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

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Abstract

This paper explores the presence of political cycles that are contingent on inequality. I claim that high inequality leads to high policy uncertainty as pressures for redistribution increase at the same time that the richest become politically more powerful. This higher policy uncertainty harms the economy through channels already studied by the literature. Using data for the US from 1947 to 2014 I find supporting evidence for this mechanism. Only when inequality is sufficiently high, policy uncertainty spikes during an election and GDP falls below its trend thereafter. Estimations using microeconomic data from the PSID show that wealth-poor households decrease their expenditure rates during election years, evidence that is in line with elections impacting private consumption through policy uncertainty in times of high inequality.

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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 right after 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.[2] Hence inequality increases the distance between the desired policies of the different groups with similar levels of political power. Since political power switches between parties adhering to each of these political groups, uncertain election results translate in higher policy uncertainty as inequality grows.

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 (Bernanke, 1983; 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 (see e.g. Baker et al., 2016).[3] 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.[4]

[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] There is an extensive literature pointing to this as a main reason for the lack of empirical support to the theoretical predictions posed by Meltzer and Richard (1981) (see e.g. Acemoglu et al., 2015; McCarty et al., 2016, and the references therein).

[3] 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.

[4] Julio and Yook (2012) exploit elections as a exogenous shock to uncertainty in a cross-section of countries and

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.[5] Therefore it tries to explain the presence of economic booms around elections, being unsuccessful in finding undisputed evidence supporting it at least for the US. Differently from this literature I focus on uncertainty and hence the occurrence of recessions around elections. Canes-Wrone and Park (2012) find related evidence for private fixed investment in ten OECD countries between 1975 and 2006. They don't consider explicitly policy uncertainty in their estimations, neither inequality as a conditioning variable.[6] Additionally I analyze in detail the behavior of private consumption and household's precautionary savings.

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

First I exploit recently constructed historical series of US policy uncertainty and wealth inequality spanning from 1947 to 2014, which includes 17 presidential elections, to asses whether the existence of a PBC is conditional on the extent of wealth inequality. The findings support the existence of UPBC. In particular I find no significant unconditional effect of elections neither in macroeconomic outcomes nor in policy uncertainty. However when conditioning on wealth concentration I find a statistically significant effect of elections in these variables. 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, 2% below trend, two quarters after the election. Under low inequality the response of GDP and uncertainty is of opposite sign, smaller and less significant.

These results are not driven by the 2008 election, which coincided with the Great Recession and relatively high wealth inequality. I control for it using dummy variables that clean for this episode in all of the estimations. Results 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

find that corporate investment falls the year of an election.

[5] There is also a focus on the macroeconomic effects of policy switches due to partisan motivations. See Alesina (1988); Franzese Jr (2002); Drazen (2004); Persson and Tabellini (2002) for reviews of the literature on office-seeking and partisan PBC.

[6] Canes-Wrone and Park (2012) condition the effect of elections on electoral competitiveness and partisan polarization. In my framework these variables, which are not available for the period considered, are not only endogenous to macroeconomic conditions but also to wealth inequality, which makes them bad controls. Note that the period 1975-2006 is a period of relatively high wealth inequality for most OECD countries.

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. Moreover results are stronger when the incumbent doesn't run for reelection and when the election results are more difficult to forecast. But in any case there is no electoral recessions when inequality is low, no matter how unpredictable the election is. I find a slightly larger effect when the Democratic Party wins the election, which may be evidence that uncertainty comes from a higher likelihood of more redistributive policies. But the effect is still present when the Republican Party wins the election so partisan effects are not behind the results. Finally, 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. Albeit smaller in scale and significance, public spending decreases as well, probably as an outcome of the fall in revenues. The unemployment rate rises after elections only under high inequality, probably as the consequence of the earlier fall in GDP.

The second exercise I perform in this paper makes use of microeconomic data on consumption, disposable income and wealth to explore the existence of a household precautionary response 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. In contrast the estimations show no significant change in expenditure rates of wealth-rich agents.

2 Macroeconomic Evidence

2.1 Data and Empirical Specification

I consider the following specification for exploring the dynamic effects of elections conditional on the level of wealth inequality:

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

where x_t is the variable of interest, firstly GDP and policy uncertainty, e_t is an indicator that takes the value of 1 when there is an election in quarter t, and wi_t is an inequality indicator. 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.[7]

To this equation I add 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

[7] Lg_e and Ld_e are selected based on AIC.

taking the value 1 in only one of the same number of quarters considered in (1), but only around the 2008 election. Without these dummies results are stronger, both for GDP and uncertainty. Besides this I try to keep the specification as parsimonious as possible, without including additional controls in the baseline estimations.[8] Below I show different extensions of (1) to explore the robustness of the results and possible mechanisms behind them.

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 **??** shows the series from 1947 to 2014.[9] 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.

As dependent variables I focus first in the effects in GDP and policy uncertainty (PU). For GDP I use the real seasonally adjusted index published by BEA, which I detrend using the HP filter. For PU 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, presented in the left panel of Figure 2, 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. The resulting series is shown in the right panel of Figure 2.

2.2 Baseline Results

First I explore whether there are systematic differences in the behavior of GDP and PU around elections, without taking into account the effect of wealth inequality. To do this I estimate Equation (1) but only including the lags of the dependent variable and the dummies for elections. Figure 3 shows the results. On the left panel I show the path for GDP and on the right panel the path for PU, each with 90% confidence bands. Period 0 is the election quarter, and I present the predicted series starting three quarters before the elections and for a total of 11 quarters. It can be seen that none of the variables take values that differ significantly from their sample averages (zero in both cases). Therefore I don't find evidence of a PBC in the US in the last 70 years.

Figure 4 shows the results when conditioning on wealth inequality. It depicts two predicted series for the same dependent variable, each with its corresponding 90% confidence interval. The

[8] Additionally I include a dummy variable for the third quarter of 2000, when considering uncertainty as the dependent variable. When this dummy is exluded significance falls in the quarter before the election, to a level that is significantly below that found for the other quarters.

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

red line is the implied path for GDP (left) and PU (right) in the case wealth inequality takes the minimum value in the sample, which is 21% in 1978. The blue line is the corresponding path when wealth inequality takes the maximum value, which is 39% in 2012. Variables differ significantly from their mean values around elections. In the case of high wealth inequality (blue) GDP (left panel) 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 and reaching its lowest level, around -2%, two quarters after the election. PU (right) in elections of high inequality (blue) starts to increase one or two quarters before the election and reaches a level that is close to two standard deviations above its average in the election quarter. It starts falling the following quarter until it comes back to a level close to its average in the second quarter after the election. Note that the timing is consistent with PU causing the subsequent fall in GDP; PU starts reacting one quarter before the election and reaches its average level much faster than GDP.[10]

In the case of low inequality (red) the results show that GDP (left) doesn't fall during elections. Indeed under low inequality GDP becomes positive and slightly significant after the first quarter following the election. A similar, although inverse pattern, is observed for PU, which falls below its average for four quarters, starting the second quarter before the election. Hence, although quantitatively smaller than the case of high inequality, these results imply that elections do have significant macroeconomic effect with low inequality as well. It is not clear however why an election may lead to a fall in PU.[11] In any case a significant difference between the two impulse-response functions is what the hypothesis suggested in the introduction would predict.

2.3 Sensitivity Analysis

In this subsection I perform different exercises to test the robustness of the results. First I use an alternative measure of wealth inequality; the fraction of total wealth accrued to the 10% richest fraction of the population. Figure 5 shows the results. The responses of both GDP and PU are qualitatively the same. They are about half the size estimated in the baseline case under high inequality, pointing to the prominent role of wealth accumulation at the very top of the distribution.

As an additional exercise I control by an interaction between elections and a linear trend. This is done 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. The inclusion of a multiplicative trend tries to ensure that this is not the case. Specifically I include the terms $\sum_{l=-Lg_e}^{Ld_e} \beta_{4l}(e_{t+l} \times (t+l))$ in the baseline Equation (1). Hence there are now $Lg_e + Ld_e + 1$ additional

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

[11] These results would be consistent with an opportunistic political cycle, since the rise in GDP might cause the fall in uncertainty. However I don't find evidence of an increase in public spending, and below I show that these results are not robust to some extensions.

coefficients, capturing the existence of the same number of linear trends in each quarter around the elections. Figure 6 shows the results, which are mostly unchanged relative to the baseline estimation.[12]

Alternatively I explore the results when using a dummy variable that takes the value one when inequality is higher than its sample average, and zero otherwise, instead of the continuous wi variable. Under this specification there is still a U-shaped path for inequality but relatively small differences in wi, and hence most of it changes at higher frequencies, are not considered to identify the results. If the estimations are capturing some low-frequency change, maybe unrelated to inequality, results should be at least as strong as in the baseline case. The implied path for GDP and PU are shown in Figure 7. The effect of elections is much smaller in this case, with GDP (left) changing less than half the amount estimated in the baseline case, and being not significant under low inequality. In the case of PU (right), a similar pattern emerges where even under high inequality the effects are not significant. 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 support the hypothesis that inequality is behind the different paths for GDP and PU around elections depicted in Figure 4.

Next I check whether the results are influenced by one particular election, different from the 2008 election, which is already controlled for in all of the estimations above. I introduce dummy variables, with the corresponding leads and lags, for each election, one at a time. Hence again there are Lg_e+Ld_e+1 additional coefficients in each estimation.[13] Figure 8 shows the corresponding paths for GDP. Overall the results show that the estimated effects are not due to some specific election, different from the one in 2008, with an extremely large drop in GDP. Indeed point estimates of the largest drop in GDP under high inequality are always larger than the baseline case, and GDP remains significantly negative for the same number of periods. Figure 9 shows the same results but for the case of the PU index. Conclusions are similar. The point estimate for the peak in the election quarter ranges from 55 (the baseline without 2008) to 65. Again it can be concluded that the baseline estimates of the effects of elections in PU are not driven by one specific, and very uncertain, election, to the extent that the baseline includes dummies for the 2008 elections.

2.4 Differences in Elections

In this subsection I explore whether the size of the UPBC depends on certain observable characteristics of elections. In particular I consider different responses in elections when the incumbent goes for reelection, when the results were relatively easy to predict, and when the same party lost or

[12] Since some of the new coefficients are significant the paths of the variables of interest around elections do change over time. In Figure 6 I evaluate the effects in the middle of the sample but results remain significant when evaluating them at any other point.

[13] When dummy variables for an election are introduced the ones for the 2008 election are excluded.

won power. Note that to do this it is necessary to increase substantially the number of parameters to be estimated, something that has to be taken into account when analyzing the results.

First I consider whether results differ when the incumbent runs for reelection. We should expect smaller effects on GDP and PU in this case since more information is available about at least one of the candidates, and it is relatively less likely a drastic change in policy. To verify this I introduce in Equation (1) a new interaction term between a dummy variable that takes the value one when the incumbent goes for reelection and zero otherwise, and the terms already included in the baseline specification, where wi interacts with the election dummies. The upper panel in Figure 10 shows the results. It only compares the two cases when inequality is high for ease of exposition, but it is worth noticing that, as in the baseline case, a drop in GDP and an increase in PU are only found under high inequality. The left panel depicts the path for GDP. The red line shows the implied path when the incumbent runs for reelection and the blue line when the incumbent doesn't do so. In both cases GDP becomes significantly negative around the election quarter, similarly than in the baseline specification (blue line in Figure 4). Same results are observed for PU on the right-hand side graph. But, as expected, the effect is quantitatively larger, both for GDP and PU, when the incumbent doesn't run for reelection (blue). The largest drop in GDP is almost 4% when the incumbent doesn't run for reelection, and less than 2% otherwise. The PU index is almost 20 points higher in the first case in the election quarter, and persists at that level for an additional period, while it falls more quickly when the incumbent doesn't run for reelection.[14]

Second I explore the influence of competitive or unpredictable elections. If election results are difficult to predict then uncertainty should be even larger when inequality is high, making bigger the negative effects on GDP. To test this I first use midterm election results and polling data to estimate the probability that the Democratic Party wins the election. Specifically I run the following regression,

$$Id_e = \alpha_0 + \alpha_1 Id_{e-1} + \alpha_2 md_e + \alpha_3 sd_e^2 + \alpha_4 ir_e + u_e \tag{2}$$

where e indexes presidential elections, Id_e is a dummy variable that takes the value 1 when the Democratic Party wins the election and 0 otherwise, md_e is the fraction of elected democrats for Congress in the midterm election previous to the presidential election e, sd_e is the support for democrats inferred from polling data, ir_e is a dummy variable that takes the value 1 if the Republican incumbent goes for reelection and 0 otherwise, and u_e is an error term.[15]

After estimating (2) I obtain the predicted probability that the Democrat candidate wins the election, p_e. Then the election predictability index for election e is defined as $epi_e = 1 - |p_e - 0.5|$.

[14] In the case the incumbent doesn't run for reelection confidence intervals are wider. This makes the fall in GDP just before the election not significant although the point estimate is very similar than the case when the incumbent runs for reelection.

[15] Specifically, denoting by s_e^i the support for the incumbent previous to election e, $s_e^d = I_{e-1}^d s_e^i + (1 - I_{e-1}^d)(1 - s_e^i)$. The source for s_e^i is Gallup.

I introduce in Equation (1) an interaction between this variable and the ones used to estimate the UPBC; the dummy variables with and without interactions with wealth inequality. The lower panel in Figure 10 shows the results. Again, for ease of exposition, it only compares the cases when inequality is at the highest level in the sample. GDP and PU around elections are depicted in the left and right graphs, respectively. In red are the implied paths when *epi* takes it maximum value in the sample, i.e. the most unpredictable election, and in blue the one corresponding to the minimum value of *epi*, i.e. the most predictable election. As expected the UPBC is more marked in the unpredictable election. GDP reacts before, and the jump in PU is larger, in that case. It is difficult however to conclude that there is no UPBC when elections are predictable. The estimations in this case are not statistically significant, but as noted above there is an important lost of degrees of freedom. They show a similar pattern than those for unpredictable elections, and we need to take into account that the blue line is the easiest to predict election in the sample.

Although results for low inequality are not shown to save space it is important to know that in this case there is no significant drop in GDP, or a significant increase in PU.[16] Thus even in the case that the election result is difficult to predict, PBC are only observed with high inequality. If there are no important differences between the policies that each of the potential governments is expected to put in place there is no policy uncertainty. And without this, there is no fall in activity.

Finally in the third exercise I explore partisan differences between elections. First I differentiate estimations according to the winner party. Results are depicted in the upper panel of Figure 11, again showing only the case of high inequality. In blue it is shown the case when the Democratic Party wins the election and in red the case the winner is the Republican Party. We can see that the effects are larger when the Democratic Party wins the election, both for GDP and PU. However the difference is mostly related to the significance of the estimations, something that can be due to the degrees of freedom that are lost when estimating these specifications. When the effects are differentiated with respect to the incumbent party the results, depicted in the lower panel of Figure 11, show stronger effects in the case the Democratic Party is the incumbent (blue), but mostly for PU, and again, in the case of GDP, mostly in terms of the significance of the results. Overall, although differences exist, they are small, making difficult to conclude that there are partisan effects behind the results.

2.5 Macroeconomic Aggregates

In this section I assess how the UPBC affects the main macroeconomic aggregates; private consumption, private fixed investment and public spending, and the unemployment rate.[17] The demand components may be causing the fall in GDP, or they may be affected by it. I cannot identify

[16] Therefore the UPBC is not due to the revision of expectations as in the so called rational partisan theory. Also, under rational partisan theory, a boom should be observed after an unexpected win of a left-wing government, but as I show below, a recession is observed independently from the identity of the winner party when inequality is high.

[17] The source for all these variables is BEA, and all of them are seasonally adjusted.

causality but I explore the correlations to see which are the most affected components. Figure 12 depicts the paths for these variables implied by estimating Equation (1). The largest response is for fixed investment (upper-left panel), the macroeconomic aggregate that is most affected by uncertainty due to the large fixed costs involved. The maximum fall in fixed investment is more than 6% two quarters after the election, the same period in which GDP falls the most after the election.[18] The response of Private Consumption (upper-right panel) is lower in magnitude, as expected, but strong. It starts falling significantly one quarter before the election and reaches its minimum in the same quarter than fixed investment and GDP, with a level that is 1.5% below trend. 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 latter is much stronger, with a minimum around 4% below trend. 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. Relative to their historical volatility, the fall in investment, consumption and GDP are similar, with falls between 1.25 and 1.38 standard deviations. In the lower-left panel I show the response of federal public spending. There is a fall as well but it is not very significant and it takes place later than the response of GDP, investment and consumption. Probably the fall is due to the fall in revenues generated by the UPBC. A similar, delayed response, is observed for the unemployment rate, which is included in first differences in Equation (1). There is a significant increase starting in the second quarter after the election, with an accumulated effect above 0.4 points of higher unemployment.

2.6 The Role of Uncertainty

The last exercise I pursue in this paper is to include the PU index as a right-hand side variable in Equation (1). If uncertainty is the link between elections and economic activity then we should estimate a smaller response of GDP and the rest of the macroeconomic variables in this case. Figure 13 shows this for the case of high inequality. The red line depicts the baseline results and the blue line the ones coming from the same estimation but including additionally the PU index as control. The response of GDP, shown in the upper-left panel, is about two thirds of the baseline response. The fact that there is still a 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 a proxy for policy uncertainty. Similar results are found for fixed investment (upper-left panel), private consumption (lower-left panel) and the unemployment rate (lower-right panel), which shows half of the response and it is not statistically significant. The only variable

[18] Results are similar when using total gross private domestic investment or fixed nonresidential investment.

with a different pattern is public spending (lower-middle panel). Its negative response is stronger and more significant when controlling for uncertainty.

3 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 1), 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 independent 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, η_g is the fixed effect and $\nu_{g,t}$ the residual.

Estimation results are shown in Table 1. 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.[19] 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 14. 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 1. 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 14).

The results using the change in the expenditure rate are shown in column 3 of Table 1. 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 14).

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.

4 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 the US spanning from 1947 to 2014

[19] 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.

and 17 presidential elections I find the existence of UPBC, i.e. a raise in policy uncertainty and a fall in GDP around presidential elections only in times of relatively high inequality. Additionally evidence of a decreasing on 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.

References

Acemoglu, D., S. Naidu, P. Restrepo, and J. A. Robinson (2015): "Democracy, redistribution, and inequality," in *Handbook of income distribution*, vol. 2, pp. 1885–1966. Elsevier.

Alesina, A. (1988): "Macroeconomics and politics," *NBER macroeconomics annual*, 3, 13–52.

Baker, S. R., N. Bloom, and S. J. Davis (2016): "Measuring economic policy uncertainty," *The Quarterly Journal of Economics*, 131(4), 1593–1636.

Bayer, C., R. Lütticke, L. Pham-Dao, and V. Tjaden (2019): "Precautionary savings, illiquid assets, and the aggregate consequences of shocks to household income risk," *Econometrica*, 87(1), 255–290.

Bernanke, B. S. (1983): "Irreversibility, uncertainty, and cyclical investment," *The Quarterly Journal of Economics*, 98(1), 85–106.

Bloom, N. (2009): "The impact of uncertainty shocks," *econometrica*, 77(3), 623–685.

Canes-Wrone, B., and J.-K. Park (2012): "Electoral business cycles in OECD countries," *American Political Science Review*, 106(1), 103–122.

Den Haan, W. J., P. Rendahl, and M. Riegler (2017): "Unemployment (fears) and deflationary spirals," *Journal of the European Economic Association*, 16(5), 1281–1349.

Drazen, A. (2004): *Political economy in macroeconomics*. Orient Blackswan.

Franzese Jr, R. J. (2002): "Electoral and partisan cycles in economic policies and outcomes," *Annual review of political science*, 5(1), 369–421.

Julio, B., and Y. Yook (2012): "Political uncertainty and corporate investment cycles," *The Journal of Finance*, 67(1), 45–83.

Krueger, D., K. Mitman, and F. Perri (2016): "Macroeconomics and Household Heterogeneity," in *Handbook of Macroeconomics*, ed. by J. Taylor, and H. Uhlig, vol. 2, chap. 11, pp. 843–921. Elsevier.

Krusell, P., and A. A. Smith, Jr (1998): "Income and wealth heterogeneity in the macroeconomy," *Journal of political Economy*, 106(5), 867–896.

Lindbeck, A. (1976): "Stabilization policy in open economies with endogenous politicians," *The American Economic Review*, 66(2), 1–19.

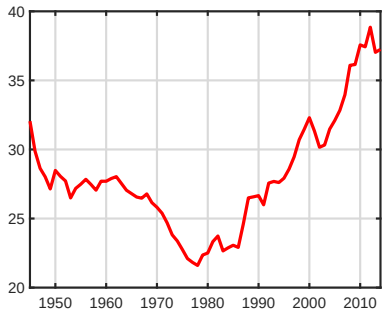
McCarty, N., K. T. Poole, and H. Rosenthal (2016): *Polarized America: The dance of ideology and unequal riches*. mit Press.

Meltzer, A. H., and S. F. Richard (1981): "A rational theory of the size of government," *Journal of political Economy*, 89(5), 914–927.

Nordhaus, W. D. (1975): "The political business cycle," *The review of economic studies*, 42(2), 169–190.

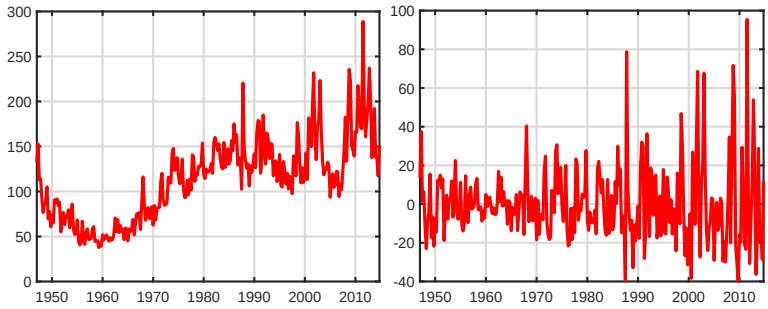
Persson, T., and G. E. Tabellini (2002): *Political economics: explaining economic policy*. MIT press.

Ravn, M. O., and V. Sterk (2017): "Job uncertainty and deep recessions," *Journal of Monetary Economics*, 90, 125–141.



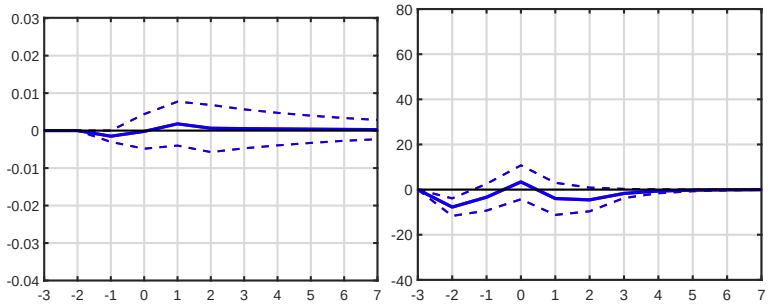
Note: fraction of total wealth held by the richest 1% of the population. Source: WID.

Figure 1: Wealth Inequality in the US, 1947-2014.



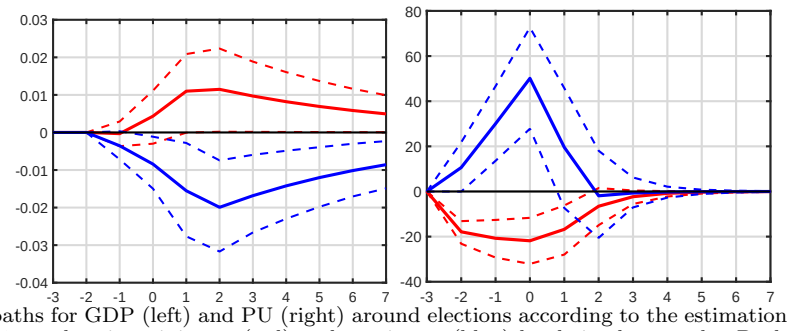
Note: the original index on the left and the dentrended series using the HP filter on the right. Source: Baker et al. (2016).

Figure 2: PU in the US, 1947-2014.



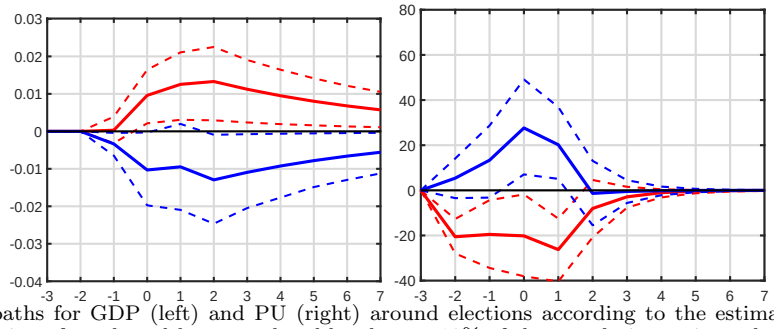
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1) but without including the interaction with wi. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 3: Political Business Cycles in the US, 1947-2014.



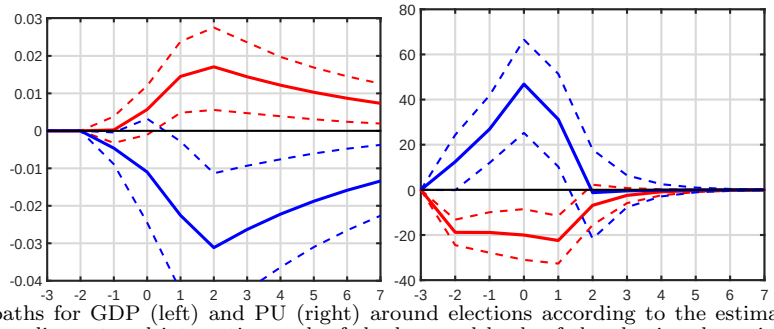
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), using values of wi equal to its minimum (red) and maximum (blue) levels in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 4: Unequal Political Business Cycles in the US, 1947-2014.



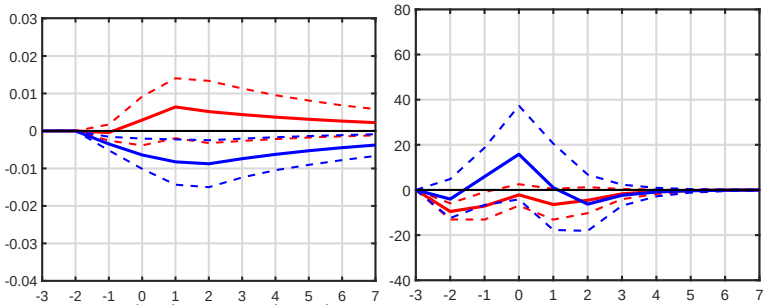
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), using the fraction of total wealth accumulated by the top 10% of the population, using values of this variable equal to its maximum level in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 5: Unequal Political Business Cycles in the US, 1947-2014. Top 10% Inequality.



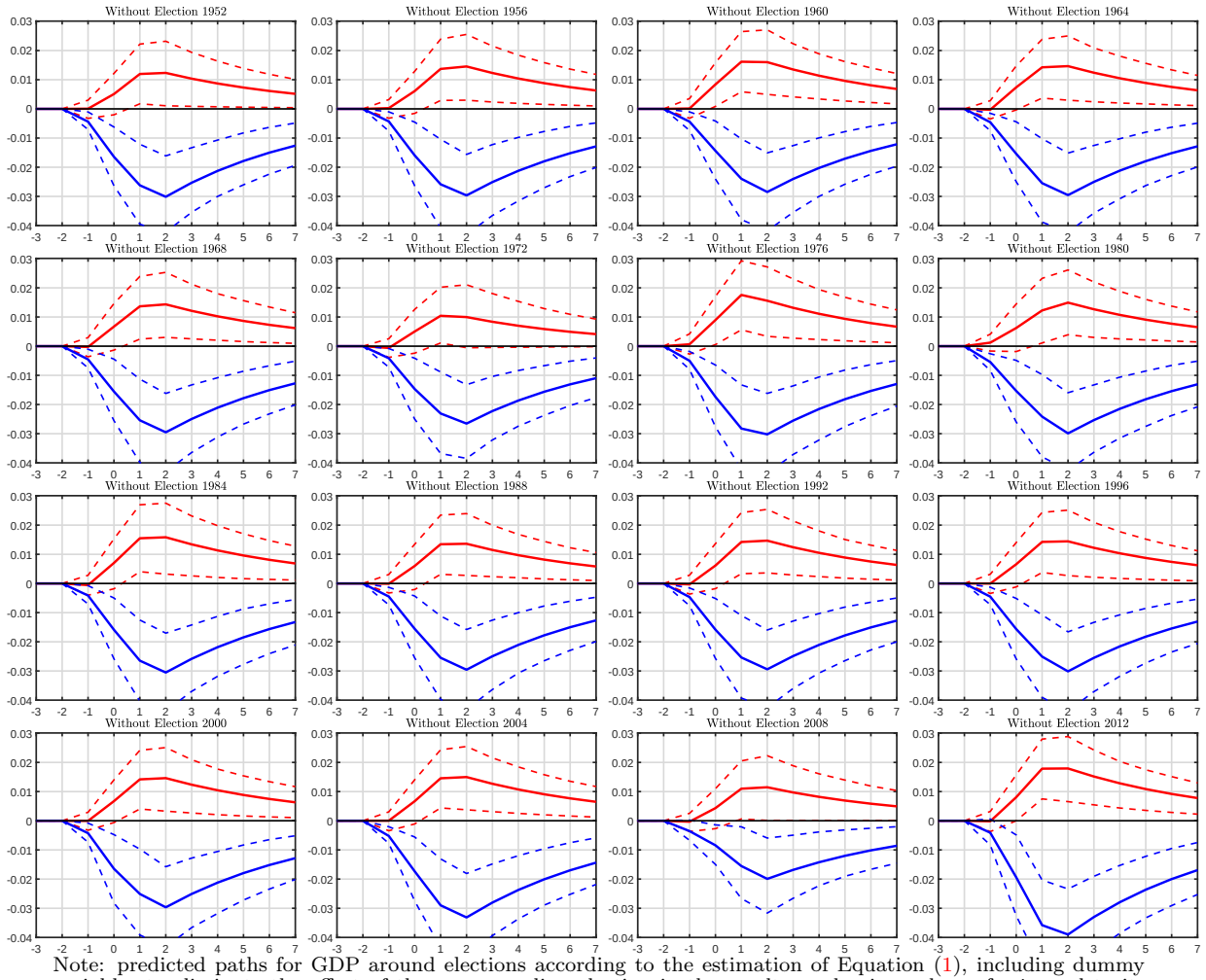
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), controlling for a linear trend interacting each of the lags and leads of the election dummies, using values of wi equal to its maximum level in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 6: Unequal Political Business Cycles in the US, 1947-2014. Linear Trend.



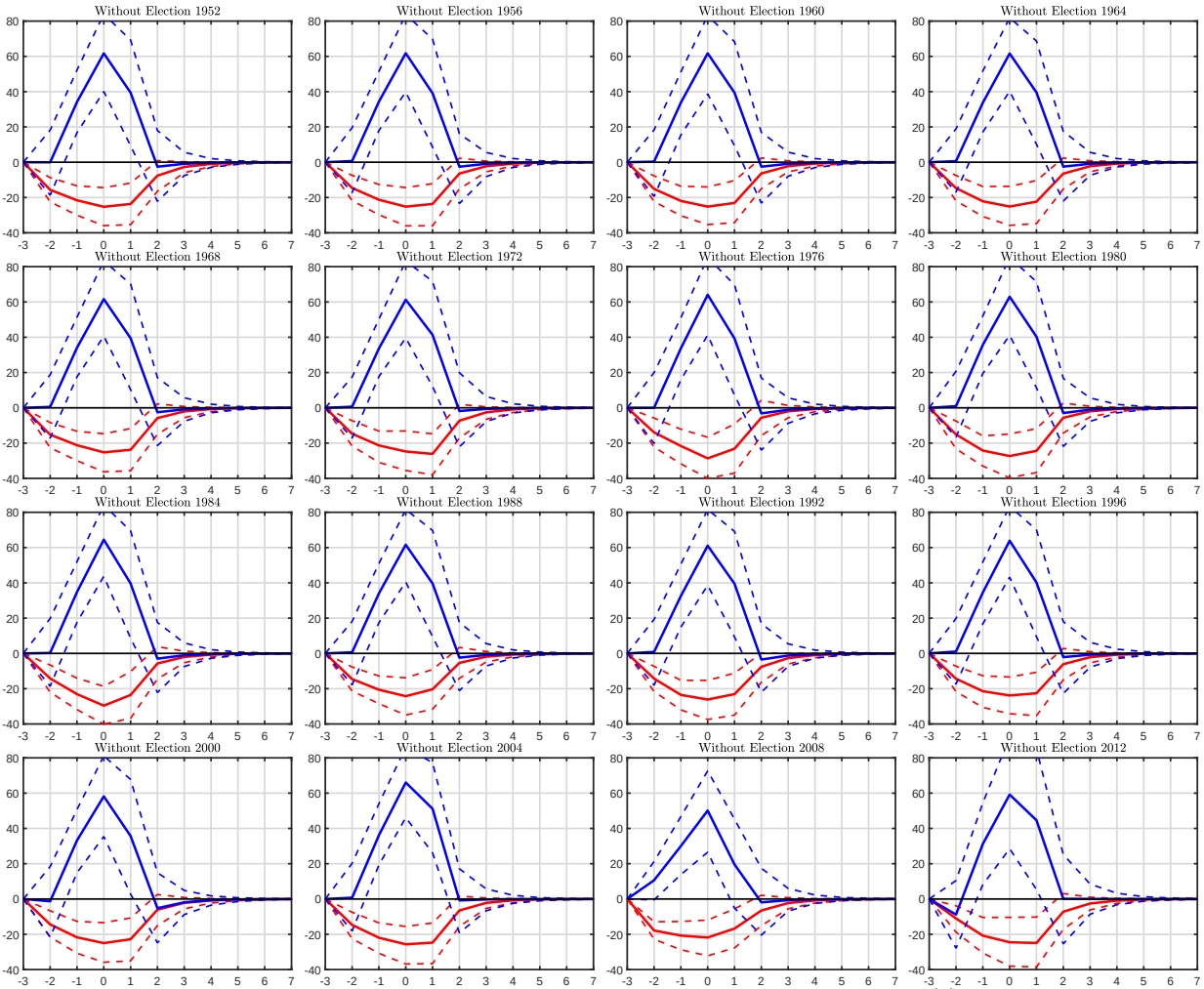
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), with a measures of wdi that takes the value 1 when wi is above its sample average, and zero otherwise. In blue is the predicted path when $wdi = 1$ and in red when $wdi = 0$. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 7: Unequal Political Business Cycles in the US, 1947-2014. Discrete Measure of Inequality.



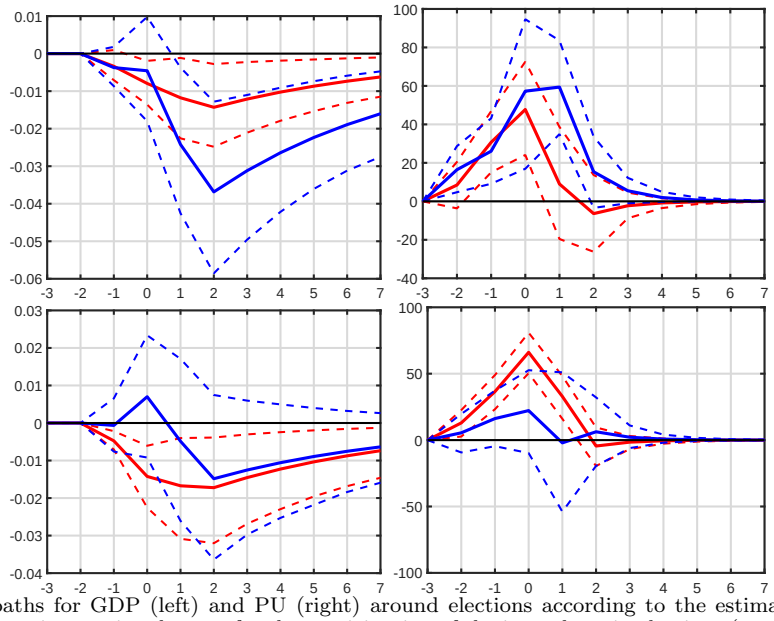
Note: predicted paths for GDP around elections according to the estimation of Equation (1), including dummy variables to eliminate the effect of the corresponding election in the results, and using values of wi equal to its minimum (red) and maximum (blue) levels in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 8: Unequal Political Business Cycles in the US, 1947-2014. GDP and the Influence of Specific Elections.



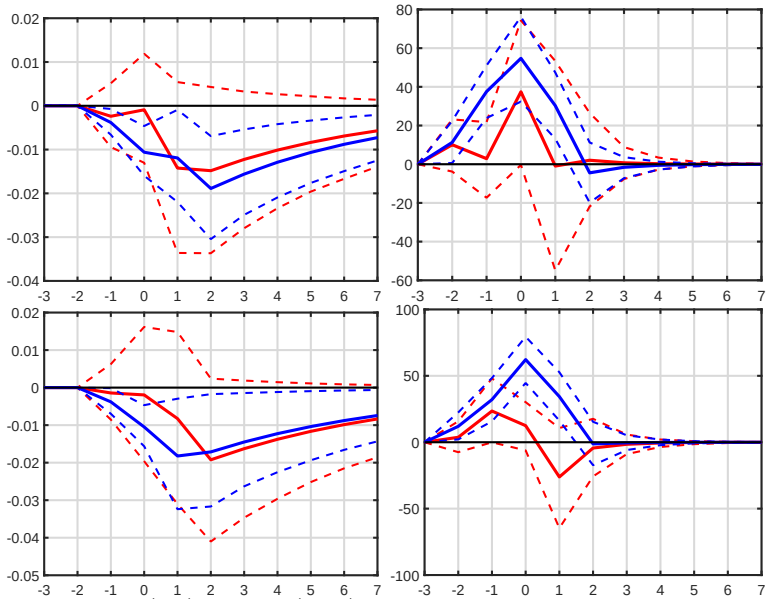
Note: predicted paths for PU around elections according to the estimation of Equation (1), including dummy variables to eliminate the effect of the corresponding election in the results, and using values of *wi* equal to its minimum (red) and maximum (blue) levels in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 9: Unequal Political Business Cycles in the US, 1947-2014. PU and the Influence of Specific Elections.



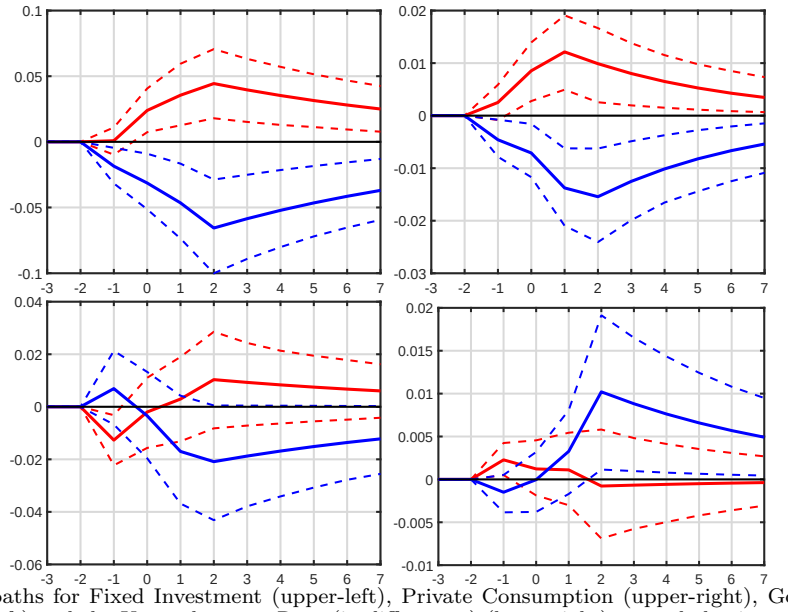
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), augmented by an interaction dummy for the participation of the incumbent in elections (upper panel) and the predictability of the election result (lower panel), using values of wi equal to its maximum level in the sample. In red the implied path when the incumbent goes for reelection (upper panel) and when the election result is difficult to predict (lower panel), and in blue the opposite cases. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 10: Unequal Political Business Cycles in the US, 1947-2014; Incumbent for Reelection and Election Result Predictability.



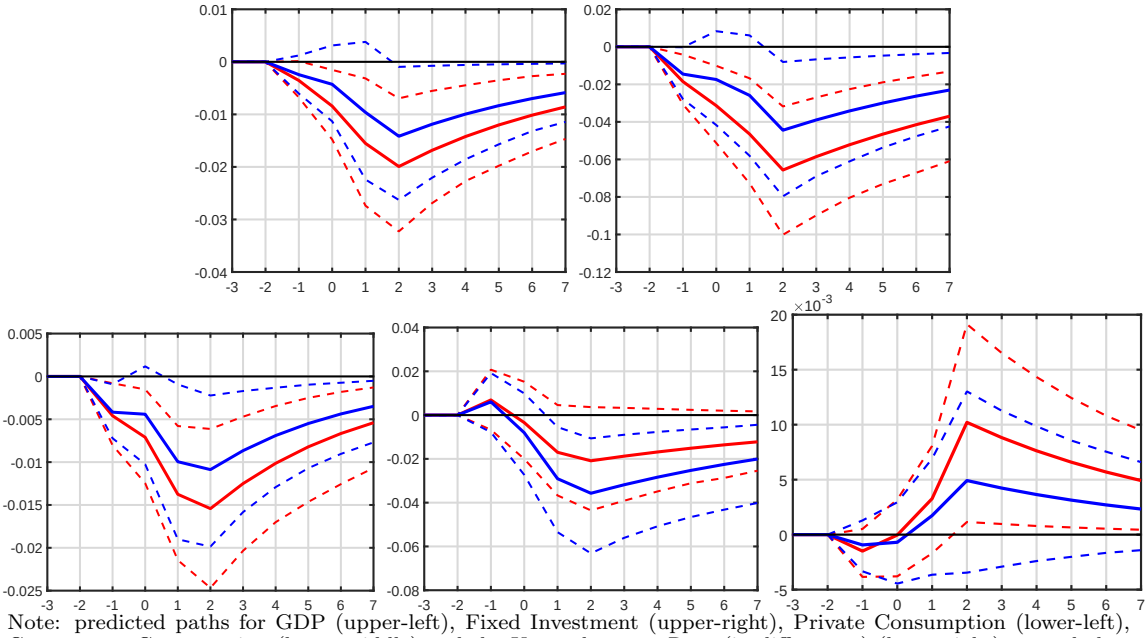
Note: predicted paths for GDP (left) and PU (right) around elections according to the estimation of Equation (1), augmented by an interaction dummy for the incumbent or winning party, using values of wi equal to its maximum level in the sample. In the top panel the blue (red) line corresponds to elections when the Democratic (Republican) Party won the election, in the lower panel the blue (red) line corresponds to elections when the Democratic (Republican) Party was the incumbent. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 11: Unequal Political Business Cycles in the US, 1947-2014; Partisan Effects.



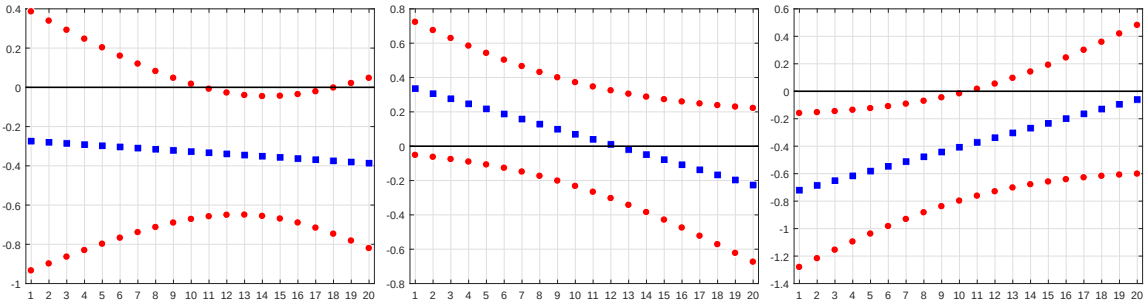
Note: predicted paths for Fixed Investment (upper-left), Private Consumption (upper-right), Government Consumption (lower-left) and the Unemployment Rate (in differences) (lower-right) around elections according to the estimation of Equation (1), using values of *wi* equal to its minimum (red) and maximum (blue) levels in the sample. Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 12: Unequal Political Business Cycles in the US, 1947-2014; Macroeconomic Aggregates



Note: predicted paths for GDP (upper-left), Fixed Investment (upper-right), Private Consumption (lower-left), Government Consumption (lower-middle) and the Unemployment Rate (in differences) (lower-right) around elections according to the estimation of Equation (1) when of *wi* is equal to its maximum level in the sample. In red baseline results and in blue results when UP is added as an explanatory variable in Equation (1). Dashed lines are 90% confidence intervals computed using the Wild Bootstrap.

Figure 13: Political Business Cycles in the US, 1947-2014. UP as a Control.



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) (see results in Table 1). In blue the point estimate and in red the 90% confidence interval. The dependent variable is normalized by its standard deviation.

Figure 14: Elections and Consumption, Microeconomic Evidence

	$\Delta\ c_{g,t}$	$\Delta\ y_{g,t}$	$\Delta\ (c/y)_{g,t}$
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 14). ‡: makes the overall effect not significant for quintiles 11-20 and 7-20 for 90% and 95% significance levels, respectively (see Figure 14). 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 1: Elections and Consumption, Microeconomic Evidence