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Polarization and Government Debt

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Abstract

When voters discount the future there is pressure on governments to increase debt. Governments are more able to resist this temptation if voters are polarized ideologically. 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 ideological polarization and debt levels in OECD countries.

Keywords: Public Debt, Ideological Polarization

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"Après moi, le déluge!"

■ Louis XV

"You cannot escape the responsibility of tomorrow by evading it today."

Abraham Lincoln

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. That these outcomes are the product of imperfect political processes is now canonical, but 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 extent of ideological distance between the parties, or polarization, the greater the level of debt.²

This paper argues the reverse. When an electorate is polarized, the number of swing voters is smaller and pleasing them materially brings little electoral reward. If voters discount

¹As 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. Eslava (2011) provides a recent survey.

 $^{^{2}}$ 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.

future debt repayment obligations, then any government that is institutionally longer-sighted will be less prone to debt. On the other hand if the electorate is ideologically concentrated then the electoral incentive to increase debt is sharpened. Acharya and Rajan (2013) argue that increased myopia in government leads to higher debt levels. Feasibly the source of government myopia is the electorate. In other words voters, quite simply, desire government debt. This impetus is dampened when there is institutional debt-aversion and when voters are more ideologically dispersed.

The argument that voters discount future debt is quite distinct from traditional (opportunistic) models of pre-electoral spending and post-election retrenchment (Nordhaus, 1975). There is no 'fiscal illusion' required in our model, and we are not predicting any such political business cycle.³ Ultimately neither 'opportunistic' nor 'rational' theories of spending cycles can explain variation in debt *levels* averaged over longer periods of time (i.e. including both election and non-election years).

The time-frame we have in mind for debt decisions is the long-run - in other words beyond electoral terms of office. As already noted the key requirement is that voters discount at a higher rate than policymakers. It is not difficult to rationalize demand for public debt amongst voters. Sovereign debt is typically paid back over decades, and many voters simply may not be around in the future. There may be bequest motives (hence aversion to debt) within households, but in the context of reducing public debt it is unclear to whom one is making the bequest. Voters will conceivably discount the benefits of reduced debt when they are spread across the population.

³Rogoff and Sibert (1988) and Rogoff (1990) restore voter rationality to this analysis using a signalextraction model when inferring incumbent competence. Recent empirical work on the presence of electoral deficit cycles in OECD countries is fairly mixed (Brender and Drazen 2005; Shi and Svensson, 2006).

Moreover in the likely scenario that voters lack full information, some degree of myopia seems plausible.⁴ Alt and Lassen (2006) document that public finances in many OECD countries are not wholly transparent. Voters may therefore assess incumbents on the basis of simple heuristics or what has visibly been achieved - not just in the election year but over the full term of office. Governments in turn may delay fiscal adjustment and debt repayment. Inferred competency signals might conceivably be increasing with debt hence a higher discount rate can potentially be seen as a reduced form specification of these sorts of mechanisms.

The rate at which policymakers, as distinct from voters, discount the future is a separate and open question. One possibility is that they are purely opportunistic, in which case they will discount at the same rate as the electorate. However, government is formed from politicians and enacted by civil servants. We conjecture that the latter in particular, at least within stable democracies, will not suffer from myopia, at least not to the same extent as voters. Whilst voters may have incentive to bring forward spending it seems more plausible that self-preserving institutions should be reasonably debt-averse.⁵ Given that government is composed of both politicians and the civil service, overall government policy may be more farsighted than that preferred by the electorate at large. There could thus conceivably be institutional resistance to borrowing.

Moreover it is not impossible that politicians themselves may be concerned with their historical legacy. Whilst not all elected officials emulate Abraham Lincoln, some may possess farsightedness under good institutions at least. Beschloss (2007) describes how various US

⁴Indeed 'ignorance' may be rational (Tullock, 1967, 2008).

⁵Note that we do not need to resort to a 'benign government' argument here. For example a budgetmaximizing bureaucracy will also be debt-averse when it wishes to be able to spend money in the future.

presidents have traded off the greater good against short-term political gain. Politicians, at least the enlightened few, may discount at lower rates than often thought.

In the model below the tension between voters and policymakers varies with ideological polarization. The greater this is, the more intransigent the electorate, and hence the smaller the increase in votes from pleasing voters materially. As such policymakers are relatively more able to make decisions based on institutional, rather than electoral, preferences. Consequently debt may fall. This hypothesis directly opposes that made in the strategic debt literature.

The competing hypotheses are tested using 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.⁶ 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 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. A one standard deviation

⁶For example Volkerink and de Haan (2001), Perotti and Kontopoulos (2002) and Alt and Lassen (2006).

increase in polarization correlates with lower central government debt by about 12% of GDP. To identify exogenous variation in polarization we use the impact of the fall of the Berlin Wall on European politics and lagged media intensity data. The results hold up in the instrumental variables regression in support of a causal negative relationship.

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.

Previous empirical work investigating fiscal policy more broadly has focussed on the common pool problem - which increasingly arises when the government is constituted of broader coalitions of interest groups.⁷ Perotti and Kontopoulos (2002) empirically investigate how fragmentation leads to "loose fiscal outcomes".⁸ Fragmentation - which should be recognized to be quite distinct from polarization - is usually defined empirically in terms of the number of political actors.⁹ In the analysis below we find that controlling for fragmentation (which indeed is found to have a positive affect on debt) strengthens the negative relationship between debt and polarization.

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

⁷Weingast 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.

⁸Persson 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.

⁹See also Volkerink and de Haan (2001) and Elgie and Mcmenamin (2008).

2 Model

There are two periods, denoted by t = 1, 2. The decision variables are the provision of public goods, g_1 and g_2 , tax rates, t_1 and t_2 and the debt level, D. Spending decisions are constrained by familiar budget constraints,

$$g_1 = t_1 y_1 + D \tag{1}$$

$$g_2 + (1+r)D = t_2 y_2 \tag{2}$$

where all variables are expressed in per capita terms and r is the interest rate. To simplify matters voters all have the same income level y_t in each period.

There are two candidates (or parties) standing for election, C = L, R. Voters (indexed *i*) obtain respective payoffs from the two candidates as follows:

$$u_i^L = w^L - \left|\frac{\varphi}{2} + \iota_i\right| \tag{3}$$

$$u_i^R = w^R - \left|\frac{\varphi}{2} - \iota_i\right|. \tag{4}$$

The first terms in (3) and (4) are defined as

$$w^{L} = \left[\left(y_{1} \left(1 - t_{1}^{L} \right) \right)^{1-\alpha} \left(g_{1}^{L} \right)^{\alpha} \right]^{1-\beta} \left[\left(y_{2} \left(1 - t_{2}^{L} \right) \right)^{1-\alpha} \left(g_{2}^{L} \right)^{\alpha} \right]^{\beta}$$
(5)

$$w^{R} = \left[\left(y_{1} \left(1 - t_{1}^{R} \right) \right)^{1-\alpha} \left(g_{1}^{R} \right)^{\alpha} \right]^{1-\beta} \left[\left(y_{2} \left(1 - t_{2}^{R} \right) \right)^{1-\alpha} \left(g_{2}^{R} \right)^{\alpha} \right]^{\beta}$$
(6)

which represents material utility derived from private consumption which depends on disposable income $y_t (1 - t_t^C)$, and the public good, g_t^C . The (intratemporal) weight attached to the latter is given by the parameter α . This parameter can be interpreted as representing *mean* levels of ideology, with higher values denoting more leftist societies. The parameter β reflects time preference, with higher values reflecting increasing importance attached to the future (period 2), and lower values reflecting higher discount rates. Utility from (both private and public good) consumption, as with income levels, is assumed to be homogenous across the electorate. However, ideological preferences are heterogenous across the electorate - the second term on the RHS of (3) and (4) - and are distributed uniformly between $-\varphi$ and φ . Each voter has a preferred ideology, represented by ι_i . For concreteness the candidates are respectively represented at the midpoint between the median voter and the extreme points of the distribution, hence $\iota_L = -\frac{\varphi}{2}$ and $\iota_R = \frac{\varphi}{2}$.¹⁰ Hence if the population becomes more ideologically diffuse, then so do the candidates.¹¹

To see how ideological dispersion affects (debt) policy sensitiveness, using (3 and 4) note that the indifferent voter's ideology is defined by

$$\iota^* = \frac{w^L - w^R}{2}$$

Hence when material benefits from candidate L exceed those from R, then the indifferent voter will be on the right of the spectrum ($\iota^* > 0$). Given the ideological distribution of

 $^{^{10}}$ For example the candidates may be chosen in Primaries where the left- and right-wing halves of the electorate elect their own candidate.

¹¹Candidate-positioning is of course in general a non-trivial question. For example Grofman (2004) discusses reasons to doubt the convergence result in Downs (1957). The main point, which we think it is plausible in most instances at least, is that for a given set of institutions an increase in the polarization of the electorate will be reflected in an increase in the polarization of candidates.

voters, then the proportion of votes obtained is

$$p_L = \frac{1}{2} + \frac{w^L - w^R}{4\varphi}.$$
 (7)

The crucial point is that as ideological polarization in the electorate increases (φ increases), then the vote response to materially pleasing voters - perhaps through higher debt - falls. Narrow ideological preferences (low φ) makes political competition stiffer, and policy moves towards the preferences of the electorate. When the electorate is highly polarized then politicians are to a greater extent liberated to pursue its own agenda. Under circumstances when government's preferences are far-sighted relative to the electorate, then lower ideological dispersion increases debt.

Candidates differ from the electorate in one respect only. Their discount rate (common to both candidates) is different, hence $\beta^C \geq \beta$. Given that on election both candidates will implement their preferred ideology, their utility is represented by

$$u^{L} = \left[\left(y_{1} \left(1 - t_{1}^{L} \right) \right)^{1-\alpha} \left(g_{1}^{L} \right)^{\alpha} \right]^{1-\beta^{C}} \left[\left(y_{2} \left(1 - t_{2}^{L} \right) \right)^{1-\alpha} \left(g_{2}^{L} \right)^{\alpha} \right]^{\beta^{C}}$$
(8)

$$u^{R} = \left[\left(y_{1} \left(1 - t_{1}^{R} \right) \right)^{1-\alpha} \left(g_{1}^{R} \right)^{\alpha} \right]^{1-\beta^{C}} \left[\left(y_{2} \left(1 - t_{2}^{R} \right) \right)^{1-\alpha} \left(g_{2}^{R} \right)^{\alpha} \right]^{\beta^{C}}.$$
(9)

It seems plausible that voters' and politicians' discount rates will differ from each other. For example if voters are myopic, then they may simply only respond electorally to higher consumption in period 1 (whether facilitated by lower taxes or manifest in greater public good provision). If politicians are institutionally constrained by a rational and farsighted civil service then they will be (de facto at least) debt averse. In this instance $\beta < \beta^C$ and there is electoral pressure for debt. On the other hand, it may be the politicians that are short-sighted. Such myopia may be founded on fixed terms, or the fact that more generally political careers are short. If periods 1 and 2 correspond to decades or generations, then any debt raised in period 1 will possibly not inconvenience the period 1 incumbent. In this case $\beta^C < \beta$ and it is the electorate who are relatively debt-averse whilst politicians would like to spend freely.

These tensions are reflected in the candidates' objective function, which depends on electoral support. Formally their objective function is posited to be

$$\max_{t_1, t_2, g_1, g_2, D} p^C + u^C \tag{10}$$

where p^{C} is the proportion of voters voting for C. Relative to the electorate, the candidates would like to reduce (increase) D, because of their lower (higher) discount rate. Such a policy move would increase u^{C} . The drawback is that this detracts from voters' utility and p^{C} falls. The crucial element is ideological dispersion. When this is high the yield in votes from changing D is lower. Put simply, greater ideological dispersion means that the politicians are less constrained to achieve their own desired debt levels. Higher ideological concentration strengthens the democratic constraint and policy moves back towards the electorate's preferences.

The timing of events is as follows. Firstly candidates announce their policy platforms, comprising the 5 decision variables described. These platforms are chosen in the full knowledge of voters' utility functions and the distribution of preferences. Secondly elections are held, and the winner gets to implement her preferred policies for period 1. Third, in period 2, policy is residually determined. The model is solved backwardly, and focusses on decisions for candidate L (debt decisions for candidate R are symmetric). The appendix contains details of the model solution.

Corollary 1 Debt levels are independent of α .

A first result is that debt levels do not depend on α . In the basic model outlined here, predisposition towards (or against) the public sector, embodied in higher values of α , has no effect on debt. The intuition of this result is that, in this framework, government size is wholly an intratemporal decision. Proponents of large government are constrained as far as debt is concerned, because higher borrowing today just means reduced public sector spending tomorrow. Proponents of small government are equally constrained because higher borrowing today inevitably means higher taxes and lower private sector spending tomorrow.

We interpret corollary 1 as meaning that particular *average* measures of ideology whether left or right, either in society as a whole or in government, do not necessarily imply higher debt. This auxiliary hypothesis is tested below, along with our main hypothesis, which relates to ideological *dispersion*.

Proposition 1 Debt levels are decreasing with polarization if $\beta < \beta^C$.

The intuition of this proposition is fairly straightforward. The choice of debt level is a weighted average of the respective ideal choices of the government and electorate. When electoral competition is stiff, in the sense of concentrated ideological preferences, and voters which respond in large number to relatively small policy changes, then higher weight is placed on the preferences of the electorate. A high voter discount rate implies higher debt. When electoral competition is weak, in the sense of dispersed ideological preferences, then voters are relatively unresponsive to policy change, and policymakers are less constrained. If policymakers are institutionally more farsighted than voters, then this means lower debt.

3 Evidence

The dependent variable, taken from Reinhart and Rogoff (2011), is total (domestic plus external) gross central government debt measured as a percentage of GDP.¹² The sample covers the period 1945-2010 in countries which have been OECD members since 1975. The mechanism proposed in this paper has politicians responding to voter preferences, hence established democracies are appropriate.

Figure 1 depicts these data, showing interesting variation across countries. A first observation is that there seem to be 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

¹²Empirical 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 in the context of this paper for two reasons. Firstly the theory (here, and in Alesina and Tabellini, 1990) relates to long-run debt levels, and is not concerned with short-run (electoral) cycles - where the primary surplus would be more appropriate. Secondly the primary surplus is defined as tax revenue minus expenditure before interest payments on debt are made. Given the presumption of solvency (which in principle 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.

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).¹³ 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 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

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

¹³The 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.

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 order to investigate Corollary 1 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.¹⁴ The most polarized election was the Finnish election of 1945 ($POL_{jt} = 43.23$) - this 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,¹⁵ and this shows up in the data

¹⁴(Although closer examination of the data reveals quite a lot of variation within West Germany: for example in 1957 $POL_{jt} = 34.57$.).

¹⁵In 1945 the elected Labour party embarked on a significant expansion of the welfare state and meaning-

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),¹⁶ 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 standard deviation of this measure with the country-level average POL_j is 0.52. Countries which are on average are measured to be more polarized according to our measure are also more polarized according to the WVS.

Figure 2 plots average debt levels within countries against averages of the polarization measure POL_j . This figure is of course only suggestive, but taken at face value is supportive of the hypothesis offered in this paper, that polarization may reduce debt. Countries that have historically been more polarized have tended to have lower debt. The slope coefficient 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

fully differed in ideology from the Conservative party, led by Winston Churchill.

¹⁶Lindqvist and Östling (2010) analyze the effect of polarization on the size of government using crosssectional measures derived from the WVS.

of 13.9% of GDP.

Figure 3 plots the evolution of cross-country year level averages of debt levels and polarization, POL_t .¹⁷ Clearly debt levels have trended upwards over time since 1960, whilst 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. 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. It has already been pointed out that 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 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

¹⁷Whilst the debt and ideology data go back to 1945, the control variables are only available from 1960 hence the formal econometric analysi focuses on the period 1960-2010.

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

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

and 64, and the percentage of the population aged 65 and above.²⁰ The benchmark empirical specification is thus

$$D_{jt} = b_1 M E A N_{jt} + b_2 P O L_{jt} + [\text{controls}] \mathbf{b}' + \mu_i + \mu_t + \varepsilon_{it}, \tag{11}$$

where D_{jt} is central government debt as a percentage of GDP in country j in year t. The parameter b_1 tests corollary 1, that average preferences for or against government provision (mean ideology - MEAN) should not matter in determining debt levels. b_2 is the principal parameter of interest. The hypothesis proposed here is that polarization (POL) is associated with reduced debt, hence $b_2 < 0$, rather than $b_2 > 0$ 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.

Column 1 of Table 1 presents the results of the benchmark estimation (11) using annual data. The parameter estimate for b_2 is somewhat smaller than in the raw correlations though remains, consistent with proposition 1, 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. On the other hand, and consistent with corollary 1, the mean ideological climate has no statistical relationship with debt. Finally, it is also noteworthy that amongst the control variables, the stand-out driver of debt is the proportion of persons aged 65 and over. Whilst there are of course several mechanisms that could account for this relationship, one possible

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

interpretation is that this is a result of 'grey power'. If retirees are especially provided for in public spending (perhaps through health expenditures or through public pensions), and bequest motives are imperfect, then increased demand for debt as they become more numerous seems plausible. This particular finding is at least not inconsistent with the argument that voters discount future debt when they are not personally going to be liable to repay it.

One concern with interpreting column 1 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 2 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_2 is now -0.970, and is significant at the 5% level. The other parameter estimates are as for column 1.

As noted in the introduction, previous empirical work examining fiscal policy has focussed on the common pool problem and political fragmentation. Fragmentation and polarization are likely to be correlated with each other and so controlling for this is important. Omission of fragmentation may bias the polarization parameter estimate towards insignificance given a positive correlation between fragmentation and polarization (the correlation coefficient is 0.23). In column 3 we include the number of parties in government (*NPC*). 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 countryspecific 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 4 contains the results. The point estimate of b_2 remains negative and is still statistically significant even in this quite demanding econometric specification.

It is possible that column 4 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 5 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.

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 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 4 depicts the polarization data in terms of deviation from 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 second instrument is lagged media intensity, measured as the average number of televisions owned in the population in the previous 10-year period.²¹ Melki and Pickering

 $^{^{21}\}mathrm{These}$ data are from the World Development Indicators.

(2014) examine the relationship between polarization and media intensity. Theoretically polarization may increase (if the media reinforces partisan differences) or decrease (if it transmits information conducive to consensus) with media intensity. In support of the latter hypothesis Melki and Pickering (2014) find that increases in media intensity lead reductions in polarization. It is harder to argue for strict exogeneity in this instance, but in the case of using 10-year averages, there is a substantial time gap between the media instrument and the polarization data so at least the instrument is pre-determined. The presence of a second instrument (that undoubtedly is independent of the first) also permits use of overidentification tests of instrument validity.

Table 2 contains the estimation results of the instrumental variables regression. The weak instruments test is rejected at the 1% level.²² Both the Sargan and Basman overidentification tests are not rejected, which supports the assumptions of instrument exogeneity. 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

 $^{^{22}}$ 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.

deviation increase in polarization is estimated to cause a reduction of central government debt of about 12% of GDP.

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 3 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.²³ 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 subsamples. 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 tension between far-sighted government (of-

²³Determined by the median value of real GDP per capita.

ficials) and a myopic electorate. Ideally we would be able to investigate this further with clear measures of time preferences for government officials and the electorate, that randomly varied across countries and time. Unfortunately good measures of distinct time preferences for institutions are not readily available, and indeed any such data that may in principle be usable is of course unlikely to be randomly distributed. Nonetheless, with these caveats in mind 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.¹²⁴ We believe this institutional measure (or its objective at least) should in principle qualify the sensitivity of debt to political pressure. In particular a high quality and independent civil service may be more able to make financing decisions independently and independent civil service 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.²⁵ 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

²⁴Kaufman et al (2009). Italics added.

 $^{^{25}}$ This is not surprising given that the measure is a function of institutional quality, and that institutions are slow to change.

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, 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

The theoretical argument presented here should not be thought of as the last word on the matter of how governments decide upon debt levels. However, we believe that the tension explored - between voters who may discount the future, and governments that (at least ideally) are institutionally averse to debt is one worth exploring. This tension is reduced when ideological polarization increases because voters are less responsive to changes in fiscal policy: 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 increased 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. Reductions in polarization that are plausibly exogenous have had a sizeable and negative impact on government debt. The negative debt-polarization relationship is apparently independent

of income, though as conjectured it is found to be somewhat stronger when 'government efficiency' is lower.

It should be observed that the debt-polarization relationship is one we would only expect to hold in countries in which there is a high level of democracy. By no means should the findings reported here be interpreted as a counter to the multitude of papers identifying adverse consequences of polarization more generally.

Ultimately the appropriate construction of institutions in which elected officials and civil servants are protected from short-termism, whatever its source, remains an open issue. Whilst strategic debt models suggest that voters need to be protected from politicians, perhaps instead it is government that needs to be protected from the electorate. This may entail a strengthening of the remit of independent fiscal councils, or the use of formal debt ceilings. A full consideration lies beyond the scope of this paper, but it seems clear that democracy is not by itself a sufficient condition for guaranteeing optimal, or indeed at all sustainable, levels of debt.

Appendix

The model is solved backwardly. In the second period, taking the debt level bequeathed from period 1 as given, there is no conflict (i.e. across parties or voters) concerning the appropriate tax and spending decisions. Using (2)

$$\max_{t_{2}^{L}} \left(y_{2} \left(1 - t_{2}^{L} \right) \right)^{1-\alpha} \left(t_{2}^{L} y_{2} - \left(1 + r \right) D^{L} \right)^{\alpha}$$

implies

$$t_2^L = \alpha + \frac{(1-\alpha)(1+r)D^L}{y_2}$$
(A1)

and

$$g_2^L = \alpha \left(y_2 - (1+r) D^L \right).$$
 (A2)

Hence higher levels of debt results in higher taxes and lower government expenditure in the second period.

Similarly, for any given decision on debt, then taxes and spending in the first period break down as

$$t_1^L = \alpha - \frac{(1-\alpha) D^L}{y_1} \tag{A3}$$

and

$$g_1^L = \alpha \left(y_1 + D^L \right). \tag{A4}$$

Candidate L wishes to maximize

$$\max_{D^L} p^L + u^L$$

which using (7) implies

$$\max_{D^{L}} \frac{1}{2} + \frac{w^{L} - w^{R}}{4\varphi} + \left[\left(y_{1} \left(1 - t_{1}^{L} \right) \right)^{1-\alpha} \left(g_{1}^{L} \right)^{\alpha} \right]^{1-\beta^{C}} \left[\left(y_{2} \left(1 - t_{2}^{L} \right) \right)^{1-\alpha} \left(g_{2}^{L} \right)^{\alpha} \right]^{\beta^{C}}.$$

Substituting in (5) and then using (A1)-(A4) and differentiating with respect to D^L yields the first order condition

$$\frac{A(1-\beta)Y^{\beta}X^{-\beta} - \beta AY^{\beta-1}X^{1-\beta}(1+r)}{4\varphi} + A(1-\beta^{C})Y^{\beta^{C}}X^{-\beta^{C}} - \beta^{C}AY^{\beta^{C}-1}X^{1-\beta^{C}}(1+r) = 0$$
(A5)

where

$$A = (1 - \alpha)^{2} \left(\frac{\alpha}{1 - \alpha}\right)^{\alpha} + \alpha^{2} \left(\frac{1 - \alpha}{\alpha}\right)^{1 - \alpha}$$
$$X = ((1 - \alpha) (y_{1} + D))^{1 - \alpha} (\alpha (y_{1} + D))^{\alpha}$$
$$Y = ((1 - \alpha) (y_{2} - (1 + r) D))^{1 - \alpha} (\alpha (y_{2} - (1 + r) D))^{\alpha}$$

and L subscripts have been dropped to de-clutter the notation. Define

$$Z \equiv \frac{X}{Y} = \frac{y_1 + D}{y_2 - (1+r)D}.$$
 (A6)

Dividing (A5) through by A and using (A6) yields an alternative FOC

$$(1-\beta) Z^{-\beta} - \beta (1+r) Z^{1-\beta} + 4\varphi (1-\beta^{C}) Z^{-\beta^{C}} - 4\varphi \beta^{C} (1+r) Z^{1-\beta^{C}} = 0$$
 (A7)

in which debt levels (embodied in Z) are clearly independent of α (corollary 1).

Under maximum polarization (as $\varphi \to \infty$), then candidates pursue their own objectives entirely, and only β^C matters in determining debt, in particular

$$Z^{\infty} = \frac{1 - \beta^C}{\beta^C \left(1 + r\right)}.$$

Under zero polarization (as $\varphi \to 0$), then candidates are obliged to weight voter preferences, and only β matters in determining debt, in particular

$$Z^0 = \frac{1-\beta}{\beta \left(1+r\right)}.$$

Given $\beta^C > \beta$, then $Z^{\infty} < Z^0$, and hence debt (via (A6)), is higher under zero polarization than under infinite polarization. Because in general (for $0 < \varphi < \infty$) optimal debt is a weighted average of candidate and voter preferences,

$$Z^{\infty} < Z < Z^0. \tag{A8}$$

Total differentiation of (A7) with respect to φ yields

$$B\frac{dZ}{d\varphi} = 4\left(1 - \beta^{C}\right)Z^{-\beta^{C}} - 4\beta^{C}\left(1 + r\right)Z^{1-\beta^{C}}$$

where

$$B \equiv \left\{ \beta \left(1-\beta\right) Z^{-(\beta+1)} + \left(1-\beta\right) \beta \left(1+r\right) Z^{-\beta} + 4\beta^{C} \varphi \left(1-\beta^{C}\right) Z^{-(\beta^{C}+1)} + 4\varphi \left(1-\beta^{C}\right) \beta^{C} \left(1+r\right) Z^{-\beta^{C}} \right\} > 0 \right\}$$

It follows that

$$\frac{dZ}{d\varphi} < 0 \iff 4\beta^C (1+r) Z^{1-\beta^C} > 4 (1-\beta^C) Z^{-\beta^C}$$
$$\Rightarrow Z > \frac{1-\beta^C}{\beta^C (1+r)}$$

which follows from (A8). Z, and hence debt, thus falls with increasing polarization when voters are more myopic than governments.



Figure 1: Central government debt as a percentage of GDP.



Figure 2: Scatter plot of average central government debt as a percentage of GDP and average ideological polarization by country.



Figure 3: Evolution of average central government debt as a percentage of GDP and average ideological polarization by year.



Figure 4

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.

(5)	$\begin{array}{c} 0.187 \\ (0.247) \end{array}$	-0.670^{**} (0.289)	-0.001 (0.001)	-0.317 $_{(0.188)}$	-0.181 (1.240)	$5.833^{***}_{(1.721)}$		0.748^{***} (0.095)	106	10-year averages	22	BCLSDV	
(4)	$\begin{array}{c} 0.061 \\ (0.259) \end{array}$	$-0.766^{*}_{(0.433)}$	-0.001 $_{(0.001)}$	-0.298 (0.226)	$\begin{array}{c} -0.619 \\ \scriptstyle (1.160) \end{array}$	$6.664^{***}_{(1.736)}$	$\begin{array}{c} 3.113 \\ (4.489) \end{array}$	$0.553^{***}_{(0.085)}$	106	10-year averages	22	SIO	0.87
(3)	-0.299 $_{(0.359)}$	-1.310^{**} (0.509)	-0.001 $_{(0.001)}$	-0.203 (0.291)	-1.750 (1.894)	$\substack{9.114^{***}\\(2.318)}$	8.418^{st} (4.409)		106	10-year averages	22	OLS	0.79
(2)	-0.291 (0.397)	-0.970^{**} (0.424)	-0.001 $_{(0.001)}$	-0.053 (0.307)	-2.054 (1.894)	$\begin{array}{c} 9.198^{***} \\ (2.417) \end{array}$			106	10-year averages	22	OLS	0.77
(1)	$\begin{array}{c} -0.103 \\ \scriptscriptstyle (0.189) \end{array}$	-0.495^{*} (0.259)	-0.001 (0.001)	-0.009 (0.228)	$-1.213 \\ {}^{(1.567)}$	$7.877^{***}_{(2.021)}$			1025	Annual	22	OLS	0.71
	MEAN	POL	LYP	TRADE	PROP1564	PROP65	NCP	$Debt_{jt-1}$	Obs	Data	No. Countries	Estimation method	R^2

 Table 1: Estimation Results

PROP65, and TRADE as control variables described in Persson and Tabellini (2003). POL is the measure of ideological polarization as described in the text. MEAN is the average left-right ideological score. NCP is the number of parties in government coalition. $Debt_{jt-1}$ is the lagged dependent variable. Fixed Country and Time Notes: Panel regressions of Central Government Debt as a percentage share of GDP including LYP, PROP1564, 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	V	0.368 (0.289)					
POL		-1.727 (0.640)***					
Obs		66					
Data		10-year averages					
No. Co	untries	22					
Estimat	tion method	IV					
Overid	(Sargan)	$\chi^2 = 2.666$	(p = 0.103)				
Overia	(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 the Berlin Wall dummy variable and media intensity measures (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)	$\begin{array}{c} 0.070 \\ (0.475) \end{array}$	$\begin{array}{c} 0.150 \\ (0.531) \end{array}$	-0.652 (0.441)	$\begin{array}{c} 0.326 \\ (0.625) \end{array}$
DOL	-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)	$\begin{array}{c} 0.004 \\ (0.002) \end{array}$	-0.000 (0.001)	-0.003^{**} (0.001)
TRADE	-0.170 (0.300)	-0.835 (0.526)	-0.080 (0.568)	$\begin{array}{c} 0.749 \\ (0.479) \end{array}$	-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	$9.551^{***}_{(2.318)}$	$10.207^{st}_{(5.830)}$	-3.409 (5.581)	-0.034 (2.310)	11.105^{*} (5.272)
NCP	${8.036^{st} \over (4.392)}$	$\underset{(6.650)}{0.912}$	$\underset{(5.672)}{6.415}$	$\begin{array}{c} 8.780 \\ (5.046) \end{array}$	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	SIO	OLS	OLS	OLS	OLS
R^{2}	0.78	0.95	0.89	0.79	0.85

Extensions
and
Robustness
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Table

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 ($LYP \ge 22801.64$.) Columns 4 and 5 respectively corresponds to higher and lower levels of average 'government efficiency' $(\overline{GOVEF} \ge 1.74.)$

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).

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