DOCUMENTOS DE TRABAJO

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N° 861 Enero 2019

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Documentos de Trabajo del Banco Central de Chile
Working Papers of the Central Bank of Chile
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Documento de Trabajo
N° 861

Working Paper
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Unequal Political Business Cycles: Inequality, Policy Uncertainty and the Macroeconomy*

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Abstract
Este trabajo explora la existencia de ciclos políticos de actividad económica que dependen del nivel de desigualdad. Se argumenta que altos niveles de desigualdad llevan a altos niveles de incertidumbre con respecto a las políticas que se realizarán en el futuro, toda vez que aumentan las presiones redistributivas y al mismo tiempo aumenta el poder político de los más ricos. Esta mayor incertidumbre tiene un efecto negativo sobre la economía por medio de canales de transmisión que ya han sido estudiados previamente por la literatura. En este trabajo se explora empíricamente esta hipótesis en base a tres estrategias distintas. Primero se implementan regresiones de panel para un grupo de 25 países y cuatro décadas. Segundo se utilizan datos históricos para EEUU desde 1947 hasta 2018 y 18 elecciones. En ambos casos se encuentra evidencia a favor del mecanismo planteado. Únicamente cuando la desigualdad es alta la el PIB cae bajo su tendencia durante una elección. También se encuentra una caída en los componentes privados de la demanda agregada y, para el caso de EEUU, un aumento en la incertidumbre política, solamente cuando la desigualdad es alta. La tercera estrategia consiste en estimaciones con datos microeconómicos del PSID, que muestran que familias de bajo nivel de riqueza reducen su tasa de consumo durante años eleccionario. Esta evidencia está en línea con la hipótesis de que las elecciones impactan el consumo privado a través de la incertidumbre política en tiempos de alta desigualdad.

Resumen
Este trabajo explora la existencia de ciclos políticos de actividad económica que dependen del nivel de desigualdad. Se argumenta que altos niveles de desigualdad llevan a altos niveles de incertidumbre con respecto a las políticas que se realizarán en el futuro, toda vez que aumentan las presiones redistributivas y al mismo tiempo aumenta el poder político de los más ricos. Esta mayor incertidumbre tiene un efecto negativo sobre la economía por medio de canales de transmisión que ya han sido estudiados previamente por la literatura. En este trabajo se explora empíricamente esta hipótesis en base a tres estrategias distintas. Primero se implementan regresiones de panel para un grupo de 25 países y cuatro décadas. Segundo se utilizan datos históricos para EEUU desde 1947 hasta 2018 y 18 elecciones. En ambos casos se encuentra evidencia a favor del mecanismo planteado. Únicamente cuando la desigualdad es alta la el PIB cae bajo su tendencia durante una elección. También se encuentra una caída en los componentes privados de la demanda agregada y, para el caso de EEUU, un aumento en la incertidumbre política, solamente cuando la desigualdad es alta. La tercera estrategia consiste en estimaciones con datos microeconómicos del PSID, que muestran que familias de bajo

*Email: aaguirre@bcentral.cl. This is work in progress. I thank Lucciano Villacorta and Michael Berlemann for helpful comments and suggestions. I also thank seminar participants at the European Public Choice Society and LACEA annual meetings. The views expressed in this paper do not necessarily represent those of the Central Bank of Chile or its Board. All errors are mine.

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1 Introduction

Inequality has gained considerable academic as well as popular attention in the last years. The surge of interest has been pushed by a widening in income and wealth inequality in developed countries and the growing availability of micro data facilitating its economic and historical analysis. Despite this there are still few papers studying the connection between inequality and macroeconomic dynamics, particularly at the business cycles frequency.[1] In this paper I document empirically a specific connection using elections as an exogenous shock that triggers policy uncertainty depending on the level of inequality. This gives rise to unequal political business cycles (UPBC), which are characterized by a fall in GDP, private consumption and investment around elections, but only in times of high inequality.

In their classic paper Meltzer and Richard (1981) present a stylized model where rising inequality in democratic countries leads to votes for redistribution. Voters in countries depicting a large concentration of wealth and income may be pleased by politicians proposing higher levels of redistribution, hurting only the few that concentrate most of the resources in the economy. However rising inequality might boost the power of the rich, enabling them not only to counter the popular will but also to achieve even less redistribution through over representation in the political process (Solt, 2008; Winters and Page, 2009; Gilens, 2012; McCarty et al., 2016; Bartels, 2018; Epp and Borghetto, 2020).[2] Hence inequality increases the distance between the desired policies of the different groups with similar levels of political power.[3] Since political power switches between parties adhering to each of these political groups, uncertain election results translate in higher policy uncertainty as inequality grows.[4]

Hence inequality leads to higher policy uncertainty, which, in turn, affects the economy. The macroeconomic effects of policy uncertainty have been extensively studied. High uncertainty may have detrimental effects on economic activity due to adjustment costs in investments and hiring and firing decisions (Cukierman, 1980; Bernanke, 1983; Rodrik, 1991; Bloom, 2009), or due to the surge of precautionary savings by households (Ravn and Sterk, 2017; Den Haan et al., 2017; Bayer et al., 2019), among other channels, predictions that seem to be confirmed by empirical work

[1] The relation between inequality and business cycles has been analyzed in the context of heterogeneous agents models. See for instance Krusell and Smith (1998) and Krueger et al. (2016).

[2] A related literature explores the effect of democratization in redistribution, finding just a weak relationship (see e.g. Acemoglu et al., 2015, and references therein).

[3] As put by McCarty et al. (2016), "In the middle of the twentieth century, the Democrats and the Republicans did dance almost cheek to cheek in a courtship of the political middle. But over the past forty years the parties have deserted the center of the dance floor in favor of the wings ... just as American politics became increasingly divisive, economic fortunes diverged."

[4] Therefore, in this context, political polarization may be caused by inequality (Hare and Poole, 2014; McCarty et al., 2016). Autor et al. (2020) find a role for rising trade exposure. Political polarization has been studied in relation to macroeconomic outcomes, for instance by Azzimonti and Talbert (2014), and, more closely related to this paper, by Canes-Wrone and Park (2012).

(see e.g. Baker et al., 2016).[5] However causality from policy uncertainty to macro outcomes is difficult to identify because policy responds to economic conditions in a forward looking manner. In this dimension the paper can be understood as identifying an exogenous source of uncertainty, i.e. elections in times of high inequality, in order to measure its causal macroeconomic effects.

According to this line of thought it is to be expected that in times of high inequality we should observe a recession around elections, everything else constant. The extensive literature on political business cycles (PBC) goes back to Nordhaus (1975) and Lindbeck (1976). Its focus has been on the incentives for an incumbent to appear competent ahead of elections and the political rewarding of preelectoral booms. Therefore it tries to explain the presence of economic expansions before elections, emphasizing the role of stabilization policies in generating them. Differently from this literature I focus on uncertainty and hence the occurrence of recessions around elections, with no specific role for stabilization policies. There is also a focus on the macroeconomic effects of policy switches due to partisan motivations, which lead to post-electoral business cycles. Unlike the UPBC, there may be a boom or a recession after the election depending on the party winning the election. Uncertainty is also key in this type of PBC, but mainly with respect to the conduct of monetary policy.[6]

Canes-Wrone and Park (2012) and Julio and Yook (2012) provide evidence supporting an alternative view of PBC.[7] Julio and Yook (2012) find that corporate investment falls the year of an election in a sample of 48 countries between 1980 and 2005. Canes-Wrone and Park (2012) find a pre-electoral decline in private gross fixed capital formation using a panel of ten OECD countries between 1975 and 2006. These papers don't consider inequality as a conditioning variable, the focus of the present paper.[8] Here not only investment is shown to be affected by elections in times of high inequality but also GDP, private consumption and policy uncertainty. I analyze in detail the behavior of private consumption using both macro and microeconomic data, trying to incorporate into the PBC literature the mechanisms generated by household's precautionary savings, which extend the effects of policy uncertainty beyond those related to irreversible investments.

Both macroeconomic and microeconomic data are used in this paper to test the UPBC hypothesis and the possible mechanisms behind it.

[5]The papers studying the effects of precautionary savings focus on job rather than policy uncertainty as a determinant of aggregate fluctuations through its effect on household's consumption decisions. In the case of investment, Hassan et al. (2019) focus specifically in firms facing political risk, which retrench investment and hiring. Caldara et al. (2020) study trade policy risks.

[6]See Alesina (1988); Franzese Jr (2002); Persson and Tabellini (2002); Drazen (2004) for reviews of the literature on office-seeking and partisan PBC. There is also a related literature that explores the different performance of Republican and Democrat governments in the US (see e.g. Blinder and Watson, 2016; Pastor and Veronesi, Forthcoming).

[7]See also related work by Julio and Yook (2016) and Jens (2017).

[8]Canes-Wrone and Park (2012) condition the effect of elections on electoral competitiveness and partisan polarization. In my framework these variables are not only endogenous to macroeconomic conditions (see Jens, 2017), but also to inequality (Hare and Poole, 2014; McCarty et al., 2016).

First I implement panel estimations with country and time-fixed effects for a group of 25 mostly advanced countries and four decades.[9] When not conditioning by inequality macroeconomic aggregates do not differ significantly from trend values during elections. But results change when conditioning by inequality. In this case I find statistically significant differences between times of low and high inequality. When inequality is sufficiently high, GDP, private consumption and investment start falling below trends four or three quarters before the election takes place, and recover not before four quarters after it. Quantitatively the effect is large. A raise of one standard deviation in within-country inequality leads to a maximum fall of about 0.6% of quarterly GDP, which happens in the election quarter. Taking into account all of the quarters GDP is below its trend the total cost is around 1% of annual GDP. If a country goes from the 5th percentile of within-country inequality to the 95th percentile, the costs are three times as large, about 1.75% of quarterly GDP and 3% of annual GDP, respectively. I find that both private consumption and investment behave similarly, with falls that are proportional to their standard deviations, but there is no significant differences in the behavior of public spending. Results remain strong when dropping snap elections, and are robust to different measures of inequality, the inclusion of linear trends and changes in the sample. Results persist when restricting to advanced, parliamentary or richest countries.

Then I exploit recently constructed historical series of US policy uncertainty and wealth inequality spanning from 1947 to 2018, which includes 18 presidential elections. The findings support the existence of UPBC, not only in analyzing the behavior of macroeconomic aggregates but also policy uncertainty. In particular I find no significant unconditional effect of elections in these variables, but I do so when conditioning on wealth concentration. When inequality is relatively high policy uncertainty starts to increase two quarters before an election and reaches a peak in the election quarter above two standard deviations. GDP starts to fall one or two quarters before the election and achieves its lowest level three quarters after the election. In this specification the effect is also sizeable. A raise of one standard deviation in inequality results in a maximum gap between quarterly GDP and its trend of 0.9% of quarterly GDP, and a total cost of 1.5% of annual GDP. Moving from an election when inequality was at the lowest level, observed in 1978, to the one with the highest level, observed in 2012, generates a total loss of more than 6% of annual GDP. In terms of macroeconomic aggregates I find that, similarly to the pattern found for GDP, both private consumption and investment fall around elections under high inequality. Again, the fall in each of this variables is proportional to its standard deviation. These results are not driven by the 2008 election, which coincided with the Great Recession and relatively high wealth inequality. Results

[9]Because results rely on the interaction between election dummies and inequality, a country-fixed effect is not enough to clean for any country-specific invariant component influencing the results. More unequal countries may have additional features that only manifest during elections, making macro variables more sensitive to them at that moment. The specification used in this paper fixes this problem in a simple way, by interacting election dummies with deviations of inequality from country averages, exploiting in this way only variation within countries.

are not only driven by low-frequency changes in inequality but by high-frequency changes as well, and they are robust to the inclusion of a trending effect in elections, lowering the likelihood that the estimations are capturing some alternative slow-moving explanatory variable. Although the effects are significant under different measures of wealth inequality it is the fraction accumulated by the very rich, i.e. 1% of the population, the one that is more relevant in the results. Also, in line with the hypothesis that wealth inequality leads to policy uncertainty and hence to a negative economic cycle, the effects in economic activity are quantitatively smaller when keeping uncertainty constant in the estimations.[10]

Results from these macroeconomic specifications are in line with the existence of a UPBC. One interesting result is the significant fall in private consumption, although it is not possible to conclude wether this is due to the direct effect of political uncertainty, or an indirect effect through income. To shed some light on this the third exercise I perform in this paper makes use of microeconomic data on consumption, disposable income and wealth to explore the existence of a precautionary response of households to elections when inequality is high. Using data from 2005 to 2017 I estimate panel fixed-effects regressions and find that, during election years, the change in the expenditure rate of relatively wealth poor agents falls significantly, with a magnitude that is as large as 70% of a standard deviation in the group of poorest households.[11] In contrast the estimations show no significant change in expenditure rates of wealth-rich agents. The finding that consumption falls more than income, and that this happens exclusively in wealth poor families, support the idea that the UPBC is generated by policy uncertainty, not only affecting firms but consumers as well.

The panel estimations are presented in Section 2, the US time-series estimations are presented in Section 3, and the US microeconomic evidence is presented in Section 4. Section 5 concludes.

2 Macroeconomic Evidence I: Panel Estimation

2.1 Panel Estimation: Data and Empirical Specification

I consider the following specification for exploring the dynamic effects of elections conditional on the level of inequality in a panel of countries:

$$\begin{aligned} x_{tj} &= \alpha_j + \delta_t + \beta_1 x_{t-1j} + \sum_{l=-Lg_e}^{Ld_e} \beta_{2l} e_{t+lj} + \sum_{l=-Lg_e}^{Ld_e} \beta_{3l}(e_{t+lj} \times (ii_{tj} - \bar{ii}_j)) \\ &\quad + \sum_{l=-Lg_e}^{Ld_e} \beta_{4l}(e_{t+lj} \times \bar{ii}_j) + \beta_4 ii_{tj} + \epsilon_{tj} \end{aligned} \tag{1}$$

[10] I also show evidence that, although negative and significant in all the cases, results are stronger when the incumbent doesn't run for reelection, when the incumbent is a Democrat and when the winner is a Democrat. These results are obtained at the cost of an important lost in degrees of freedom, but support the idea that uncertainty influences the results, because of the incumbent result, and makes clearer the difference with partisan PBC.

[11] The 2008 election is also excluded from this result.

where subindexes j and t denote country and quarter, respectively. The dependent variable x is quarterly GDP or a domestic demand component, seasonally adjusted and detrended using the HP filter. The specification contains both country and period fixed-effects, denoted by α_j and δ_t, respectively. The first lag of the dependent variable is included to better capture the dynamic effects of elections.[12] The variable e_{tj} is an indicator that takes the value of 1 when there is an election in period t and country j. Then, the coefficients β_{2l} capture the unconditional effect of elections on the variable of interest, from Lg_e periods before the election to Ld_e periods after the election. The following term in equation (1) captures the interaction with inequality. The variable ii_{tj} is a measure of income inequality for period t and country j, and $\bar{ii}_j$ is is the country average for the entire period. Therefore the coefficients β_{3l} capture the additional effects of elections due to inequality, but only taking into account variations of inequality within countries.[13] Note that ii doesn't vary with l so any short-run variation in inequality, which might be influenced by elections, is not taken into account when estimating β_{3l}. The last two dependent variables are included to control for average inequality and inequality in periods of no elections. Finally ϵ_{tj} is the residual term.

Throughout this paper I will be careful about controlling for the Great Recession initiated in 2008. In the case of the panel estimations the time-effect is insufficient if countries were affected differently, or if the effect was different in countries going through electoral processes. To eliminate this possibility I don't consider any election taking place during the years 2008 and 2009 in the estimations, setting $e_{tj} = 0$ for that period. This leaves 12, from a total of 154 elections, out of the estimations.[14]

For macroeconomic aggregates the source of the data is the IFS.[15] For inequality I use data from the Luxembourg Income Study Database (LIS), which report inequality indicators from harmonized microdata collected from a cross-section of countries and various decades. Since they come from microeconomic surveys these indicators are available with a variable periodization, typically once

[12] As explained below I restrict the sample to countries with at least 40 quarters of data. The average number of quarters per country is more than 90. This makes unlikely the existence of the incidental parameter problem. I show below that results remain significant when restricting the sample to countries with at least 60 and 80 quarters of data, cases in which the average number of quarters per country rises to 100 and 130, respectively.

[13] The inclusion of a fixed-effect would typically make this adjustment unnecessary. It is not the case here because the focus is on the interaction term $e_{tl} \times ii_{tl}$, which has an average very close to zero.

[14] Including dummy variables for each of these elections as an alternative way of controlling for the effects of the Great Recession would require the inclusion of $12 \times (Lg_e + 1 + Ld_e)$ new variables to equation (2). This may deteriorate the precision of the estimations.

[15] I use seasonally adjusted real GDP (codes NGDPRSAXDC, NGDPRKSAXDC, NGDPRKSAIX and NGDPRCHSAXDC). In the case of demand components I use seasonally adjusted final consumption expenditure from private sector (code NCPSAXDC), final consumption expenditure from the public sector (NCGGSAXDC) and gross fixed capital formation (code NFISAXDC), all deflated by the seasonally adjusted GDP deflator (code NGDPDSAIX). The only modifications I make is to adjust base year changes in the data for Canada and Israel, as well as dropping data for Israel previous to 1990, a period of high inflation rates.

every 3 or 5 years. To obtain the value of inequality in each election year I interpolate the series annually.[16] LIS publishes different inequality indicators. I use the 90/10 percentiles ratio, as it is the one that better captures inequality at the extremes of the distribution. Below I show how results change when using the gini index. Data for elections comes from updates of Bormann and Golder (2013), complemented with data from internet sources for years that are not available. I consider only presidential elections in presidential systems and only parliamentary elections in parliamentary systems. I restrict the sample to elections in countries with high democracy scores. To do this I use the Polity IV dataset, and only include years with a polity index, which ranges from -10 to 10, above 5. Finally I keep countries with at least 10 years of consecutive observations.[17] Table 1 lists the countries included in the baseline estimations, the time period and the number of elections considered for each. Most of the countries are developed and parliamentary, the earliest data is from the 70s and spans from 10 to more than 40 years, and the number of elections per country ranges from 2 to 14.

2.2 Panel Estimation: Baseline Results

I first show the results using GDP as the dependent variable. Before conditioning on inequality I estimate equation (1) only with election dummies and fixed and time effects, to explore the existence of a PBC in the sample. Based on this specification the left-upper panel of Figure 1 shows the predicted path for GDP around an election quarter $t = 0$, together with bootstrapped 90% confidence bands.[18] As can be seen in the graph deviations from trend GDP are small (below 0.1%) and not statistically significant. Hence there is no evidence of PBC in the sample.

Next I turn to the estimation of UPBC introducing the interactions with income inequality specified in equation (1). Note that the existence of the UPBC implies that the coefficients on these interactions are negative and significant. I report the value and significance of these in the first column of Table 2. To save space I don't report the rest of the coefficients included in equation (1). I include seven different dummies, one for each of the five quarters before the election, the quarter of the election and the quarter after it.[19] The coefficients are negative and statistically significant, at least at the 95% confidence level, in every quarter during the year previous to the election. This evidence is in line with the existence of an UPBC: the path for GDP around elections under high inequality is below the path around elections under low inequality.

[16] To obtain the value in periods without elections, a variable that is used as a control, I interpolate annually and then assume there is no variation within a year.

[17] Because of the slow-moving nature of inequality it is important to consider long periods of time for each country. In the sensitivity analysis I show results with more stringent restrictions.

[18] Here and in the rest of the paper I use the wild bootstrap to compute confidence intervals and to assess the significance of the estimated coefficients.

[19] These periods are chosen to have at least one coefficient before and after the election, and one non-significant coefficient at each extreme. Results don't change much when using an alternative configuration of these dummies.

To get a better sense of the size of the effect I normalize the inequality variable $ii_{tj} - \bar{ii}_j$ in such a way that a value 1 corresponds to a benchmark of high inequality, and a value of 0 to a benchmark of low inequality. Note that these benchmarks are both set in terms of deviations from the country's average level of inequality, so they correspond to measures of within-country inequality.[20] As benchmarks I take the 95th and 5th percentile of the variable $ii_{tj} - \bar{ii}_j$ in the sample.[21] Therefore the coefficients in Table 2 can be interpreted as the GDP loss during the corresponding quarter, when a country reaches the high inequality benchmark, relative to the level of GDP observed in the low inequality benchmark. However this number doesn't include the dynamics arising from the persistence in GDP. To include this dynamic effect I compute impulse-response functions for each of the benchmarks and obtain the maximum difference between the two, which I report in the seventh row of column (1) in Table 2. Additionally I report in the eight row the sum of the differences between the two impulse-response functions to obtain an estimation of the total loss during the entire election period. These statistics show that, relative to the benchmark of low inequality, quarterly GDP falls a maximum of 1.76% during an election under high inequality. This is very close to the quarterly GDP standard deviation in the sample. The total loss in GDP is almost 12% of quarterly GDP, or around 3% of annual GDP. These estimations are statistically significant at a 99% level. Since the specification used is linear in inequality results are proportional to the change in inequality. Take for instance a variation in inequality equivalent to a one within-country standard deviation. This is 0.32. Then the difference would be one third of the difference reported above: in a country where inequality increases by a one within-country standard deviation, quarterly GDP will fall a maximum of 0.58% relative to the initial situation, and the total lost would be 1% of annual GDP.

The entire path of the difference between the impulse-response functions under the two benchmarks is depicted in the middle-upper panel of Figure 1. The difference starts being negative 4 quarters before the election and remains like this for at least 7 quarters. The minimum value is achieved the quarter of the election. In the upper-right panel of Figure 1 the two impulse-responses are shown separately. There we can see that under the low inequality benchmark GDP remains close to trend GDP, without significant deviations. Thus the results described above are due to the path under high inequality, which shows a persistent fall until the quarter of the election.

[20] Hence it may be the case that an individual country never achieves any of these levels, or may be the case that a country with a low level of inequality on average, achieves at some point the high inequality benchmark.

[21] I only consider developed countries when computing the percentiles to avoid the influence of potentially high deviations in developing countries. It turns out however that differences are not so large. In the baseline case, where I use the 90/10 income ratio, the percentiles would be about 30% lower and higher when including developing countries. In the case of the gini coefficient, for which I show results below, the difference is close to zero.

2.3 Panel Estimation: Demand Components

In this subsection I show results from estimating equation (1) using aggregate demand components as dependent variables. Specifically I explore the existence of an UPBC in private consumption, public expenditures and investment. Coefficient estimations are presented in columns (2) to (4) in Table 2. I keep the number of lags and leads of the election dummy used in the GDP estimations. Both private consumption and investment (columns 1 and 2) depict negative and significant coefficients. The size of the effect is large. When taking into account the dynamics of each component the maximum distance between the high and low inequality benchmarks are 1.96% and 6.35% of quarterly consumption and investment, respectively. When comparing these numbers to the standard deviations of each of the variables results are proportional to them, consumption falls a maximum of 1.09 standard deviations while investment does so a maximum of 1.11 standard deviations. These numbers are about 10% larger than for GDP. The total loss is 3% of annual consumption and almost 8.2% of annual investment. Public expenditures show a different pattern. There is only one significant coefficient, that is positive, four quarters before the election. Afterwards coefficients decrease in size and become negative after the quarter before the election, but the overall effect is not significant. This is a sign that fiscal policy is not behind the UPBC found in GDP and private demand components.

In Figure 1, below the GDP impulse-response functions, are shown those corresponding to each of the aggregate demand components. On the left I show first the impulse-response function when not conditioning in inequality, and it can be seen that none of the variables show significant deviations relative to their trend values. Then, in the middle, the differences between the high and low inequality benchmarks are plotted. As in the case of GDP, both consumption and investment (second and third rows, respectively) become negative and significant four quarters before the election. The lowest levels are achieved between the election quarter and one quarter before, and the difference remains negative and significant at least two quarters after the election. In both cases the results are due to a fall in times of high inequality, as can be seen in the right panels, which depict the impulse-responses for the two benchmarks separately. In the case of public expenditures (last row) we observe a positive and significant difference during the quarters before the election. But this pattern is explained by a lower spending in times of low inequality rather than higher spending under high inequality, as shown in the right panel. Spending under high inequality becomes negative and significant after the election, probably affected by the fall in GDP.

Hence we see that private consumption and investment decline around elections only when inequality is sufficiently high relative to the country's average. Although it is not possible to identify whether this is caused directly by inequality, or indirectly through the decline in income, these estimations may shed light on the mechanisms behind the UPBC. In particular the strong decline in consumption and investment may be the outcome of political uncertainty in line with the literature revised in the introduction. This decline in aggregate demand may lower GDP, and

this in turn may affect public expenditures.[22]

2.4 Panel Estimation: Sensitivity Analysis

In this subsection I modify the baseline specification in different dimensions to assess the robustness of the results just presented. For brevity I focus only in GDP. All of the results are reported in Table 3, together with the baseline estimation which is presented in column (1).

One concern with the results shown so far is the potential endogeneity of elections. Most of the countries in the sample have parliamentary systems that allow for snap elections. If the occurrence of these elections is correlated with the economic cycle then the estimations may be biased. Note however that in the UPBC, and unlike the traditional theories explaining the PBC, this correlation needs to be contingent in inequality. In order to bias the results, if snap elections are called when GDP is below (above) trend, then they have also to be called more frequently in times of higher (lower) than the average inequality. To be sure the result is not driven by this type of elections I estimate equation (1) including only electiones that were scheduled with at least one year in advance. In the rest of the elections I set $e_{jt} = 0$. Results are shown in column (2) of Table 3. Only 106 elections, out of 142, are included in this case. Results are very similar. Although the maximum fall is now larger (2.37% vs 1.36%), the overall effect is almost the same (11.9% vs 12.2%). Additionally in the third column of Table 3 I only keep countries that have never had a snap election during the period analyzed. These are only 10 countries, and only 43 elections are considered. Although the significance of some of the coefficients fall, as expected due to the smaller sample, the maximum and total effects are still similar than the baseline, and highly significant. Therefore these exercises show that it is unlikely that the results are driven by endogenous elections.

Next I use the gini index instead of the 90/10 income percentile ratio. Results are presented in column (4). Although results are still highly significant the magnitude of the effect is about 20% lower than in the benchmark. Then in column (5) I introduce a linear trend interacting with the set of election dummies, in case results are rather capturing some time variation in PBC spuriously correlated with inequality. The size and significance of the results are mostly unchanged. The same happens when I consider elections during the years 2008 and 2009 (column 6), which are not included in the baseline estimations. Again results are unchanged. Finally, in columns (7) and (8) I restrict the sample to countries with at least 15 and 20 years of data, respectively. The total effect falls slightly, between 14% and 22%, and its significance remains, despite the reduction in the number of observations.

Next I estimate equation (1) for sub-groups of countries to explore potential characteristics behind the results. Again I restrict the analysis to GDP to save space. Results are presented in

[22] In the last part of the paper I use microeconomic data to show that the consumption-income ratio falls during elections in low-income households, which suggest an independent effect of inequality on consumption through uncertainty.

Table 4, again with the baseline specification appearing in column (1) for comparisons. First I redo the estimations keeping only countries with a parliamentary system. Results, presented in column (2), remain significant and the effect becomes a little larger than in the baseline. Second I drop the 5 non-advanced economies included in the sample, as defined by the IMF, and results remain very similar (column 3). Results remain unchanged as well when dropping the 5 transition economies included in the benchmark estimations (column 4). Since the sample is mainly composed by developed countries these alternative specifications only discard at most 5 countries. To make a larger adjustment in the last column I only keep the 15 richest countries in terms of average GDP per capita. Despite the reduction in the sample size results remain significant, although now the effect is smaller. The maximum fall is about 80%, and the total effect is 63%, relative to the baseline estimates.

Overall the effects are robust to different specifications and different sub-samples. The most important variation is when using the gini index instead of the 90/10 income percentile ratio, which may be a sign that inequality at the extremes is more important, and when only including the two-thirds richest countries.

3 Macroeconomic Evidence II: US Time-Series Estimations

In this section I test the existence of a UPBC in the US. I focus in this country for several reasons. First the data necessary for the estimation is available for a long period of time. Specifically I use data for 70 years and 18 presidential elections. An important advantage is that one of these series is an index of political uncertainty, which can be used to better explore the mechanisms behind the UPBC. Moreover the US has a presidential system and periodical elections that have been taking place every four years without exceptions. It also has had the maximum democracy score since the beginning of the sample. An additional advantage is that inequality has had large and persistent swings during the sample period, an appropriate variation to test the UPBC.

3.1 Time-Series Estimation: Data and Empirical Specification

I slightly modify equation (1) to obtain the following specification for exploring the dynamic effects of elections conditional on the level of wealth inequality in a time-series setting:

$$x_t = \beta_0 + \beta_1 x_{t-1} + \sum_{l=-Lg_e}^{Ld_e} \beta_{2l} e_{t+l} + \sum_{l=-Lg_e}^{Ld_e} \beta_{3l}(e_{t+l} \times wi_t) + \beta_4 wi_t + \epsilon_t \tag{2}$$

There are few differences with respect to equation (1). Because it is only one country there is no j index nor time effects. Second, the inequality indicator is denoted by wi_t because, due to greater availability, I use wealth instead of income inequality. As before the inequality indicator is kept constant around elections to isolate the estimations from any potential causal effect of elections

on inequality. The third difference is that this variable doesn't need to be adjusted by its sample average. Again the coefficients of interest are those in β_{2l} and β_{3l}. These, together with β_1 allow to study the dynamics of the variables of interest before and after elections.

Like in the panel estimations, I add to this equation dummy variables to ensure that results are not driven by the 2008 election, which coincided with a large drop in GDP in a time of relatively high wealth inequality, but for reasons that may be not related to the election. I add $Lg_e + 1 + Ld_e$ dummy variables, each taking the value 1 in only one of the same number of quarters considered in (2), but only around the 2008 election. I also add as an explanatory variable the growth rate of oil prices and its lags. Unlike the 2008 dummy variables, which reduce the size of the UPBC, oil prices don't affect much the results, but they allow for slightly more precise estimations. Besides this I try to keep the specification as parsimonious as possible, without including additional controls in the baseline estimations.

For inequality I use as a preferred measure the fraction of wealth accrued by the top 1% of the population, which is published by WID. The choice of wealth instead of income inequality is made based on availability since measures of income concentration are only available from 1962. Figure 5 shows the series from 1947 to 2016.[23] It is worth noticing that wealth concentration at the top has not behaved monotonically during the period analyzed. Raising shares are observed only since around 1980, when they bottomed out after a sustained decline that started around 1960. From the beginning of the sample until that year it remained relatively stable. This U-shaped pattern is relevant for the interpretation of the results since otherwise the estimations may be capturing some trending factors not necessarily related to inequality. Nevertheless I show below that results are not modified when including linear trends interacting with election dummies, and that they are reduced when only considering low frequency variations.

As dependent variables I use, as in the panel estimations, GDP and aggregate demand components at a quarterly frequency. For these I use the real seasonally adjusted indexes published by BEA, which I detrend using the HP filter. Additionally I use an index of political uncertainty (PU) as a dependent variable. I use the index constructed by Baker et al. (2016), which reflects the frequency of articles in six major U.S. newspapers that contain ceratin combinations of terms related to PU. The index shows an upward drift since the 1960s. According to Baker et al. (2016) this may have been caused by rising political polarization or the growing economic role for government. I use the cyclically adjusted component using the HP filter to clean for this trending factors.

3.2 Time-Series Estimation: Baseline Results

First I explore whether there are systematic differences in the behavior of GDP around elections, without taking into account the effect of wealth inequality. The left panel of Figure 2 shows the corresponding path for GDP together with 90% confidence bands. Period 0 is the election quarter,

[23] Although these series are available from 1913 I only consider the postwar period.

and I present the predicted series starting two quarters before the elections and for a total of nine quarters. It can be seen that the impulse-response of GDP never takes values that differ significantly from trend. Therefore I don't find evidence of a PBC in the US in the last 70 years.

Now I turn to the results when conditioning on wealth inequality. Column 1 of Table 5 shows the estimated values and significance levels of the coefficients on the inequality and election dummies interactions. I use the same criteria than in the panel to select lags and leads. This means in this case that the specification includes one lag and three leads. The first negative and significant estimated coefficient is observed during the quarter of the election. Subsequently the values remain negative and at similar levels for the three quarters after the election, although only the one for the second quarter is significant. Hence the time-series evidence for the US shows the same pattern observed in the panel estimations, that GDP falls around the election only when inequality is sufficiently high. The main difference in this case is that the fall in GDP seems to happen closer to the election quarter. In the panel estimations the first negative and significant coefficient is observed four quarters before, although it was delayed when only richest countries were considered in the sample. The eight and ninth rows present the estimates of the maximum and total difference between the high and low inequality benchmarks. Both estimates are significant at the 99% level. Since in this case I work with only one country I choose the highest and lowest levels of wi observed in the data to define the benchmarks. These values are 21%, observed in 1978, and 39%, observed in 2012. The estimates imply that the maximum difference in GDP between those two extremes during an election is 3.57% of quarterly GDP, and the total difference when taking into account every period GDP differs between benchmarks is almost 25% of quarterly GDP, or more than 6% of annual GDP. As in the panel estimations the effect is linear in inequality. The standard deviation of inequality is a quarter of the difference used as benchmark. Then an increase in wealth inequality of one standard deviation results in a total loss of 1.5% of annual GDP, and a maximum drop of about 0.9% of quarterly GDP. These estimates are larger than the ones found in the panel, even when expressed in terms of the quarterly standard deviation of GDP, which was 1.61% during the sample period.[24]

The upper-middle panel of Figure 2 shows the relative path for GDP around elections between times of high and low inequality. As expected from the results just presented, GDP differs significantly from trend around elections. GDP starts falling one quarter before the election, and becomes significantly different from zero on the election quarter, remaining as such for the following seven quarters. It reaches its lowest level in the third quarter after the election. The upper-right panel of Figure 2 shows the two impulse-responses separately. There we can see that part of the difference

[24]In the panel estimations the standard deviation of inequality in the US is 15% larger than the average. Then, according to the panel estimations, a change in one standard deviation would mean a maximum and total loss of 0.67% and 1.15%, respectively. These numbers are the ones should be compared to the 0.9% and 1.5% found here. Part of the difference may be explained by the fact that the indicators for inequality differ between the two specifications. Of course any US-specific effect can be also behind the differences.

between periods of low and high inequality is due to a higher-than-trend level of GDP in times of low inequality, something not found in the panel estimations. While in the high inequality benchmark the maximum loss of GDP is around 2% of quarterly GDP, in the low inequality benchmark the maximum gain is 1.5% of GDP. Hence the existence of a UPBC in the US, which is about the difference between times of low and high inequality, would have been hiding the existence of an office-seeking UPC.

As already noted an advantage of focusing in the US is the availability of a long series capturing political uncertainty, a key ingredient in the mechanisms behind the UPBC. For ease of interpretation I normalize the PU index by its standard deviation. As in the case of GDP I first explore the existence of an unconditional change in the PU index during an election. This is shown in the lower-left panel of Figure 2. As it is the case with GDP, there is no significant effects for this variable either. It goes up the quarter of the election, but the effect is very small and not significant. However, when conditioning on wealth inequality results change. The second column of Table 5 shows the estimated coefficients. I adjust in this case the number of lags and leads for the election dummy because the significant coefficients appear before, which would be consistent with PU causing the fall in GDP. The first coefficient that is positive and significant is observed two quarters before the election, and the last one is observed in the quarter after the election. Again the effect is large. The peak of the difference between the high and low inequality benchmarks is around 3.7 standard deviations, and it is statistically significant at the 99% level.

The lower-middle panel of Figure 2 depicts the difference between the path for the PU index around an election quarter in the high versus the low inequality benchmark. The difference starts to increase two quarters before the election and reaches its maximum level during the election quarter. In the quarter before the election the IC widens and the effect becomes not significant for only that period, but this seems to be due to some noise as the point estimate stays close to the level reached the previous quarter. It starts falling the following quarter, until it comes back to a level close to its average two quarters after the election. Note that the timing is consistent with PU causing the subsequent fall in GDP; PU starts reacting one or two quarters before GDP and reaches its normal level much faster.[25] The lower-right panel depicts the impulse-responses for the two benchmarks separately. Here we also observe a significant effect when inequality is low, and this contributes to the size found for the differential effect. When inequality is the highest the PU index reaches a peak of 2.5 standard deviations.

[25] Unlike GDP the variable for PU is just a proxy. Actual PU may be more persistent that what its proxy shows.

3.3 Time-Series Estimation: Demand Components

In this section I assess how the UPBC affects the aggregate demand components in the US; private consumption, private fixed investment and public spending.[26] Similarly than in the panel estimations I cannot identify causality, but the correlations can shed some light about the mechanisms behind the UPBC.

Before describing the results I show in the left panel of Figure 3 the paths for these variables implied by estimating equation (2) without conditioning in inequality. As in all the cases I have revised, there in no evidence of a PBC in any of these variables. Results from estimating equation (2) with inequality are shown in the last three columns of Table 5. It can be seen that results are as expected for both private consumption and investment. The maximum drops are around 2.7% and 9.5% of quarterly GDP, respectively. This is equivalent to 2.16 and 1.96 standard deviations, respectively. The total cost is about 4,6% of annual consumption and 18% of annual investment. Unlike these private components of aggregate demand the coefficients for public expenditures change sign. In the election quarter the difference is positive and significant, but thereafter they become negative, and after two quarters, not significant. The corresponding patterns for each of the variables are depicted in the Figure 3. The figure shows consumption in the upper panel, investment in the middle, and government expenditures in the bottom panel. In the middle the difference between the impulse-response functions are shown, and in the right each of them are shown separately.

Therefore, in line with the UPBC predictions and the evidence from panel estimations, private demand declines during an election only if inequality is sufficiently high. The fall in private consumption is noteworthy. Its magnitude is large in comparison to its standard deviation.[27] This fall in consumption may be explained by the fall in GDP and the corresponding effect on disposable income. Alternatively it may be explained by the accumulation of precautionary savings by families facing more uncertainty about their income after taxes and subsidies in electoral periods under high inequality. In this case we would observe a fall in the expenditure rate. In the next section I explore this using microeconomic data on consumption, income and wealth.

3.4 Time-Series Estimation: Sensitivity Analysis

In this subsection I perform different exercises to test the robustness of the time-series findings. To save space I restrict the analysis to GDP estimations. Table 6 shows the results, together with the baseline specification in column (1). First I use an alternative measure of wealth inequality; the fraction of total wealth accrued to the 10% richest fraction of the population. Column (2) shows

[26] The source for all these variables is BEA, and all of them are seasonally adjusted. For public spending I use Federal Government Consumption Expenditures and Gross Investment.

[27] I don't show the results but when differentiating between durable and nondurable consumption, both fall around elections under high inequality, but the response of the first is much stronger, with a maximum fall that is about three times larger than the fall in total consumption.

the estimated coefficients. The response of GDP is statistically significant and qualitatively the same, although around 20% smaller in total. This is in line with the results using gini in the panel estimations, and may be indicating that wealth accumulation at the very top of the distribution is more relevant for UPBC.

As in the panel estimations the next exercise is to control by an interaction between elections and a linear trend, to capture any unobservable process that may make political business cycles less or more marked over time. Although wealth inequality has been increasing only since the mid-seventies, it may still be capturing some trending effect not related with inequality.[28] Column (3) shows the results, which are still significant and quantitatively much stronger.[29]

In column (4) I explore the results when only considering low frequency changes in inequality. To do this I use as wi a dummy variable that takes the value one when inequality is higher than its sample average, and zero otherwise. Hence there is still a U-shaped path for wi, but relatively small differences, most of the variations at high frequencies, are not considered to identify the results. The effect of elections is much smaller in this case, about 40% of the baseline estimations. Since a big fraction of the variability in wi, and the one that must be less correlated with some other low-frequency changing variable, is not considered in the estimations, these results make more likely that inequality is behind the different paths for GDP around elections, as expected by UPBC.

The last two exercises depicted in Table 6 try to shed light on the mechanisms behind the different responses of macroeconomic variables to elections. The first one consist in including the PU index as a right-hand side variable in equation (2). If uncertainty is the link between elections and economic activity then we should estimate a smaller response of GDP in this case, as PU is a bad control in the estimation. Column (7) of Table 3 shows this. The total response of GDP is below 70% of the baseline response. The main change is observed in the quarter during the election, which is when the UP index peaks. The fact that there is still a negative and significant effect means either the existence of channels different form uncertainty, or that the PU index doesn't capture all of the movements in uncertainty, which is likely since this index is just a proxy for policy uncertainty. Following the same logic I see how results change when controlling by how predictable is the result of the election. If election results are difficult to predict then policy uncertainty should be even larger when inequality is high, increasing the negative effects on GDP.[30] To test this I first use midterm election results, polling data from Gallup and wether the incumbent goes for reelection to estimate the probability that the Democratic Party wins the election, p_e. Then the

[28] Specifically I include the terms $\sum_{l=-Lg_e}^{Ld_e} \beta_{4l}(e_{t+l} \times (t+l))$ in equation (2). Hence there are now $Lg_e + Ld_e + 1$ additional coefficients, capturing the existence of the same number of linear trends in each quarter around the elections.

[29] The trend has positive coefficients meaning that over time GDP has been reacting more positively to elections. Then larger coefficients on inequality counteract this effect in the last decades.

[30] This would also make stronger partisan PBC. In the UPBC case the claim is that inequality increases the distance between the preferred policies of different political groups, and hence the effect should exist even when the result of the election is relatively easy to predict.

election predictability index for election e is defined as $UE_e = 1 - |p_e - 0.5|$. When introducing this variable as a control in the estimations (column 7) results change in the same way than when including the UP index, meaning that uncertainty is, at least in part, behind the results.

Next I check the influence of each of the 18 elections in the results. To do this I introduce dummy variables, with the corresponding leads and lags, for each election, one at a time. Hence there are $Lg_e + Ld_e + 1$ additional coefficients in each estimation. Figure 4 depicts the maximum difference in GDP between the two inequality benchmarks. First I consider the baseline estimation, which has already a set of dummy variables for the year 2008. Results for this case are in blue. The solid line shows the baseline estimate and the circles show how this varies when using a set of dummies for the year marked in the horizontal axis. It can be seen that the 2012 election greatly influences the results. Without that election the maximum drop in GDP goes from 3.6% to 5.7% of quarterly GDP, or 0.9% to 1.4% of annual GDP. Apart from the 2012 election there is no other election influencing significantly the results, with the estimates varying inside a range between 3% and 4% of quarterly GDP. In red I show the results from the same exercise but without the set of dummies for the 2008 election. The maximum loss is higher in about 1% of quarterly GDP. I didn't control for the 2012 election in the baseline estimations because, unlike the 2008 election, it would have strengthen the result. It is worth noticing that all of the different estimates summarized in Figure 4 are statistically significant at the 99% confidence level. Considering or not these influential elections have quantitative, but not qualitative, effects.

I don't show the results to save space but the same pattern is found when running this robustness analysis to the specification with PU as an explanatory variable. As in the case of GDP the effect is about 15% smaller when using the top 10% indicator for wealth inequality, and about 70% smaller when using the discrete measure of inequality that only takes into account low frequency changes. The results are robust to the inclusion of dummies for each one of the elections in the sample except, again, 2012. But now the influence is smaller, the maximum difference changes in just 20%, and in the opposite direction; the spike is smaller when not considering that election. Hence the 2012 election seems to be an election with better than expected macroeconomic performance, and higher than expected uncertainty levels.

It would be interesting to explore how the findings change with some features of the elections to better understand the mechanisms behind the UPBC in the US. However in this case the 2012 election plays a substantial role as it becomes even more influential when only considering a subset of elections. To by-pass this problem and get an idea of the difference between elections I include the set of dummies for both the 2008 and 2012 elections and then report how the maximum effect varies according to certain characteristics of elections. With the caveat that there is a substantial drop in degrees of freedom results are as follow: the maximum drop in GDP is (1) about twice as large when the incumbent doesn't run for reelection than when he does, (2) about twice as large when a democrat wins the election than when a republican do so, and (3) about twice as large when

the incumbent is a democrat than when he is a republican. The first result may be due to the fact that, when the incumbent runs, more information is available about at least one of the candidates, and it is relatively less likely a drastic change in policy. The second result is the opposite than what would be expected under partisan PBC. In all the cases the effect is still negative and significant at the 99% level.

4 Microeconomic Evidence

In this section I use microeconomic data on consumption, income and wealth to explore more closely the channels behind the UPBC macroeconomic evidence reported so far. I focus in particular on the claim that inequality, through its effect on policy uncertainty, leads to a surge of precautionary savings by households. Since consumption of wealth-poor agents is the most sensitive to changes in uncertainty, we should expect a relatively larger fall in the expenditure rate in this group during election years and high inequality. To test this hypothesis I make use of the Panel Study of Income Dynamics (PSID) which provides household level panel data on earnings, income, consumption expenditures and wealth for the U.S. Unfortunately data on consumption is available only for the last two decades, a period that is too short to perform the type of exercise done so far, where results are explicitly conditioned on the level of wealth inequality. Instead, and backed by the fact that inequality has reached its highest levels in the last years (Figure 5), I use data for 2005-2017 and interpret the results as if they were obtained under high inequality, i.e. as a time when the UPBC was active.

To test the hypothesis I estimate the following panel fixed-effects specification,

$$\Delta x_{g,t} = \gamma_0 + \gamma_1 e_t + \gamma_2 \ (e_t \times g) + \gamma_3 \ I_{t=2008} + \gamma_4 \ (I_{t=2008} \times g) + \eta_g + \nu_{g,t}. \tag{3}$$

In this equation the dependent variable $\Delta x_{g,t}$ is the change in the variable of interest x for the wealth group g from year t to year $t+2$. The timing is due to the fact that PSID data is given every two years. Hence I have 6 periods of data to use in the estimations, with 3 elections, 2008, 2012 and 2016. Every available period t I split the whole sample in 20 percentiles according to the net stock of wealth. For each individual I compute the change in x from t to $t+2$, and then the mean over group g, computed for period t, corresponds to $\Delta x_{g,t}$. The first explanatory variable in (3) is e_t, a dummy variable that takes the value 1 whenever there is an election between t and $t+2$. It turns out that elections have been held in years between those when PSID data becomes available, and hence $\Delta x_{g,t}$ is the change in variable x before and after the election when $e_t = 1$. Clearly this is not the best timing, and it can bias the results toward zero, but it is the only available option. Note that since e_t doesn't vary across groups it is not possible to include time-dummies in the specification. The second independent variable $e_t \times g$ is the election variable multiplied by the group indicator, and it captures differences across wealth groups. The hypothesis that relates the UPBC with precautionary savings implies $\gamma_2 > 0$. Finally $I_{t=2008}$ is a dummy variable for the

2008 election, which also appears interacted with g, to isolate the results from the effects of the Great Recession as it was done in the exercises using macroeconomic data. The variable η_g is the fixed-effect and $\nu_{g,t}$ is the residual term.

Estimation results are shown in Table 7. For ease of exposition I normalize the value of the dependent variable by its standard deviation, and show only the coefficients of interest, those associated with e_t. In the first column I use the percentage change in consumption as the dependent variable.[31] The coefficient on e_t shows that during election years there is a fall in consumption growth that is close to a quarter of a standard deviation, but the unconditional effect is not significant. The interaction with g has a negative coefficient. Although it is not significant as well, the two coefficients imply a significant negative effect for some of the groups. To see this I plot the point effect, and its 90% confidence bands, for each of the 20 wealth groups in the left panel of Figure 6. It can be seen that the point effect is always negative, with an average size of a third of a standard deviation, and that it is significant between the 11 to 18 wealth quintiles. Next I use the percentage change in disposable income as the dependent variable in column 2 of Table 7. The unconditional effect is positive but not significant. The interaction is negative but it is not strong enough to make the overall effect negative and significant for some of the groups, and the average effect is close to zero (see the center panel of Figure 6).

The results using the change in the expenditure rate are shown in column 3 of Table 7. It is worth to notice that this variable is the group-average of the change in individual expenditure rates, and not the change in the ratio of the group-average consumption and disposable income. It closely captures the reaction of precautionary savings of individual agents. In this case there is a negative and significant effect of elections. The coefficient implies a fall in three quarters of a standard deviation in the expenditure rate in a year of election relative to a year without it. As expected the coefficient on the interaction between election year and group is positive, meaning that the fall is greater for wealth-poor groups. Although not significant by itself, it counteracts the significant unconditional effect, implying that the overall effect stops being significant for agents in the 12 and 7 quintiles and above, for 90% and 95% significance levels, respectively (see Figure 6).

Overall the effects are in line with the existence of a precautionary reaction of consumption in election years. Although the estimations are imprecise, consumption seems to fall similarly across wealth groups. More precise estimations are obtained for the expenditure rate, which is closely associated with the precautionary motive. The response of this variable during election years is negative and significant, but only for wealth-poor agents.

[31] For consumption I use food, housing, transportation, clothing, trips, and other recreation expenditures. A narrower measure that only includes food, housing and transportation is available since 1999. I use the first one as it is more representative but results are similar when using this alternative measure.

5 Conclusions

In this paper I document a specific mechanism by which inequality affects macroeconomic dynamics at the business cycles frequency. This mechanism is novel and manifests itself trough policy uncertainty triggered by presidential elections. Using data for a panel of 25 countries, and for the US, I find the existence of UPBC, i.e. a fall in GDP and private aggregate demand components, and a raise in policy uncertainty around presidential elections only in times of relatively high inequality. The effects are large and robust to different specifications. Additionally evidence of a decreasing of expenditure rates for relatively wealth-poor agents during elections is presented, which is in line with the hypothesis that policy uncertainty, triggered by elections under high inequality, generates an increase in household's precautionary savings.

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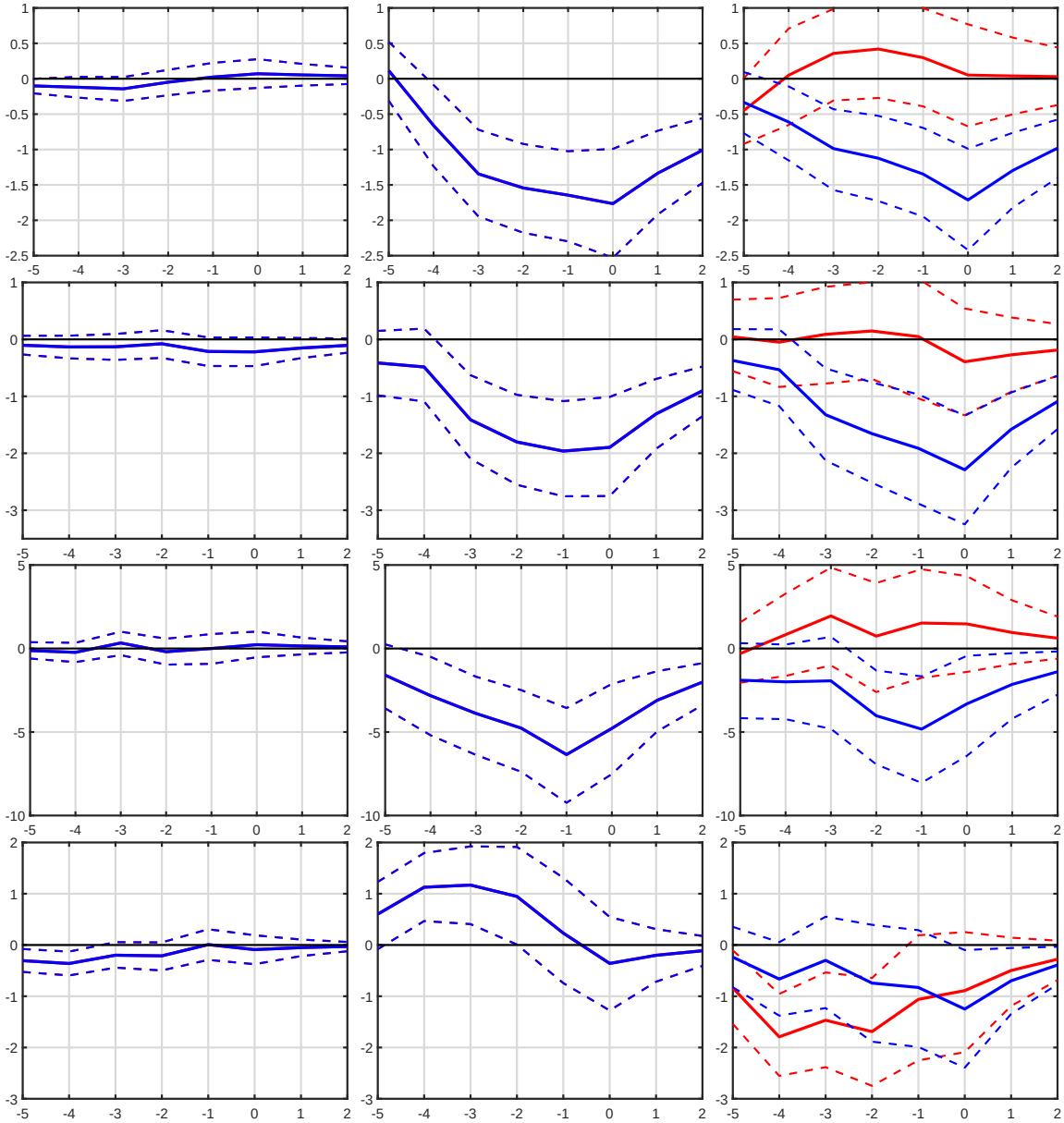
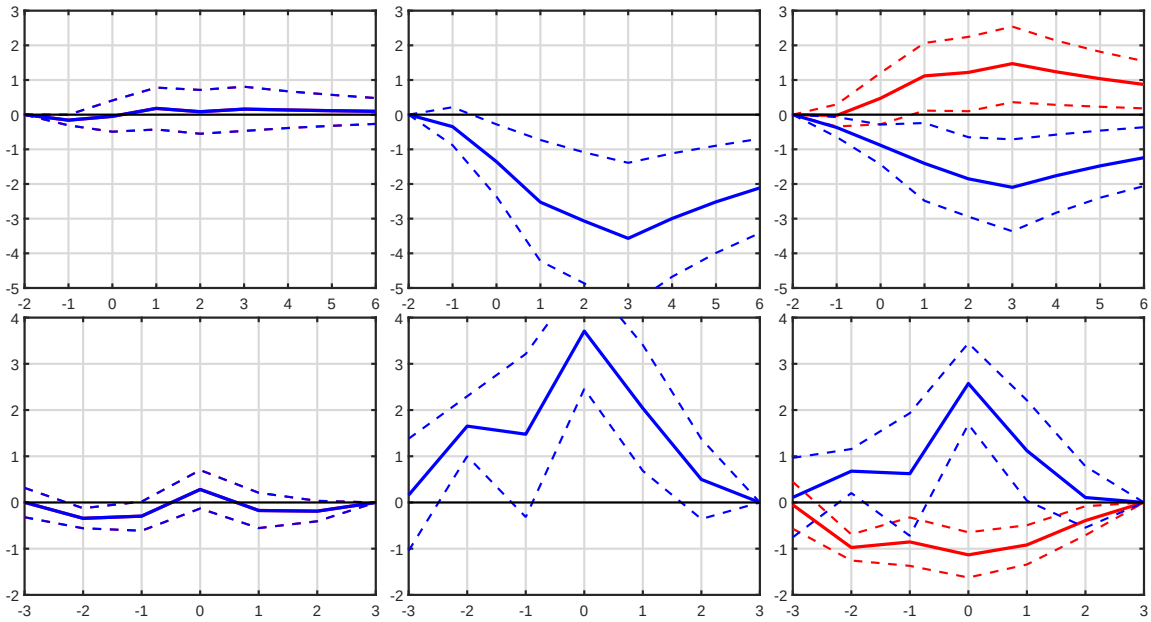


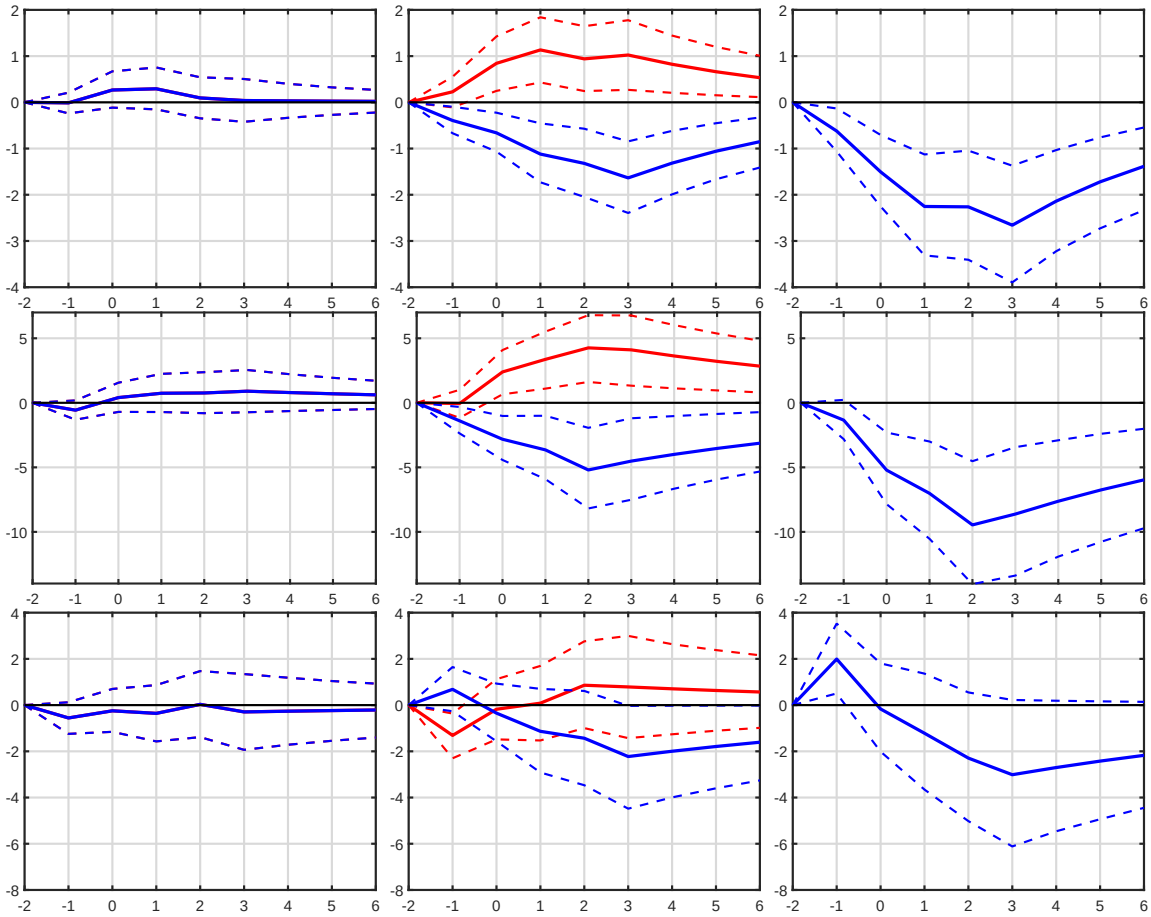
Note: the figure shows the impulse-response functions derived from the estimation of equation (1) for GDP (first row), private consumption (second row), private investment (third row) and public expenditures (fourth row). The left column depicts the impulse-response functions without conditioning in inequality. The center column depicts the difference in impulse-response functions between the high and low inequality benchmarks. The right column depicts the impulse-response functions for the high (blue) and low (red) inequality benchmarks separately. Period 0 is the quarter of the election. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 1: Unequal Political Business Cycles, Panel Estimates



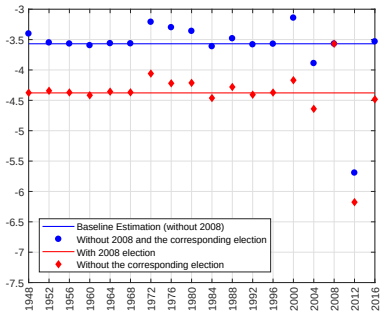
Note: the figure shows the impulse-response functions derived from the estimation of equation (2) for GDP (first row) and the PU index (second row). The left column depicts the impulse-response functions without conditioning in inequality. The center column depicts the difference in impulse-response functions between the high and low inequality benchmarks. The right column depicts the impulse-response functions for the high (blue) and low (red) inequality benchmarks separately. Period 0 is the quarter of the election. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 2: Unequal Political Business Cycles, US Time-series Estimations



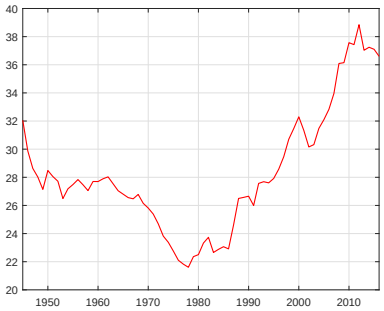
Note: the figure shows the impulse-response functions derived from the estimation of equation (2) for private consumption (first row), investment (second row) and public expenditures (third row). The left column depicts the impulse-response functions without conditioning in inequality. The center column depicts the difference in impulse-response functions between the high and low inequality benchmarks. The right column depicts the impulse-response functions for the high (blue) and low (red) inequality benchmarks separately. Period 0 is the quarter of the election. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 3: Unequal Political Business Cycles, US Time-series Estimations, Demand Components



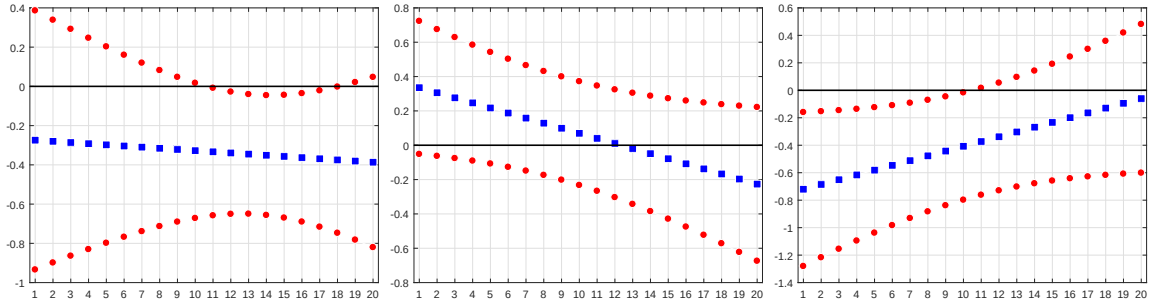
Note: maximum difference between the high and low inequality benchmarks of the impulse-response functions derived from the estimation of equation (2). The solid blue line is the baseline estimate. Blue circles show the estimates when controlling for the election marked in the horizontal-axis. The solid red line is the estimate when not controlling for the 2008 election. Red diamonds show the estimates when controlling for the election marked in the horizontal-axis but not for the 2008 election.

Figure 4: Political Business Cycles, US Time-series Estimations, Sensitivity Analysis



Note: fraction of total wealth held by the richest 1% of the population.
Source: WID.

Figure 5: Wealth Inequality in the US, 1945-2016.



Note: effect of elections on consumption (left), disposable income (center) and expenditure rate (right) for each of the 20 wealth quintiles, from estimating Equation (3). In blue the point estimate and in red the 90% confidence interval. The dependent variable is normalized by its standard deviation.

Figure 6: Elections and Consumption, Microeconomic Evidence

	Country	Years	Elections		Country	Years	Elections
1	Australia	1981 - 2013	12	14	Israel	1990 - 2015	8
2	Austria	1996 - 2012	4	15	Italy	1995 - 2013	5
3	Canada	1971 - 2012	13	16	Luxembourg	1995 - 2012	3
4	Switzerland	1982 - 2012	8	17	Netherlands	1996 - 2012	6
5	Czech Republic	1996 - 2012	4	18	Norway	1979 - 2012	8
6	Germany	1991 - 2014	6	19	Slovenia	1997 - 2011	4
7	Spain	1995 - 2012	5	20	Sweden	1993 - 2004	3
8	Estonia	2000 - 2012	3	21	United States	1974 - 2015	10
9	Finland	1990 - 2012	6	22	Chile	1996 - 2014	4
10	France	1978 - 2009	8	23	Hungary	1995 - 2014	5
11	United Kingdom	1969 - 2015	12	24	Mexico	1997 - 2011	2
12	Greece	1995 - 2012	6	25	Poland	1995 - 2015	6
13	Ireland	1995 - 2009	3				

Note: countries included in the panel baseline estimation. Years are the initial and final year the country appears in the sample and Elections is the number of elections included for each country in the sample.

Table 1: Sample in Panel Estimations

	GDP	Private Consumption	Investment	Public Expenditures
	(1)	(2)	(3)	(4)
$\beta_{3,-5}$	0.12	-0.41	-1.59	0.60
$\beta_{3,-4}$	-0.75^{***}	-0.20	-1.79	0.79^{**}
$\beta_{3,-3}$	-0.84^{***}	-1.08^{***}	-2.06^{**}	0.54
$\beta_{3,-2}$	-0.53^{***}	-0.83^{***}	-2.25^{**}	0.29
$\beta_{3,-1}$	-0.48^{**}	-0.72^{**}	-3.26^{***}	-0.30
$\beta_{3,0}$	-0.52	-0.54^{*}	-0.67	-0.49
$\beta_{3,1}$	0.21	-0.28	-2.86^{***}	-0.09
Max effect	-1.76^{***}	-1.96^{***}	-6.35^{***}	-0.36
Total effect	-11.9^{***}	-12.0^{***}	-32.8^{***}	3.3
R^2	0.80	0.60	0.62	0.46
Obs	2302	2274	2274	2274
Elections	142	141	141	141
Countries	25	25	25	25

Note: equation (1) estimation results. Only the coefficients on the interaction between elections and inequality are shown (first seven rows). The eight row shows the maximum difference between the impulse-response functions derived from the estimation of equation (1) for high and low inequality benchmarks. The ninth row shows the total difference between these two impulse-response functions. ***,**, and * indicate significance at 1%, 5%, and 10% levels computed using the Wild bootstrap.

Table 2: Panel Estimations

	Baseline	Only fixed elections	Only countries with fixed elections	Gini inequality	Linear trend	With 2008-2009 elections	15 years of observations	20 years of observations
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\beta_{3,-5}$	0.12	0.15	−0.24	0.12	0.13	0.13	0.15	0.27
$\beta_{3,-4}$	-0.75^{***}	-1.06^{***}	-1.42^{***}	-0.55^{**}	-0.79^{***}	-0.79^{***}	-0.76^{***}	-0.60^{**}
$\beta_{3,-3}$	-0.84^{***}	-1.09^{***}	−0.31	-0.64^{**}	-0.92^{***}	-0.83^{***}	-0.78^{***}	-0.76^{**}
$\beta_{3,-2}$	-0.53^{***}	-0.62^{***}	-0.88^{***}	-0.55^{***}	-0.50^{**}	-0.60^{***}	-0.50^{***}	-0.64^{***}
$\beta_{3,-1}$	-0.48^{**}	-0.64^{**}	−0.45	-0.41^{*}	-0.61^{**}	-0.47^{**}	-0.37^{*}	−0.24
$\beta_{3,0}$	−0.52	-0.76^{**}	−0.09	−0.37	-0.59^{*}	−0.44	−0.51	-0.79^{*}
$\beta_{3,1}$	0.21	0.39	-0.43^{*}	0.12	0.20	0.27	0.20	0.32
Max effect	-1.76^{***}	-2.37^{***}	-2.09^{***}	-1.43^{***}	-1.96^{***}	-1.73^{***}	-1.56^{***}	-1.65^{***}
Total effect	-11.9^{***}	-12.2^{***}	-14.5^{***}	-9.6^{***}	-12.9^{***}	-11.9^{***}	-10.3^{***}	-9.3^{***}
R^2	0.80	0.81	0.86	0.80	0.81	0.81	0.80	0.79
Obs	2302	2302	772	2302	2302	2302	2032	1398
Elections	142	106	43	142	142	154	128	92
Countries	25	25	10	25	25	25	20	11

Note: equation (1) estimation results. Only the coefficients on the interaction between elections and inequality are shown (first seven rows). The eight row shows the maximum difference between the impulse-response functions derived from the estimation of equation (1) for high and low inequality benchmarks. The ninth row shows the total difference between these two impulse-response functions. ***,**, and * indicate significance at 1%, 5%, and 10% levels computed using the Wild bootstrap.

Table 3: Panel Estimations: Robustness Analysis

	Baseline	Only parliamentary	Only Advanced Economies	No Transition Economies	Richest 15 Economies
	(1)	(2)	(3)	(4)	(5)
$\beta_{3,-5}$	0.12	0.44	0.31	0.11	−0.29
$\beta_{3,-4}$	-0.75^{***}	-0.61^{**}	−0.43	-0.69^{***}	0.02
$\beta_{3,-3}$	-0.84^{***}	-0.93^{***}	-0.81^{***}	-0.87^{***}	-0.58^{*}
$\beta_{3,-2}$	-0.53^{***}	-0.57^{**}	-0.41^{*}	-0.51^{***}	-0.56^{*}
$\beta_{3,-1}$	-0.48^{**}	-0.67^{**}	-0.55^{**}	-0.44^{*}	-0.69^{*}
$\beta_{3,0}$	−0.52	-0.73^{*}	−0.63	−0.51	−0.23
$\beta_{3,1}$	0.21	0.47	0.37	0.26	−0.23
Max effect	-1.76^{***}	-2.06^{***}	-1.72^{***}	-1.59^{***}	-1.42^{**}
Total effect	-11.9^{***}	-12.1^{***}	-10.3^{**}	-10.3^{***}	-7.6^{**}
R^2	0.80	0.80	0.81	0.79	0.80
Obs	2302	2004	2010	1968	1594
Elections	142	128	126	121	100
Countries	25	22	21	20	15

Note: equation (1) estimation results. Only the coefficients on the interaction between elections and inequality are shown (first seven rows). The eight row shows the maximum difference between the impulse-response functions derived from the estimation of equation (1) for high and low inequality benchmarks. The ninth row shows the total difference between these two impulse-response functions. ***,**, and * indicate significance at 1%, 5%, and 10% levels computed using the Wild bootstrap.

Table 4: Panel Estimations: Subgroups of Countries

	GDP	Policy Uncertainty	Private Consumption	Investment	Public Expenditures
	(1)	(2)	(3)	(4)	(5)
$\beta_{3,-3}$		0.16			
$\beta_{3,-2}$		1.65^{***}			
$\beta_{3,-1}$	-0.35	1.48	0.27	0.34	0.02
$\beta_{3,0}$	-1.07^{**}	3.71^{***}	-0.62^{**}	-1.34	1.99^{**}
$\beta_{3,1}$	-1.39	2.04^{***}	-1.00^{***}	-4.03^{***}	-1.96^{***}
$\beta_{3,2}$	-0.95^{*}	0.50	-1.04^{**}	-2.40^{*}	-1.07
$\beta_{3,3}$	-0.99		-0.45	-3.25^{**}	-1.20
Max effect	-3.57^{***}	3.71^{***}	-2.66^{***}	-9.46^{***}	-3.01
Total effect	-24.9^{***}	9.5^{***}	-18.3^{***}	-73.0^{***}	-19.9
R^2	0.74	0.20	0.68	0.82	0.82
Obs	279	279	279	279	279
Elections	18	18	18	18	18

Note: equation (**??**) estimation results. Only the coefficients on the interaction between elections and inequality are shown (first seven rows). The eight row shows the maximum difference between the impulse-response functions derived from the estimation of equation (**??**) for high and low inequality benchmarks. The ninth row shows the total difference between these two impulse-response functions. ***,**, and * indicate significance at 1%, 5%, and 10% levels computed using the Wild bootstrap.

Table 5: Panel Estimations

	Baseline	Top 10% wealth	Linear trend	Inequality high-low	PUI as a control	UE as a control
	(1)	(2)	(3)	(4)	(7)	(8)
$\beta_{3,-1}$	-0.35	0.36	0.24	0.21	0.37	0.50^{*}
$\beta_{3,0}$	-1.07^{**}	-0.33	-0.49	-0.23	-0.10	-0.22
$\beta_{3,1}$	-1.39	-1.76^{***}	-1.35	-0.43	-0.57	-0.33
$\beta_{3,2}$	-0.95^{*}	-0.41	-1.80	-0.71^{*}	-0.97	-1.13
$\beta_{3,3}$	-0.99	-0.90^{*}	-1.55^{*}	-0.12	-0.81	-0.86
Max effect	-3.57^{***}	-2.78^{**}	-4.96^{***}	-1.38^{**}	-2.56^{**}	-2.95^{**}
Total effect	-24.9^{***}	-20.9^{**}	-34.2^{***}	-10.2^{**}	-16.8^{*}	-19.1^{*}
R^2	0.74	0.74	0.75	0.74	0.75	0.75
Obs	279	279	279	279	279	279
Elections	18	18	18	18	18	18

Note: equation (**??**) estimation results. Only the coefficients on the interaction between elections and inequality are shown (first seven rows). The eight row shows the maximum difference between the impulse-response functions derived from the estimation of equation (**??**) for high and low inequality benchmarks. The ninth row shows the total difference between these two impulse-response functions. ***,**, and * indicate significance at 1%, 5%, and 10% levels computed using the Wild bootstrap.

Table 6: Time-series Estimations: Sensitivity Analysis

	$\Delta\ c_{g,t}$	$\Delta\ y_{g,t}$	$\Delta\ (c/y)_{g,t}$
e_t	-0.27	0.37	-0.76 **
	0.43	0.25	0.36
$e_t \times g$	-0.01 †	-0.03	0.03 ‡
	0.03	0.02	0.03
Obs	120	120	120

Note: results from estimating Equation (3). The dependent variable is normalized by its standard deviation. †: makes the overall effect significant at the 90% confidence level for quintiles 11-18 (see Figure 6). ‡: makes the overall effect not significant for quintiles 11-20 and 7-20 for 90% and 95% significance levels, respectively (see Figure 6). Coefficients on 2008 election dummies and fixed effects included but not shown. Robust standard errors, below the estimated coefficients, are clustered at wealth groups. ***,**, and * indicate significance at 1%, 5%, and 10% levels.

Table 7: Elections and Consumption, Microeconomic Evidence

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