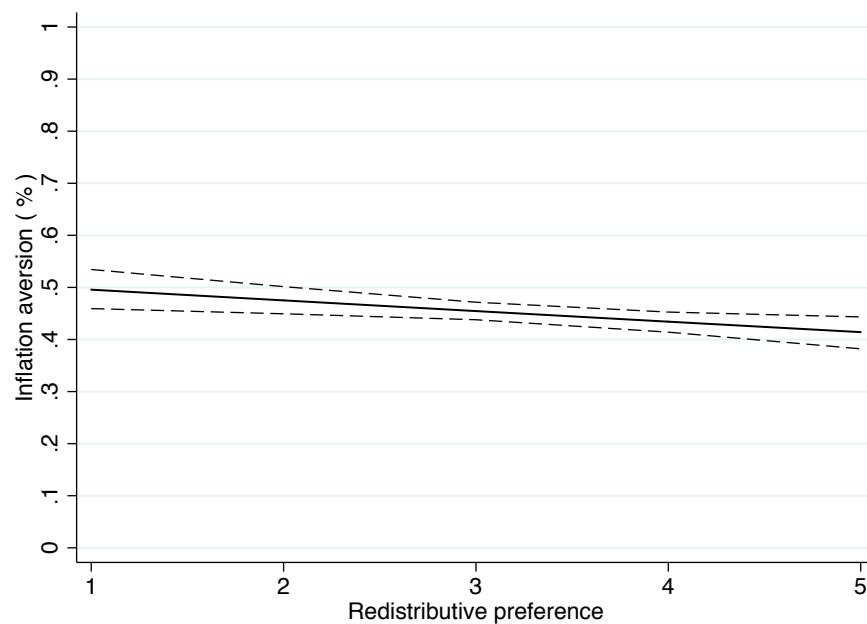
Note: A respondent was asked whether he/she agrees with the statement that "on the whole, do you think it should be or should not be the government's responsibility to reduce income differences between the rich and poor." The higher the value, the more a respondent agrees with the statement.

Figure 2-7 Redistribution 3



Note: A respondent was asked whether he/she agrees with the statement that "those with high income should" pay a larger proportion of their earnings as taxes. The higher the value, the more a respondent agrees with the statement.

Figure 2-8 Redistribution 4



Note: A respondent was asked whether he/she agrees with the statement that the current levels of taxes on the rich are too low. The higher the value, the more a respondent agrees with the statement.

CHAPTER 3 MONETARY TECHNOCRACY AND DEMOCRATIC ACCOUNTABILITY

How Central Bank Independence Conditions Economic Voting

3.1 Introduction

The literature on central bank independence (CBI) has investigated how the delegation of monetary policy from elected governments to conservative central banks affects economic policy and outcomes. Its most crucial finding is that independent central banks can effectively insulate their monetary policy from inflation-prone politicians and thus successfully achieve the banks' exclusive goal of a low-inflation economy (Alesina and Summers 1993; Bodea and Hicks 2015). Moreover, given the tight links between monetary policy on the one hand and fiscal and exchange rate policy on the other as essential components of macroeconomic policy, CBI literature further showed that the central banks can even restrict the policy autonomy of elected governments in the latter two areas when they perceive it necessary for attaining price stability, in particular by using a countervailing monetary policy (Bearce 2008; Bodea and Higashijima 2017; Freeman, Hays, and Stix 2000). As a whole, the literature on CBI has clearly attested that CBI can substantially constrain elected governments' macroeconomic policy choices to narrow parameters, thereby diminishing democratic control over the domestic economy.

In the political economy literature, there has been growing discussion regarding how restraints on governments' economic policy imposed by neoliberalist reforms, globalization or international institutions such as the International Monetary Fund or the European Union can

weaken democratic accountability²⁹, particularly based on the evidence of moderated patterns of economic voting (Alcaniz and Hellwig 2011; Carlin and Hellwig 2020; Hellwig and Samuels 2007; Hobolt and Tilley 2014). Yet despite the increasing clout of technocrats in independent central banks over democratic control of economic policy due to widespread CBI reform since the 1990s, surprisingly little has been studied on CBI's implication for accountability of representative governments for economic policymaking or performance. That is, few studies have explained when democratically elected governments' capacity to regulate the economy, the so-called the "room to maneuver" ³⁰ in the economy, is fundamentally limited due to macroeconomic straightjacket enforced by CBI, whether voters would still be able or willing to hold those governments to account on the basis of economic performance. Can the dispersion of the controls over economic policy between elected governments and central banks reduce voters' ability and willingness to assign responsibility for economic performance to the former during elections, thereby diminishing the behavior of economic voting? Can we still assume that voters can extract clear and reliable information about incumbent governments' competency from rates of economic growth or unemployment when in fact the governments only have considerably restrained institutional authority to manage those macroeconomic conditions because of the expanded independence of central banks? This chapter attempts to explore these puzzles.

²⁹ "Democratic accountability" refers here to "the electorate's capacity to reward or sanction incumbent politicians" (Samuel 2004, 425).

³⁰ Freeman (2002) defines room to maneuver as "the degree to which officials in one country can choose a distinctive mix of welfare outcomes for their citizens."

Drawing on the concept of "clarity of responsibility"³¹ created by Powell and Whitten (1993), I argue that CBI's constraining effects on elected governments' ability to manage the economy complicates who is ultimately responsible for economic performances and thus attenuates the sanctioning mechanism of democracy whereby voters punish or reward those governments in elections according to those performances.³² A significant body of literature on economic voting has revealed a range of economic as well as political structures which can undermine electoral accountability for economic outcomes (Anderson 2006; Hellwig 2001; Hobolt and Tilley 2014; Powell and Whitten 1993). In particular, these studies did so by examining the mitigating impacts of decentralized authority over economic policy or the national economy's exposure to external factors like trade or international capital on which elected governments do not have effective influences on the magnitude of economic voting. No study in this literature, however, has explored the implication of CBI on the relationship between economic performances and voting behavior.

I claim that CBI can also constitute a crucial condition which can weaken electoral accountability for economic outcomes because CBI blurs the clarity of elected governments' responsibility for those outcomes. At the heart of the concept of clarity of responsibility is an assumption that in order for voters to be able and willing to hold incumbents fully accountable, elected governments must have complete control over policy instruments essential to manage the

³¹ Clarity of responsibility refers to "the characteristics of domestic political context which shape the ability of citizens to apportion responsibility for economic or policy decisions to particular institutions." (Anderson 2006)

³² In this chapter, I rely on voters' socio-tropic evaluations rather than the pocketbook evaluations used in most past studies in the literature of clarity of responsibility.

economy (Anderson 2006; Carlin and Hellwig 2020; Kosmidis 2018). In contrast, if the crucial part of economic policy authority is institutionally separated from elected governments' control, voters will be less likely to assign full responsibility for economic conditions to the governments. As I explained at the beginning, CBI implies that elected governments relinquish the most powerful macroeconomic policy device to regulate the economy -- monetary policy. Given the substantial influence of monetary policy through its manipulation of domestic interest rates on private consumption, investment, exchange rates, capital flows, and government spending, all of which are critically important elements determining the performance of the domestic economy, the transfer of such important policy authority to independent central banks should result in a proportionate reduction in elected governments' responsibility for the economy. At the very least, it would be logical to expect that some portion of the governmental burden of responsibility would be lessened due to horizontally distributed policy mandates which can shift the public perception that a president or a prime minister is the only one who is in charge of the economy.

Though it is quite rare data, the survey by Ipsos (2005)³³ clearly indicates that voters are able to attribute a portion of responsibility for the state of the economy to central bankers. It shows, for example, that while 55% of respondents in the U.S. reported that the President George Bush was the most responsible for the economy, 29% said that Alan Greenspan, the Chair of the Federal Reserve at the time, was 'more responsible' than the President. Moreover, Hobolt and Tilley (2014) point out that voters living in the EU countries or the Euro areas can assign responsibility for both national economic conditions and interest rate policy to EU institutions, including the European Central Bank (ECB). This chapter seeks to move beyond these findings and document more general and systematic evidence that voters tend to discount the weight of economic performances

³³ Ipsos 2005. "The Associated Press Federal Reserve Study Conducted by Ipsos Public Affairs".

indicated by macroeconomic indicators on their voting decisions in elections as central banks' independent operation of monetary policy constrains elected government's capacity to influence the economy.

Utilizing the survey data from the Comparative Study of Electoral Systems (CSES: Module 1, 2, 3, and 4), I test my hypothesis on 38 countries (107,947 respondents) from 1996 to 2016. Specifically, I examined the conditional effects of CBI on the electoral influence of objective macroeconomic performances including unemployment and economic growth, controlling for political as well as economic variables, which the literature of clarity of responsibility has already argued crucially affects the amplitude of economic voting. I also estimated how the effects of respondents' subjective perception regarding economic outcomes on voting for incumbents are conditioned by the levels of CBI. The results suggest that CBI significantly moderates the impacts of both the macroeconomic variables and voters' subjective assessment of the economy on voting for incumbents. Finally, the outcomes turned out to be robust to using the alternative measure of CBI and different model specifications.

This chapter contributes to existing political economy literature in three ways. First, it shows how the problem of democratic accountability, which the literature of CBI has long suggested, but has not explicitly addressed, actually materializes through elections. The CBI literature has convincingly shown that central banks emerged as a strong countervailing force against elected governments in the area of macroeconomic policy by shedding light on the robust policy constraints which CBI can impose on governments and the substantial influence central banks can directly have on the economy. Some scholars even suggest that a consensus exists among economists that the national economy is ruled by the central bank, not government.³⁴ Clearly, the CBI literature has challenged traditional notions about 'who is in charge' of the

³⁴ Paul Krugman. "Presidents and the Economy," *The New York Times*, January 4 2015.

economy. I argue, however, that the shift in perceptions of who is in charge has not led to a serious discussion on who is more or less ‘accountable’ for economic outcomes in democratic settings. This chapter demonstrates that the dominance of authority of independent central banks over monetary policy significantly undermines the governments' accountability for economic outcomes. In particular, this chapter documents that the patterns of reward and punishment mechanism of elections on the basis of economic performances tends to be moderated in countries where monetary policy constraints are strongly institutionalized in the form of CBI.

Second, this chapter may also contribute to academic discussion over the tension between technocracy as "rule by experts" and representative democracy as rule by parties, which the recent global financial crisis and the following emergence of technocratic politics reignited (Caramani 2017, 54; Harbermas 2015; Marangoni and Verzichelli 2015). In particular, the existing literature suggests that technocratic rule can harm democratic accountability by isolating policymakers from proper checks and balances and by reducing transparency in policymaking procedures (Bertsou and Caramani 2020; Freeman 2002; Sanchez-Cuenca 2017). Since CBI has been understood as one of the most prominent technocratic reforms which revealed similar problems of lacking a countervailing force and transparency (Broz 2002), the implication of this reform for democratic accountability should also be relevant in accounting for the relationship between technocracy and representative democracy in general.

The third contribution of this chapter is its identification of another crucial condition which can explain variations in the magnitude of economic voting across countries, as yet unexplored in the election literature. This omission seems quite surprising, considering the significant implications of CBI for the autonomy of elected governments in the management of macroeconomic policy. I expect that the evidence of CBI's conditional effects on the influence of

macroeconomic indicators in elections offered in this chapter will deepen our understandings of economic voting in contemporary economies which CBI reforms have swept across.

3.2 Literature Review

3.2.1 CBI and democracy

CBI refers to the delegation of monetary policy from elected officials to central banks and also constraints on governments' influence on the banks (de Haan, Bodea, Hicks, Eijffinger 2018 ,184).

The most broadly used measure of CBI, first created by Cukierman, Webb, and Neyapti (1992) and later updated by Bodea and Hicks (2015) and Garriga (2016), sets forth the crucial conditions which conceptually constitute CBI: the tenure of the head of a central bank, the formation and objective of the bank's monetary policy, and restriction on the bank's lending to elected governments. For example, central banks are considered more independent if the head of the bank's term of office is longer, if the bank has a stronger control over the formation of monetary policy, if price stability is the sole mandate of the bank, and if there is heavier restriction on lending to elected governments.

Political economists have explained the cause of CBI with a focus on the problem of time inconsistency. The time inconsistency problem occurs because elected officials can hardly make credible commitments to price stability which they had promised to the public. An incentive to renege on the pledge of price stability emerges from the fact that unexpected inflation can boost economic growth and employment, both of which are electorally more important for the incumbent politicians than inflation (Ehrmann and Fratzscher 2011). Thus, inflation bias in the economy would persist as long as monetary policy, which crucially determines the level of inflation, is in the hands of elected governments. On the contrary, if monetary policy is delegated to politically insulated central banks whose sole legal mandate is keeping price stability, the commitment to low

inflation will be much more credible. In particular, when elected governments' control on the bank is fundamentally restricted due to such conditions as a head of the bank's long tenure, the bank's exclusive control of monetary policy, price stability as an exclusive mandate of the bank, and limitation on lending to governments, the credibility of the commitment to price stability will be significantly enhanced. Therefore, the CBI literature suggests that elected governments in a large number of countries since the 1990s have renounced their control over monetary policy and established independent central banks as a commitment device for stable price (Barro and Gordon 1983; Kydland and Prescott 1977).

Since monetary policy has substantial impacts on citizens' economic welfare and income and wealth distribution among them, the delegation of this policy from democratically elected officials to technocrats in central banks has been considered to pose a serious problem of a democratic deficit in the management of the economy. For instance, referring to CBI as "monetary technocracy", Freeman asserts that CBI is "antithetical to popular sovereignty" because it represents the interest of the owners of mobile capital, as opposed to those of the general population (Freeman 1990, 14). He further points out that CBI is a process in which elected governments "have not so much delegated monetary policy to technocrats as they have abdicated their responsibility to their constituents" (Freeman 2002, 904). Moreover, Berman and McNamara, suggest that by introducing CBI, "countries surrender much control over their economic fates" and that advocates of the ECB, which is one of the most independent central banks among developed countries, overlooked "the importance of democracy" in their rush to create it (Berman and McNamara 1999, 5). Though their insights on the conflict between CBI and democratic rule over the economy help us understand the important political implication of CBI, the literature has not explicitly addressed the problem of democratic accountability caused by CBI. In particular, the literature falls short of explaining when democratically accountable policymakers renounce a

crucial part of their economic policy authority such as monetary policy and delegate it to technocrats like central bankers, whether their responsibility for economic outcomes can also be renounced and delegated.

3.2.2 Clarity of responsibility

The economic voting literature has suggested that there are important ‘contextual conditionalities’ which can blur the clarity of elected governments' responsibility for economic performances. Specifically, it explains that a variety of political, institutional, or economic factors which significantly undermine the governments' capability to manage the economy can also weaken voters' incentive to hold the governments accountable on the basis of economic outcomes. For instance, Hellwig and Samuels (2007) argue that because voters understand that globalization primarily characterized by free trade and mobile capital inevitably reduces elected governments' ability to control the economy, the pattern of economic voting where elections function as the sanctioning mechanism, tends to be moderated in countries with relatively open economies. Similarly, Hobolt and Tilley (2014) claim that citizens in EU member countries are aware that a significant portion of their countries' sovereignty over economic policy was delegated to the EU and thus that they are less likely to attribute responsibility for economic outcomes to their national governments. The economic voting literature has also proposed a list of conditions which voters might take into account as exonerating factors when they assess elected governments' responsibility for the economy. It includes the degree of government cohesion (Hobolt, Tilley, and Banducci 2013), multi-level governance (Anderson 2006), neoliberalist reforms (Carlin and Hellwig 2020), and the policy impositions by international institutions (Alcaniz and Hellwig 2011; Lobo and Lewis-Beck 2012). Yet no study has explored the implications of CBI on democratic

accountability for economic outcomes.³⁵ Given the fact that a large number of countries, especially democratic ones, have already adopted this crucial institutional reform and that, consequently, the representative governments in those countries have little monetary policy authority to effectively manage their economy, a scholarly investigation on the CBI's impacts on democratic accountability for economic conditions in general and on economic voting in particular is long overdue.

3.3 Theory

I argue that CBI, which constrains elected governments' ability to run the economy, attenuates voters' ability and willingness to punish (or reward) incumbents for the state of the economy. As the literature of clarity of responsibility suggests, in order for voters to be able and willing to hold incumbents fully accountable, it should be assumed that elected governments take complete control over policy instruments essential to manage the economy (Anderson 2006; Carlin and Hellwig 2020; Kosmidis 2018). On the contrary, if the crucial part of economic policy authority is institutionally separated from elected governments' control, voters will be less likely to assign full responsibility for economic conditions to the governments. In particular, as is true in the case of CBI, when elected officials voluntarily renounce their powerful policy authority in order to avoid politicization of that authority for electoral advantage (Alesina, Roubini, Cohen 1997; Dellepiane-Avellaneda 2013; Lohmann 1997; Rogoff 1985), voters will be more likely to cut the governments slack for economic outcomes. Therefore, as much as the increased economic clout of independent

³⁵ Carlin and Hellwig's (2020) recent study on Latin America addresses the conditional effects of "neoliberal reforms" on economic voting but CBI is not included in their theoretical discussion as one of the "reforms". Rather, they focus on the influence of "trade, financial market, tax reform, private sector ownership, and labor markets" and minimum wage.

central banks undermines elected officials' grip of the economy, the reward and punishment mechanisms of economic voting is expected to be weakened.

The CBI literature has offered ample evidence that independent central banks have substantially limited elected governments' room to maneuver in the economy. In this section, I will focus on how CBI constrains governments' policy authority and thus blurs the line of responsibility for policy outcomes in three macroeconomic policy areas: monetary, fiscal, and exchange rate policy. First, CBI implies that elected governments lose their ownership of monetary policy which is a key device to manipulate important economic outcomes, including unemployment and economic growth. These outcomes are also exactly the macroeconomic variables which the economic voting literature has found to be crucial in determining electoral outcomes. When CBI is not institutionally established and thus central banks act as if they were merely a subdivision of a finance ministry, monetary policy is set to achieve the economic outcomes which elected governments intend to achieve. Under this circumstance, where it appears that elected governments have full control over the macroeconomic policy tool, knowing who to blame when the overall economic conditions turn out to be negative would be clear to voters.

Under the condition of CBI, however, central banks conduct autonomous monetary policy strictly following their pre-determined legal mandate which is to keep price stability rather than complying with the governments' specific preference toward the macroeconomy. It naturally follows, then, that the macroeconomic indicators (e.g. unemployment, and economic growth) which are strongly determined by monetary policy will reflect the banks' preference, not that of the elected governments. The CBI literature has empirically demonstrated that CBI can effectively prevent elected governments from intervening in monetary policy and, as a result that central banks can shape the macroeconomic outcomes in accordance with their exclusive preference for low inflation. For example, Bodea and Hick (2015) indicate that the direction of monetary policy in

countries with CBI systematically differs from that of those without it. Their empirical analysis shows that the growth rate of the money supply tends to be lower in countries whose central banks enjoy a high level of CBI. This finding implies that independent central banks generally prioritize the goal of keeping down inflation over growth or employment and thus tend to conduct a more restrictive monetary policy than elected governments would have desired.

This conservative monetary policy by independent central banks often results in macroeconomic outcomes which elected governments did not intend. Particularly, even though restrictive monetary policy can ensure price stability, the policy should sometimes trade off low inflation against other important economic goals, such as higher growth and more employment, on which politicians in governments would usually put more weight. For instance, Rogoff (1985) argues that "it is not optimal to appoint a central banker whose only concern is low and stable inflation" since its exclusive emphasis on price stability comes at the cost of central banks' insufficient ability to respond to economic disturbances including rising unemployment or recessions. Rodrik (2018) also suggests that independent central banks that exclusively focus on low inflation generate a deflationary bias which usually conflicts with economic growth. Regarding deflation bias under CBI, Stanley Fischer (1994, 293) also wrote:

"An important reason to expose central bankers to elected officials is that, just as the latter may have an inflationary bias, the former may easily develop a deflationary bias. Shielded as they are from public opinion, cocooned within an anti-inflationary temple, central bankers can all too easily deny... that cyclical unemployment can be reduced by easing monetary policy."

Empirically, though the effects of CBI on economic growth or employment levels show mixed evidence on the whole, several studies clearly show that the delegation of monetary policy to conservative central banks is quite costly in terms of those economic performances since these

banks tend to deepen recessions (Debelle and Fischer 1994) or generate a higher sacrifice ratio (Hall and Franzese 1998; Iversen 1998, 1999; Posen 1995, Posen 1998).³⁶ I suggest that this considerable influence of CBI on the economy substantially complicates for voters the problem of exactly who is responsible for fluctuations of economic outcomes and thus weakens the accountability of elected governments for those outcomes during elections.

Second, CBI can put strong restraints on fiscal policy, which also plays a critical role in management of the economy. Fiscal policy has been considered an effective tool to reduce the economic fluctuations arising from the business cycle. For example, when the economy's aggregate output is significantly lower than its potential output, thereby creating a recessionary gap, governments can boost output by conducting expansionary fiscal policy. Fiscal expansion, which usually takes the form of government purchases of goods and services, tax cuts, or government transfers, can help raise growth and employment levels by increasing aggregate demand when other components of the demand such as private consumption and investment are too weak. The experience of the recent Great Recession clearly proved that fiscal policy is essential in stimulating the depressed economy, even though the degree of fiscal expansion in most countries at the time was still considered insufficient due to their already high budget deficits. The fiscal stimulus package in the U.S and the Euro area during the recession, for example, is estimated to have increased the real GDP growth by up to 1.7% annually, which would have not occurred if it were not for that fiscal policy (Coenen, Straub, and Traband 2012; Furman, Stevenson, and Stock 2014).

³⁶ For more evidence on the negative effects of CBI on economic growth and employment, see Cornwall and Cornwall (1998), Fischer (1994), Soskice and Iversen 2000.

Authority of fiscal policy generally belongs to elected politicians and is evidently beyond the unelected central bankers' mandate. Yet prominent studies of CBI argue that independent central banks can significantly constrain the elected governments' fiscal policy (Bodea and Higashijima 2017; Cusack 2001; Neyapti 2003; Sargent and Wallace 1981; Treisman 2000). In particular, those studies suggest that the banks can impose fiscal discipline on governments. Because fiscal deficits can put pressure on central banks to accommodate those deficits through running a printing press, thereby increasing the money supply and thus inflation, independent central banks with the primary objective of price stability have an incentive to enforce governments to balance their budget. According to these studies, when fiscal balance seems to deteriorate due to elected governments' expansionary policy, the banks often actively attempt to impose fiscal discipline by threatening to raise interest rates, thereby elevating governments' borrowing costs. Using this countervailing monetary policy, independent central banks, especially in democratic countries, were found to be able to effectively limit governments' fiscal activities.

Recent anecdotal evidence also shows that central bankers can publicly intervene in the discussion of fiscal policy and pressure governments to reflect banks' policy preferences. For instance, Mario Draghi, then head of the ECB, asserted that Eurozone countries needed "fiscal adjustment" when those countries were still suffering from the recession brought about by the global financial crisis.³⁷ More recently, Jerome Powell, the chairman of the Federal Reserve, also openly warned that the current level of fiscal deficit was not "sustainable" and urged the U.S

³⁷ Brian Blackstone. "ECB Chief Defends Austerity Measures," *Wall Street Journal*, December 17 2012.

Congress to reduce the deficits.³⁸ I expect that when the authority of fiscal policy, which is at the core of democratic politics, is undermined by the unelected technocrats in the central banks as such, elected officials can more easily shirk their responsibility for the performance of the economy.

Finally, exchange rate policy is another pillar of macroeconomic instruments which elected governments can rely on to shape the condition of the national economy in the way that they prefer. Yet an autonomous implementation of the policy can again be interrupted by independent central banks' monetary policy. That is, even if elected governments have a particular preference on exchange rate policy regarding either the level or flexibility of exchange rates, the outcome of the policy can significantly depart from that preference when independent central banks have a different exchange rate policy preference which conflicts with that of the governments.

As the former Federal Reserve chair Paul Volcker once said, the exchange rate is the most important price in the whole economy because it affects the relative prices of goods and services among countries and thus can determine flows of international investments and trades. In open economies in which such international transactions accounts for a high proportion of economic output, the economic fortune of a country critically depends on fluctuations of exchange rates. A significant body of empirical studies has shown this important link between exchange rates and macroeconomic performances. For instance, Dollar (1992), Bosworth et al (1995), and Belke and Kaas (2004) suggest that volatile real exchange rates negatively affect economic growth and employment while Galindo et al (2006), and Rodrik (2008) show that undervalued currency is positively associated with such macroeconomic outcomes.

³⁸ Christopher Rugaber. "Powell urges Congress to tackle growing budget deficit," *AP news*, November 14 2019.

Due to these important impacts of exchange rates, governments have actively intervened in exchange rate markets to manipulate the level and degree of flexibility of the exchange rates to attain their preferred economic goals (Calvo and Reinhart 2002, Jager 2016, Plumper and Neumayer 2011, Sattler and Walter 2010). Yet since an exchange rate is essentially a function of the quantity of money in circulation and the domestic interest rate, both of which are exclusively controlled by central banks, in addition to the level of foreign reserve of which governments generally take control, central banks' monetary policy inevitably interacts with governments' exchange rate policy (Krugman, Obstfeld, and Melitz 2017). Therefore, due to divergent policy objectives between conservative central banks and elected governments, a conflict in exchange rate policy can arise, which can make it difficult for governments to achieve the level of exchange rate that they consider the most optimal. Bearce's study (2008) on the effects of CBI on exchange rate stability, for example, clearly shows this tension between independent central banks whose sole objective is low inflation and elected governments which have to achieve a delicate balance among the goals of economic growth, full employment, and price stability. Bearce explains that although under a fixed exchange rate regime, central banks must accommodate fiscal expansion, aiming to boost economic growth through a similarly expansive monetary policy to stabilize exchange rates, 'independent' central banks tend to refuse to do so since such loose monetary policy can lead to higher inflation. When high interest rates caused by an expansive fiscal policy cannot be lowered due to the banks' opposition to this accommodation, high interest rates can first weaken the positive effects of a fiscal stimulus on economic growth because they will crowd out private consumption and investments. Furthermore, high interest rates can also negatively affect exchange rate stability which governments strive to maintain because they usually cause sudden inward flows of foreign capital which can disrupt foreign exchange markets. Given these important potential impacts that independent central banks can have on exchange rate policy, I argue that

CBI can blur the line of responsibility in exchange rate policy as well by intruding into the policy area of which elected governments have traditionally taken charge and that this constitutes another important context where voters' ability to hold the governments accountable for economic policy and its outcomes diminish.

Despite the aforementioned evidence of CBI's robust constraints on government's macroeconomic policy, several important studies point out that central banks, regardless of their status of legal independence, can still be pressured by government to reflect its political needs for higher employment and growth in monetary policy at the expense of price stability (Binder 2018; Lohmann 1992). Lohmann suggests that since government can always override central banks by amending laws which define their independence, at some costs, it would be optimal for the banks to accommodate the government's preference, particularly when there are extraordinary economic shocks such as financial crises or deep recessions. Moreover, relying on country reports by the Economist Intelligence Unit (EIU) and Business Monitor International (BMI), Binder (2018) empirically shows that no matter how independent they are legally, some central banks faced political pressure from their governments. Yet I do not think that this limitation of CBI can significantly challenge my argument that voters, on average, would recognize the validity of legally defined CBI and its substantive influence on the economy and thus assign less than full responsibility for economic performances to the elected government. First, independent central banks' compliance with the government should be considered as more the exception than the rule. Lohmann (1992) specifically points out that independent central banks can become flexible under "extreme situations" which are by definition far from being common or average conditions.

Furthermore, according to Binder (2018), only 3.8%³⁹ of the 118 central banks in her sample were found to “succumb” to government’s pressure, which I consider a fairly small percentage. Thus, I expect that the effects of circumstances where CBI becomes more flexible or suffers from political pressure will be minimal.

Next, even when extraordinary circumstances lead central banks to reflect governments’ preference in monetary policy, it is more likely that central banks will do so voluntarily rather than being coerced by governments’ overt demand visible to the public because as Lohmann suggests, being flexible in those situations is the optimal choice for the banks. Moreover, the open political pressure followed by the central banks’ capitulation to it will be far more costly for both governments and central banks. Those central banks will suffer from reputation costs due to the reneging on the commitment to their original mandate and their independence in the future will be questioned by the market. More importantly, governments are also likely to face large audience costs by reneging on its commitment to CBI which is legally protected. The existing literature suggests that governments’ failure to commit, for example, to a fixed exchange rate regime incurs substantial political costs, especially before elections (Bernhard 1998; Edwards 1996; and Collins 1996). I expect that the political costs of the failure to respect legal CBI will also be significant. Therefore, even when central banks’ compliance occurs, it is not very likely to be visible to the public, and, accordingly, will not significantly alter how voters perceive CBI and its impacts on the economy.

³⁹ Binder found that approximately 10% of 118 central banks faced political pressure in an average year. Among the 10%, she found that around 38% of them succumbed to political pressure while the rest resisted it.

Based on the theoretical discussion in this section, I posit the following hypotheses:

H1: *The higher the CBI, the less the negative (positive) effects of economic outcomes on voting for an incumbent.*

H2: *The higher the CBI, the less the positive (or negative) effects of a voter's evaluation of the overall economy on voting for an incumbent.*

Here, I expect symmetric effects of CBI on economic voting, which means that both positive and negative influence of the economic outcomes will be reduced under the condition of high CBI. One could argue that by delegating monetary policy to central banks, governments would attempt to shift blames for the negative outcomes to the banks while it would still take credits for the positive ones, which implies the asymmetric effects of CBI (Kane 1980). I am skeptical of this argument, however, since even if governments would behave opportunistically as the above counter-argument suggests, how voters would respond to it is a different matter. If citizens (whether they are voters or market agents) are rational enough to anticipate and take into account the time-inconsistent behavior of governments in their economic behaviors, which is the fundamental assumption on which the CBI literature is built, I expect that they would also be sophisticated enough not to be readily manipulated by governments' claim that it is only responsible for good economic outcomes.

3.4 Empirical Analysis

3.4.1 Data

3.4.1.1 Dependent variable

This chapter draws on election data from the Comparative Study of Electoral Systems (CSES) survey (Modules 1, 2, 3, and 4) and my sample includes all elections for 'national office' in the data (presidential elections for presidential and semi-presidential systems and parliamentary

elections for parliamentary and semi-parliamentary systems)⁴⁰. Given the data availability of other independent variables which are used in the analysis, the sample consists of 108 elections in 38 countries from 1996 to 2016 (107,947 respondents). The dependent variable is voting for or against an incumbent government party. It is coded as 1 if a respondent voted for the head of an incumbent government, a candidate from his or her party, or an incumbent government party itself and otherwise 0.⁴¹

3.4.1.2 Independent variables

To test the conditional effects of CBI on economic voting, I use several interaction variables that combine the measure of CBI on the one hand and two macroeconomic variables - unemployment and real GDP growth⁴² (*CBI*Unemployment* and *CBI* Growth*) and voters' subjective evaluation of the economy on the other (*CBI*Economic Perception*). Only Module 1 and 4 of the CESE contain an *Economic Perception* variable. It is measured by a survey question in those modules which asks "Would you say that over the past twelve months, the state of the economy in [country] has gotten better, stayed about the same, or gotten worse?". The value of this *Economic Perception* variable ranges from 1 to 3. The higher the value, the more positive the respondent's assessment.

As the measure of CBI, I utilize the data made by Bodea and Hicks (2015). Based on the coding methods originally introduced by Cukierman, Webb, and Neyapti (1992), they updated the CBI data by increasing their coverage in terms of both observed countries and periods. Also, instead of using decade-average data, they created the annual CBI data. Their CBI scores are constructed by the weighted average of the independence of the head of a central bank (0.2) and

⁴⁰ I am grateful to Ju Yeon Park for generously sharing her study's replication dataset (Park 2019).

⁴¹ The vote cast for other parties that constitute a government coalition is coded as 0.

⁴² Unemployment data was retrieved from the World Bank and real GDP growth data from the Penn World Table.

policy formation (0.15), clarity of policy objective (0.15), and limitations on lending to the government (0.5). The scores range from 0 to 1 and indicate that the higher the scores, the higher the CBI. For a robustness check, I also use the CBI data created by Garriga (2016).

3.4.1.3 Control variables

I also include both individual-level and national-level control variables to isolate the effects of CBI on economic voting. First, all models include control variables to account for respondents' gender (*Female*), *Age*, *Education*, *Income* and partisan affiliation with the party of an incumbent government (*Party ID*). Moreover, at the aggregate level, an incumbent party's vote share in a previous election is included to control for the persistent effect of the governing party's popularity (*Vote share*). Finally, in order to control for the endogeneity problem that might occur because of potential correlations between CBI and other factors, which can attenuate economic voting, as suggested by the literature on clarity of responsibility (Anderson 2006; Hellwig and Samuels 2007; Powell and Whitten 1993), I added more national-level control variables in separate models. First, to rule out the effects of political structures which decentralize policy authority of governments and thus might weaken governments' responsibility for economic performances, I include '*Unified government*', which measures whether an incumbent governing party controls all legislatures, '*Number of other government parties*', '*State government*', which measures degrees of multilevel governance in a country. Additionally, because it is possible that trade and financial liberalization can have correlations with both CBI (Bodea and Hicks 2015; Polillo and Guillen 2005) and the magnitude of economic voting (Hellwig and Samuels 2007), I also included the variables *Trade* and *Capital openness* in the models. All the independent and control variables are lagged by one year.

3.4.2 Econometrics models

Given that the value of the dependent variable is 0 or 1, I employ logistic regressions to estimate the conditioning effects of CBI on economic voting. I use country-fixed effects to control for unobserved country heterogeneity and year-fixed effects to account for year-specific shocks. Furthermore, as the robustness check, I also estimate multilevel logistic regressions as a means to prevent potential underestimation of standard errors derived from the intra-country dependence of the observations in my hierarchical data structure and to allow random intercepts at both the individual- and country-level.⁴³

3.4.3 Results and discussion

The results from Table 3-1 show that CBI significantly moderates the effects of macroeconomic variables (unemployment and economic growth) and voters' subjective assessment of the economy (economic perception) on voting for incumbents.⁴⁴ Both the positive influences of economic growth and voters' positive assessment of the economic conditions and the negative impacts of unemployment on voting for incumbent governments are found to diminish as CBI increases. All of the interaction terms are statistically significant and have hypothesized signs, except economic perception. Yet Figure 3-3 shows that the CBI's impact on the marginal influence of economic perception is also statistically significant and has the expected downward slope.

Table 3-2 summarizes the magnitudes of CBI's conditioning influence on each variable's marginal effect on voting for incumbents, which are illustrated in Figure 3-1, 3-2, and 3-3.

⁴³ Angrist and Pischke 2008; Steenbergen and Jones 2002.

⁴⁴ I included the same models but without interaction terms in Table 3-9 in the appendix to show the original effects of these macroeconomic variables and the voters' economic assessment.

According to Table 3-2, a change in CBI from one standard deviation below its average value to one standard above it decreases the negative influence of unemployment on voting for incumbents by the substantial amount of 68%, while the same change causes a 46% decrease in the positive effect of economic growth. The same shift in CBI reduces the positive impacts of voters' positive assessment of the economy by 67%. Taken together, these outcomes strongly suggest that democratically elected governments' accountability for the economy to voters weakens when independent central banks constrain the governments' capacity to manage it.

In Tables 3-3 and 3-4, I included a list of the economic variables (*Trade* and *Capital openness*) as well as political ones (*Unified government*, *Number of other government parties*, and *State government*), which the literature of clarity of responsibility has considered crucial in shaping the contexts of economic voting. The conditioning effects of CBI stays significant in all these models. The outcomes are found to be robust to the use of multilevel models (Table 3-5) and the use of alternative CBI data (Table 3-6 in appendix). Finally, in order to control for the distorting effects of outliers or influential observations, I removed observations whose CBI values are below the 5th percentile or above the 95th percentile and whose Pregibon's dbeta values are above the 90th percentile. The conditional effects of CBI still remained significant in all the models (Table 3-7 and 3-8 in Appendix).

Table 3-1: The Effects of CBI on Economic Voting

VARIABLES	Model 1	Model 2	Model 3
CBI	-2.330*** (0.224)	0.576*** (0.183)	-1.074*** (0.320)
Unemployment	-0.286*** (0.0179)		
CBI*Unemployment	0.262*** (0.0210)		
Growth		13.82*** (1.303)	
CBI*Growth		-9.635*** (1.751)	
Economic perception			0.547*** (0.0499)
CBI*Economic perception			-0.0849 (0.0821)
Party ID	3.628*** (0.0246)	3.622*** (0.0245)	3.628*** (0.0376)
Income	0.00780 (0.00639)	0.00738 (0.00639)	0.00802 (0.00989)
Education	-0.0665*** (0.00530)	-0.0650*** (0.00530)	-0.0730*** (0.00833)
Age	-0.0166*** (0.00604)	-0.0146** (0.00604)	-0.0187** (0.00949)
Female	0.105*** (0.0164)	0.105*** (0.0164)	0.145*** (0.0257)
Vote share	-0.00954*** (0.00188)	-0.00383** (0.00188)	0.0317*** (0.00436)
Constant	1.720*** (0.175)	-1.193*** (0.139)	-2.407*** (0.277)
Election	108	108	44
Observations	107,947	107,947	45,740
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.300	0.300	0.331

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 3-1: CBI and Marginal Effects of Unemployment Rate

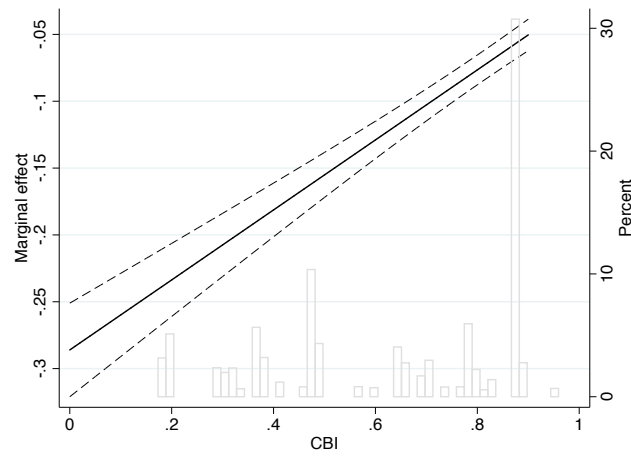


Figure 3-2: CBI and Marginal Effects of Economic Growth Rate

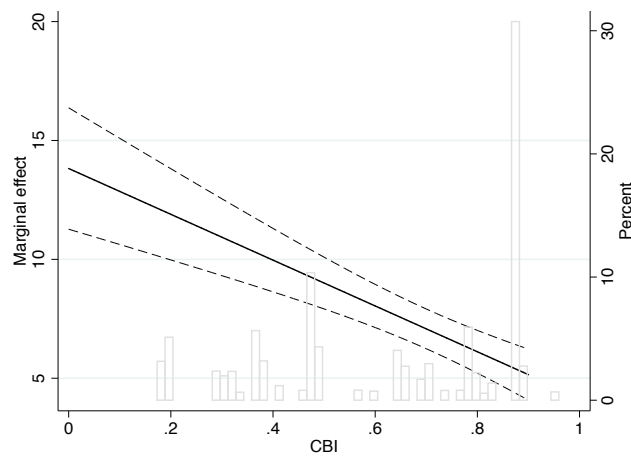


Figure 3-3: CBI and Marginal Effects of Economic Perception

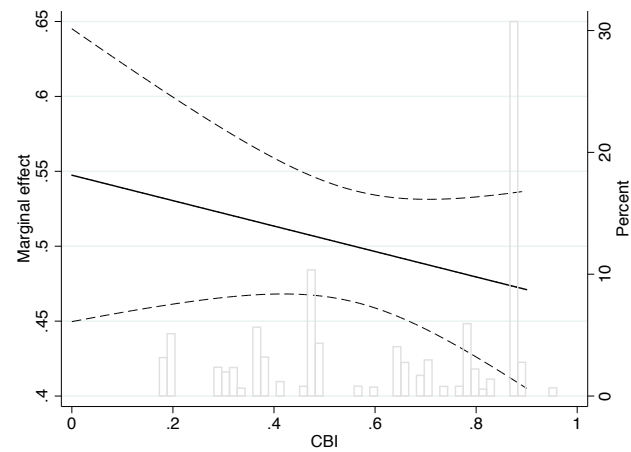


Table 3-2: Marginal Effects of Economic Voting

	Unemployment	Growth	Perception
- σ	-0.19	10.13	0.51
Mean CBI	-0.12	7.80	0.49
+ σ	-0.06	5.46	0.17

Table 3-3: The Effects of CBI on Economic Voting with more Political Control Variables

VARIABLES	Model 4	Model 5	Model 6
CBI	-2.340*** (0.231)	0.269 (0.190)	-1.990*** (0.419)
Unemployment	-0.271*** (0.0179)		
CBI*Unemployment	0.243*** (0.0211)		
Growth		12.32*** (1.308)	
CBI*Growth		-9.128*** (1.754)	
Economic perception			0.573*** (0.0504)
CBI*Economic perception			-0.104 (0.0833)
Party ID	3.626*** (0.0247)	3.619*** (0.0247)	3.644*** (0.0381)
Income	0.00376 (0.00648)	0.00354 (0.00647)	0.00587 (0.0101)
Education	-0.0690*** (0.00539)	-0.0675*** (0.00538)	-0.0782*** (0.00851)
Age	-0.0170*** (0.00613)	-0.0151** (0.00613)	-0.0235** (0.00966)
Female	0.105*** (0.0167)	0.104*** (0.0166)	0.146*** (0.0262)
Vote share	-0.000887 (0.00197)	0.00343* (0.00197)	0.0544*** (0.00578)
Unified government	-0.583*** (0.0369)	-0.557*** (0.0370)	-0.371*** (0.0923)
Number of other gov parties	0.232*** (0.0228)	0.195*** (0.0233)	0.772*** (0.0940)
State Government	0.963*** (0.101)	1.648*** (0.0960)	1.078*** (0.154)
Constant	-0.157 (0.265)	-4.185*** (0.203)	-4.941*** (0.323)
Election	102	102	41
Observations	105,322	105,322	44,380
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.304	0.304	0.337

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-4: The Effects of CBI on Economic Voting with Globalization Control Variables

VARIABLES	Model 7	Model 8	Model 9
CBI	-2.436*** (0.229)	0.193 (0.191)	-3.022*** (0.455)
Unemployment	-0.271*** (0.0180)		
CBI*Unemployment	0.249*** (0.0212)		
Growth		11.13*** (1.336)	
CBI*Growth		-7.356*** (1.792)	
Economic perception			0.575*** (0.0502)
CBI*Economic perception			-0.118 (0.0825)
Party ID	3.628*** (0.0246)	3.623*** (0.0245)	3.652*** (0.0379)
Income	0.00769 (0.00643)	0.00737 (0.00642)	0.00485 (0.0100)
Education	-0.0681*** (0.00533)	-0.0669*** (0.00532)	-0.0759*** (0.00844)
Age	-0.0162*** (0.00608)	-0.0148** (0.00608)	-0.0204** (0.00961)
Female	0.107*** (0.0165)	0.107*** (0.0165)	0.148*** (0.0261)
Vote share	-0.00334* (0.00199)	0.000393 (0.00196)	0.0269*** (0.00593)
Trade	0.00287* (0.00171)	0.000958 (0.00168)	0.0121** (0.00503)
Capital openness	0.293*** (0.0313)	0.258*** (0.0315)	0.679*** (0.0695)
Constant	0.692*** (0.193)	-1.773*** (0.150)	-3.011*** (0.353)
Elections	107	107	43
Observations	107,241	107,241	45,059
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.302	0.302	0.338

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-5: Multilevel Models: The Effects of CBI on Economic Voting

VARIABLES	Model 10	Model 11	Model 12
CBI	-0.810*** (0.159)	0.577*** (0.125)	1.316*** (0.221)
Unemployment	-0.121*** (0.0129)		
CBI*Unemployment	0.0959*** (0.0158)		
Growth		4.851*** (1.024)	
CBI*Growth		-1.062 (1.335)	
Economic perception			0.543*** (0.0486)
CBI*Economic perception			-0.0971 (0.0791)
Party ID	3.598*** (0.0243)	3.596*** (0.0243)	3.607*** (0.0374)
Income	0.00874 (0.00634)	0.00800 (0.00633)	0.00849 (0.00985)
Education	-0.0727*** (0.00522)	-0.0699*** (0.00521)	-0.0725*** (0.00816)
Age	-0.0185*** (0.00599)	-0.0132** (0.00598)	-0.00729 (0.00936)
Female	0.106*** (0.0163)	0.106*** (0.0163)	0.149*** (0.0257)
Vote share	-0.00189 (0.00161)	0.000429 (0.00159)	0.0274*** (0.00324)
Constant	-0.0483 (0.175)	-1.760*** (0.140)	-3.916*** (0.213)
Elections	108	108	44
Observations	107,947	107,947	45,740
Number of groups	38	38	30

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

3.5 Conclusion

Alan Blinder (1996) once suggested that the Fed has more power on how many people are hired or laid off and how many businesses succeed and fail in the U.S. than the President and Berman and Mcnamara (1999) wrote that the ECB is "more powerful than most national governments and responsible for helping to set the economic and political course for 280 million people and almost a quarter of the global economy". The literature of CBI has successfully substantiated that the above statements have little exaggeration. This body of literature has offered a quite clear picture of governments that are tightly constrained by independent central banks in the areas of not only monetary policy but also fiscal and exchange rate policy, all of which has critical impacts on citizens' economic welfare. The literature has not sufficiently clarified, however, what this weakened democratic rule over the economy implies for electoral democracy. How would voters respond, for instance, to the changed political contexts where unelected bankers take over the substantial level of controls on their economic fate from the representative governments which they democratically elected? I suggest that because the existing literature has overly focused on the supply-side of CBI's implication on economic policy, it has largely ignored how CBI affects its demand-side.

The key findings in this chapter indicate that, as an institutionalized form of monetary technocracy, CBI discourages citizens from evaluating their representative governments based on the fluctuating fortunes of their jobs and businesses in elections, even though these are the very conditions which may most fundamentally affect their lives. Specifically, the empirical evidence of this chapter showed that both the negative influences of unemployment and the positive impacts of economic growth on voting for incumbent governments are significantly attenuated. Furthermore, it also showed that the effects of the voters' subjective assessment of the state of the economy on voting decisions are reduced. By doing so, this chapter demonstrated what the

emergence of the CBI implies for electoral democracy: weakened electoral accountability for the economy followed by weakened democratic controls over it. As the demand-side explanation of CBI's implication on economic policy, the finding here that CBI results in citizens putting less voting weight on their economic well-being seem to resonate with Hellwig's argument in his electoral study of clarity of responsibility that "mass publics tend to demand less from governments when they perceive them as constrained" (Hellwig 2014; Kosmidis 2018, 519).

Building on the findings in this chapter, I expect that more meaningful studies on the relationship between central banks and democratic accountability can be conducted. First, my research can be extended to examine how economic crises can again condition the mitigating effects of CBI on economic voting. While experiencing a series of recent economic crises, we observed that nothing brought more public attention to central bankers than economic crises. In particular, when monetary policy often emerges as "the only stabilization tool in town" during crises due to tight fiscal constraints imposed on many governments by high borrowing costs in unstable financial markets or binding fiscal rules, the relative role of independent central banks in coping with the crises may appear more prominent than that of elected governments (Buiter 2014, 270). Therefore, as the public expects more from these unelected bankers than the representative governments, we might speculate that CBI's erosive effects on democratic accountability can be intensified in the midst of economic crises. Second, it would be useful for future research to also explore the impact of another important aspect of central bank reform - increasing transparency - on voters' ability to monitor and electorally evaluate economic conditions. Given that the transparency reform, in direct contrast to CBI reform, has been considered an effective way to democratically control central banks and their policymaking, we might expect it to have different impacts on economic voting.

APPENDIX

Table 3-6: Models with Garriga's CBI data

VARIABLES	Model 13	Model 14	Model 15
CBI	-1.003*** (0.164)	1.471*** (0.169)	2.308*** (0.345)
Unemployment	-0.334*** (0.0204)		
CBI*Unemployment	0.313*** (0.0243)		
Growth		12.80*** (1.274)	
CBI*Growth		-8.896*** (1.771)	
Economic perception			0.561*** (0.0526)
CBI*Economic perception			-0.0950 (0.0927)
Party ID	3.618*** (0.0247)	3.609*** (0.0246)	3.589*** (0.0396)
Income	0.0130** (0.00653)	0.0142** (0.00652)	0.0213** (0.0106)
Education	-0.0655*** (0.00538)	-0.0646*** (0.00538)	-0.0651*** (0.00891)
Age	-0.0145** (0.00617)	-0.0125** (0.00617)	-0.0145 (0.0102)
Female	0.104*** (0.0168)	0.105*** (0.0168)	0.181*** (0.0276)
Vote share	-0.0152*** (0.00202)	-0.0109*** (0.00199)	-0.00871 (0.00590)
Constant	1.669*** (0.167)	-1.254*** (0.131)	-2.319*** (0.297)
Elections	102	102	36
Observations	104,283	104,283	39,938
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.299	0.299	0.325

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-7: Models without Outliers

VARIABLES	Model 18	Model 19	Model 20
CBI	-2.146*** (0.254)	2.214*** (0.234)	-2.122*** (0.642)
Unemployment	-0.245*** (0.0199)		
CBI*Unemployment	0.210*** (0.0256)		
Growth		34.10*** (2.055)	
CBI*Growth		-42.97*** (2.962)	
Economic perception			0.569*** (0.0537)
CBI*Economic perception			-0.113 (0.0898)
Party ID	3.626*** (0.0257)	3.625*** (0.0256)	3.663*** (0.0393)
Income	0.0109 (0.00675)	0.0105 (0.00675)	0.00280 (0.0103)
Education	-0.0619*** (0.00560)	-0.0580*** (0.00560)	-0.0710*** (0.00871)
Age	-0.0166*** (0.00639)	-0.0144** (0.00640)	-0.0150 (0.00994)
Female	0.106*** (0.0174)	0.106*** (0.0174)	0.149*** (0.0268)
Vote share	-0.0179*** (0.00220)	0.00762*** (0.00216)	0.0211* (0.0110)
Constant	1.811*** (0.208)	-2.071*** (0.176)	-1.338* (0.746)
Elections	96	96	41
Observations	96,778	96,778	42,664
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.303	0.303	0.336

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-8: Models without Influential Observations

VARIABLES	Model 21	Model 22	Model 23
CBI	-2.236*** (0.242)	0.593*** (0.197)	-2.952 (3.543)
Unemployment	-0.292*** (0.0193)		
CBI*Unemployment	0.257*** (0.0227)		
Growth		13.16*** (1.416)	
CBI*Growth		-7.896*** (1.910)	
Economic perception			1.192*** (0.308)
CBI*Economic perception			-0.488 (0.523)
Party ID	3.770*** (0.0259)	3.767*** (0.0258)	6.535*** (0.336)
Income	0.0148** (0.00692)	0.0152** (0.00692)	0.0381 (0.0565)
Education	-0.0677*** (0.00562)	-0.0661*** (0.00562)	-0.159*** (0.0508)
Age	-0.0131** (0.00655)	-0.0118* (0.00655)	-0.0546 (0.0554)
Female	0.0921*** (0.0178)	0.0952*** (0.0178)	0.218 (0.143)
		-	
Vote share	-0.0110*** (0.00208)	0.00585*** (0.00207)	0.0580 (0.0515)
Constant	1.680*** (0.189)	-1.226*** (0.151)	-3.306* (1.839)
Elections	108	108	39
Observations	97,145	97,152	4,453
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.332	0.332	0.758

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-9: Models without Interaction Terms

VARIABLES	Model 24	Model 25	Model 26
Unemployment	-0.0757*** (0.00537)		
Growth		5.882*** (0.370)	
Economic perception			0.515*** (0.0185)
Party ID	3.652*** (0.0237)	3.650*** (0.0237)	3.623*** (0.0368)
Income	0.00629 (0.00620)	0.00819 (0.00620)	0.00957 (0.00959)
Education	-0.0600*** (0.00512)	-0.0587*** (0.00512)	-0.0632*** (0.00805)
Age	-0.0175*** (0.00586)	-0.0148** (0.00586)	-0.0164* (0.00918)
Female	0.0993*** (0.0160)	0.0992*** (0.0160)	0.156*** (0.0250)
Vote share	- 0.00870*** (0.00180)	-0.00441** (0.00179)	0.0312*** (0.00436)
Constant	0.119 (0.113)	-0.786*** (0.104)	-3.009*** (0.229)
Elections	117	117	48
Observations	115,608	115,608	48,772
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R2	0.303	0.303	0.330

Standard errors in
parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3-10: Sample countries and elections

Country	Respondents
Albania	816
Australia	6,928
Austria	1,340
Belgium	1,646
Brazil	5,352
Bulgaria	1,447
Canada	4,625
Chile	2,651
Croatia	634
Denmark	4,044
Estonia	606
Finland	3,624
France	2,131
Germany	7,976
Greece	630
Hungary	1,762
Ireland	3,081
Israel	2,095
Italy	328
Japan	1,877
Mexico	2,821
Netherlands	6,655
New Zealand	7,019
Norway	7,359
Philippines	1,732
Poland	4,345
Portugal	2,850
Romania	1,286
Slovak Republic	890
Slovenia	1,692
South Africa	454
Spain	2,474
Sweden	3,548
Turkey	1,509
United Kingdom	3,512
United States	4,337
Uruguay	884

Elections	Respondents	Elections	Respondents	Elections	Respondents
ALB 2005	816	FIN 2011	918	NZL 2008	735
AUS 1996	1,457	FIN 2015	933	NZL 2011	986
AUS 2004	1,345	FRA 2002	594	NZL 2014	732
AUS 2007	1,121	FRA 2012	1,537	PHL 2004	853
AUS 2013	3,005	GBR 1997	2,004	PHL 2010	879
AUT 2008	713	GBR 2005	532	POL 1997	954
AUT 2013	627	GBR 2015	976	POL 2001	769
BELF1999	1,646	GRC 2009	630	POL 2005	811
BGR 2001	1,037	HRV 2007	634	POL 2007	1,014
BGR 2014	410	HUN 1998	923	POL 2011	797
BRA 2002	1,612	HUN 2002	839	PRT 2002	511
BRA 2006	405	IRL 2002	1,624	PRT 2005	1,419
BRA 2010	1,721	IRL 2007	521	PRT 2009	486
BRA 2014	1,614	IRL 2011	936	PRT 2015	434
CAN 1997	1,304	ISL 1999	987	ROU 1996	803
CAN 2004	1,224	ISR 1996	588	ROU 2004	483
CAN 2008	1,476	ISR 2003	504	SVK 2010	563
CAN 2011	621	ISR 2006	444	SVK 2016	327
CHL 1999	865	ISR 2013	559	SVN 1996	706
CHL 2005	867	ITA 2006	328	SVN 2004	299
CHL 2009	919	JPN 1996	729	SVN 2008	328
DEU12002	1,630	JPN 2004	976	SVN 2011	359
DEU22002	656	JPN 2007	172	SWE 1998	873
DEU 1998	1,455	MEX 2000	1,081	SWE 2002	890
DEU 2005	1,689	MEX 2006	1,056	SWE 2006	1,011
DEU 2009	1,319	MEX 2012	684	SWE 2014	774
DEU 2013	1,227	NLD 1998	1,480	TUR 2011	833
DNK 1998	1,563	NLD 2002	1,327	TUR 2015	676
DNK 2001	1,638	NLD 2006	2,022	URY 2009	884
DNK 2007	843	NLD 2010	1,826	USA 1996	1,023
ESP 1996	666	NOR 1997	1,656	USA 2004	738
ESP 2000	642	NOR 2001	1,442	USA 2008	1,393
ESP 2004	614	NOR 2005	1,549	USA 2012	1,183
ESP 2008	552	NOR 2009	1,407	ZAF 2014	454
EST 2011	606	NOR 2013	1,305		
FIN 2003	809	NZL 1996	3,514		
FIN 2007	964	NZL 2002	1,052		

CHAPTER 4 DO FINANCIAL CRISES INCREASE INCOME INEQUALITY?

With

Cristina Bodea

and

Christian Houle

4.1 Introduction

A significant amount of evidence points out that financial crises stoke political upheaval.⁴⁵ In particular, such crises have been shown to reduce support for incumbent politicians and increase electoral volatility (Bartels and Bermeo 2014; Crespo-Tenorio Jensen, Rosas 2014; Echegaray 2005, Keefer 2007; Remmer 1991), increase polarization (Mian, Sufi and Trebbi 2014) or lead to regime breakdown (Pepinsky 2009).⁴⁶ One mechanism contributing to such political upheaval is the rising economic inequality that results from the macroeconomic effects of and political responses to economic crises (Bordo and Meissner 2015; McCarthy, Poole, and Rosenthal 2006; Reinhart and Rogoff 2009; Rosas 2006). Yet the link between economic crises and income inequality lacks firm empirical support. The mixed findings, we argue are due to the literature's failure to address convincingly key threats to inference that afflict this relationship: reverse causality, the slow moving nature of inequality and significant measurement error for both the independent and dependent variables. Our paper reviews the literature, discusses the major threats to causal inference and offers an estimation strategy that credibly deals with the empirical faults we identify in the literature.

⁴⁵ Not surprisingly, politicians have strived to avoid the fallout from financial crises by de facto socializing the response to financial instability (Chwieroth and Walter 2019).

⁴⁶ Some of this reaction is conditional (Bertoa and Wesber 2019, Crespo-Tenorio, Jensen and Rosas 2014).

Financial crises are linked to income inequality through the direct effect of slowed economic growth and rising unemployment on the lower income classes, as well as through an indirect effect that weakens the bargaining power of labor. These effects are compounded by the policy reactions to crises which tend to favor big banks and corporate interests, rather than the broad citizenry and often include austerity measures that disproportionately influence the less well-off. The counterpoint is that financial crises hurt asset values and, thus, may reduce the wealth and income of the rich, who tend to hold the kinds of assets that generate income. On the whole, however, unless there are strong negative wealth effects that influence disproportionately the well-off, the expectation is that financial crises increase income inequality. The past literature, however, fails to identify a robust positive effect going from crises to income inequality. We believe that a key reason for the lack of consistent findings is inattention to the direction of causality, the persistent nature of inequality, and the large measurement error for the key variables involved in the estimation – income inequality and financial crises.

To tackle these major data pathologies and the estimation issues they entail we use OLS models with decade aggregated data, the lagged dependent variable and one period lag (one decade) on all the independent variables. To address countries' unmeasured heterogeneity, we also use General Method of Moments estimation. We only revert to annual data after showing an effect running from crises to income inequality and use Error Correction Models with yearly data to differentiate short-run from long-run effects. Using our methodology we find that currency, banking, inflation and external as well as domestic debt crises increase inequality. We also show that, in most cases, the effect of crises on inequality operates in the long-run. However, stock market crises – the kinds of crises that have major negative effects on asset values, and thus the wealth and income of the rich - do not increase inequality. If anything, they decrease it, although the effect is not statistically significant.

Our contribution is to identify a robust effect linking a wide variety of financial crises to income inequality. Our paper discusses the threats to inference ignored in past work and uses a research design that tackles those important methodological concerns. The empirical results suggest a novel mechanism – worsening income inequality - through which economic crises can have adverse political effects. They also suggest that the effects of crises play out in the long term and the political consequences of a major financial crisis like that of 2007 have yet to be fully realized.

4.2 Crises and Inequality

Crises

Financial crises have a long history and the literature identifies a number of inter-related manifestations (Bordo and Eichengreen 1999, Kindleberger 1987, Reinhart and Rogoff 2009). Of these, *banking crises* usually become apparent when countries experience significant bank runs, bank closures or mergers, or large government interventions to prop-up the banking system (Laeven and Valencia 2018, Reinhart and Rogoff 2009). In the modern era of governments acting as insurers or lenders of last resort, banking crises often have fiscal implications for the government (Reinhart and Rogoff 2009, Bordo and Meissner 2015, Chwioroth and Walter 2019).⁴⁷ Thus *debt*

⁴⁷ Even absent large scale bailouts, Reinhart and Rogoff (2009) show that, largely owing to collapsing revenues, government debt typically rises by about 86 percent in the three years following a systemic financial crisis. This increase in government debt sets the stage for rating downgrades and, in the worst scenario, debt default.

*crises*⁴⁸ – the inability of governments to meet payment dates for principal or interest on what they owe -- can emerge as a consequence of governments bailing out the banks.⁴⁹

Financial crises also emerge from rapid changes to the value of countries' currencies. Historically, such fluctuations in the value of currencies came about through the drastic reduction of precious metal content of coins. In modern times, *currency crises* (or exchange rate crises) manifest themselves when the value of a country's currency falters precipitously, often despite government assurances that the currency will not be allowed to fall. *Inflation crises* – a rapid increase in the rate at which overall prices grow – are also part of financial instability, because, as Reinhart and Rogoff (2009) note, inflation diminishes the value of all debts, de facto being the equivalent of a partial default.⁵⁰ Finally, financial instability can be driven by significant changes in asset prices in the real-estate or the stock market. For example, major *stock market crashes* are likely to generate a slew of bank closures and take-overs and state interventions to support the banking system.

⁴⁸ Debt crises can involve external debt – debt held mostly by foreign creditors and many times, although not necessarily, in a foreign currency. They can also involve domestic debt, which is held mostly in domestic currency by domestic residents.

⁴⁹ Such debt crises – external or domestic – can be the consequence of other combinations of factors, including, for example excessive foreign currency indebtedness, coupled with a fixed exchange rate regime, and currency depreciation in neighboring countries or export competitors.

⁵⁰ Unsurprisingly, because they reflect a loss in the value of a national currency, inflation and currency crises tend to go hand in hand in terms of timing and magnitude.

Economic effects of crises

The conventional wisdom is that the poor suffer to a greater degree in economic crises (Baldacci et al. 2002), even though, as we discuss in the next section, the empirical evidence is mixed. The literature discusses several channels linking crises to an unequal distribution of income.

One of the first effects of financial crises is a slowdown in economic growth and a rise in unemployment. Although reverse causality is major issue for empirical estimation, financial crises are believed to generate significant output losses (Baldacci et al. 2002; Bordo and Meissner 2015; Reinhart and Rogoff 2009).⁵¹ Banking crises and overlapping crises (banking, currency, debt)⁵² are shown to have particularly large effects on economic growth (Bordo and Meissner 2015). Inflation, especially high inflation, and indebtedness also have well documented detrimental effects on output growth (Andres and Hernando 1997; Barro 1995; Easterly and Bruno 1999; Kumar and Woo 2010). Even turbulence in the stock market is shown to reduce growth (Levine and Zervos 1998). These crises-induced recessions usually translate in lost jobs and unemployment has been shown to affect more severely low skill, low income individuals (Hibbs 1987). Moreover, the long term unemployed suffer from declining re-employment wages (Jacobson, LaLonde, and Sullivan 1993; Nichols, Mitchell, and Lindner 2013; Ruhm 1991) and structural unemployment is directly linked to increased income inequality (Mocan 1999).⁵³ Thus, financial crises can be

⁵¹ Ziebarth (2013) and Della'Ariccia et al. (2008) show convincing evidence of a causal link from financial crises to declines in economic growth.

⁵² These are the so called twin (banking and currency) or triple (banking, currency, debt) crises.

⁵³ Related research looks at the incidence of poverty in the aftermath of financial crises. This work finds that currency crises increase poverty (Baldaci et al. 2002, Nikoloski 2011, Rewilak 2018). The effect of banking and debt crises is more ambiguous.

expected to have a direct effect through output losses and unemployment that increases the discrepancy of incomes going to the poor versus the rich.

Compounding the effect of recession, financial crises may reduce labor's bargaining power and contribute to income inequality as workers accept lower wages in order to restore firm profitability. Capital mobility is already reducing the relative share of income going to labor (Jayadev 2007) and crises may aggravate this tendency (Furceri and Loungani 2015, Maarek and Orgiazzi 2013)⁵⁴. Diwan (2001) points to distributional fights between labor and capital during crises times. With capital having a credible threat of exit from a country in crisis, labor often remains hostage. Thus, even when labor is organized, it may agree to wage restraints in order to restore the profitability of firms and avoid the massive layoffs implied by bankruptcies.

On the other hand, other mechanisms may be at work such that some crises disproportionately influence the income of the rich.⁵⁵ In a stock market crash, for instance, significant amounts of wealth can be wiped off (Wolff 2013) and asset losses, in particular on corporate and non-corporate equity, can reduce the income of the well-off.⁵⁶ To the extent that the

⁵⁴ Furceri and Loungani (2015) show that capital account liberalization increases income inequality, especially when liberalization is followed by financial crises (debt, banking and currency crises).

⁵⁵ Jenkins et al. 2013 paints a more balanced view of the effect of recessions on inequality suggesting that the effect depends on the nature of the recessions (effect on employment income versus investment income) and the nature of policy responses which may offset losses in earned employment income.

⁵⁶ Kuhn et al. (2019) show that there are important differences in the assets held by the middle class and the rich in the US. The middle class is invested disproportionately in the real estate market, while the rich predominantly own equity. Thus, different financial crises (stock market crashes versus real-estate busts) and crisis recovery influence the incomes and wealth of the middle class versus the rich. The historic rise in real estate prices that preceded the 2007 crisis explains why, while the US has seen dramatic increases in income inequality, there was no increase in

poor in a society do not own assets that generate income, such crises are then less likely to affect those that are already poor and will disproportionately influence the asset incomes of the wealthy (Baldacci et al. 2002).⁵⁷ This is consistent with Roine et al. (2009)⁵⁸ who find that periods of high economic growth disproportionately increase the income of the very rich, and that banking crises reduce the income of the richest 1%. Such dynamics do not imply that middle class wealth is unaffected by financial crises, especially in developed countries. In fact, in developed countries the rising indebtedness in the household sector and the increasing role of the financial sector in the functioning of domestic economies leave middle class wealth vulnerable to financial meltdowns (Chwioroth and Walter 2019). What is not clear is whether wealth loss from the type of assets that the middle class owns (leveraged real-estate) generates income losses to the same degree as in the case of the rich (Kuhn et al. 2019).

Effects of policy aimed at resolving crises

In addition to the effects of the crises themselves, policy responses can influence the distribution of income. Very directly, Mian et al. (2014) note that in the aftermath of crises different constituencies vie for and receive state support. Of these, they point out, big banks asking for bailouts are well organized and connected, and thus are more likely to access government help in

wealth inequality. The disparity in wealth has only taken off after 2007 when the stock market (and the wealth of the rich) recovered quickly while real estate prices saw only a modest recovery.

⁵⁷ Baldacci et al. (2002) note that the very poor tend to be involved in activities in the informal sector, and are thus less likely to incur revenue losses during crises and downturns in the formal economy. Still, they point out that in recessions, relatively productive workers may join the informal sector driving down earnings in that part of the economy.

⁵⁸ Their data covers 16 countries over the twentieth century.

the form of government guarantees. On the other hand, mortgage holders were equally hurt by the housing market implosion, but because of their large numbers and lack of organization, they were less likely to receive government support.

More broadly, financial crises often elicit a mix of austerity measures, including spending cuts (Blyth 2013), government employee lay-offs (IMF 2000; OECD 2011) and a tightening of domestic monetary policy (Langhammer and Souze 2007). For example, high inflation and currency depreciation are often addressed by raising domestic interest rates. Higher interest rates come at a cost to employment, again reinforcing the direct negative effects of crises on income equality. Similarly, debt crises and the explosion of debt in the aftermath of banking crises are addressed with spending cuts, postponed investment and layoffs, hurting the incomes of the worse off who tend to be on the receiving end of social policy. Directly, Ball et al. (2013) and Woo et al. (2013) show that fiscal consolidation increases income inequality especially though its effect on employment and wages.

Empirical expectation

The sum of the direct and policy-induced effects of crises on inequality suggest that crises should lead to an increased inequality of the distribution of income. This effect should prevail, unless there are large negative wealth effects that disproportionally influence the income of the very rich.

4.3 Past Work and Key Threats to Inference

A large literature investigates the link between the development and liberalization of financial markets and income inequality.⁵⁹ However, until recently, the literature has been relatively

⁵⁹ A separate literature also looks at the effect of financial liberalization on financial instability and crises (Akhter and Daly 2009, Guillaumont Jeanneney and Kpodar 2011).

unconcerned with the potential consequences of financial and economic crises on the distribution of income. In Table 4-1 we summarize the progression in this literature, including their uses of particular measures of income inequality, types of financial crises, and estimation methodology. Before the most recent global financial crisis the limited work on the subject only looked at the effect of the relatively easier to identify currency crises (Galbraith and Lu 1999, Dirwan 2001, Baldacci et al. 2002, Jayadev 2007). This early literature focuses on the effect of currency crises and shows that crises increase income inequality measured as industrial earnings, the share of income going to labor or the Gini coefficient. This early research use annual data and thus fails to consider the very persistent nature of inequality. Also, some of the methods used (t-tests, simple OLS) cannot reliably help identify the effects of crises on income inequality or are invalid if endogeneity is potentially reverse linking inequality to financial crises (difference in difference). A large share of the subsequent literature investigates the effect of the Great Recession that started in 2007 (Jenkins et al 2013, Meyer and Sullivan 2013, Piketty and Saez 2013, Amate-Fortes et al. 2017). These studies show mixed effects. In their descriptive analysis, Piketty and Saez (2013) argue that the effects of financial fragility on inequality (income share of the very rich) appear to differ across countries. Jenkins et al (2013) use household surveys for 16 rich countries for the period 2007-2009, and look at the effect of the Great Recession on wages, employment and capital income. Their conclusion is that, while countries did see some differentiated outcomes,

Table 4-1: Economic Crises and Inequality

Studies	Measures of inequality	Types of crises	Crisis data source	Effects	Sample	Data Frequency	Methods	LDV
Galbraith and Lu 1999	Inequality of industrial earnings (Galbraith and Lu, 1998)	Currency	Kaminsky and Reinhart (1996)	Increase inequality	19 countries 1972-1995 (n=65)	Yearly	T-test	No
Diwan 2001	Labor share (UN national account)	Currency	Own calculation following Frankel and Rose (1995)	Increase inequality	135 countries 1975-1995 (n=2406)	Yearly	OLS	No
Baldacci et al. 2002	Inequality: Gini coefficient (Deininger and Squire, 1998)	Currency	Own calculation following Frankel and Rose (1995)	Increase inequality	65 crisis episodes 1960-1998 (n=62)	Yearly	Difference in difference	No
Jayadev 2007	Labor share (UN national account)	Currency	Own calculation following Frankel and Rose (1995)	Increase inequality	20 countries 1972-1996 (n=289)	5-year average	OLS	No
Atkinson and Morelli 2011	Gini coefficient (Atkinson and Morelli, 2011)	Banking	Combination of Reinhart and Rogoff (2011) & Laeven and Valencia (2013)	Mixed effect	25 countries 1911-2010 (n=37)	Yearly	Descriptive analysis	No
Agnello and Sousa 2012	Gini coefficient (Solt 2009)	Banking	Reinhart and Rogoff (2011)	Decrease inequality	62 countries 1980-2006 (n=1237)	Yearly	GMM	Yes
Maraca and Orgiazzi 2013	Manufacturing labor share (author-calculated)	Currency	Kaminsky and Reinhart (1999)	Increase inequality	25 countries 1963-2003 (n=324)	Yearly	Fixed effect	Yes
Jenkins et al. 2013	Gini coefficient (Eurostat & EU_SILC)	Great Recession	Own calculation	No effect	15 countries 2006-2008 (n=45)	Yearly	Descriptive analysis	No
Meyer and Sullivan 2013	Income inequality: 90/10 ratio (Current Population Survey) Consumption inequality: 90/10 ratio (Consumer Expenditure Interview Survey)	Great Recession	Own calculation	Increase inequality	US case 2000-2011(n=12)	Yearly	Descriptive analysis	No
Piketty and Saez 2013	Top 1% income share (the World Top Incomes Database)	Great Depression Great Recession	Own calculation	Mixed effect	12 countries 1900-2010	Yearly	Descriptive analysis	No

Table 4-1 (cont'd)								
Morelli 2014	Top 0.01%, 5%, 10% income share (the World Top Incomes Database)	Banking	Combination of Reinhart and Rogoff (2011) and Laeven and Valencia (2013)	Mixed effect	US case 1913-2012 (n=94)	Yearly	ADL	Yes
Li and Yu 2014	Gini coefficient (Solt 2009)	Banking	Laeven and Valencia (2013)	Mixed effect	18 countries 1966-2005 (n=115)	Yearly	Fixed effect, GMM	Yes
Denk and Courneade 2015	Gini coefficient (OECD Income Distribution and Poverty database)	Banking	Laeven and Valencia (2013)	No effect	31 countries 1974-2011 (n=318)	Yearly	Fixed effect	No
de Haan and Sturm 2016	Gini coefficient (Solt 2009)	Banking	Laeven and Valencia (2013)	Increase inequality	89 countries 1975-2005 (n=426)	5-year average	Fixed effect	No
Bazillier and Najman 2017	Labor share (UN national account)	Currency & Banking	Currency: Berman (2009) Banking: Caprio and Klingebiel (2002)	Increase inequality (Currency) No effect (Banking)	36 countries 1970-2002 (n=645)	Yearly	Fixed effect, 2SLS	No
Amate- Fortes et al. 2017	Gini coefficient, Income quintile ratio (Eurostat)	Great Recession	Own calculation	Mixed effect	27 countries 1996-2011 (n=432)	Yearly	Tobit, FGLS, PCSE, RGMM	No
Baiardi and Morana 2017	Gini coefficient (Solt 2016)	Debt	Own calculation	Increase inequality	19 countries 1985-2013 (n=171)	Yearly	Stacked OLS	No
Gokmen and Morin 2019	Gini coefficient (Solt 2009)	Currency, banking, & stock market, debt	Reinhart and Rogoff (2011)	No effect, Decrease inequality (Stock market crash)	70 countries 1973-2006	Yearly	Difference in difference	No

Note: “Methods” column indicates major estimation methods of a study. “LDV” refers to lagged dependent variable. LDV column shows whether a study uses lagged dependent variable or not in its empirical analysis.

the distribution of income overall was largely unaffected by the recession, due to government social spending for the bottom of the distribution and the decline of distributed income from corporations which affected the income of the very affluent. Amate-Fortes et al. (2017) use the 27

EU countries over the period from 1996 to 2011 and find that inequality (Gini coefficient and the 80/20 income ratio) has not changed systematically during the crisis and its immediate aftermath (2008-2011). On the other hand, Meyer (2013) argue that, in the US, the Great Recession has done nothing to stave off the trend of rising income inequality. The ratio of 90 to 10 income (after tax and transfers) has steadily increased from 2000 to 2011, including in the recession and its aftermath (2008-2011). The trend was undisturbed by the recession, suggesting that the negative wealth effects of the recession on the asset income of the rich did not compensate for the other effects of the crisis on the less well off.

The very recent literature looking a greater number of crises (countries and years covered, as well as types of financial crises) also finds a mixed effect. Thus, banking crises are found to have a mixed effect on inequality (Atkinson and Morelli 2011, Li and Yu 2014), no effect (Denk and Cournede 2015, Bazillier and Najman 2017, Gokmen and Morin 2019), decrease inequality (Agnello and Sousa 2012) or increase inequality (de Haan and Sturm 2016). Currency crises increase inequality (Maraca and Orgiazzi 2013, Bazillier and Najman 2017) or are found to have no effect (Gokmen and Morin 2019). Only one study looks at debt crises finding that they increase inequality (Baiardi and Morana 2017) and one study looks at stock market crashes showing a reduction in inequality (Gokmen and Morin 2019). The common thread in these precursor studies is: 1) the use of annual data (except de Haan and Sturm 2016); 2) little attention to the data pathologies we underline below;⁶⁰ 3) generally a focus on only one type of crisis even though, as discussed in the literature, financial crises tend to be inter-related (except Gokmen and Morin 2019,

⁶⁰ Similar to our work, several studies use GMM methods (Agnello and Sousa 2012, Li and Yu 2014, Amate-Fortes et al. 2017) to tackle reverse causality. Yet these studies also use annual data which, as we explain below, is fraught with measurement error.

Bazillier and Najman 2017)⁶¹; and 4) no discussion of long versus short term effects of financial crises. We address points 1-4 in the empirical estimation section and discuss below the main data problems that preclude previous work from identifying a causal link between financial crises and income inequality.

Reverse causality

Reverse causality is an important concern affecting the ability of the past work to draw meaningful inference. The empirical ramifications of potential endogeneity need to be addressed, even if the reverse link from inequality to crises remains debated. In the decades leading to the financial crisis of 2008, income inequality has increased across most developed countries. Prominently, Rajan (2010) argues that politicians feel compelled to respond to rising income inequality. Yet, these responses fail to directly redistribute or generate long-term investment and, rather, they create distortions, excessive indebtedness and lead to financial crisis. One example is the US case in the late 1990s, when increased inequality was addressed with expanded mortgage credit, which ultimately led to the housing bubble and a major crisis. Another case is India, where state owned banks increase lending prior to elections to the poor, but electorally important farmers (Cole 2009).⁶² A related mechanism is posited by Kumhof, Rancière and Winant (2015), who suggest

⁶¹ No study looks at inflation crises. While this may be understandable given the connection between inflation and currency crises, the literature measures them separately, they may precede each other and, thus, they deserve a distinct treatment.

⁶² Destek and Koksel (2019) find that the Rajan hypothesized relationship between inequality and credit booms holds for crises in Anglo Saxon countries, but not for other European countries. Schularick and Taylor (2012) also find that financial crises are preceded by credit booms. Perugini et al. (2016) find a positive relationship between income concentration and private sector debt levels.

that increasing inequality driven by unequal rates of growth for capital gains and labor's wages will fuel a cycle of credit from the rich to the poor, increasing the chance of a crisis as debt builds for the citizens at the bottom of the income ladder.⁶³ In their model, it can take decades for the change in the relative incomes to societal groups to result in economic crises.

Reverse causality most prominently figures in explanations of major financial crises in the United States.⁶⁴ Other research that looks at a broader set of cases questions whether income inequality is a root cause of economic crises. Thus, Atkinson and Morelli (2011) survey 25 countries over a century and find that crises are preceded by both rising and declining inequality. Similarly, Bordo and Meissner (2012) survey 14 countries over 80 years and show that while credit booms are related to crises, inequality only occasionally increases during periods of credit booms. These results are challenged, however: Gu and Huang (2014) link inequality in Anglo Saxon countries to credit booms, and thus financial crises. In addition, Ahlquist and Ansell (2017) find that inequality is related to credit booms in 18 OECD countries, in particular in countries dominated by right wing governments that skirt redistribution through fiscal policy.

Our assessment is that there are a number of compelling theoretical explanations and enough cases that illustrate well causality going from inequality to crises, including evidence for the potential causal mechanisms. Thus, a serious investigation of the consequences of financial crises for income distribution has to present a research design that deals with reverse causality.

⁶³ Additional arguments have been posited in the literature, including linking inequality and financial liberalization to crises. For a review see van Treeck (2014), Stockhammer (2015).

⁶⁴ In their discussion of the US, Piketty and Saez (2013) note that "highly plausible that rising top incomes did contribute to exacerbate financial fragility" (p.473). Yamarik et al. (2016) also find a significant positive long-run relationship between inequality and real estate lending across U.S. states.

Slow moving nature of inequality and measurement error

Besides an elevated risk of endogeneity, the analysis of income inequality and financial crises presents additional challenges. In particular, given the persistent nature of inequality and measurement error for both inequality and crises, we consider the use of annual data in the past literature as far too noisy to be able to generate reliable inferences. We explain our reasoning below.

The Standardized World Income Inequality Database (SWIID, Solt 2009) is most the comprehensive data set that standardizes incomes, allowing comparisons across countries. This data provides the Gini coefficient before and after taxes, which ranges from zero (perfect equality of income) to 100 (perfect inequality). While this data has made strides in terms of coverage, comparability and ability to separate the effect of fiscal policy redistribution, there remain lingering issues: One is that annual inequality is very slow moving (the correlation between the average market Gini coefficient in consecutive periods is 0.9884 for yearly data and 0.8134 for decade aggregated data) and therefore the noise in annual macroeconomic data in the explanatory side is particularly damaging (Delis et al. 2014). A second issue is that the annual income inequality in SWIID is imputed for countries that only have infrequent measures of incomes. This includes much of Africa, Asia and Latin America. Both of these issues render as inadequate the use of annual observations in the study of inequality.

Compounding issues related to the measurement of the dependent variable, measuring crises – their onset and duration - is also not a trivial matter. For example, when discussing the dating of banking crises, Reinhart and Rogoff (2009) note that their mark for banking crises (bank runs and/or the closure, takeover or government assistance to large financial institutions) could date the beginning of a crisis either too late or too early. They also note that “it is often difficult or impossible to accurately pinpoint the year in which the crisis ended” (Reinhart and Rogoff 2009: 11). Similarly, for both domestic and external debt crises, Reinhart and Rogoff note that the end

points of crises are either “indeterminate” or “impossible to ascertain”. By comparison, currency and inflation crises appear easier to diagnose by imposing a certain threshold for the annual depreciation of the currency (e.g., Frankel and Rose 1996 - 25%) or, respectively the annual inflation rate (e.g., 40%). Even for currency crises, however, just looking at the amount of currency depreciation may underestimate the duration or severity of the crisis as countries resort to defensive measures to limit depreciation, including spending foreign reserves, increasing domestic interest rates or imposing capital controls.⁶⁵ Diverging definition and the overall difficulty in precisely dating financial crises is reflected in important differences in the empirical coding of financial crises (Bordo and Meissner 2015)⁶⁶, although there is some overlap in the time trends of crises incidence.⁶⁷

In response to these important empirical challenges, the next sections discuss our research design that deals directly with the key threats to inference in assessing a causal link running from financial crises to income inequality: reverse causality, slow movement of the dependent variable and measurement error in both the dependent and independent variables.

⁶⁵ An additional issue with coding crises may be that some symptoms (e.g. the forcible conversion of foreign currency deposits into local currency) are indicators of multiple crises – inflation, external debt or banking crises.

⁶⁶ Bordo and Meissner (2015) compare the datasets from Bordo et. al (2001), Reinhart and Rogoff, and Laeven and Valencia (2013). Of these datasets, Laeven and Valencia (2013) identify the fewest crises. For example, even when years and countries overlap, Laeven and Valencia report only half the currency crises in Reinhart and Rogoff (2009) or Bordo et. al (2001).

⁶⁷ This occurs for Reinhart and Rogoff (2009) or Bordo et al. (2001) data.

4.4 Data and Testing Strategy

Our main sample covers 185 observations on 66 countries between 1960 and 2009. The unit of analysis is the country-decade. We thus have a maximum of 5 observations for each country: 1960s, 1970s, 1980s, 1990s and 2000s. We compute the country-decade observations by calculation the average value of each variable over the whole decade. For example, the GDP per capita value of a given country in the 1970s is the average GDP per capita of that country between 1970 and 1979. This is the same approach as Reuveny and Li (2003), among others. Tables 4-5 of the appendix summarizes all the variables included in the main analysis.

As explained above, using yearly data would be highly problematic because it is unlikely that crises affect inequality within a single year. Inequality is highly persistent within country over time. Also, as discussed, the onset of crises themselves is highly imprecise. Using 10-year averages is thus more appropriate. We only revert to annual data after establishing an effect of crises on income inequality and use error-correction models (ECMs) to distinguish between the long-term and short-term effects of crises.

To reduce serial correlation concerns, given the persistent nature of inequality, all models include the lagged dependent variable (the lagged market Gini coefficient in the main analyses). Thus, we have a maximum of 4 observations per country. However, the average number of observations per country is only 2.8. Therefore, given that inequality is highly persistent within countries over time, our empirical approach can be seen as fairly conservative. All explanatory variables are also lagged by one period.

Dependent Variables

Our main measure of inequality is the market Gini coefficient of the Standardized World Income Inequality Database (SWIID, version 4.1), created by Frederick Solt. Most Gini coefficient

datasets suffer from serious comparability problems (Atkinson and Brandolini 2001; Solt 2009). Gini coefficient datasets rely on national surveys, which employ different methods, units of reference and definitions of income.

One partial exception is the Luxembourg Income Study (LIS) dataset, which is usually seen as the gold standard in terms of comparability. However, it covers only a small number of mostly developed countries. The SWIID “seek[s] to maximize comparability while providing the broadest possible coverage of countries and years” (Solt Forthcoming, p.1). Solt (2009, Forthcoming) employs an algorithm to standardize Gini coefficients from other sources (e.g., the World Income Inequality Database) using the LIS.

To do so, he categorizes each observation in eleven combinations depending on the method, unit of reference and definition of income used. He then estimates the ratios between each combination for each country. If Solt does not have enough information on a given ratio for a country, he uses information on that ratio from other countries within the same region (he defines eight regions). He then employs these ratios to standardize the observations. Our dependent variable is the average market Gini coefficient of a country over a given decade.

In addition to estimating market Gini coefficients, Solt also estimates net Gini coefficient values and the share of the income that accrues to the top one percent. These will be employed below in robustness tests.

Independent Variables

We employ the crisis dataset of Reinhart and Rogoff (2009, 2011). It covers currency crises, banking crises, inflation crises, stock market crises, domestic debt crises and external debt crises. Reinhart and Rogoff identify currency crises using exchange rate depreciation. A currency crisis

occurs whenever the annual depreciation rate surpasses 15% annually. Reinhart and Rogoff do not rely on other indicators, such as interest rate increases or reserve losses.

Banking crises are coded using key events. Reinhart and Rogoff focus on two types of events: “(i) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions; or (ii) if there are no runs, the closure, merging, takeover, or large-scale government assistance of an important financial institution (or group of institutions) that marks the start of a string of similar outcomes for other financial institutions” (Reinhart and Rogoff 2011, p.1680).

Reinhart and Rogoff measure inflation crises using an annual 20% threshold. They use the definition of stock market crises of Barro and Ursua (2009), who define a stock market crisis as a decline of real return of stock price by at least 25 percent. Debt crises occur when a country defaults on payment of debt obligations. A debt crisis is external (as opposed to domestic) when the debt was incurred under foreign legal jurisdiction.

Although the different types of crises can occur concurrently, the different measures are not perfectly correlated. Table 4-6 of the appendix shows the correlation between each pair of crisis type using the decade averages.⁶⁸ As expected, inflation and currency crises are highly correlated (0.91). However, the correlation between the other forms of crises is much lower, ranging from 0.07 (banking and domestic debt crises) and 0.45 (inflation and external debt crises). Therefore, the different measures capture something different.

We use the Reinhart and Rogoff (2009, 2011) data for several important reasons that are related to the data pathologies identified earlier. First, while alternative data sets like Laeven and Valencia (2018) have a larger cross sectional coverage, the use of Reinhart and Rogoff gives us an

⁶⁸ We use the 10-year averages rather than yearly data when looking at the correlation because some types of crises can lead to other types. Therefore, using annual data would underestimate the real correlation between crises.

additional decade of information, which is crucial for persistent variables like income inequality and to our design that averages data over decades. Of note, even if the number of countries covered by Reinhart and Rogoff is smaller, these are the most important countries in the world in terms of global output -- the share of world GDP covered by these countries in 1990 is 89.24% (Reinhart and Rogoff 2010, p. 46). Second, directly comparing Reinhart and Rogoff and Laeven and Valencia's information on the prevalence of financial crises is an opportunity for a stark contrast. The Appendix shows the prevalence of crisis-years for the countries and time periods that overlap in both datasets. On the whole, Laeven and Valencia identify about a fifth of the currency crisis-years in Reinhart and Rogoff, a little more than a half of the banking crisis-years, and their default crisis years are less than a tenth of Reinhart and Rogoff's external debt crisis-years. By using the Reinhart and Rogoff's more lenient criteria to identify financial crises we thus include events that are less severe, and thus, less likely to influence the distribution of income. This choice, if anything, should limit our ability to identify effects.

As before, the crisis variables are calculated by taking the average over the whole decade. Thus, they indicate the proportion of years a country experienced a given type of crisis during a given decade.

Control Variables

We employ the same control variable as Reuveny and Li (2003). First of all, democracies have been argued to reduce inequality because they provide more power to the poor, who have the right to vote. At the same time, some political regimes may be more vulnerable to economic crises. We measure the quality of democracy with the Polity score (Marshall et al 2017).

We include further three variables that control for economic openness. First, we control for trade openness, measured as the value of exportation and importation divided by GDP (taken from

the World Bank). Multiple authors have argued that trade either increases (e.g., Rodrik 1997) or decreases (e.g., Birdsall 1998) inequality. It is also possible that economic openness affects the likelihood that a country experiences an economic crisis. Second, we control for FDI inflows (FDI net inflows as a percentage of GDP; World Bank). As with trade, the literature is mixed regarding the effect of FDI on inequality. Third, we include a variable for portfolio inflows (portfolio investment net inflow as a percentage of GDP; World Bank).

Finally, according to the Kuznets curve, inequality first increases with economic development and then decreases once a country attains a given level of development, meaning that there is an inverted U-shaped relationship between income per capita and inequality. The level of development may also affect the likelihood of experiencing a crisis. We thus control for GDP per capita (logged) and its square (World Bank). As mentioned above, all models include a lagged dependent variable.

Table 4-2: OLS Analysis of the Effect of Crises on Market Gini Coefficients

	1	2	3	4	5	6
LDV	0.715*** (0.0586)	0.734*** (0.0577)	0.720*** (0.0619)	0.706*** (0.0716)	0.733*** (0.0579)	0.712*** (0.0595)
Currency crises	4.196*** (1.146)					
Banking crises		1.708* (0.880)				
Inflation crises			3.113*** (1.080)			
Stock market crises				-1.508 (1.342)		
Domestic debt crises					3.339** (1.437)	
External debt crises						3.526*** (1.014)
Polity score	0.0614 (0.0580)	0.0523 (0.0607)	0.0547 (0.0580)	0.00245 (0.0846)	0.0397 (0.0610)	0.0430 (0.0607)
Trade	-0.00442 (0.00811)	-0.0138* (0.00703)	-0.00736 (0.00794)	-0.0164** (0.00721)	-0.0156** (0.00687)	-0.0119 (0.00741)
Portfolio inflow	-0.236** (0.117)	-0.157 (0.124)	-0.164 (0.118)	-0.129 (0.115)	-0.161 (0.104)	-0.121 (0.107)
FDI inflow	0.349 (0.257)	0.491** (0.243)	0.377 (0.265)	0.440 (0.263)	0.516** (0.231)	0.423* (0.245)
GDP pc (logged)	-2.989 (2.130)	-0.417 (1.826)	-2.377 (2.040)	-1.821 (1.579)	-0.751 (1.833)	-1.734 (1.900)
GDP pc squared (logged)	0.212 (0.131)	0.0408 (0.112)	0.175 (0.126)	0.130 (0.0996)	0.0669 (0.113)	0.136 (0.118)
Observations	185	185	185	142	185	185
R-squared	0.709	0.681	0.696	0.690	0.684	0.701

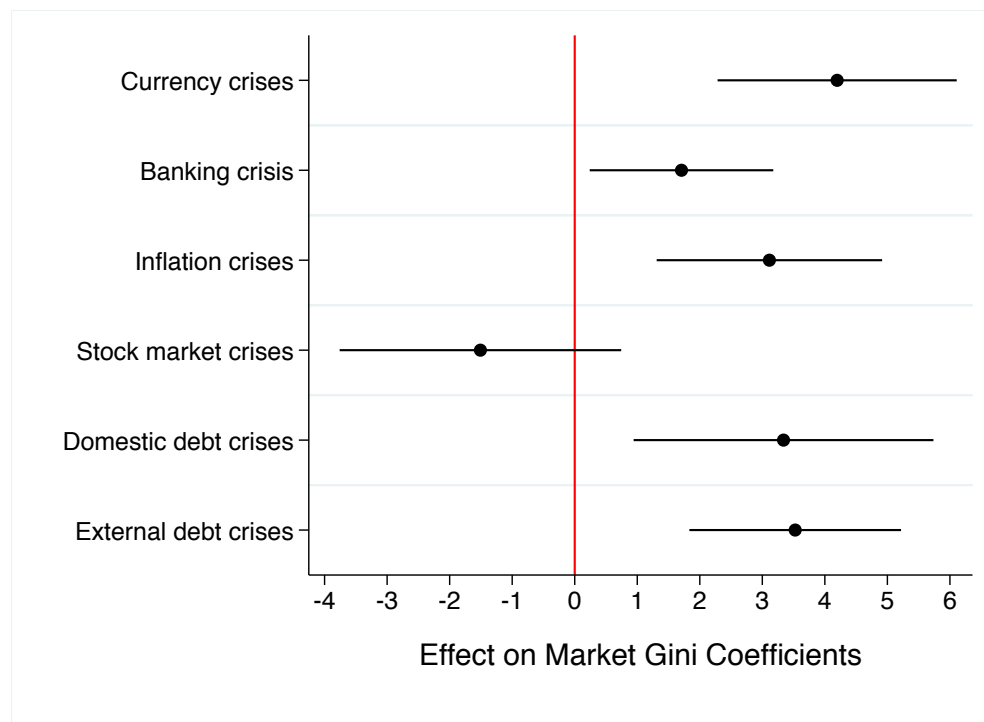
Note: OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0

4.5 Empirical Results

Main Results

Table 4-2 shows our main results. All models are ran using OLS with country clustered standard errors. Inequality is measured using market Gini coefficients. The unit of analysis is the decade, and each variable takes the mean over the decade. All independent variables are lagged one period (a decade). This strategy should minimize the issue of reverse causality noted in our earlier discussion.

Figure 4-1: Effect of Crises on Market Gini Coefficients

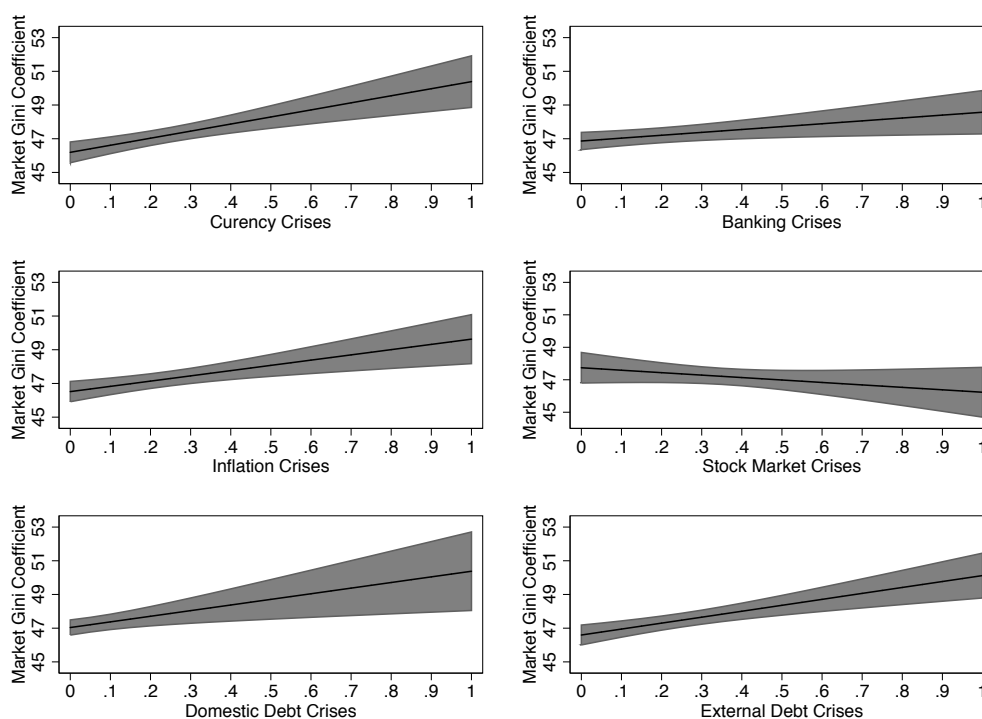


Note: Shows 90 percent confidence intervals. Based on Table 4-2.

As shown in Table 4-2, all types of crises, except for stock market crises, are associated with an increase in inequality the following decade. One possible reason why stock market crises do not increase inequality is that such crises have a stronger effect on the wealthy, who are more likely

to own stocks.⁶⁹ Figure 1 shows the effect of increasing the value of the crisis variable from 0 (i.e. no year in the decade had a crisis) to 1 (i.e. all years in the decade had crises). For example, currency crises increase the market Gini coefficient in the following decade by about 4. Such an increase is very large given that, as explained above, Gini coefficients change little within country over time. The correlation in the market Gini coefficients between consecutive decades is over 0.81. Not a single variable, apart from the crisis variables, has a consistently significant effect on inequality.

Figure 4-2: Predicted Market Gini Coefficients



Note: Initial Gini coefficient set at 46. Shows 90 percent confidence intervals. Based on Table 4-2.

⁶⁹ The different results on stock market crises are not driven by the reduced sample size. With the exception of domestic debt crises, all results are unchanged (both using OLS and system GMM) when we restrict the sample to the observations for which we have data on stock market crises.

Table 4-3: System GMM Analysis of the Effect of Crises on Market Gini Coefficients

	7	8	9	10	11	12
LDV	0.382 (0.257)	0.608*** (0.174)	0.450* (0.260)	0.680*** (0.162)	0.572** (0.232)	0.530** (0.227)
Currency crises	8.884*** (3.417)					
Banking crises		4.951* (2.845)				
Inflation crises			11.33** (5.475)			
Stock market crises				-3.443 (3.681)		
Domestic debt crises					13.87* (7.653)	
External debt crises						6.253*** (2.269)
Polity score	0.0579 (0.0735)	0.0398 (0.0643)	0.0609 (0.0679)	-0.0264 (0.0740)	-0.0105 (0.0662)	0.0129 (0.0635)
Trade	0.0122 (0.0140)	-0.00453 (0.00838)	0.0185 (0.0176)	-0.0150** (0.00739)	-0.00814 (0.00772)	-0.00331 (0.00812)
Portfolio inflow	-0.251 (0.153)	-0.158 (0.130)	-0.0822 (0.173)	-0.207* (0.111)	-0.146 (0.124)	-0.114 (0.142)
FDI inflow	0.246 (0.330)	0.280 (0.263)	-0.00570 (0.444)	0.345 (0.272)	0.314 (0.244)	0.268 (0.278)
GDP pc (logged)	-7.890 (5.102)	-2.408 (2.828)	-8.477* (4.617)	-2.216 (2.553)	-3.731 (3.215)	-4.337 (3.425)
GDP pc squared (logged)	0.512* (0.298)	0.164 (0.161)	0.570** (0.277)	0.162 (0.150)	0.266 (0.185)	0.306 (0.197)
Hansen(p-value)	0.817	0.161	0.513	0.0744	0.153	0.419
AR2(p-value)	0.375	0.224	0.360	0.637	0.289	0.335
Observations	185	185	185	142	185	185

Note: System GMM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors in parentheses. ***
p<0.01, ** p<0.05, * p<0.1

Figure 2 shows the predicted market Gini coefficient at different values of the crisis variables for a country with an initial market Gini coefficient of 46 (which is the median of the sample). With the exception of stock market crises, all types of crises increase inequality. For example, a country that experienced an external debt crisis in 5 of the years' decade will, on average, experience an increase in its Gini coefficient of about 2 points (from 46 to 48).

One fundamental problem with our OLS models may be that countries experiencing crises may be fundamentally different from those that do not, in ways that our control variables do not capture. One way to deal with country heterogeneity is to add country fixed-effects to our OLS model. However, in small-T panels like ours, fixed-effects estimation is not optimal (Roodman 2009) because a shock to the country's fixed effect does not decline with time and there is significant correlation between the lagged dependent variable and the error term (the Nickell bias; Nickell, 1981). Also, inequality varies little, so fixed-effects models lead to greatly inefficient estimations. To address these shortcomings of our data, we show estimations from system generalized method of moments (GMM) models.⁷⁰ This estimation is designed for small-T large-N panels (Roodman 2009) and eliminates country fixed effects through first differencing, thus reducing bias concerns and identifying the within-country relationship between the variables of interest. We use system GMM rather than difference GMM because both the dependent and independent variables are sticky (Heid, Langer and Larch 2012).

⁷⁰ Arellano and Bover 1995; Blundell and Bond 1998. System GMM uses lagged values of the dependent and independent variables as instrument and combines regressions in differences with regressions in levels to better address issues of weak instrumentation. We use the orthogonal deviations transformation that preserves sample size in panels with gaps (Arellano and Bover 1995) and only up to the second lag of the variables for the regression in differences, to reduce the number of instruments and the risk of over-fitting the data. The lag of the dependent variable is considered endogenous in our GMM models.

Table 4-3 redoes Table 4-2 using system GMM. All our OLS results are robust, and the substantive effects of crises actually increase (except for stock market crises). For example, while in the OLS model, increasing the ‘Currency Crisis’ variable from 0 to 1 is associated with an increase in the market Gini coefficient of about 4 points, it is associated with an increase of more than 8.8 points when using system GMM. The consistency of the GMM system estimator is assessed with two standard specification tests: The Hansen test of over-identifying restrictions tests the overall validity of the instruments and failure to reject the null hypothesis gives support for the model, including our choice of endogenous variables. The Arellano–Bond test for AR(2) in first differences tests whether the residuals from the regression in differences is second order serially correlated and failure to reject the null hypothesis supports the model specification. Our models satisfy the bar set by these two metrics.

Few of the control variables have a strong and consistent effect on inequality. This is most likely due to the fact that inequality is highly sticky and that our empirical approach, which controls for the lagged dependent variable, is fairly conservative. Also, we only have four values for each country. In this context, the results on the crisis variables are particularly interesting.

Robustness Tests

The appendix presents a large number of robustness tests. First, the main analysis uses the market Gini coefficient of Solt (2009). Tables from 4-10 to 4-15 redo the OLS and system GMM analyses using the net Gini coefficients of Solt (2009),⁷¹ the share of the income that accrues to the richest one percent (also from Solt 2009), and the Gini coefficients of the Estimated Household Income

⁷¹ The net Gini coefficient measures inequality after tax and transfers, while the market Gini coefficient measures inequality before tax and transfers.

Inequality Data Set (EHII). The latter are Gini coefficients that have been harmonized across surveys by the University of Texas Inequality Project. On balance, the results are unchanged.⁷²

Second, Tables from 4-16 to 4-23 rerun the analysis using all four measures of inequality with random effects and panel-corrected-standard-errors (PCSE).⁷³ The only change is that the effect of banking crisis is not significant when using the top 1% share along with random effect. Third, in the main models, the inclusion of investment variables – *Portfolio inflow* and *FDI inflow* – reduces the sample size due to those variables’ limited data availability. Therefore, in Tables 4-24 and 4-25, we redo Tables 4-2 and 4-3 without these two variables. Dropping these two variables increases the sample size from 185 to 219 observations. Results are unchanged.

Fourth, our sample begins in the 1960s. We do so because Solt’s inequality dataset starts in 1960. In Tables 4-26 and 4-27, we redo the analysis with the 1950s. We use the earliest value of the Gini coefficient (in the 1960s) as the value for the 1950s. For example, if for a given country, our first observation on inequality is recorded in 1960, then we take this value as the average Gini coefficient during the 1950s. The value for the 1960s remains the average Gini coefficient between 1960 and 1969. Tables 4-26 and 4-27 exclude the investment variables (because they are not available for the 1950s), and we use the trade and GDP per capita variables of the Penn World Table (rather than the World Bank whose data do not cover 1950s). The results are robust.

Fifth, to make sure that our results are not driven by outliers on inequality, Tables 4-28 and 4-29 show that the results are unchanged if we exclude observations with market Gini coefficients

⁷² Three results change. The effect of banking crises is not significant when using the net Gini coefficient with OLS, and the share of the top 1% with OLS. Similarly, the effect of inflation crises is not significant when using the EHII Gini coefficients with system GMM.

⁷³ The regression on banking crisis does not run when using the EHII Gini coefficients with PCSE. Therefore, these results have been omitted.

below the 5th percentile of the distribution or above the 95th percentile of the distribution. Sixth, countries that are economically freer may be more likely to experience economic crises. Moreover, economic freedom may also increase inequality. In Table 4-30, we show that the OLS results are unchanged when we control for the Fraser Index (Financial liberalization) that captures the degree to which the country is free economically (Fraser Institute).⁷⁴ Seventh, Tables 4-31 and 4-32 demonstrate that the results are robust to the inclusion of a control variable for the size of the financial market (domestic credit to private sector as % of GDP; taken from the World Bank database).

Finally, we construct a variable (Crisis tally) which counts the number of crises that a country experiences over a given decade (excluding stock market crises). This enable us to test whether inequality tends to increase among countries that experience more crises, regardless of their types. As shown in Table 4-33, we find that Crisis tally does increase inequality, although the system GMM results are significant at the 10% level.

Error-Correction Models

One possible shortcoming in our main analysis is that it does not distinguish between the short-term and the long-term effects of crises. In fact, since we employ 10-year averages, one could argue that we only look at the long-run effect. In this section, we address this issue by using error-correction models (ECMs). In these analyses, we use annual data rather than 10-year averages. We are not concerned with cointegration, but as Keele and De Boef (2008) point out, ECMs are useful for both stationary and integrated data. ECMs include both the levels of the independent variables as well as their change and can thus be used to discuss long-run equilibria and rates of

⁷⁴ We could not estimate the system GMM models with the Fraser Index because it only covers three time periods: 1980s, 1990s, and 2000s.

reequilibration in stationary data. Short-term effects are given by the change in the independent variables, while long-term effects are given by the levels. Results are shown in Table 4-4. The table shows the effect of the change in each crisis variable (e.g., D.Currency Crisis) as well as the effect of the level variable (e.g., L.Currency Crisis). In each model, the coefficient on the lagged dependent variable is the error correction term and it shows how long it takes for the dependent variable to return to equilibrium after a shock. We also report the long-term multipliers of each crisis variable. These give the long-term effect of increasing the currency crisis from 0 to 1 on the Gini coefficients. The long-term multipliers are calculated by dividing the estimated coefficients on the level variables by that of the lagged dependent variable.

The ECM models provide interesting findings. On average, results tend to support our argument that crises' effect on inequality operate in the long-term (rather than, say, within a single year). In all models the coefficient on the lagged dependent variable is between 0.034 and 0.038. This means that each year, about 3.5 to 4 percent of the crises variable's effect will be felt, meaning that it would take about 25 years to experience the entire effect of a crisis. Inflation and external debt crises only have a long-term effect. For example, while external debt crises increase inequality by only about 0.07 in the year in which they occur, they increase it by more than 9 points ($0.353/0.0386$) in the long-run. Banking crises increase inequality both in the short- and long-term. They increase the Gini coefficient by 0.19 in the current year and by more than 7 in the long-term. Only currency crises increase inequality in the short-term but not the long-term. Even in this case, the short-term effect is only significant at the ten percent level. Stock market crises and domestic debt crises, for their part, have no significant effect in either the short- or the long-run. Explaining these asymmetric effects is an interesting question for futures research.

Table 4-4: ECM Analysis of the Effect of Crises on Market Gini Coefficients

	13	14	15	16	17	18
LDV	-0.0352*** (0.00693)	-0.0376*** (0.00698)	-0.0372*** (0.00688)	-0.0346*** (0.00749)	-0.0355*** (0.00700)	-0.0386*** (0.00698)
L.Currency crises	0.117 (0.0981)					
D.Currency crises	0.104* (0.0599)					
L.Banking crises		0.278** (0.108)				
D.Banking crises		0.190** (0.0782)				
L.Inflation crises			0.288* (0.155)			
D.Inflation crises			0.0761 (0.0999)			
L.Stock market crises				-0.120 (0.0921)		
D.Stock market crises				-0.0723 (0.0528)		
L.Domestic debt crises					0.0808 (0.325)	
D.Domestic debt crises					-0.113 (0.243)	
L.External debt crises						0.353*** (0.137)
D.External debt crises						0.0695 (0.0981)
L.Polity score	0.0151 (0.0103)	0.0147 (0.0101)	0.0155 (0.0102)	-0.00286 (0.0101)	0.0136 (0.0101)	0.0134 (0.01000)
D.Polity score	0.00462 (0.0179)	-0.000494 (0.0175)	0.00565 (0.0181)	-0.0142 (0.0185)	0.00346 (0.0169)	-0.000977 (0.0177)
L.Trade	-0.000768 (0.00134)	-0.000927 (0.00143)	-0.000797 (0.00138)	-0.000813 (0.00110)	-0.000932 (0.00137)	-0.00103 (0.00141)
D.Trade	-0.00154 (0.00248)	-0.000574 (0.00244)	-0.000860 (0.00238)	-0.00184 (0.00287)	-0.00126 (0.00242)	-0.00131 (0.00241)
L.Portfolio inflow	0.00359 (0.00336)	0.00308 (0.00355)	0.00294 (0.00339)	0.00530* (0.00318)	0.00376 (0.00340)	0.00287 (0.00350)
D.Portfolio inflow	-0.00107 (0.00274)	-0.00110 (0.00269)	-0.00174 (0.00260)	-0.00126 (0.00269)	-0.00118 (0.00263)	-0.00173 (0.00259)
L.FDI inflow	-4.34e-05 (0.00963)	-0.000250 (0.00985)	-2.40e-05 (0.00972)	-0.00458 (0.00736)	-9.44e-05 (0.00954)	0.000650 (0.00965)
D.FDI inflow	-0.00135 (0.00560)	-0.000112 (0.00547)	-0.00125 (0.00549)	-0.00386 (0.00536)	-0.00138 (0.00549)	-0.00131 (0.00543)
L.GDP pc (logged)	-0.934** (0.378)	-0.887** (0.383)	-0.892** (0.377)	-0.705* (0.375)	-0.932** (0.379)	-0.804** (0.353)
D.GDP pc (logged)	0.929 (1.563)	0.822 (1.488)	0.948 (1.455)	0.506 (1.729)	0.793 (1.489)	0.972 (1.415)
L.GDP pc squared (logged)	0.0574*** (0.0217)	0.0547** (0.0220)	0.0566*** (0.0218)	0.0447** (0.0214)	0.0571*** (0.0218)	0.0518** (0.0206)
D.GDP pc squared (logged)	-0.0571 (0.0892)	-0.0446 (0.0856)	-0.0614 (0.0841)	-0.0313 (0.0985)	-0.0542 (0.0858)	-0.0612 (0.0817)
Long-term multipliers	3.5977	7.3936	7.7419	-3.4682	2.2761	9.1451
Observations	1,709	1,711	1,711	1,429	1,711	1,711
Wald Chi2	54.73	71.95	63.13	75.85	57.86	62.82

Note: ECM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.6 Conclusion

Few authors have tested the effect of economic crises on economic inequality and the few that did show mixed results. This is an important omission, notably because one of the channels through which economic crises can have destabilizing effects is by widening the gap between the rich and the poor. In this paper, we fill this gap and test the effect of crises on inequality. We find that currency, banking, inflation and external as well as domestic debt crises increase inequality. We have also shown that in most cases, the effect of crises on inequality operate in the long-run. However, stock market crises do not increase inequality. If anything, they decrease it (although the effect is not statistically significant).

These findings have important implications for the literature. For one, they suggest a novel mechanism through which economic crises can have adverse political effects. Among other things, inequality has been shown to harm democracy (Houle 2009) and reduce support for democracy (Krieckhaus et al. 2014), to breed political violence (Bartusevicius 2014), to increase political inequality (Houle 2018), to encourage corruption (You and Khagram 2005), and to increase political polarization (Voorheis et al. 2016). Our results thus suggest that economic crises can have an indirect effect on some of the most important questions in the social sciences.

APPENDIX

Table 4-5: Summary Statistics

Variables	Mean	St.Dev.	Median	Min	Max
Market gini	45.3	8.939	45.7	20.89	75.72
Net gini	37.98	10.11	37.71	17.08	70.41
Top1%	9.554	4.433	8.382	2.468	29.64
EHII	42.96	6.951	44.37	21.22	58.25
Currency crises	0.188	0.266	0.1	0	1
Banking crises	0.125	0.203	0	0	1
Inflation crises	0.162	0.283	0	0	1
Stock market crises	0.277	0.231	0.3	0	1
Domestic debt crises	0.0289	0.127	0	0	1
External debt crises	0.148	0.284	0	0	1
Polity score	0.33	7.179	-0.8	-10	10
Trade	74.13	45.45	65.33	0.438	391.7
FDI inflow	2.863	7.01	1.323	-10.77	150.1
Portfolio inflow	0.851	13.79	0	-0.76	326.5
GDP per capita	7.246	1.633	7.108	3.769	11.71

Table 4-6: Correlation between the Crises Variables

	Currency crises	Banking crises	Inflation crises	Stock market crises	Domestic debt crises	External debt crises
Currency crises	1					
Banking crises	0.30	1				
Inflation crises	0.91	0.29	1			
Stock market crises	0.10	0.18	0.15	1		
Domestic debt crises	0.18	0.07	0.26	0.14	1	
External debt crises	0.43	0.27	0.45	0.09	0.32	1

Data Comparison: Reinhart and Rogoff (2011) and Laeven and Valencia (2013)

Table 4-7: The Definition of Currency Crisis

Currency crisis		Laeven & Valencia		Total
		0	1	
Reinhart & Rogoff	0	2,200	24	2,224
	1	471	79	535
Total		2,671	103	2,774

Table 4-8: The Definition of Banking Crisis

Banking crisis		Laeven & Valencia		Total
		0	1	
Reinhart & Rogoff	0	2,289	47	2,336
	1	268	175	443
Total		2,557	222	2,779

Note: Laeven & Valencia's banking crisis variable without borderline cases

Table 4-9: The Definition of Debt Crisis

Debt crisis		Laeven & Valencia		Total
		0	1	
Reinhart & Rogoff	0	2,328	4	2,332
	1	417	30	447
Total		2,745	34	2,779

Note: Uses Laeven & Valencia's default variable

Table 4-10: OLS Analysis of the Effects of Crises on Net Gini Coefficients

LDV	0.804***	0.822***	0.804***	0.832***	0.821***	0.797***
	-0.0428	-0.0422	-0.0451	-0.0475	-0.0421	-0.043
Currency crises	3.899***					
	-1.026					
Banking crises		1.489				
		-1.058				
Inflation crises			3.084***			
			-0.996			
Stock market crises				-0.156		
				-1.35		
Domestic debt crises					3.620***	
					-1.185	
External debt crises						2.970***
						-0.983
Polity score	0.038	0.0319	0.0322	-0.0163	0.019	0.0203
	-0.0554	-0.0603	-0.0567	-0.0868	-0.0603	-0.0611
Trade	-0.00335	-0.0117	-0.00547	-0.0157	-0.0131*	-0.0108
	-0.00904	-0.00789	-0.00896	-0.00956	-0.00779	-0.00835
Portfolio inflow	-0.247	-0.18	-0.176	-0.161	-0.177	-0.14
	-0.168	-0.163	-0.176	-0.185	-0.171	-0.192
FDI inflow	0.379	0.507*	0.394	0.544	0.518**	0.467*
	-0.27	-0.26	-0.273	-0.339	-0.249	-0.268
GDP pc (logged)	-2.121	0.134	-1.693	-0.151	-0.24	-0.801
	-1.535	-1.687	-1.659	-1.823	-1.666	-1.608
GDP pc squared (logged)	0.105	-0.043	0.0791	-0.0117	-0.0146	0.0216
	-0.0991	-0.108	-0.105	-0.112	-0.107	-0.104
Observations	185	185	185	142	185	185
R-squared	0.881	0.871	0.877	0.887	0.873	0.876

Note: OLS analyses. Uses net Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4-11: OLS Analysis of the Effects of Crises on Top 1% Share

LDV	0.864***	0.885***	0.853***	0.870***	0.871***	0.861***
	-0.039	-0.0387	-0.041	-0.0471	-0.0399	-0.0412
Currency crises	2.042***					
	-0.576					
Banking crises		0.753				
		-0.711				
Inflation crises			1.705***			
			-0.605			
Stock market crises				0.434		
				-0.788		
Domestic debt crises					2.377***	
					-0.769	
External debt crises						1.204*
						-0.72
Polity score	0.0227	0.022	0.0208	-0.0107	0.0149	0.0193
	-0.0344	-0.0368	-0.0356	-0.0426	-0.0366	-0.0378
Trade	-0.000837	-0.0049	-0.00182	-0.00838*	-0.0057	-0.00503
	-0.00436	-0.00451	-0.00448	-0.00435	-0.00429	-0.00448
Portfolio inflow	0.157	0.196*	0.196	0.227*	0.202*	0.203*
	-0.116	-0.112	-0.121	-0.135	-0.118	-0.121
FDI inflow	0.114	0.179	0.121	0.250**	0.182	0.174
	-0.121	-0.133	-0.124	-0.111	-0.114	-0.126
GDP pc (logged)	-0.688	0.403	-0.479	0.674	0.198	0.0841
	-1.387	-1.349	-1.408	-1.238	-1.349	-1.288
GDP per squared (logged)	0.0646	-0.00863	0.0517	-0.0135	0.00678	0.015
	-0.0857	-0.0828	-0.087	-0.0761	-0.0833	-0.0798
Observations	181	181	181	138	181	181
R-squared	0.799	0.786	0.795	0.792	0.792	0.79

Note: OLS analyses. Uses top 1% share. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4-12: OLS Analysis of the Effects of Crises on EHII

LDV	0.901*** (0.0406)	0.906*** (0.0405)	0.897*** (0.0412)	0.933*** (0.0492)	0.918*** (0.0414)	0.870*** (0.0467)
Currency crises	2.375*** (0.649)					
Banking crises		1.690* (0.920)				
Inflation crises			2.395*** (0.680)			
Stock market crises				0.0262 (0.684)		
Domestic debt crises					3.621*** (1.301)	
External debt crises						3.037*** (0.885)
Polity score	-0.0910* (0.0470)	-0.0906* (0.0456)	-0.0961** (0.0473)	-0.0199 (0.0466)	-0.0933** (0.0465)	-0.102** (0.0456)
Trade	-0.0189*** (0.00492)	-0.0217*** (0.00451)	-0.0190*** (0.00501)	-0.0261*** (0.00399)	-0.0236*** (0.00420)	-0.0211*** (0.00390)
Portfolio inflow	-0.232*** (0.0813)	-0.169* (0.0944)	-0.180** (0.0784)	-0.286*** (0.0840)	-0.191** (0.0814)	-0.150* (0.0870)
FDI inflow	0.284 (0.173)	0.298* (0.176)	0.265 (0.174)	0.512*** (0.171)	0.353** (0.167)	0.281* (0.163)
GDP pc (logged)	1.317 (1.360)	2.890** (1.142)	1.521 (1.355)	1.648 (1.251)	2.944** (1.164)	1.746 (1.179)
GDP pc squared (logged)	-0.0592 (0.0829)	-0.163** (0.0707)	-0.0697 (0.0828)	-0.0833 (0.0777)	-0.160** (0.0725)	-0.0869 (0.0736)
Observations	167	167	167	130	167	167
R-squared	0.888	0.882	0.888	0.901	0.882	0.891

Note: OLS analyses. Uses EHII. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4-13: System GMM analysis of the Effect of Crises on Net Gini Coefficients

LDV	0.720***	0.670**	0.813***	1.255***	0.838***	0.939***
	-0.159	-0.298	-0.155	-0.383	-0.145	-0.184
Currency crises	8.506**					
	-3.389					
Banking crises		9.795**				
		-4.407				
Inflation crises			15.03*			
			-7.981			
Stock market crises				-11.3		
				-9.7		
Domestic debt crises					5.216*	
					-3.102	
External debt crises						7.060***
						-2.733
Polity score	0.02	0.0204	0.0484	-0.0164	-0.00821	0.008
	-0.0532	-0.0729	-0.0735	-0.149	-0.0517	-0.0619
Trade	0.00693	-0.000225	0.0259	-0.00968	-0.0109	-0.000926
	-0.0128	-0.0116	-0.0213	-0.0123	-0.00734	-0.00804
Portfolio inflow	-0.335	-0.0553	-0.174	-0.662*	-0.264	-0.26
	-0.211	-0.269	-0.252	-0.384	-0.179	-0.189
FDI inflow	0.264	0.254	-0.248	0.0766	0.444*	0.0912
	-0.327	-0.434	-0.513	-0.494	-0.251	-0.303
GDP pc (logged)	-5.402***	-2.181	-8.374**	6.6	-1.968	-3.298*
	-2.07	-2.218	-3.498	-7.347	-1.546	-1.865
GDP pc squared (logged)	0.315**	0.0698	0.549**	-0.318	0.11	0.237*
	-0.132	-0.154	-0.226	-0.395	-0.103	-0.129
Hansen(p-value)	0.364	0.989	0.893	0.865	0.15	0.7
AR2(p-value)	0.294	0.885	0.734	0.998	0.647	0.496
Observations	185	185	185	142	185	185
Wald chi2	377.1	373.9	267.4	221.2	590.3	415.9

Note: System GMM analyses. Uses net Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-14: System GMM analysis of the Effect of Crises on Top 1% Share

LDV	0.810***	0.823***	0.737***	0.714***	0.756***	0.797***
	-0.0822	-0.112	-0.152	-0.13	-0.0709	-0.0709
Currency crises	2.616**					
	-1.135					
Banking crises		5.946***				
		-1.929				
Inflation crises			12.32**			
			-4.997			
Stock market crises				-3.025		
				-3.23		
Domestic debt crises					2.900***	
					-1.028	
External debt crises						2.370***
						-0.82
Polity score	0.00168	0.0185	0.00928	-0.065	-0.00823	-0.00443
	-0.0318	-0.0371	-0.05	-0.0485	-0.0351	-0.036
Trade	0.000811	0.00346	0.0238*	-0.0118	-0.00597	-0.00286
	-0.00507	-0.00648	-0.0142	-0.00744	-0.00467	-0.00433
Portfolio inflow	0.151	0.252*	0.272	0.188	0.206	0.215
	-0.129	-0.14	-0.186	-0.169	-0.133	-0.142
FDI inflow	0.079	-0.0616	-0.401	0.275*	0.182	0.0986
	-0.131	-0.191	-0.348	-0.159	-0.113	-0.118
GDP pc (logged)	-1.382	-0.666	-5.682**	1.715	-0.273	-0.736
	-1.304	-1.334	-2.492	-1.726	-1.237	-1.209
GDP pc squared (logged)	0.112	0.0553	0.413**	-0.0753	0.0366	0.0736
	-0.0821	-0.0835	-0.166	-0.111	-0.0783	-0.0762
Hansen(p-value)	0.176	0.915	0.954	0.275	0.167	0.186
AR2(p-value)	0.531	0.93	0.147	0.18	0.768	0.506
Observations	181	181	181	138	181	181
Wald chi2	175.7	156.7	45.78	117.3	235.7	218.3

Note: System GMM analyses. Uses Top 1% share. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-15: System GMM analysis of the Effect of Crises on EHII

LDV	0.996***	0.956***	1.014***	1.055***	0.852***	1.010***
	-0.152	-0.143	-0.159	-0.087	-0.266	-0.124
Currency crises	7.195**					
	-3.491					
Banking crises		4.971*				
		-2.837				
Inflation crises			6.816			
			-5.03			
Stock market crises				-0.781		
				-2.81		
Domestic debt crises					38.47	
					-42.67	
External debt crises						6.208*
						-3.466
Polity score	-0.0771	-0.0884*	-0.0891	-0.00465	-0.129**	-0.107*
	-0.0592	-0.0493	-0.0583	-0.0541	-0.0622	-0.0575
Trade	-0.00742	-0.0154***	-0.00845	-0.0231***	-0.0231***	-0.0125**
	-0.00898	-0.00535	-0.0105	-0.00471	-0.0068	-0.00551
Portfolio inflow	-0.352***	-0.168	-0.208**	-0.383***	-0.203	-0.173
	-0.106	-0.13	-0.104	-0.122	-0.139	-0.113
FDI inflow	0.0829	0.103	0.034	0.421**	0.441	-0.014
	-0.224	-0.222	-0.245	-0.201	-0.303	-0.23
GDP pc (logged)	-0.667	2.781	0.423	2.509	0.719	1.619
	-2.708	-1.839	-3.482	-1.594	-3.533	-1.981
GDP pc squared (logged)	0.0918	-0.147	0.0332	-0.115	-0.00451	-0.0418
	-0.161	-0.106	-0.211	-0.0966	-0.199	-0.12
Hansen(p-value)	0.871	0.607	0.523	0.218	0.816	0.689
AR2(p-value)	0.292	0.969	0.305	0.766	0.989	0.366
Observations	167	167	167	130	167	167
Wald chi2	631.7	641	611.7	1429	258.5	706.9

Note: System GMM analyses. Uses Top 1% share. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-16: PCSE Analysis of the Effects of Crises on Market Gini Coefficients

LDV	0.718***	0.734***	0.729***	0.713***	0.732***	0.717***
	-0.0261	-0.0241	-0.0231	-0.0343	-0.0242	-0.0224
Currency crises	4.158***					
	-0.827					
Bank crises		1.708				
		-1.057				
Inflation crises			3.012***			
			-0.767			
Stock market crises				-1.477**		
				-0.61		
Domestic debt crises					3.349**	
					-1.461	
External debt crises						3.481***
						-0.894
Polity score	0.0620**	0.0523	0.0567*	0.00594	0.0394	0.0444
	-0.0294	-0.0342	-0.029	-0.0381	-0.0316	-0.052
Trade	-0.00461	-0.0138***	-0.00798***	-0.0169***	-0.0156***	-0.0121***
	-0.00332	-0.00318	-0.00279	-0.00291	-0.00147	-0.00186
Portfolio inflow	-0.238**	-0.157**	-0.172**	-0.136	-0.160**	-0.125*
	-0.094	-0.0717	-0.0708	-0.0909	-0.0662	-0.0722
FDI inflow	0.354***	0.491***	0.394***	0.465**	0.514***	0.431***
	-0.0572	-0.0624	-0.0503	-0.182	-0.0326	-0.0624
GDP pc (logged)	-2.984**	-0.417	-2.373**	-1.87	-0.749	-1.743
	-1.316	-1.193	-1.024	-2.149	-1.036	-1.333
GDP pc squared (logged)	0.212**	0.0408	0.175**	0.133	0.0667	0.137
	-0.0893	-0.0784	-0.0715	-0.134	-0.0701	-0.0887
Constant	22.03***	13.05**	19.59***	20.74**	14.40***	17.92***
	-5.245	-5.207	-4.111	-9.285	-4.349	-5.195
Observations	185	185	185	142	185	185
R-squared	0.716	0.681	0.72	0.714	0.682	0.711
Rho	-0.0148	8.13E-05	-0.0443	-0.0384	0.00504	-0.0205

Note: PCSE analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-17: PCSE Analysis of the Effects of Crises on Net Gini Coefficients

LDV	0.791***	0.810***	0.795***	0.821***	0.806***	0.787***
	-0.0305	-0.0203	-0.0268	-0.0312	-0.0206	-0.0301
Currency crises	4.098***					
	-1.46					
Banking crisis		1.539***				
		-0.262				
Inflation crises			3.201***			
			-1.228			
Stock market crises				-0.173		
				-0.51		
Domestic debt crises					3.814**	
					-1.714	
External debt crises						3.156**
						-1.433
Polity score	0.0327	0.0271	0.0284	-0.0235	0.013	0.0151
	-0.0402	-0.033	-0.0347	-0.0365	-0.0333	-0.0396
Trade	-0.00266	-0.0112*	-0.00496	-0.0150**	-0.0126***	-0.0104***
	-0.00334	-0.00593	-0.00393	-0.00734	-0.00483	-0.00318
Portfolio inflow	-0.249***	-0.180***	-0.175***	-0.160***	-0.177***	-0.137***
	-0.0454	-0.0337	-0.0372	-0.0448	-0.0404	-0.0511
FDI inflow	0.353***	0.484***	0.375***	0.499*	0.489***	0.446***
	-0.0933	-0.141	-0.0984	-0.289	-0.123	-0.0797
GDP pc (logged)	-2.221	0.0968	-1.742	-0.193	-0.281	-0.855
	-1.499	-0.749	-1.295	-1.348	-0.703	-1.336
GDP pc squared (logged)	0.11	-0.0421	0.0816	-0.00939	-0.0134	0.0245
	-0.0902	-0.0448	-0.0789	-0.0758	-0.0427	-0.0816
Observations	185	185	185	142	185	185
R-squared	0.872	0.862	0.87	0.877	0.863	0.87
Rho	0.096	0.0798	0.0638	0.0892	0.096	0.0641

Note: PCSE analyses. Uses net Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-18: PCSE Analysis of the Effects of Crises on Top 1% Share

LDV	0.848***	0.874***	0.837***	0.845***	0.854***	0.838***
	-0.0231	-0.0186	-0.0235	-0.0179	-0.0202	-0.0183
Currency crises	2.153***					
	-0.529					
Banking crisis		0.735*				
		-0.405				
Inflation crises			1.812***			
			-0.522			
Stock market crises				0.438		
				-0.313		
Domestic debt crises					2.490**	
					-1.125	
External debt crises						1.368***
						-0.427
Polity score	0.0204	0.0204	0.0186	-0.0136	0.0125	0.0156
	-0.0242	-0.0281	-0.0244	-0.0195	-0.0274	-0.0337
Trade	-0.000379	-0.00473	-0.00135	-0.0076	-0.00537	-0.00454
	-0.00415	-0.00625	-0.00436	-0.00657	-0.00534	-0.00486
Portfolio inflow	0.152***	0.192***	0.193***	0.209***	0.197***	0.199***
	-0.0161	-0.0283	-0.0248	-0.0152	-0.0258	-0.0297
FDI inflow	0.0981	0.170*	0.105	0.221	0.165**	0.152**
	-0.0715	-0.103	-0.0667	-0.155	-0.0803	-0.0704
GDP pc (logged)	-0.734	0.41	-0.517	0.6	0.194	0.0494
	-1.004	-0.787	-0.995	-1.111	-0.855	-1.005
GDP pc squared (logged)	0.0679	-0.00898	0.0545	-0.00904	0.00725	0.0179
	-0.0601	-0.0461	-0.0601	-0.0683	-0.0517	-0.0603
Observations	181	181	181	138	181	181
R-squared	0.782	0.773	0.779	0.759	0.772	0.767
Rho	0.0837	0.0555	0.0751	0.133	0.0829	0.105

Note: PCSE analyses. Uses top 1% share. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-19: PCSE Analysis of the Effects of Crises on EHII

LDV	0.891***	0.883***	0.916***	0.899***	0.855***
	-0.0478	-0.0497	-0.0603	-0.068	-0.0506
Currency crises	2.416***				
	-0.501				
Inflation crises		2.511***			
		-0.521			
Stock market crises			-0.00932		
			-0.786		
Domestic debt crises				3.749***	
				-1.356	
External debt crises					3.056***
					-0.672
Polity score	-0.0947***	-0.102***	-0.0257	-0.101***	-0.110***
	-0.0348	-0.0303	-0.0272	-0.0318	-0.0243
Trade	-0.0186***	-0.0186***	-0.0255***	-0.0231***	-0.0207***
	-0.00405	-0.00414	-0.0066	-0.00434	-0.00329
Portfolio inflow	-0.212**	-0.153	-0.275***	-0.161	-0.123
	-0.0906	-0.107	-0.1	-0.105	-0.099
FDI inflow	0.265***	0.240***	0.490***	0.316***	0.252***
	-0.0818	-0.0751	-0.107	-0.0864	-0.0849
GDP pc (logged)	1.537*	1.761*	1.645	3.234***	2.033*
	-0.9	-0.927	-1.229	-1.219	-1.227
GDP pc squared (logged)	-0.073	-0.0845	-0.0844	-0.178**	-0.104
	-0.0602	-0.0598	-0.0839	-0.077	-0.0802
Observations	167	167	130	167	167
R-squared	0.883	0.886	0.907	0.884	0.892
Rho	0.128	0.154	0.193	0.187	0.173

Note: PCSE analyses. Uses EHII. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-20: Random Effects Analysis of the Effects of Crises on Market Gini Coefficients

LDV	0.654***	0.646***	0.628***	0.652***	0.632***
	-0.0677	-0.0706	-0.0843	-0.0702	-0.07
Currency crises	4.675***				
	-1.167				
Banking crisis		2.072**			
		-0.81			
Stock market crises			-1.521		
			-1.327		
Domestic debt crises				3.970***	
				-1.532	
External debt crises					3.972***
					-1.058
Polity score	0.038	0.0239	-0.0316	0.011	0.00561
	-0.0603	-0.0626	-0.0765	-0.0636	-0.0614
Trade	-0.000768	-0.00874	-0.0107	-0.0111	-0.007
	-0.00824	-0.00692	-0.00726	-0.00694	-0.0074
Portfolio inflow	-0.335***	-0.270**	-0.228**	-0.270***	-0.235**
	-0.114	-0.127	-0.0985	-0.102	-0.103
FDI inflow	0.298	0.398*	0.286	0.429*	0.328
	-0.247	-0.236	-0.242	-0.221	-0.238
GDP pc (logged)	-3.982*	-2.008	-3.270*	-2.129	-2.976
	-2.419	-2.179	-1.687	-2.15	-2.221
GDP pc squared (logged)	0.282*	0.148	0.233**	0.162	0.224*
	-0.147	-0.132	-0.106	-0.131	-0.135
Observations	185	185	142	185	185

Note: Random effects analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-21: Random Effects Analysis of the Effects of Crises on Net Gini Coefficients

LDV	0.732***	0.734***	0.727***	0.773***	0.728***	0.710***
	-0.0597	-0.062	-0.0619	-0.0705	-0.0628	-0.0608
Currency crises	4.545***					
	-1.024					
Banking crisis		1.783*				
		-0.975				
Inflation crises			3.611***			
			-0.987			
Stock market crises				-0.661		
				-1.18		
Domestic debt crises					5.067***	
					-1.285	
External debt crises						4.044***
						-1.067
Polity score	-0.00578	-0.0159	-0.0125	-0.0778	-0.0316	-0.0387
	-0.055	-0.0584	-0.0557	-0.0726	-0.0592	-0.0581
Trade	-0.000468	-0.00779	-0.00217	-0.0135	-0.00894	-0.00599
	-0.00982	-0.00876	-0.0098	-0.00921	-0.00886	-0.00927
Portfolio inflow	-0.350**	-0.286*	-0.269	-0.236	-0.282	-0.24
	-0.177	-0.171	-0.181	-0.197	-0.18	-0.209
FDI inflow	0.403	0.491**	0.407	0.493*	0.489**	0.425*
	-0.254	-0.248	-0.257	-0.295	-0.234	-0.251
GDP pc (logged)	-3.678*	-1.929	-3.094		-2.29	-2.747
	-2.091	-2.16	-2.135		-2.112	-2.127
GDP pc squared (logged)	0.214	0.0948	0.179	-0.00577	0.125	0.157
	-0.13	-0.134	-0.132	-0.021	-0.131	-0.131
Observations	185	185	185	142	185	185

Note: Random effects analyses. Uses net Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-22: Random Effects Analysis of the Effects of Crises on Top 1% Share

LDV	0.776***	0.787***	0.755***	0.774***	0.775***	0.760***
	-0.0434	-0.0446	-0.0455	-0.0522	-0.0458	-0.0421
Currency crises	2.358***					
	-0.591					
Banking crisis		0.772				
		-0.655				
Inflation crises			2.064***			
			-0.651			
Stock market crises				0.633		
				-0.694		
Domestic debt crises					2.643***	
					-0.761	
External debt crises						1.740**
						-0.743
Polity score	-0.0031	-0.00482	-0.00601	-0.0324	-0.0111	-0.0116
	-0.0338	-0.0363	-0.0349	-0.0385	-0.036	-0.0364
Trade	-0.000154	-0.00442	-0.000889	-0.00665	-0.00513	-0.00386
	-0.00423	-0.00441	-0.00438	-0.00447	-0.0043	-0.00436
Portfolio inflow	0.139	0.173	0.184	0.199	0.18	0.188
	-0.129	-0.121	-0.129	-0.138	-0.127	-0.134
FDI inflow	0.108	0.167	0.108	0.191*	0.163	0.138
	-0.109	-0.119	-0.112	-0.106	-0.104	-0.113
GDP pc (logged)	-0.816	0.224	-0.592	0.142	0.0139	-0.177
	-1.351	-1.282	-1.388	-1.346	-1.327	-1.234
GDP pc squared (logged)	0.0805	0.0099	0.0673	0.0249	0.026	0.0408
	-0.0831	-0.0786	-0.0856	-0.0821	-0.0818	-0.0764
Observations	181	181	181	138	181	181

Note: Random effects analyses. Uses top 1% share. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-23: Random Effects Analysis of the Effects of Crises on EHII

LDV	0.892***	0.891***	0.886***	0.880***	0.897***	0.857***
	-0.041	-0.0415	-0.0415	-0.0526	-0.0432	-0.0481
Currency crises	2.391***					
	-0.666					
Banking crisis		1.721**				
		-0.855				
Inflation crises			2.455***			
			-0.689			
Stock market crises				0.0836		
				-0.77		
Domestic debt crises					3.856***	
					-1.222	
External debt crises						2.965***
						-0.934
Polity score	-0.0991**	-0.102**	-0.105**	-0.0427	-0.110**	-0.116**
	-0.0477	-0.0465	-0.0479	-0.0462	-0.0474	-0.0467
Trade	-0.0188***	-0.0216***	-0.0189***	-0.0267***	-0.0234***	-0.0208***
	-0.00475	-0.00439	-0.00488	-0.0043	-0.0041	-0.00387
Portfolio inflow	-0.231***	-0.170*	-0.179**	-0.326***	-0.192**	-0.153*
	-0.0821	-0.0931	-0.0794	-0.086	-0.0832	-0.0912
FDI inflow	0.264	0.264	0.244	0.493***	0.304*	0.242
	-0.173	-0.179	-0.175	-0.186	-0.171	-0.169
GDP pc (logged)	1.457	2.881**	1.676	0.838	3.016**	1.911
	-1.469	-1.307	-1.456	-1.618	-1.385	-1.323
GDP pc squared (logged)	-0.065	-0.159**	-0.0761	-0.0283	-0.159*	-0.0924
	-0.0892	-0.0802	-0.0885	-0.0979	-0.0847	-0.0814
Observations	167	167	167	130	167	167

Note: Random effects analyses. Uses EHII. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-24: OLS Analysis of the Effects of Crises on Market Gini Coefficients
(Without Portfolio & FDI Inflow Variables)

LDV	0.763***	0.774***	0.768***	0.769***	0.775***	0.760***
	-0.0496	-0.0491	-0.0526	-0.0566	-0.0486	-0.051
Currency crises	4.283***					
	-1.026					
Banking crisis		2.379**				
		-1.056				
Inflation crises			3.092***			
			-0.963			
Stock market crises				-0.522		
				-1.274		
Domestic debt crises					3.979**	
					-1.92	
External debt crises						3.504***
						-1.043
Polity score	0.0672	0.0585	0.062	0.00842	0.0427	0.0551
	-0.0487	-0.0513	-0.049	-0.0672	-0.052	-0.052
Trade	0.00226	-0.00304	9.18E-05	-0.00644*	-0.0045	-0.00282
	-0.00361	-0.00361	-0.00366	-0.00344	-0.00324	-0.00342
GDP pc (logged)	-3.080**	-1.387	-2.601*	-2.082	-1.514	-2.315*
	-1.37	-1.204	-1.394	-1.533	-1.267	-1.377
GDP pc squared (logged)	0.215**	0.1	0.187**	0.151	0.115	0.171**
	-0.0848	-0.0736	-0.0866	-0.0948	-0.0787	-0.0854
Observations	219	219	219	172	219	219
R-squared	0.701	0.677	0.688	0.685	0.677	0.69

Note: OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4-25: System GMM Analysis of the Effects of Crises on Market Gini Coefficients
(Without Portfolio & FDI Inflow Variables)

LDV	0.404*	0.653***	0.431*	0.694***	0.676***	0.616***
	-0.242	-0.156	-0.236	-0.136	-0.189	-0.166
Currency crises	10.04***					
	-3.58					
Banking crisis		6.494**				
		-2.667				
Inflation crises			11.38***			
			-4.395			
Stock market crises				-3.453		
				-3.761		
Domestic debt crises					18.83**	
					-9.048	
External debt crises						7.480***
						-2.353
Polity score	0.0622	0.046	0.061	-0.0353	-0.0215	0.0111
	-0.0755	-0.0642	-0.0689	-0.0752	-0.0637	-0.0608
Trade	0.0184	0.00146	0.0186	-0.00788	-0.00387	0.00107
	-0.0123	-0.00677	-0.0128	-0.00607	-0.00658	-0.00639
GDP pc (logged)	-8.173	-2.259	-8.544*	-2.015	-3.623	-4.138
	-5.114	-2.65	-4.932	-2.552	-2.876	-3.028
GDP pc squared (logged)	0.531*	0.156	0.572*	0.152	0.272	0.304*
	-0.3	-0.152	-0.295	-0.153	-0.169	-0.178
Hansen(p-value)	0.886	0.32	0.765	0.0585	0.178	0.669
AR2(p-value)	0.751	0.794	0.653	0.372	0.914	0.741
Observations	185	185	185	142	185	185
Wald chi2	44.14	81.78	41.68	104.5	68.91	92.61

Note: System GMM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4-26: OLS Analysis of the Effects of Crises on Market Gini Coefficients
(The Sample Periods Extended to 1950s)

LDV	0.813***	0.827***	0.821***	0.805***	0.832***	0.821***
	-0.0405	-0.0407	-0.0418	-0.0473	-0.0398	-0.0395
Currency crises	3.889***					
	-0.957					
Banking crises		2.034*				
		-1.156				
Inflation crises			2.813***			
			-0.926			
Stock market crises				-0.709		
				-1.105		
Domestic debt crises					3.793**	
					-1.822	
External debt crises						3.307***
						-0.994
Polity score	0.0447	0.023	0.0336	-0.045	0.0113	0.0251
	-0.0436	-0.0442	-0.0439	-0.0523	-0.0438	-0.0441
Trade	0.00241	-0.00289	1.50E-05	-0.00713**	-0.00457	-0.00322
	-0.00416	-0.00358	-0.00389	-0.00299	-0.00299	-0.00291
GDP pc (logged)	-2.336*	-1.274	-2.171	-1.805	-1.561	-2.460*
	-1.353	-1.203	-1.338	-2.098	-1.31	-1.457
GDP pc squared (logged)	0.176**	0.108	0.170*	0.151	0.133	0.192**
	-0.0867	-0.0784	-0.0862	-0.13	-0.0844	-0.0932
Observations	273	273	273	213	273	273
R-squared	0.743	0.726	0.734	0.712	0.727	0.737

Note: System OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Portfolio and FDI inflow variables are excluded since their data are not available in 1950s. For Trade and GDP pc variables' the World Bank data are replaced with the data from Penn World Table since the World Bank data for these variables are not available in 1950s.

Table 4-27: System GMM Analysis of the Effects of Crises on Market Gini Coefficients
(The Sample Periods Extended to 1950s)

LDV	0.480**	0.639***	0.515**	0.400**	0.645***	0.640***
	-0.197	-0.13	-0.252	-0.203	-0.183	-0.117
Currency crises	14.43***					
	-4.293					
Banking crises		6.961**				
		-3.337				
Inflation crises			13.97**			
			-5.884			
Stock market crises				-13.62***		
				-4.899		
Domestic debt crises					41.11	
					-28.42	
External debt crises						9.592***
						-3.159
Polity score	0.140**	0.0655	0.127*	-0.084	0.0108	0.0527
	-0.0706	-0.0499	-0.0695	-0.0736	-0.0567	-0.0458
Trade	0.0261**	0.00422	0.0219	-0.00685	-0.00444	0.00256
	-0.0122	-0.00562	-0.0143	-0.00684	-0.00834	-0.00394
GDP pc (logged)	-4.628	-2.452	-5.027	3.265	-5.26	-4.812
	-3.373	-2.377	-3.481	-3.989	-3.488	-2.959
GDP pc squared (logged)	0.274	0.146	0.311	-0.172	0.352*	0.328*
	-0.207	-0.148	-0.211	-0.245	-0.212	-0.184
Hansen(p-value)	0.847	0.0839	0.372	0.0324	0.265	0.535
AR2(p-value)	0.329	0.693	0.349	0.522	0.82	0.496
Observations	273	273	273	213	273	273
Wald chi2	34.88	61.69	28.66	20.19	35.02	70.98

Note: System GMM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Portfolio and FDI inflow variables are excluded since their data are not available in 1950s. For Trade and GDP pc variables' data are replaced with the data from Penn World Table since the World Bank data are not available in 1950s.

Table 4-28: OLS Analysis of the Effects of Crises on Market Gini Coefficients
(With the Sample excluding the observations below 5th percentile and above 95th percentile of Market Gini Coefficients)

LDV	0.529***	0.529***	0.524***	0.452***	0.532***	0.505***
	-0.0597	-0.0609	-0.0613	-0.071	-0.0609	-0.0589
Currency crises	2.950***					
	-1.106					
Banking crisis		1.882**				
		-0.889				
Inflation crises			2.261**			
			-1.017			
Stock market crises				-2.039		
				-1.219		
Domestic debt crises					2.216**	
					-0.939	
External debt crises						3.524***
						-0.978
Polity score	0.0333	0.0287	0.0281	-0.0475	0.0211	0.0267
	-0.0606	-0.0615	-0.0604	-0.0753	-0.063	-0.0637
Trade	-0.00474	-0.00904	-0.00639	-0.0135**	-0.0121*	-0.00802
	-0.00778	-0.00637	-0.0075	-0.00576	-0.00664	-0.00727
Portfolio inflow	-0.146	-0.0569	-0.0886	-0.0712	-0.0844	-0.0474
	-0.0929	-0.0953	-0.0941	-0.103	-0.0875	-0.0918
FDI inflow	0.398	0.432**	0.407	0.516**	0.514**	0.419*
	-0.251	-0.21	-0.246	-0.228	-0.228	-0.236
GDP pc (logged)	-0.98	1.01	-0.57	-0.948	0.721	-0.32
	-2.448	-2.234	-2.276	-1.764	-2.215	-2.195
GDP pc squared (logged)	0.0763	-0.0562	0.0512	0.0658	-0.0349	0.0396
	-0.148	-0.135	-0.138	-0.11	-0.134	-0.133
Observations	165	165	165	125	165	165
R-squared	0.519	0.497	0.507	0.473	0.493	0.537

Note: OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-29: System GMM Analysis of the Effects of Crises on Market Gini Coefficients
(With the Sample Excluding the Observations below 5th Percentile and above 95th Percentile of Market Gini Coefficients)

LDV	0.11	0.321	-0.039	0.291	0.192	0.297
	-0.365	-0.197	-0.393	-0.213	-0.314	-0.258
Currency crises	8.026**					
	-3.665					
Banking crisis		5.834**				
		-2.918				
Inflation crises			10.77**			
			-5.313			
Stock market crises				-1.13		
				-3.201		
Domestic debt crises					6.954	
					-6.566	
External debt crises						6.045**
						-2.36
Polity score	0.00949	0.00587	0.00155	-0.0629	-0.0326	-0.00925
	-0.0726	-0.0602	-0.0809	-0.0636	-0.0714	-0.0602
Trade	0.0107	0.000516	0.0182	-0.0108	-0.00708	-0.00142
	-0.0134	-0.00916	-0.0169	-0.00847	-0.0089	-0.00793
Portfolio inflow	-0.215	-0.069	-0.0131	-0.0624	-0.0935	-0.0745
	-0.176	-0.112	-0.206	-0.172	-0.142	-0.13
FDI inflow	0.466	0.33	0.393	0.542**	0.641**	0.383
	-0.413	-0.23	-0.474	-0.226	-0.32	-0.316
GDP pc (logged)	-6.095	-1.043	-8.248	-3.072	-1.964	-2.379
	-5.016	-3.185	-5.541	-2.71	-3.724	-3.234
GDP pc squared (logged)	0.388	0.0669	0.527	0.189	0.128	0.176
	-0.291	-0.183	-0.331	-0.159	-0.213	-0.187
Hansen(p-value)	0.895	0.336	0.712	0.031	0.119	0.436
AR2(p-value)	0.286	0.126	0.227	0.48	0.278	0.253
Observations	165	165	165	125	165	165
Wald chi2	23.39	73.8	15.39	95.29	49.34	85.58

Note: System GMM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-30: OLS Analysis of the Effects of Crises on Market Gini Coefficients
(The Measure of Financial Liberalization (from The FRASER index) included in models)

LDV	0.708***	0.721***	0.713***	0.692***	0.720***	0.704***
	-0.064	-0.0621	-0.0657	-0.0793	-0.0625	-0.0642
Currency crises	3.520***					
	-1.139					
Banking crisis		1.075				
		-0.838				
Inflation crises			2.225**			
			-1.107			
Stock market crises				-2.327		
				-1.489		
Domestic debt crises					2.321	
					-1.965	
External debt crises						2.862***
						-1.076
Polity score	0.131**	0.133**	0.130**	0.0828	0.128**	0.122**
	-0.0564	-0.0612	-0.0584	-0.0891	-0.0612	-0.0598
Trade	0.00169	-0.00595	-0.00139	-0.0135	-0.00759	-0.00487
	-0.00902	-0.00795	-0.00934	-0.00844	-0.00809	-0.00867
Portfolio inflow	-0.131	-0.0627	-0.0672	-0.129	-0.0784	-0.0438
	-0.107	-0.107	-0.108	-0.118	-0.103	-0.115
FDI inflow	0.172	0.289	0.202	0.490*	0.337	0.263
	-0.289	-0.246	-0.291	-0.283	-0.256	-0.264
GDP pc (logged)	-2.583	0.235	-1.544	0.369	0.0115	-0.718
	-1.889	-1.898	-1.93	-1.974	-1.886	-1.872
GDP pc squared (logged)	0.165	-0.0136	0.102	-0.0176	0.00122	0.0578
	-0.119	-0.119	-0.121	-0.126	-0.119	-0.117
Financial liberalization	0.0168	-0.00878	0.0059	-0.0227	-0.00674	-0.0091
	-0.0307	-0.0314	-0.031	-0.0362	-0.0312	-0.028
Observations	164	164	164	127	164	164
R-squared	0.709	0.688	0.696	0.691	0.688	0.703

Note: OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4-31: OLS Analysis of the Effects of Crises on Market Gini Coefficients
(The Measure of Size of Financial Market (Domestic Credit to Private Sector as % of GDP)
included)

LDV	0.715***	0.735***	0.720***	0.704***	0.734***	0.713***
	-0.0588	-0.0596	-0.0623	-0.0711	-0.0593	-0.0607
Currency crises	4.217***					
	-1.135					
Banking crisis		1.808**				
		-0.88				
Inflation crises			3.126***			
			-1.064			
Stock market crises				-1.511		
				-1.346		
Domestic debt crises					3.278**	
					-1.416	
External debt crises						3.498***
						-1.016
Polity score	0.062	0.049	0.055	0.00301	0.0375	0.0414
	-0.0577	-0.0601	-0.0575	-0.0847	-0.0605	-0.0605
Trade	-0.00427	-0.0143**	-0.00728	-0.0161**	-0.0160**	-0.0122
	-0.00788	-0.00704	-0.00766	-0.00706	-0.0068	-0.00735
Portfolio inflow	-0.236**	-0.158	-0.164	-0.127	-0.163	-0.123
	-0.117	-0.125	-0.119	-0.115	-0.106	-0.111
FDI inflow	0.348	0.483*	0.376	0.446*	0.515**	0.423*
	-0.256	-0.247	-0.263	-0.264	-0.233	-0.247
GDP pc (logged)	-2.975	-0.618	-2.371	-1.729	-0.869	-1.814
	-2.144	-1.859	-2.055	-1.569	-1.853	-1.919
GDP pc squared (logged)	0.21	0.0615	0.174	0.12	0.0794	0.145
	-0.133	-0.117	-0.129	-0.101	-0.117	-0.121
Domestic credit	0.00102	-0.00724	0.000528	0.00367	-0.00465	-0.00337
	-0.00846	-0.00877	-0.00875	-0.00876	-0.00838	-0.00885
Observations	185	185	185	142	185	185
R-squared	0.709	0.682	0.696	0.69	0.684	0.701

Note: OLS analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4-32: System GMM Analysis of the Effects of Crises on Market Gini Coefficients
(The Measure of Size of Financial Market (Domestic Credit to Private Sector as % of GDP)
included)

LDV	0.385	0.601***	0.475*	0.665***	0.568**	0.524**
	-0.243	-0.189	-0.247	-0.17	-0.238	-0.231
Currency crises	8.998***					
	-3.239					
Banking crisis		5.203*				
		-2.816				
Inflation crises			10.66**			
			-4.955			
Stock market crises				-3.637		
				-3.635		
Domestic debt crises					14.38*	
					-7.649	
External debt crises						6.374***
						-2.265
Polity score	0.0619	0.034	0.0645	-0.0296	-0.0134	0.0103
	-0.0748	-0.064	-0.0663	-0.075	-0.0668	-0.0647
Trade	0.0129	-0.005	0.0173	-0.0149**	-0.0082	-0.00343
	-0.0136	-0.00842	-0.0166	-0.00726	-0.00785	-0.00821
Portfolio inflow	-0.255*	-0.15	-0.0982	-0.197*	-0.141	-0.109
	-0.141	-0.131	-0.145	-0.115	-0.128	-0.147
FDI inflow	0.244	0.265	0.0214	0.349	0.307	0.263
	-0.325	-0.279	-0.406	-0.281	-0.254	-0.287
GDP pc (logged)	-7.823	-2.647	-7.835*	-2.125	-3.86	-4.475
	-4.926	-2.899	-4.354	-2.574	-3.225	-3.432
GDP pc squared (logged)	0.500*	0.193	0.517**	0.154	0.278	0.32
	-0.288	-0.168	-0.257	-0.15	-0.186	-0.199
Domestic credit	0.00703	-0.0134	0.0117	0.000724	-0.0036	-0.00498
	-0.0119	-0.01	-0.0151	-0.0084	-0.0102	-0.0106
Hansen(p-value)	0.8	0.148	0.46	0.0816	0.149	0.41
AR2(p-value)	0.392	0.193	0.383	0.68	0.276	0.328
Observations	185	185	185	142	185	185
Wald chi2	52.84	112.8	50.47	202.6	108.6	123.4

Note: System GMM analyses. Uses market Gini coefficients. All explanatory variables are lagged. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4-33: OLS & System GMM Analysis of the Effects of the Total Number of Crises
on Market Gini Coefficients

	OLS	System GMM
Crisis Tally	1.000**	2.061*
	-0.397	-1.135
Polity score	0.0463	0.0473
	-0.0785	-0.0746
Trade	-0.0067	0.00731
	-0.00849	-0.0119
Portfolio inflow	-0.0673	-0.0484
	-0.122	-0.158
FDI inflow	0.279	0.11
	-0.278	-0.394
GDP pc (logged)	-4.949**	-9.923**
	-1.951	-4.246
GDP pc squared (logged)	0.328***	0.630***
	-0.121	-0.243
LDV	0.696***	0.443
	-0.0767	-0.281
R-squared	0.705	
Hansen(p-value)		0.205
AR2(p-value)		0.397
Observations	142	142
Wald chi2		78.26

Note: OLS & System GMM analyses. Uses market Gini coefficients.
All explanatory variables are lagged. Robust standard errors clustered by country in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

CHAPTER 5 CONCLUSION

In the second chapter, I demonstrated that inequality significantly moderates citizens' aversion to inflation and thus their preference for anti-inflation policy. In doing so, it illuminates the micro foundation of the political dynamics that links inflation to inequality. With rising economic disparities and the recent global resurgence of the populist politics, I suggest that this research can stimulate more academic discussions on the implications of those trends. Future research, for instance, can explore how weakened inflation aversion in a country under the conditions of inequality affects the independence of its central bank. Given that more than a few economists have already raised serious concerns that the recent advent of populism may have negative impacts on "the consensus in favor of central bank independence," the question seems timely (Masciandaro and Passarelli 2018). Future work can also investigate the influence of anemic public preference for low inflation caused by an intensifying economic gap on political parties' monetary policy stances, which have converged around the neoliberalist emphasis on price stability across a number of countries over the past decade.

The third chapter points out that because the existing literature has overly focused on the supply-side of CBI's implication on economic policy, it has largely ignored how CBI affects its demand-side. The key findings in this chapter indicate that, as an institutionalized form of monetary technocracy, CBI discourages citizens from evaluating their representative governments based on the fluctuating fortunes of their jobs and businesses in elections, even though these are the very conditions which may most fundamentally affect their lives. Building on the findings in this chapter, I expect that more meaningful studies on the relationship between central banks and democratic accountability can be conducted. For example, my research can be extended to examine how economic crises can again condition the mitigating effects of CBI on economic voting. While

experiencing a series of recent economic crises, we observed that nothing brought more public attention to central bankers than economic crises. In particular, when monetary policy often emerges as "the only stabilization tool in town" during crises due to tight fiscal constraints imposed on many governments by high borrowing costs in unstable financial markets or binding fiscal rules, the relative role of independent central banks in coping with the crises may appear more prominent than that of elected governments (Buiter 2014, 270). Therefore, as the public expects more from these unelected bankers than the representative governments, we might speculate that CBI's erosive effects on democratic accountability can be intensified in the midst of economic crises.

The forth chapter identifies a robust effect linking a wide variety of financial crises to income inequality. This chapter discussed the threats to inference ignored in past work and used a research design that tackles those important methodological concerns. The empirical results suggest a novel mechanism – worsening income inequality - through which economic crises can have adverse political effects. They also suggest that the effects of crises play out in the long term and the political consequences of a major financial crisis like that of 2007 have yet to be fully realized.

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