Ideological Polarization and Government Debt

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Abstract

Under conditions of imperfect information, competent incumbents increase spending in order to signal their type, thus raising government debt beyond that which is socially optimal. Proclivity to debt is reduced when the electorate is ideologically polarized because the vote-payoff to higher spending is reduced. Policy contrasts starkly with models of 'strategic debt' wherein debt is predicted to increase with polarization. Using time-varying polarization measures generated from ideology data from party manifestos we find a sizable and statistically significant negative association between debt levels in OECD countries and ideological polarization in the electorate.

1 Introduction

In 2010 average central government debt in the OECD stood at 69% of GDP. In 1974 this figure stood at 23%, down from 88% in 1945. Moreover at any point in time there is substantial cross-country variation. 2010 debt levels varied from 22% in Switzerland to 189% in Japan. Whilst it is widely recognized that these outcomes are the product of imperfect political processes, a full explanation represents a formidable challenge to political economics.[1]

Persson and Svensson (1989) and Alesina and Tabellini (1990) formalized the idea of 'strategic debt'. Given the likelihood of being replaced in the future, an ideologically motivated incumbent will encumber future (ideologically distant) governments with debt. The greater the ideological distance between the parties, or polarization, the greater the level of debt.[2]

This paper argues the reverse. When the electorate is ideologically polarized, then political competition can become dampened as fiscal policy becomes less effective as a means of winning additional voters. If it is indeed the political process that distorts policy towards excessive debt, the electoral incentive to increase debt is reduced if that process dulls with polarized ideological preferences.

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[1] As noted by Alesina and Perotti (1995) efficiency-based explanations (e.g. Barro, 1979) alone cannot explain either the levels or variation in public debt observed across countries and time. Recent contributions include Battaglini and Coate (2008) and Yared (2010). Eslava (2011) provides an excellent recent survey.

[2] Persson and Svensson (1989) model preference heterogeneity over total government expenditure whilst Alesina and Tabellini (1990) focus on the composition of expenditure. In support of Persson and Svensson (1989) Pettersson-Lidbom (2001) finds that right-wing governments increase debt whilst left-wing government reduce debt when faced with the likelihood of being replaced. However this is a different, and not mutually exclusive, hypothesis from that pertaining to the ideological distance between the two parties. For example in Persson and Svensson's (1989) model the impetus for debt (given a conservative incumbent) is stronger when the ideological distance between the two parties is bigger.

One seminal formulation of an imperfect political process is the signalling model of Rogoff (1990) and Rogoff and Sibert (1988). Given imperfect information concerning candidate quality, competent incumbents are obligated to increase spending beyond that which would be socially optimal in order to distinguish themselves. Aidt et al (2011) also examine the policy distortion arising in a signalling model of public spending, and find that spending is tilted towards observable spending using data from Portuguese municipalities. In the theoretical analysis below we adapt the model of Aidt et al (2011) and focus on the public debt policy decision. The theoretical structure assumes that voters can observe public good provision, but do not know whether this provision is enabled through competence or by public debt, which are both unobservable. In the separating equilibrium, competent incumbents set high levels of spending, necessitating debt, in order to signal their type.

The assumption that voters are not fully aware of the debt repercussions of current fiscal policy is not new in political economics. Buchanan and Wagner (1977) argue that voters suffer from "fiscal illusion", in part induced by complexities in the fiscal system, and in part induced by "rational ignorance" (Downs, 1957, and Tullock, 1967).[3] Moreover even under the strong assumption of fully rational voters, the relevant borrowing data do not become available before a substantial lag and are then usually subject to further historical revisions.[4]

Voters therefore have to infer incumbent competency on the basis of observed levels of public provision. Because incompetent incumbents suffer from greater signalling costs, then competent incumbents can successfully increase spending to a level that the incompetents

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[3]As an example of low general knowledge concerning public finances, about 59% of Americans told in a Washington Post/ABC News poll in 2013 that they believed that the federal deficit was growing whilst at that time it was not.

[4]See Irwin (2015) on the substantial difficulties of providing accurate contemporaneous public debt data.

cannot match. The information asymmetry thus necessitates debt as an outcome of competent types having to distinguish themselves.

When the dispersion of political preferences increase, as with political polarization, then the payoffs in the signalling game change. In particular the capacity to improve the election-win probability through spending falls as voters become less responsive to spending when they are ideologically polarized.[5] Consequently the level of spending required to price out low competent incumbents falls, and hence debt falls as well. Moreover in the theory the probability of competent types being re-elected falls with polarization. Because it is the competent incumbents that increase debt this feature also serves to reduce average debt levels.

The theoretical analysis provides a counterpoint to recent literature which generally, though not universally, finds adverse consequences of political polarization. Azzimonti (2011) theorizes that the common pool problem in public service provision is exacerbated, causing higher taxes and lower growth, and Woo (2003, 2005) and Azzimonti and Talbert (2014) find increased policy variability and hence subsequent greater macroeconomic volatility. Canes-Wrone and Park (2012) argue for a 'reverse political business cycle' in which uncertainty over the future policy environment increases with polarization thus dampening investment prior to elections.[6] The findings in the present paper are compatible with this literature. The basic argument here is that polarization can weaken electoral competition, and in doing

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[5]Relatedly, Adams et al (2017) show that non-moderate voters weight candidates' ideological positions far more than moderate voters using survey data from the 2010 Cooperative Congressional Election Study. By definition greater polarization means less moderate voters, hence a greater weight on ideology and a lower weight on material concerns.

[6]On the other hand Testa (2010 and 2012) and Brown et al (2011) theorize that polarization can reduce corruption. Melki and Pickering (2016) find supportive evidence for this hypothesis using data from the US.

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so act to reduce policy failures that can emerge from the political process.[7]

To motivate the empirical analysis figure 1 presents a simple cross-country correlation between central government debt levels in 2010 and the polarization measure generated from the World Values Survey used by Lindqvist and Östling (2010) in their analysis of the size of government. The data sample here is a cross-section of quite diverse countries.[8] The scatter plot reveals a negative raw correlation between polarization and debt. Prima facie this is supportive of the theory advanced in the present paper, and contrary to the strategic debt literature. Nonetheless it is not possible to infer causality for the standard reason that analysis of cross-country performance omits considerable unobserved heterogeneity.

Below the competing hypotheses are tested using time-varying polarization measures generated from ideology data from political manifestos and observed voting behavior. These data are described in more detail below, but at the outset we note that one important feature of these data is that they vary over time. Previous analyses of the relationship between fiscal policy and ideological polarization has only used cross-sectional analysis, or in the context of panel data has relied on fixed measures of ideology for party positioning - wherein time variation is generated through variation in seats.[9] Within countries the distance between parties is not fixed over time hence the data used here represent an improvement over the previous work. Within-country variation also allows us to control for unobserved

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[7]Relatedly Schultz (2008) also models voters as poorly informed, finding conditions under which longer term lengths (hence reduced accountability) can be an optimal way of reducing policy distortions.

[8]The econometric analysis below focuses only on established OECD democracies for three reasons. First, both our model and the strategic debt literature rely on democratic processes. Second, debt default concerns have generally been greater outside the OECD. Third, over a meaningful time-span the manifestos data, which we exploit to generate time-varying ideological dispersion (polarization) measures, are only available for the OECD sample.

[9]For example Alt and Lassen (2006). Relatedly Volkerink and de Haan (2001) and Perotti and Kontopoulos (2002) use cross-sectional policy to investigate the effect of fragmented government on fiscal policy.

fixed country-specific characteristics that might drive debt.

The econometric analysis consistently finds a statistically significant negative relationship between central government debt and ideological polarization. The relationship is robust to the inclusion of a number of controls, and in particular is strengthened when a measure of fragmentation (which is distinct from polarization) is included. In contrast to the strategic debt literature we find that it is ideological dispersion in the electorate, rather than ideological distance between the government and their potential replacement, that correlates with debt. A one standard deviation increase in polarization correlates with lower central government debt by about 12% of GDP. To identify exogenous variation in polarization we use lagged media penetration data and also the impact of the fall of the Berlin Wall on European politics. Campante and Hojman (2013) and Melki and Pickering (2014) both argue for a causal relationship from increased media penetration to reduced polarization. Using the alternative instrumental variables the results hold up in support of a causal negative relationship between polarization and debt.

Furthermore the negative relationship between debt and polarization is found to be stronger when 'government efficiency' is weaker. This latter variable is defined by institutional independence from political pressures. As such we would expect a priori that governments scoring highly on this measure would be more able to resist voter demands for debt. The data thus also support this line of reasoning.

The next section develops the theoretical argument, section 3 contains the empirical analysis and section 4 concludes.

2 Model

In this section we lay out a basic theoretical argument that, in contrast to the literature on strategic debt, underpins the hypothesis that polarization reduces public debt. As discussed above the theoretical analysis is an adaptation of Aidt et al (2011). The key differences are that we include debt as a means of public good provision, and model uncertainty in whether the public good provision stems from competence or debt. There are two periods, denoted by $t = 1, 2$, and a continuum of citizen-voters who care about private consumption c_t and public goods, g_t in the two periods. In our analysis there is only one type of public good, hence lifetime utility for the representative citizen-voter is

$$u^v = c_1 + \ln g_1 + \beta \left(c_2 + \ln g_2 \right) \tag{1}$$

where $\beta \in (0, 1)$ is the discount factor. Each citizen-voter is endowed with income y in each period and pays an exogenous and fixed lump-sum tax τ, hence consumes $c_t = c = y - \tau$.

Public good provision in both periods is enabled through taxation, and also through stochastic incumbent competency, ε_t, which is unobserved. Moreover the incumbent may finance period 1 spending through debt, D, which also is not observed. Public goods g_t are therefore constrained by

$$g_1 = \tau + D + \varepsilon_1 \tag{2}$$

$$g_2 = \tau - D + \varepsilon_2 \tag{3}$$

Each period a citizen-voter is elected, who is either competent $(\varepsilon_t = \varepsilon_H)$ or incompetent $(\varepsilon_t = \varepsilon_L < \varepsilon_H)$, and competency is fixed in the sense that re-elected incumbents retain

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their original competency. The proportion of citizen voters that are competent is $\rho \in (0, 1)$. Elected politicians derive utility from private consumption and public good provision, and also receive 'ego-rents' m whilst in office.

As well as having material concerns, citizen voters also care about the ideology of their elected politician. Following Aidt et al (2011) this is modeled as a random shock v_t to citizen-voters' preferences for the incumbent relative to the challenger. To simplify matters the random variable v_t is drawn from a uniform distribution $U(-\varphi, \varphi)$. The parameter φ captures the dispersion of ideological preferences, with high values of φ representing greater ideological polarization.

The information structure of the model is as follows:

1. At the beginning of period 1, the incumbent observes his competency ε_1 and decides fiscal policy g_1 and hence D.

2. Voters observe v_1 and the level of public good provision g_1.

3. At the end of period 1 an election takes place where the incumbent runs against a randomly chosen challenger.

4. At the beginning of period 2, the election-winner residually implements public good spending according to (3).

As with Aidt et al (2011) the structure describes a sequential game of incomplete information, with a natural solution in the form of Perfect Bayesian Equilibrium described by (type-determined) fiscal allocations and an endogenous reelection probability.

Policy in the second period is determined by $g_2 = \tau - D + \varepsilon_2$. Second-period utility is given by

$$W(i) = y - \tau + \ln(\tau - D + \varepsilon_i) \qquad \text{for } i \in \{L, H\} \tag{4}$$

if the incumbent is re-elected, and

$$W(C) = y - \tau + \rho \ln(\tau - D + \varepsilon_H) + (1 - \rho) \ln(\tau - D + \varepsilon_L) \tag{5}$$

if a challenger of unknown type is elected. The representative citizen-voter votes in favor of the incumbent if and only if

$$\widehat{\rho}(g_1) W(H) + (1 - \widehat{\rho}(g_1)) W(L) - W(C) + v_1 \geq 0 \tag{6}$$

where $\widehat{\rho}(g_1)$ represents the citizen-voters' updated beliefs that the incumbent is of type H following observed public good provision in period 1. Given the uniform distribution of v_1, the probability of getting reelected is

$$\pi(\widehat{\rho}(g_1)) = \frac{1}{2} + \frac{\widehat{\rho}(g_1) W(H) + (1 - \widehat{\rho}(g_1)) W(L) - W(C)}{4\varphi}. \tag{7}$$

Notice the role played by φ - ideological dispersion. Greater values of φ weaken the electoral imperative of signalling competency. Essentially competency becomes less important in determining election results under greater political polarization. The imperative to signal competency (as will be derived) through higher debt is thus weakened if polarization increases.

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Equation (7) defines the reelection rule constraining the first-period public spending (and therefore debt) decision. Following Aidt et al (2011) the incumbent weighs up the expected value of being reelected

$$V(\varepsilon_i) = m + W(i) - W(C)$$

against the cost of signalling $C(g_1^i, \varepsilon_i)$, defined by the distortionary cost of setting policy away from the socially optimal levels of public provision. The trade-off is that under particular conditions there is an incentive to increase spending today (and therefore incur debt) beyond the social optimum in order to signal competency.

Proposition 1 *(Equilibrium) The unique intuitive Perfect Bayesian Equilibrium in undominated strategies is a separating equilibrium and is characterized by the following strategies and beliefs:*

1. *An incumbent of type L sets $g_1^L = \frac{2(\tau + \varepsilon_L)}{1+\beta}$ in period 1. If reelected he sets $g_2^L = \frac{2\beta(\tau + \varepsilon_L)}{1+\beta}$ in period 2.*

2. *An incumbent of type H sets $g_1^H = g_1^s$ in period 1 where*

$$g_1^s = \max\left\{\frac{2(\tau + \varepsilon_H)}{1+\beta}, g^s\right\}$$

   with g^s defined as

$$g^s = \max\left\{g \mid C(g_1^i, \varepsilon_L) = \beta\left(\pi(\widehat{\rho}(g)) - \pi(\widehat{\rho}(g_1^L))\right)V(\varepsilon_L)\right\}.$$

   If reelected, he sets $g_2^H = 2(\tau + \varepsilon_H) - g^s$ in period 2.

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3. *Citizen-voters' posterior beliefs are $\widehat{\rho}(g_1) = 1$ for all $g_1 \geq g_1^s$ and $\widehat{\rho}(g_1) = 0$ for all $g_1 < g_1^s$ and the reelection rule is given by (7).*

Proposition 1 is a modification of proposition 1 in Aidt et al (2011). Notice that in the separating equilibrium the type L incumbents are 'priced out' to the extent that they cannot match the spending of the H types. The signalling cost of matching spending (as in a pooling equilibrium) is sufficiently great for L types that they can do no better than adhering to the socially optimal level of spending. Hence for example if $\beta = 1$ then debt-levels would be 0 if the incumbent is type L. However higher levels of debt stem from competent incumbents, who set spending sufficiently high to price out the L types, thus signalling their type and hence improving their re-election chances, though inducing a policy distortion in the form of excessive debt.

Proposition 2 states how increased ideological polarization affects chosen debt levels.

Proposition 2 *Increased ideological polarization reduces equilibrium debt.*

There are two distinct elements to proposition 2, which work in the same direction. Firstly polarization affects the probability that low types will assume office. In particular equation (7) entails a levelling to the extent that the incumbent's re-election is closer to $\frac{1}{2}$ with higher values of φ, holding all else equal. This works against competent incumbents, who in the separating equilibrium enjoy $\pi(\widehat{\rho}(g_1)) > \frac{1}{2}$, but works in favor of incompetent incumbents, with $\pi(\widehat{\rho}(g_1)) < \frac{1}{2}$.

The second element of this proposition is that g^s falls - reducing debt levels for competent incumbents. The logic of this is as follows. In the separating equilibrium what defines g^s is the calculus of setting g at that level for L-type incumbents. Type-L signalling costs -

which are entirely material - are unaffected by ideological polarization (φ). However the sensitivity of the reelection probability to perceived competency is dampened. (Analytically the term $\pi\left(\widehat{\rho}\left(g\right)\right) - \pi\left(\widehat{\rho}\left(g_1^L\right)\right)$ in proposition 1 falls.) This means that the expected benefits of signalling are also reduced, which lowers the threshold level of g^s. Spending by competent incumbents thus falls in the separating equilibrium.

The effect of polarization is to weaken the extent to which electoral politics are affected by material policy. More often than not political-economic models identify institutional weaknesses in particular electoral processes. The signalling mechanism is seminal in the political business cycle literature (Rogoff, 1990 and Rogoff and Sibert, 1988), and lays out a credible story through which policy may be distorted given likely informational asymmetries in the political process. Our argument is that ideological polarization acts to weaken the signalling imperative, thereby reducing policy distortions such as higher debt.

3 Evidence

3.1 Data and Empirical Strategy

The dependent variable, taken from Reinhart and Rogoff (2011), is total (domestic plus external) gross central government debt measured as a percentage of GDP.[10] The sample covers the period 1945-2010 in countries which have been OECD members since 1975. The

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[10]Empirical work in this broad area focusses on the primary surplus rather than debt levels (e.g. Persson and Tabellini, 2003; Alt and Lassen, 2006). We prefer actual debt levels as a dependent variable because the primary surplus is defined as tax revenue minus expenditure before interest payments on debt are made. Given the presumption of solvency (which characterizes the OECD for most of the time), then countries with higher steady state debt levels are more predisposed towards a primary surplus. The primary surplus data therefore may quite often be systematically misleading in terms of representing chosen levels of public debt.

mechanism proposed in this paper, and also in the strategic debt literature, both emphasize electoral concerns hence established democracies are the appropriate sample.

Figure 2 depicts these data, showing interesting variation across countries. A first observation is that there are important universal time effects. Many countries ended the second world war with large debt obligations. In 1946 average public debt levels in the sample stood at 93% of GDP. Debt levels then fell as a percentage of GDP as they were paid off, and of course as GDP itself rose relatively quickly over the subsequent three decades, with average debt levels reaching their minimum (at 23.6% of GDP) in 1974. Since that time public debt as a percentage of GDP has increased, for instance quite markedly following the financial crisis of 2007/2008, rising to 69.4% in 2010, the most recent year for which data are available. There is also interesting cross sectional variation. Taking the whole sample period, public debt in Germany and Switzerland respectively averaged at 18.3% and 21.5%, whilst the averages for Great Britain and Belgium are respectively 78.1% and 78.6%. It seems reasonable to infer that 'debt aversion' is not constant across countries.

The key explanatory variable, ideological polarization, is constructed using ideological data produced by the Manifestos Research Group (Budge et al, 2001, and updated by Klingemann et al, 2006).[11] This source derives a unidimensional left-right ideology score produced at the level of the party, which varies across time (as manifestos of particular parties change per election), denoted $rile_{pjt}$ for party p in country j in year t, which in principle

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[11]The manifestos data pass various 'external validation' tests. For example country level averages of these data show that the Scandinavian countries are on average substantially more left-wing than say the US or Australia. Average ideology in anglo Saxon countries such as the UK exhibit a marked drift to the right in the 1980s. Gabel and Huber (2000) argue that the MRG data are a good measure of ideology, as they corresponds well with other data sources such as expert surveys (e.g. Castles and Mair (1984)) and data from the World Values Survey (WVS). Pickering and Rockey (2011) use the manifestos data to explore the relationship between government size, ideology and economic development.

varies between -100 (extreme left) to +100 (extreme right). Within the OECD sample the leftmost observation - with a $rile$ measure of -68.1 - is the Danish Socialist People's Party in 1960, whilst the rightmost observation is the Australian Country party in 1954 - with a $rile$ measure of 85. To construct a measure of polarization (POL) in an election year within a particular country we estimate the standard deviation of underlying ideology distribution the using the formula

$$POL_{jt} = \sqrt{\sum_p V_{pjt} rile_{pjt}^2 - \left(\sum_p V_{pjt} rile_{pjt}\right)^2}$$

where V_{pjt} is the proportion of votes received by party P in the election. Thus in a two party system where both parties get 50% of the vote, with ideology $rile_L = -10$ and $rile_R = 10$, then the standard deviation is 10. If the parties' respective ideology move to $rile_L = 10$ and $rile_R = 30$, holding vote shares constant at 50%, then the standard deviation is unaltered. If $rile_L = 10$ and $rile_R = 50$, then the standard deviation increases to 20. Data for non-election years were obtained through linearly interpolating between the nearest election-years. In the empirical analysis we also utilize the mean ideology, constructed analogously according to $MEAN_{jt} = \sum_p V_{pjt} rile_{pjt}$.

The resulting series for POL_{jt} demonstrate interesting variation across time and space. The mean value for POL_{jt} is 17.0 and its standard deviation is 6.95. The least polarized election in the sample was the German election of 1965 $(POL_{jt} = 2.47)$. At face value this perhaps reflects the consensual approach to politics in this country following the second world war.[12] The most polarized election was the Finnish election of 1945 $(POL_{jt} = 43.23)$ - this

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[12](Although closer examination of the data reveals quite a lot of variation within West Germany: for

latter case reflects the presence of a politically strong communist party (the Finnish People's Democratic League) together with overtly anti-Soviet centrist and rightwing movements that prioritized Finnish sovereignty.

A key advantage of the polarization measure used in this paper is that it varies across time as well as across countries. Hence differences in the level of debt that may be due to time-invariant unobservable country characteristics (for example such as German 'debt aversion') may be controlled for via the use of fixed effects. In the UK for example, politics were fairly polarized at the point of the 1945 general election,[13] and this shows up in the data as $POL_{jt} = 21.4$. The measure proceeded to decline, reflecting the 'post-war consensus' and in the 1959 general election POL_{jt} reached its UK minimum of 4.32. An ideological divide started to re-emerge in the 1970s peaking in 1983 at 28.3, reflecting Thatcher's drive to the right, and Labour's continued adherence to generalized public ownership then embodied in Clause 4 of its own constitution. More latterly, with the emergence of New Labour, polarization has declined, with POL_{jt} in single digits so far through the 21st century.

Alternative polarization measures, for example generated from the World Values Survey (WVS),[14] essentially represent a snapshot of a country at a given moment hence will not capture within-country variation across time. Nonetheless, the WVS permit a validation test of the POL_{jt} measure used here. In particular the most recent WVS contains a question which asks "In political matters, people talk of "the left" and "the right." How would you place your views on (a 1-10 Likert) scale, generally speaking?". The correlation of the

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example in 1957 $POL_{jt} = 34.57$.)

[13]In 1945 the elected Labour party embarked on a significant expansion of the welfare state and meaningfully differed in ideology from the Conservative party, led by Winston Churchill.

[14]Lindqvist and Östling (2010) analyze the effect of polarization on the size of government using cross-sectional measures derived from the WVS.

standard deviation of this measure with the country-level average POL_j is 0.52. Countries which on average are measured to be more polarized according to our measure are also more polarized according to the WVS.

The measure of polarization used here is appropriate in the context of testing the theory proposed here, that reduced dispersion of preferences implies greater political competition and hence greater debt levels when current spending is rewarded. However, polarization as conceived in the strategic debt literature is somewhat distinct, in that it refers to distance between parties rather than dispersion in the electorate. In essence the further the incumbent from their expectation of future policy, the greater the level of debt. In order to separately test the strategic debt hypothesis a separate 'government distance' (GOV_DIST_{jt}) measure is also used in the empirical analysis. This is measured as the absolute distance between a weighted measure of government ideology and mean ideology in the electorate $MEAN_{jt}$ defined above.[15] The maintained assumption here is that the current ideological mean in the population proxies for the expectation of the ideological disposition of future regimes. The correlation between POL_{jt} and GOV_DIST_{jt} in the annual data is 0.427, hence the two are positively correlated as would be expected, but there is also some usable variation. Governments that are more distant from mean ideology are more prevalent when the electorate is more dispersed.

Figure 3 plots average debt levels within countries against averages of the polarization measure POL_j. This figure, like figure 1, is of course only suggestive, but taken at face value is again supportive of the hypothesis offered in this paper, that polarization may reduce

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[15]The weights are defined by the seat shares of the parties formally represented in government. Data for the parties in government were taken from the Database of Political Institutions.

debt. Furthermore the fact that figures 1 and 3 are consistent with each other supports the use of the manifesto-generated polarization data. The slope coefficient in figure 3 is equal to -2 (with a p-value of 0.07), hence a permanent one standard deviation (6.95) increase in polarization is statistically associated with a reduction of central government debt of 13.9% of GDP.

Figure 4 plots the evolution of cross-country year level averages of debt levels and polarization, POL_t.[16] Clearly debt levels have trended upwards over time since 1960, whilst average polarization has declined. Broadly speaking the early part of the sample is characterized by low debt and high polarization, whilst the latter part of the sample is characterized by high debt and low polarization.[17] In a simple bivariate regression the slope coefficient is equal to -3.97 (with a p-value of 0.003). Again, this figure certainly cannot be taken as evidence of a causal relationship. Nonetheless, the facts are at least consistent with the interpretation offered in this paper.

To investigate this relationship in more depth we turn to a regression analysis. Certain countries may be more debt averse than others, perhaps for historical reasons. Likewise common time effects are also obviously important. If international borrowing rates increase, or business cycles and indeed growth are at all synchronous, then debt levels may rise simultaneously across countries. For these reasons both fixed and time effects are included as standard in the regression analysis.

The regression analysis also includes standard control variables, following Persson and

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[16]Whilst the debt and ideology data go back to 1945, the control variables are only available from 1960 hence the formal econometric analyis focuses on the period 1960-2010.

[17]One driver of the fall in average polarization is the decline of the European radical left after 1989 (March and Mudde, 2005).

Tabellini (2003) in their analysis of central government primary budget surplus data. In particular we control for the natural log of real GDP per capita in constant dollars (chain index),[18] the degree of trade openness,[19] the percentage of the population aged between 15 and 64, and the percentage of the population aged 65 and above.[20] The benchmark empirical specification is thus

$$D_{jt} = b_1 POL_{jt} + [\textbf{controls}]\, \textbf{b}' + \mu_i + \mu_t + \varepsilon_{it}, \tag{8}$$

where D_{jt} is central government debt as a percentage of GDP in country j in year t. b_1 is the principal parameter of interest. The hypothesis proposed here is that debt falls with polarization (POL), hence $b_1 < 0$, rather than $b_1 > 0$ in the case of Alesina and Tabellini (1990). The vector of controls are augmented with fixed effects, μ_i and time effects μ_t. In addition all estimation results are reported with standard errors clustered by country.

3.2 Ordinary Least Squares Regression Results

Column 1 of Table 1 presents the results of the benchmark estimation (8) using annual data. The parameter estimate for b_1 is somewhat smaller than in the raw correlations though remains, consistent with the theory above, negative and significant with a p-value of 0.07. The negative statistical association survives in the presence of fixed country and year effects, as well as the control variables. These results imply that a one standard deviation reduction in polarization is associated with an increase in central government debt of 3.44% of GDP.

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[18]Following Persson and Tabellini (2003) these data were obtained from the Penn World Tables.

[19]Measured as the sum of exports and imports divided by GDP. Source: World Bank World Development Indicators (WDI).

[20]Data for the demographic controls were also obtained from the WDI.

On the other hand, the mean ideological climate has no statistical relationship with debt. It is also noteworthy that amongst the control variables, the stand-out driver of debt is the proportion of persons aged 65 and over, consistent with Song et al (2012).

Column 2 of Table 2 includes the measure of government distance, GOV_DIST, described above. According to the strategic debt hypothesis the coefficient estimate on this variable should be positive. All else equal the larger the difference between the ideological disposition of the government and the ideological mean in the electorate, the greater the incentive for the government to increase debt. However the estimated coefficient for this variable is negative (though insignificant), whilst the coefficient estimate pertaining to POL is essentially unaltered in terms of size and significance.

One concern with interpreting results using annual data is that both government debt and ideological dispersion are quite slow moving variables. Furthermore there may be important cyclical effects in the context of annual debt data. To overcome this problem, and following the standard approach taken in the empirical growth literature from here on we report results using 10 year averages of the data. Moreover, the polarization data are undoubtedly measured with some error. For example if a particular party publishes a relatively idiosyncratic (and perhaps unrepresentative) manifesto for a particular election, thereby failing to adequately represent the parties' underlying ideological position, then averaging the data with adjacent elections will improve the quality of the ideology data. Column 3 therefore repeats the analysis of column 1, but using 10 year averages. Despite a smaller number of observations, the estimation results hold up, and indeed improve in terms of estimated parameter magnitude and statistical significance (as would be expected if the polarization measure is improved). The estimate for b_1 is now -0.970, and is significant at the 5% level.

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The other parameter estimates are as for column 1.

Column 4 again adds GOV_DIST as an additional regressor. As with the annual data government distance from the mean is found to be negatively (though insignificantly) correlated with government debt, hence the data are not supportive of the strategic debt hypothesis. Inclusion of this variable in the context of the 10-year averages data also leads to a slight drop in the estimated significance of POL, although the point estimate is not significantly different. It is possible that GOV_DIST is picking up some of the polarization effect as argued for this paper. Most importantly in this and indeed in all subsequent regressions GOV_DIST was found to be insignificantly related to debt and so is dropped from the analysis.

Previous empirical work investigating political determinants of fiscal policy has focussed on the common pool problem - which increasingly arises when the government is constituted of broader coalitions of interest groups.[21] For example Perotti and Kontopoulos (2002) empirically investigate how fragmentation leads to "loose fiscal outcomes".[22] Fragmentation, which should be recognized to be quite distinct from polarization, is usually defined empirically in terms of the number of political actors.[23] However, because fragmentation and polarization are correlated with each other (the correlation coefficient is 0.23) omission of fragmentation may bias the polarization parameter estimate towards insignificance. In column 5 we include the number of parties in government (NPC) following this literature.

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[21]Weingast et al. (1981) explore how government resources are misallocated under the common pool problem. Alesina and Drazen (1991) and Velasco (2000) analyze the implications for debt.

[22]Persson and Tabellini (2003) investigate constitutional rules and find that the average government fiscal cash surplus is higher under majoritarian electoral rule compared with proportional representation in cross-sectional data.

[23]See also Volkerink and de Haan (2001) and Elgie and Mcmenamin (2008).

A priori, the larger this number, the worse the common pool problem and the greater the public debt. The results confirm this hypothesis, with the parameter estimate relating to NPC exhibiting a positive sign, and which is significant at the 10% level. The magnitude of this estimated effect is quite large. An additional party in government is estimated to increase debt by 8.4% of GDP. Importantly the parameter estimate for POL is still negative and significant, indeed moreso now that fragmentation is separately controlled for.

The presence of fixed country and time effects goes some way towards controlling for unobserved determinants of government debt. However, it is possible that unobserved country-specific effects may be time-varying, and indeed that time-effects are heterogenous impact by country. To further control for unobserved country and time-specific factors the econometric analysis is next augmented to include the lagged dependent variable. Furthermore even within 10 year averages there is likely to be some persistence in the dependent variable that ideally should be accounted for in the analysis. Column 6 contains the results. The point estimate of b_1 remains negative and is still statistically significant even in this quite demanding econometric specification.

It is possible that column 6 underestimates the effect of ideological polarization on public debt, due to the Nickell (1981) bias associated with models that include fixed effects and have a lagged dependent variable. The bias is in the order 1/T, and when decadal data are used $T = 5$, so this is an important consideration. To correct for this column 7 employs the Bias-Corrected Least Squares Dummy Variable (BCLSDV) estimator proposed by Kiviet (1995) and extended by Bruno (2005). The relationship between polarization and public debt remains negative, and is now estimated to be significant at the 5% level.

3.3 Instrumental Variables Regression Results

The results presented so far establish a robust negative statistical relationship between public debt and ideological polarization - one that survives in the presence of a substantial battery of controls. However, endogeneity is still a concern here: possibly both variables co-move in response to an unseen third variable. Ideally what is required here are plausibly exogenous movements in polarization. In an attempt to identify such movements we employ two instrumental variables. The first of these is lagged media intensity, measured as the average number of televisions owned in the population in the previous 10-year period.[24] In the case of the US Campante and Hojman (2013) found that the introduction of TV in the US causally reduced ideological polarization. Using international data Melki and Pickering (2014) also found that increases in media intensity statistically lead observed reductions in polarization. In the context of using 10-year averages, there is also a substantial time gap between the media instrument and the polarization data so clearly the instrument is pre-determined.

The second instrument is the fall of the Berlin wall in 1989. This event clearly satisfies the conditions of exogeneity, and plausibly had a sizeable effect on ideological polarization, especially in Europe. Prior to this event parties of the left in Europe usually explicitly defined themselves as socialist, whilst parties of the left in democracies outside of Europe (e.g. the U.S.) were generally more centrist. The event was a decisive signal, in simple terms, that communism had failed. As such, voters and indeed parties of the left in western Europe shifted somewhat to the right. Indeed March and Mudde (2005) find that the decline of the 'radical left' in Europe dated from 1989. This implies an exogenous compression of ideology in European countries. Figure 5 depicts the polarization data in terms of deviation from

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[24]These data are from the World Development Indicators.

the mean across time. Polarization towards the end of the sample falls in both the European and non-European sub-sample, but the reduction is greater in the European countries. This instrument is constructed as a dummy variable set equal to one in European countries post-1989 and zero elsewhere. The presence of a second instrument (that undoubtedly is independent of the first) also permits use of overidentification tests to investigate the exclusion restrictions.

Table 2 contains the estimation results of the instrumental variables regression. The weak instruments test is rejected at the 1% level.[25] Both the Sargan and Basman overidentification tests are not rejected, which supports the assumptions of instrument exogeneity, and the associated exclusion restrictions. Importantly polarization is still found to be negative and statistically significant, and indeed the magnitude of the estimated coefficient is increased relative to the OLS estimates. This is quite plausible if for example debt increases in 'bad times', which simultaneously entails greater polarization. The 'bad times' are not fully controlled for in the OLS regression and would bias the OLS estimate towards zero. When polarization is instrumented, then any endogenous element of polarization is in principle cleaned out, and a clearer picture emerges of how exogenous changes in polarization affect chosen debt levels. The estimated coefficient is −1.7, not far from the slope (−2) in the scatter plot in figure 2. Under the conditions of instrument validity, then the estimated quantitative effect is quite sizeable: a one standard deviation increase in polarization is estimated to cause a reduction of central government debt of about 12% of GDP.

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[25] In the first stage regression lagged media is negative and significant with a p-value of 0.002, and the Berlin wall dummy is negative and significant with a p-value of 0.058.

3.4 Robustness and Mechanisms

Table 3 investigates robustness and also whether or not the results reported thus far change with economic development and government institutions. The mechanism proposed in the paper relates to democracy, and feasibly under non-democratic systems the relationship between polarization and government debt could be quite different. The sample analyzed in this paper is the OECD - hence only relates to democratic systems, though countries do differ in terms of the maturity of their democracies. In column 1 the regression specification is as for column 4 of table 1 but the sample excludes observations from the Greece, Portugal and Spain from the 1970s, which were all then new democracies. As can be seen the results are essentially unaltered given their exclusion.

Columns 2 and 3 of table 3 split the sample by economic development.[26] The theory is silent on this point, but generally voter and politician behavior may vary with development, and it is in any case useful to gauge whether parameter estimates are stable across these sub-samples. In column 2 the (relatively) high income sample again returns a negative coefficient for polarization of a very similar magnitude to that found for the full sample. Statistical significance falls slightly to 7.6% though this is not surprising given the smaller sample. In column 3 the (relatively) low income sample also returns a negative coefficient, which despite increased magnitude is of reduced statistical significance ($p = 0.162$). The debt-polarization relationship is somewhat looser under lower economic development, but overall these results do not indicate that the parameter estimates depend on the level of development.

The core argument of the paper emphasizes the need to signal competence via higher current spending. Excessive government debt arises out of a political process with information

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[26]Determined by the median value of real GDP per capita.

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asymmetries. Both in principle and in practice there may be institutional defences against the debt distortion. In order to investigate this empirically we make use of the 'Government Efficiency' ($GOVEF$) data produced by Kaufman et al (2009). These data "captur(e) perceptions of the quality of public services, *the quality of the civil service and the degree of its independence from political pressures*, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies."[27] We believe this institutional measure (or its objective at least) should in principle qualify the capacity for incumbents to suboptimally increase debt. In particular a high quality and independent civil service may be more able to make financing decisions independently and indeed resist short-termist political demands for debt. Consequently, albeit somewhat tentatively, it may be hypothesized that countries which score highly on this measure might exhibit a weaker debt-polarization relationship than those which do not.

The $GOVEF$ data are only available from 1996-2012. Furthermore there is not much in the way of within-country variation.[28] To make matters simple we take the average $GOVEF$ score for each country, rank them in order, and then divide the sample of 22 countries into two groups of 11 thereby creating a low government efficiency subsample and a high government efficiency subsample. This ordering and grouping can be seen in table 4. Globally these data range in principle range from -2.5 to $+2.5$, and there is quite a lot of variation even across the OECD sample on this measure. Columns (4) and (5) of table 3 contain estimation results for these two subsamples. Column (4) is the high government efficiency group of countries. Here the estimated relationship between debt and polarization,

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[27]Kaufman et al (2009). Italics added.

[28]This is not surprising given that the measure is a function of institutional quality, and that institutions are slow to change.

whilst still negative, is now much reduced in terms of statistical significance ($p = 0.268$). In the low government efficiency group of countries (column 5) the parameter estimate is much larger in terms of magnitude, and is statistically significant at the 8% level. The results are reliant on quite a small dataset, but nonetheless there is a degree of support for the conjecture that the debt-polarization relationship is stronger in the low government efficiency countries.

4   Conclusion

It is widely recognized that high levels of public debt arise out of imperfections in the political process. Undoubtedly, as established by Rogoff (1990) and Rogoff and Sibert (1988), a key weakness in any democratic system is imperfect information regarding politician quality. Competent incumbents are compelled into debt in order to signal their quality. This tendency is reduced when ideological polarization increases because voters are less responsive to changes in fiscal policy: hence the hypothesis that polarization leads to lower debt levels. This prediction opposes the argument of 'strategic debt' in Alesina and Tabellini (1990) and Persson and Svensson (1989) where polarization is predicted to increase debt. Using ideology data taken from manifestos we find a robust negative empirical relationship between observed debt and polarization. This negative relationship is strengthened when fractionalized politics are controlled for and sustains in instrumental variable regressions. The negative debt-polarization relationship is estimated to be independent of income, though as conjectured it is found to be somewhat stronger when 'government efficiency' is lower.
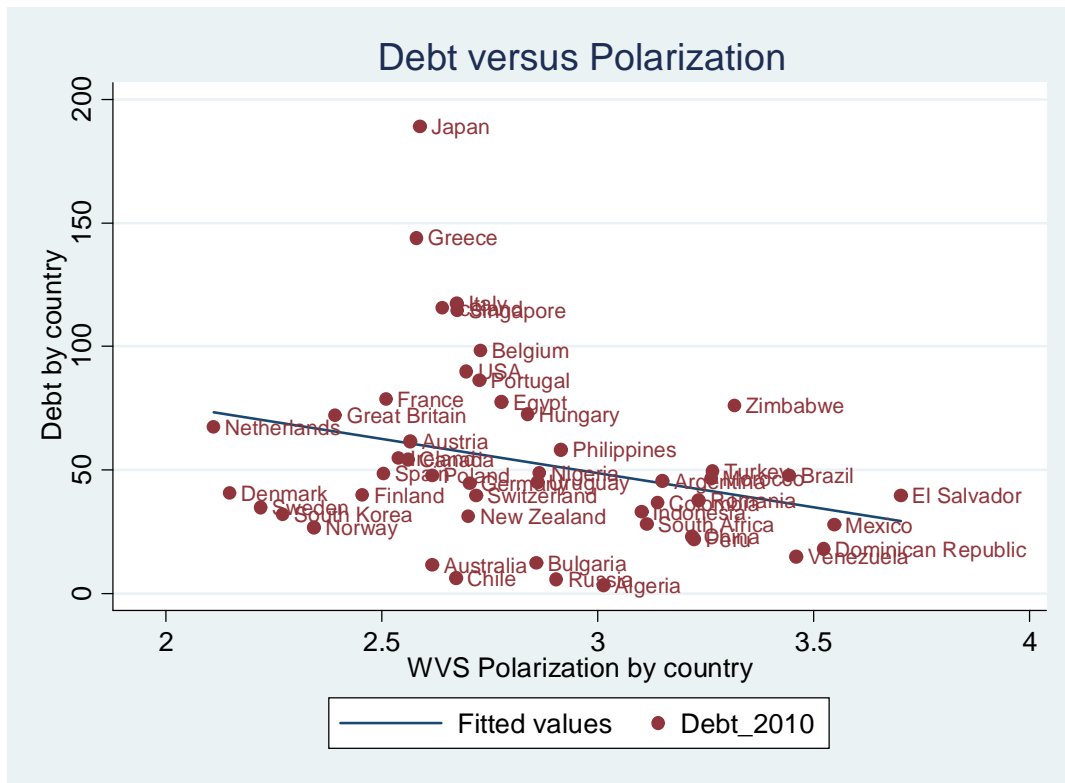
Figure 1: Scatter plot of central government debt as a percentage of GDP in 2010 and ideological polarization by country. Ideological polarization is measured using the standard deviation of the 'Gov' question in the World Values Survey (see Lindqvist and Östling, 2010).
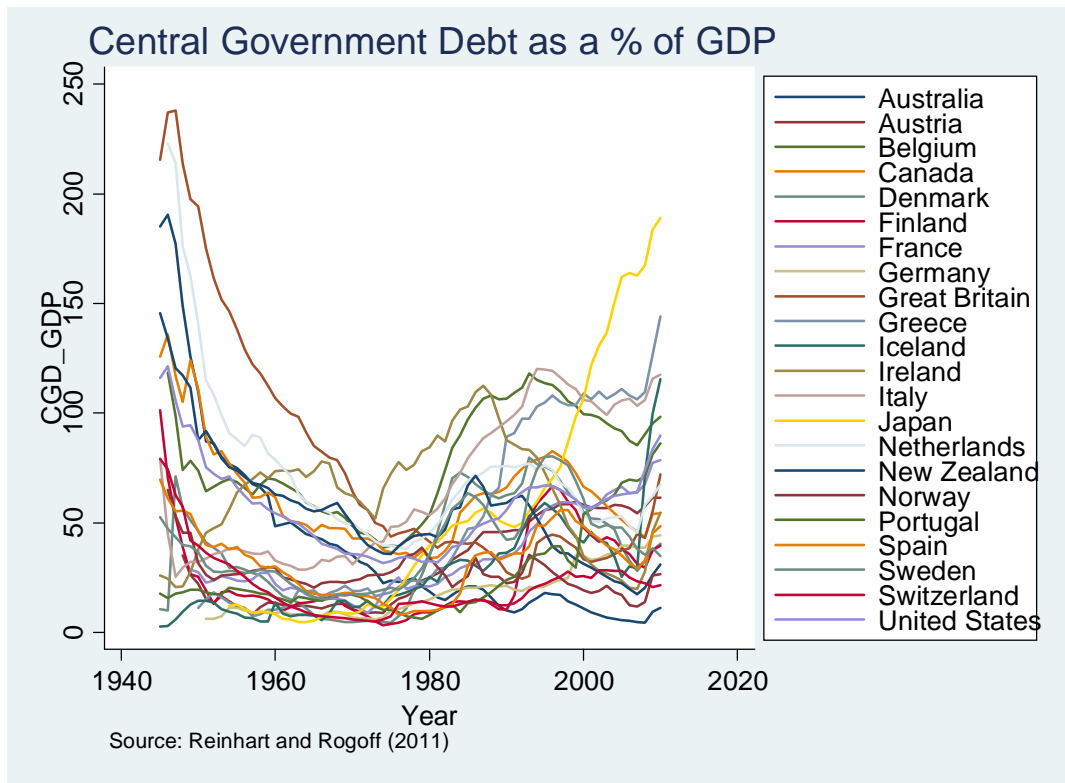
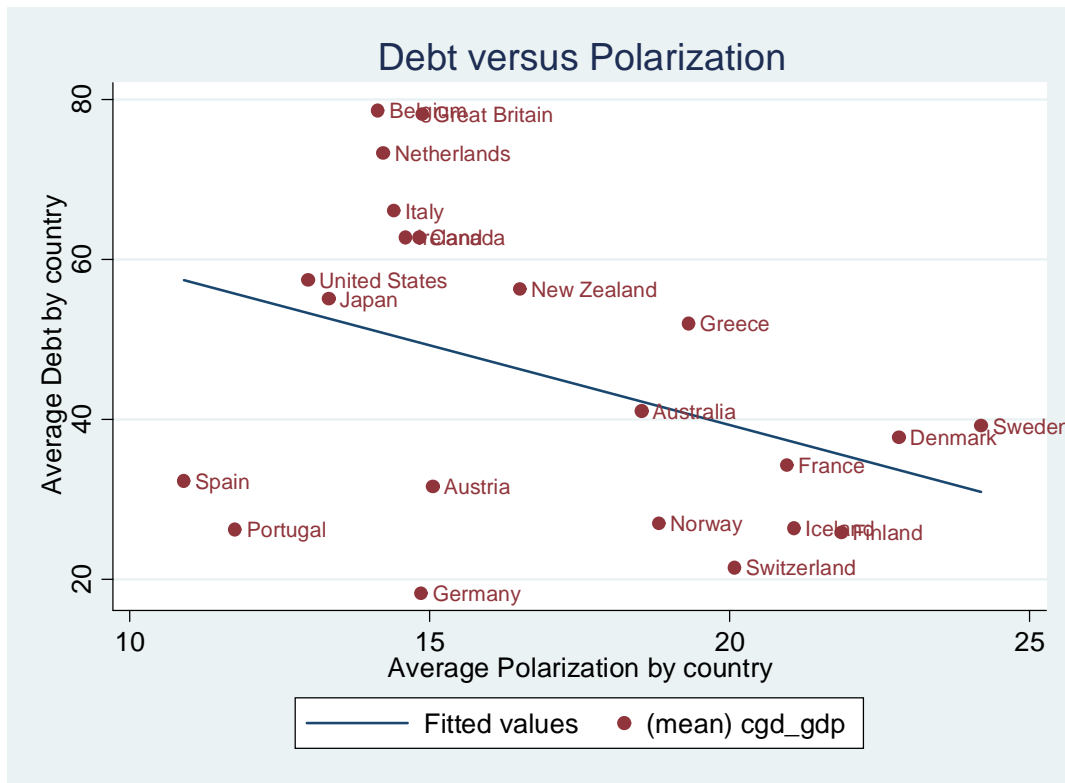Figure 2: Central government debt as a percentage of GDP.

Figure 3: Scatter plot of average central government debt as a percentage of GDP and average ideological polarization by country (using manifesto-generated ideology data).
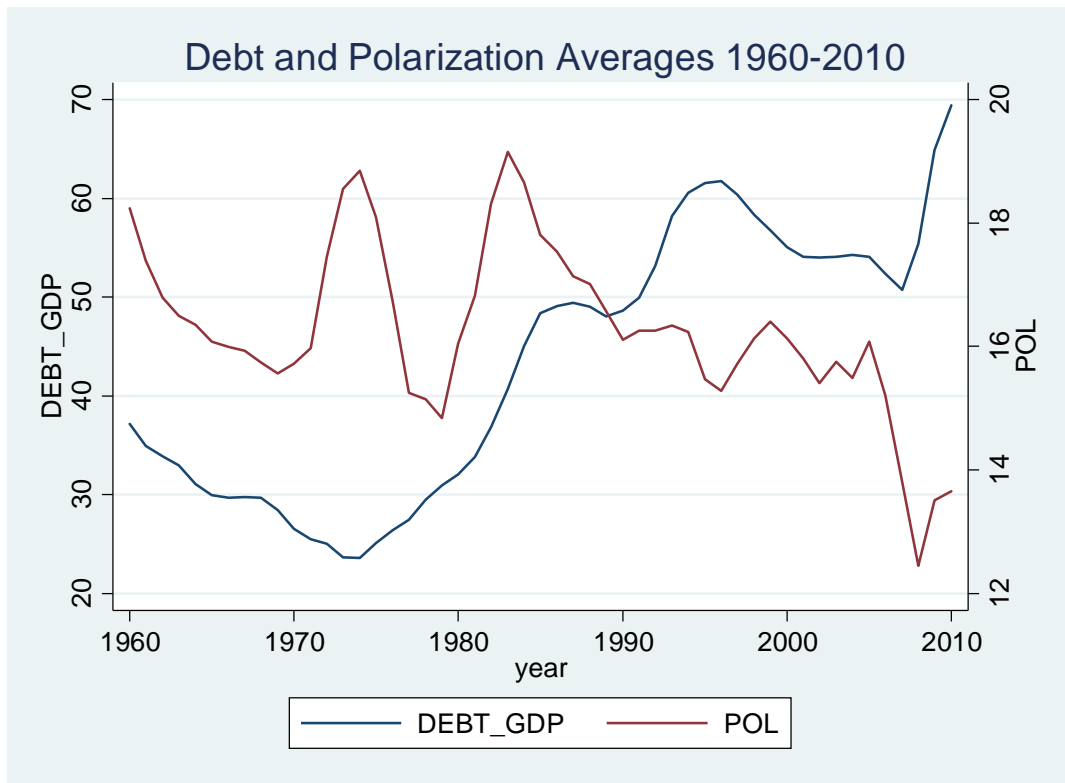
Figure 4: Evolution of average central government debt as a percentage of GDP (DEBT_GDP) and average ideological polarization (POL) by year.
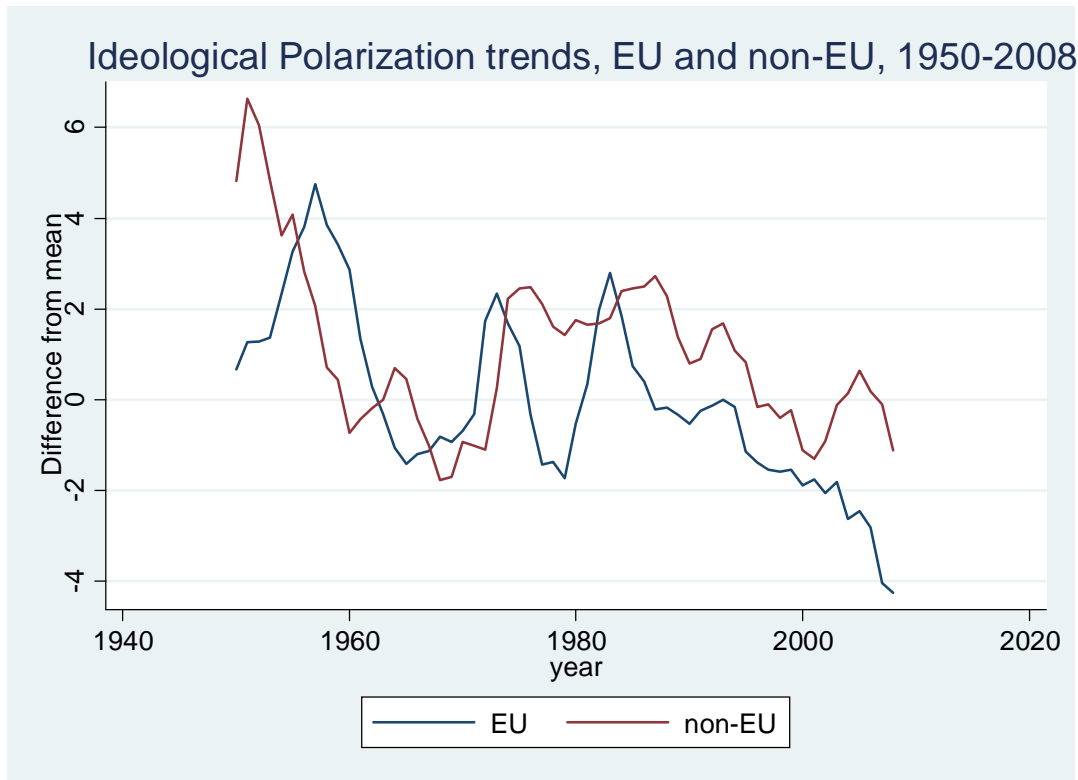
Figure 5

The series are constructed as follows: First within each country demeaned polarization data are constructed by subtracting the country-level average from each observation to remove country-specific fixed effects. Second the demeaned series are averaged across each geographic area for each year.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$MEAN$	−0.103 (0.189)	−0.076 (0.197)	−0.291 (0.397)	−0.303 (0.413)	−0.299 (0.359)	0.061 (0.259)	0.187 (0.247)
POL	−0.495* (0.259)	−0.484* (0.238)	−0.970** (0.424)	−0.878* (0.453)	−1.310** (0.509)	−0.766* (0.433)	−0.670** (0.289)
GOV_DIST		−0.114 (0.114)		−0.122 (0.456)			
LYP	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)
$TRADE$	−0.009 (0.228)	−0.035 (0.227)	−0.053 (0.307)	−0.051 (0.316)	−0.203 (0.291)	−0.298 (0.226)	−0.317 (0.188)
$PROP1564$	−1.213 (1.567)	−1.072 (1.672)	−2.054 (1.894)	−2.037 (1.919)	−1.750 (1.894)	−0.619 (1.160)	−0.181 (1.240)
$PROP65$	7.877*** (2.021)	7.826*** (2.023)	9.198*** (2.417)	9.199*** (2.420)	9.114*** (2.318)	6.664*** (1.736)	5.833*** (1.721)
NCP					8.418* (4.409)	3.113 (4.489)	
$Debt_{jt-1}$						0.553*** (0.085)	0.748*** (0.095)
Obs	1025	986	106	106	106	106	106
Data	Annual	Annual	10-year averages	10-yr aves.	10-yr aves.	10-yr aves.	10-yr aves.
No. Countries	22	22	22	22	22	22	22
Method	OLS	OLS	OLS	OLS	OLS	OLS	BCLSDV
R^2	0.71	0.71	0.77	0.77	0.79	0.87	

Table 1: Estimation Results

Notes: Panel regressions of Central Government Debt as a percentage share of GDP including LYP, $PROP1564$, $PROP65$, and $TRADE$ as control variables described in the text. $MEAN$ is the average left-right ideological score. POL is the measure of ideological polarization as described in Persson and Tabellini (2003). NCP is the number of parties in government coalition. $Debt_{jt-1}$ is the lagged dependent variable. Fixed Country and Time effects are included. Standard errors (reported in parentheses) are estimated by clustering errors by country. *, **, and *** respectively denote significance levels at 10%, 5% and 1%.

	(1)
$MEAN$	0.368 (0.289)
POL	-1.727 (0.640)***
Obs	66
Data	10-year averages
No. Countries	22
Estimation method	IV
Overid (Sargan)	$\chi^2 = 2.666$ $(p = 0.103)$
Overid (Basman)	$\chi^2 = 1.464$ $(p = 0.225)$
Weak Inst.	$F = 5.703$ $(p = 0.007)$
R^2	0.92

Table 2: Instrumental Variable Estimation Results

Notes: Instrumental Variables regression of Central Government Debt on ideological polarization using media intensity measures and the Berlin Wall dummy variable (described in the text) as instruments. *, **, and *** respectively denote significance levels at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)	(5)
$MEAN$	−0.308 (0.365)	0.070 (0.475)	0.150 (0.531)	−0.652 (0.441)	0.326 (0.625)
POL	−1.240** (0.489)	−0.952* (0.508)	−1.702 (1.172)	−0.741 (0.633)	−2.365* (1.190)
LYP	−0.001 (0.001)	−0.001 (0.001)	0.004 (0.002)	−0.000 (0.001)	−0.003** (0.001)
$TRADE$	−0.170 (0.300)	−0.835 (0.526)	−0.080 (0.568)	0.749 (0.479)	−0.231 (0.505)
$PROP1564$	−1.499 (1.864)	−1.905 (3.971)	−1.063 (2.867)	−1.776* (0.939)	−0.378 (3.036)
$PROP65$	9.551*** (2.318)	10.207* (5.830)	−3.409 (5.581)	−0.034 (2.310)	11.105* (5.272)
NCP	8.036* (4.392)	0.912 (6.650)	6.415 (5.672)	8.780 (5.046)	10.852 (6.043)
Obs	103	53	53	55	51
Data	10-year averages	10-year averages	10-year averages	10-year averages	10-year averages
No. Countries	22	21	21	11	11
Estimation method	OLS	OLS	OLS	OLS	OLS
R^2	0.78	0.95	0.89	0.79	0.85

Table 3: Robustness and Extensions

Notes: As for Table 1. Column 1 excludes Greece, Portugal and Spain observations from the 1970s. Columns 2 and 3 respectively correspond to higher and lower income levels ($LYP \gtreqless 22801.64$.) Columns 4 and 5 respectively corresponds to higher and lower levels of average 'government efficiency' ($\overline{GOVEF} \gtreqless 1.74$.)

Country	$\overline{GOVEF}$	Country	$\overline{GOVEF}$
Denmark	2.139	Belgium	1.727
Finland	2.137	UK	1.725
Sweden	1.990	USA	1.640
Switzerland	1.972	Germany	1.638
Norway	1.920	Ireland	1.569
Netherlands	1.894	France	1.561
Canada	1.868	Japan	1.329
Iceland	1.841	Spain	1.326
Austria	1.817	Portugal	1.072
New Zealand	1.775	Greece	0.651
Australia	1.749	Italy	0.561

Table 4: Average Government Efficiency Ranking

Notes: $\overline{GOVEF}$ is average 'Government Efficiency' 1996-2012, using data measured and described in Kaufman et al (2009).

References

Adams, James, Erik Engstrom, Danielle A. Joesten and Walter J. Stone, Jon Rogowski and Boris Shor (2017). Do Moderate Voters Weigh Candidates' Ideologies? Voters' Decision Rules in the 2010 Congressional Elections. *Political Behavior* 39: 205-227.

Aidt, Toke, Francisco José Veiga and Linda Gonçalves Veiga (2011). Election Results and Opportunistic Policies: A New Test of the Rational Political Business Cycle Model. *Public Choice* 148: 21-44.

Alesina, Alberto, and Allan Drazen (1991). Why are Fiscal Stabilizations Delayed? *American Economic Review* 81: 1170-1180.

Alesina, Alberto, and Roberto Perotti (1995). The Political Economy of Budget Deficits. *IMF Staff Papers* 42(1): 1-31.

Alesina, Alberto, and Guido Tabellini (1990). A Positive Theory of Fiscal Deficits and Government Debt. *Review of Economic Studies* 57: 403-414.

Alt, James E., and David Dreyer Lassen (2006). Fiscal Transparency, Political Parties, and Debt in OECD countries. *European Economic Review* 50: 1403-1439.

Azzimonti, Marina (2011). Barriers to Investment in Polarized Societies. *American Economic Review* 101(5): 2182-2204.

Azzimonti, Marina and Matthew Talbert (2014). Polarized Business Cycles. *Journal of Monetary Economics* 67: 47-61.

Barro, Robert (1979). On the Determination of Public Debt. *Journal of Political Economy* 87: 940-947.

Battaglini, Marco, and Stephen Coate (2008). A Dynamic Theory of Public Spending, Taxation and Debt. *American Economic Review* 98(1): 201-236.

Brown, David S., Michael Touchton and Andrew Whitford (2011). Political Polarization as a Constraint on Corruption: A Cross-National Comparison. *World Development* 39(9): 1516-1529.

Bruno, Giovanni S. F. (2005). Approximating the bias of the LSDV estimator for Dynamic Unbalanced Panel Data Models. *Economics Letters* 87: 361-366.

Buchanan, James M. and Richard E. Wagner (1977). *Democracy in Deficit: The Political Legacy of Lord Keynes.* New York: Academic Press.

Budge, Ian, Hans-Dieter Klingemann, Andrea Volkens and Judith Bara with Eric Tanenbaum, Richard C. Fording, Derek J. Hearl, Hee Min Kim, Michael McDonald and Silvia Mendez (2001). *Mapping Policy Preferences: Estimates for Parties, Electors and Governments 1945-1998.* Oxford: Oxford University Press.

Campante, Filipe R., and Daniel A. Hojman (2013). Media and Polarization: Evidence from the Introduction of Broadcast TV in the US. *Journal of Public Economics* 100: 79-92.

Canes-Wrone, Brandice, and Jee-Kwang Park (2012). Electoral Business Cycles in OECD Countries. *American Political Science Review* 106(1): 103-122.

Castles, Francis, and Peter Mair (1984). Left-Right Political Scales: Some Expert Judgements. *European Journal of Political Research* 12: 73-88.

Downs, Anthony (1957). *An Economic Theory of Democracy.* New York: Harper.

Elgie, Robert, and Iain McMenamin (2008). Political Fragmentation, Fiscal Deficits and Political Institutionalisation. *Public Choice* 136: 255-267.

Eslava, Marcela (2011). The Political Economy of Fiscal Deficits: A Survey. *Journal of Economic Surveys* 25(4): 645-673.

Gabel, Matthew, and John D. Huber (2000). Putting Parties in Their Place: Inferring Party Left-Right Ideological Positions from Party Manifestos Data. *American Journal of Political Science* 44: 94–103.

Irwin, Timothy C. (2015). Defining the Government's Debt and Deficit. *Journal of Economic Surveys* 29(4): 711-732.

Kaufman, Daniel, Aart Kray and Massimo Mastruzzi (2009). Governance Matters III: Aggregate and Individual Governance Indicators 1996-2008. World Bank Policy Research Working Paper No. 4978.

Kiviet, Jan F. (1995). On Bias, Inconsistency, and Efficiency of Various Estimators in Dynamic Panel Data Models. *Journal of Econometrics* 68: 53-78.

Klingemann, Hans-Dieter, Andrea Volkens, Judith Bara, Ian Budge and Eric Tanenbaum (2006). *Mapping Policy Preferences II. Estimates for Parties, Electors, and Governments in*

Eastern Europe, the European Union and the OECD, 1990-2003. Oxford: Oxford University Press.

Lindqvist, Erik, and Robert Östling (2010). Political Polarization and the Size of Government. *American Political Science Review* 104(3): 543-565.

March, Luke, and Cas Mudde (2005). What's Left of the Radical Left? The European Radical Left After 1989: Decline and Mutation. *Comparative European Politics* 3(1): 23-49.

Melki, Mickael, and Andrew C. Pickering (2014). Political Polarization and the Media. *Economics Letters* 125(1): 36-39.

Melki, Mickael, and Andrew C. Pickering (2016). Polarization and Corruption in America. University of York Department of Economics Discussion Paper no 16/09.

Nickell, Stephen (1981). Biases in dynamic models with fixed effects. *Econometrica* 49(6): 1417–1426.

Perotti, Roberto, and Yianos Kontopoulos (2002). Fragmented Fiscal Policy. *Journal of Public Economics* 86: 191-222.

Persson, Torsten and Lars Svensson (1989). Why a Stubborn Conservative would Run a Deficit: Policy with Time-Inconsistent Preferences. *Quarterly Journal of Economics* 104(2): 325-345.

Persson, Torsten and Guido Tabellini (2003). *The Economic Effects of Constitutions.* Cambridge, MA: MIT Press.

Pettersson-Lidbom, Per (2001). An Empirical Investigation of the Strategic Use of Debt. *Journal of Political Economy* 109(3): 570-583.

Pickering, Andrew C., and James Rockey (2011). Ideology and the Growth of Government. *Review of Economics and Statistics* 93(3), 907-919.

Reinhart, Carmen M., and Kenneth S. Rogoff (2011). From Financial Crash to Debt Crisis. *American Economic Review* 101(5): 1676-1706.

Rogoff, Kenneth S. (1990). Equilibrium Political Budget Cycles. *American Economic Review* 80: 21-36.

Rogoff, Kenneth S., and Anne Sibert (1988). Elections and Macroeconomic Policy Cycles. *Review of Economic Studies* 55: 1-16.

Schultz, Christian (2008). Information, Polarization and Term Length in Democracy. *Journal of Public Economics* 92: 1078-1091.

Song, Zheng, Kjetil Storesletten and Fabrizio Zilibotti (2012). Rotten Parents and Disciplined Children: A Politico-Economic Theory of Public Expenditure and Debt. *Econometrica* 80(6): 2785-2803.

Testa, Cecilia (2010). Bicameralism and corruption. *European Economic Review* 54(2): 181-198.

Testa, Cecilia (2012). Is Polarization Bad? *European Economic Review* 56(6): 1104-1118.

Tullock, Gordon (1967). *Towards a Mathematics of Politics*. Ann Arbor: University of Michigan Press.

Velasco, Andrés (2000). Debts and Deficits with Fragmented Fiscal Policymaking. *Journal of Public Economics* 76: 105–125.

Volkerink, Bjørn, and Jakob de Haan (2001). Fragmented Government Effects on Fiscal Policy: New Evidence. *Public Choice* 109(3-4): 221-242.

Weingast, Barry R., Kenneth A. Shepsle, and Christopher Johnson (1981). The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics. *Journal of Political Economy* 89(4): 642-664.

Woo, Jaejoon (2003). Social polarization, industrialization, and fiscal instability: theory and evidence. *Journal of Development Economics* 72: 223-252.

Woo, Jaejoon (2005). Social polarization, fiscal instability and growth. *European Economic Review* 49: 1451-1477.

Yared, Pierre (2010). Politicians, Taxes and Debt. *Review of Economic Studies* 77: 806-840.