FISCAL TRANSPARENCY, POLITICAL PARTIES, AND DEBT IN OECD COUNTRIES[1]

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Abstract

Many believe and argue that fiscal, or budgetary, transparency has large, positive effects on fiscal performance. However, the evidence linking transparency and fiscal policy outcomes is less compelling. To analyze the effects of fiscal transparency on public debt accumulation, we present a career-concerns model with political parties. This allows us to integrate as implications of a single model three hitherto-separate results in the literature on deficit and debt accumulation: that transparency decreases debt accumulation (at least by reducing an electoral cycle in deficits), that right-wing governments (at least for strategic reasons) tend to have higher deficits than left-wing governments, and that increasing political polarization increases debt accumulation. To test the predictions of the model, we construct a replicable index of fiscal transparency on 19-country OECD data. Simultaneous estimates of debt and transparency strongly confirm that a higher degree of fiscal transparency is associated with lower public debt and deficits, independent of controls for explanatory variables from other approaches.

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1. Introduction

Many believe that fiscal transparency has large and positive effects on fiscal performance. According to the IMF, "transparency in government operations is widely regarded as an important precondition for macroeconomic fiscal sustainability, good governance, and overall fiscal rectitude" (Kopits and Craig 1998: 1). Both the IMF and the OECD have recently developed Codes of Best Practice for Fiscal Transparency. Fiscal adjustment programs (like some aimed at satisfying Maastricht Treaty criteria) can employ or produce creative accounting practices. Transparency can affect the probability that such budgetary tricks are revealed. In ways like that, more transparency leads to lower budget deficits and makes fiscal discipline and control of spending easier to achieve. However, while such asserted effects are common, there is not much empirical evidence about institutional transparency and fiscal policy outcomes. Some links appear between fiscal transparency and fiscal performance in European countries, and between indirect measures of transparency and fiscal performance in Latin American countries. Many remain convinced of the importance of fiscal transparency, however.[2]

The purpose of this paper is to investigate whether a higher degree of fiscal transparency is in fact associated with lower public debt, other things equal. To do this, we extend the career-concerns model of public debt developed by Persson and Tabellini (2000) and, in particular, Shi and Svensson (2002) to include political parties with preferences over public spending. We show that this allows us to integrate as implications of a single model three hitherto-separate results in the literature on deficit and debt accumulation: that transparency decreases debt accumulation, at least partly through an effect on the electoral cycle (Shi and Svensson, 2002), that increasing political polarization increases debt accumulation (see, for instance, Alesina and Tabellini, 1990), and that right-wing governments, at least for strategic reasons, tend to have higher deficits than left-wing governments (Persson and Svensson, 1989). We also develop measures of fiscal transparency and show that recent evidence from OECD countries is consistent with these implications, even after controlling for the effects of explanatory variables from other political-economic models of debt and deficits, and accounting for the potential endogeneity of transparency.

[2] On Europe, see von Hagen (1992), de Haan et al. (1999), Milesi-Ferretti (forthcoming), and Hallerberg et al. (2001). On Latin America, see Alesina et al. (1999).

The theoretical literature on the causes and consequences of fiscal, or budgetary, transparency is not large.[3] In the Shi and Svensson (2002) political agency model that we extend below, voters want more competent politicians in office, as they can provide more public goods for given levels of taxation and private consumption. However, this creates incentives for incumbents to try to "appear competent" by issuing debt, providing more public goods by 'buying now and paying later'. In the model, the degree of fiscal or budget transparency determines when and how far voters can observe debt, and thus the extent to which an incumbent can use debt to appear competent. Milesi-Ferretti (forthcoming), on the other hand, considers in a reduced-form model the effect of transparency on government debt and deficits in a regime characterized by fiscal rules, allowing for creative accounting practices like those arising in connection with the Maastricht Treaty (Easterly 1999). Transparency, Milesi-Ferretti argues, affects the probability that such practices are revealed, resulting in a penalty for not meeting the formal budget rule requirement. Thus, transparency determines the scope for creative accounting vs. "true" fiscal adjustment, and matters only because of the existence of fiscal rules. Finally, Ferejohn (1999) examines an agency model in which fiscal transparency affects voter trust in government and thus the size of government. In all these cases, transparency increases the probability or accuracy of observations of incumbents' performance.

The empirical literature on transparency is also limited, in part by measurement problems.[4] So, in addition to providing a model that synthesizes and unifies several disparate results on debt, we construct a direct, replicable index variable measuring the transparency of budget processes of OECD countries. The index contains variables comparable though not identical to ones collected and analyzed in the American states (Alt, Lassen, and Skilling 2002). Further, we use this index to investigate empirically the hypotheses of the model. We find that fiscal transparency is, indeed, robustly associated with lower public debt and deficits, even after allowing for the effects of partisanship and polarization. However, we also recognize that fiscal institutions are subject to change, and investigate the reasons why governments change fiscal

[3] Asymmetric information models of fiscal policy have been studied by, e.g., Rogoff (1990), but a direct focus on the role of fiscal transparency is rare. Besley and Prat (2001) touch on transparency in their investigation of the role of the media in communicating information about the government to voters. The effects of transparency about monetary policy objectives has begun to be studied as well; see, e.g., Faust and Svensson (2001), Jensen (2002), and Stasavage (2003).

[4] Alesina and Perotti (1996) note that the "results on transparency probably say more about the difficulty of measuring it, than about its effect on fiscal discipline", a point echoed in Alesina and Perotti (1999) and Tanzi and Schuknecht (2000).

transparency. This allows us to correct transparency for possible endogeneity in the empirical analysis. Estimating the simultaneous empirical model leaves the main results unaltered.

Finally, many other analyses of public debt focus on the number of actors involved in the budget process. Two conjectures predominate: either there is a "common pool problem" so that actors do not internalize the full cost of their spending or there is a "fragmentation problem" so that they cannot coordinate, for instance on a response to negative shocks. "Actors" include the number of spending ministers, parties in a governing coalition, decentralized units in a federal system, or veto players.[5] Our model does not make specific predictions about these other variables, so in the empirical analysis we control for as many alternative approaches as possible.

The paper proceeds as follows. Section 2 defines fiscal transparency. Section 3 summarizes the career-concerns model of fiscal transparency with competing political parties, deriving results for the effects of transparency, and partisanship and polarization from the "strategic debt" literature, to guide the empirical analysis. (We present the full model in an appendix.) Section 4 describes the construction of the transparency index, as well as other data, used in the empirical work. Section 5 examines the effects of fiscal transparency on fiscal performance, the causes of variation in fiscal transparency across the OECD, and the possible endogeneity of transparent institutions with respect to debt. Section 6 concludes.

2. Defining Fiscal Transparency

Greater transparency eases the task of attributing outcomes to the acts of particular politicians. It makes observers more able to distinguish effort from opportunistic behavior or stochastic factors "primarily by providing actors with greater or lesser degrees of certainty about the present and future behavior of other actors" (Hall and Taylor 1996, p. 939).[6] With respect to the budgetary process, a comprehensive definition of fiscal transparency is the following:

> "Fiscal transparency is defined … as openness toward the public at large about government structure and functions, fiscal policy intentions, public sector accounts, and

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[5] Proposed remedies include delegation to a strong central Ministry of Finance (when there is no problem of ideological heterogeneity) and a form of commitment among coalition partners when there is (Hallerberg et al. 2001). On the effects of number, possibly conditional on decentralization and heterogeneity, of ministers and parties see Kontopoulos and Perotti (1999) and Volkerink and de Haan (2001); on decentralized units in a federal system see Rodden and Wibbels (2002); and on veto players see Tsebelis (2002).

> projections. It involves ready access to reliable, comprehensive, timely, understandable, and internationally comparable information on government activities … so that the electorate and financial markets can accurately assess the government's financial position and the true costs and benefits of government activities, including their present and future economic and social implications" (Kopits and Craig 1998: 1).[7]

The literature also provides specific examples of transparent budget reporting procedures:

> "A transparent budget process is one that provides clear information on all aspects of government fiscal policy. Budgets that include numerous special accounts and that fail to consolidate all fiscal activity into a single 'bottom line' measure are not transparent. Budgets that are easily available to the public and to participants in the policymaking process, and that do present consolidated information, are transparent" (Poterba and von Hagen 1999: 3-4).

As features of non-transparent financial reporting, Alesina and Perotti (1996) identify optimistic predictions on key economic variables and forecasts of the effects of new policies, and creative and strategic use of what is kept on or off budget, budget projections, and multi-year budgeting.

We believe more transparent procedures have four distinct characteristics. First, more transparent procedures should process *more information*, and, other things equal, do so in *fewer documents*. This speaks to openness and ease of access and monitoring. Second, the possibility of *independent verification*, which has been shown experimentally to be a key feature in making communication persuasive and/or credible, increases transparency. Third, there should be a commitment to *non-arbitrary language*: words and classifications should have clear, shared, unequivocal meanings. The use of generally accepted accounting principles in some of the American states is a good example of this. Finally, the presence of *more justification* increases transparency, reducing the optimism and strategic creativity referred to above. Below we operationalize multiple indicators of these characteristics into an index of budget transparency.

[6] In studying retrospective economic voting, the political science literature calls this consequence of transparent institutions "clarity of responsibility" (Paldam, 1991; Powell and Whitten, 1993; Lowry, Alt, and Ferree, 1998; Nadeau, Niemi, and Yoshinaka, 2002; Alt, Lassen, and Skilling 2002).

3. Model

In this section we introduce a career-concerns model of debt accumulation, following Shi and Svensson (2002) and Persson and Tabellini (2000, ch. 4), and extend it to contain partisan politics. In our adaptation of these models, politicians thus have known preferences both over policy and exogenous office rents, and therefore value reelection. Also, politicians differ in their competence in providing public goods, but their competence is unknown by both voters *and politicians themselves* at the time of policy decision. Left and right parties are organizations of competing politicians that promote platforms, or promises to provide respectively more or less public goods. Voters differ in their relative preferences over private vs. public goods and consider both (their inference of) incumbent ability *and* party platform when deciding for whom to vote.

As above, the intuition of the model is that voters want more competent politicians, which creates incentives for incumbents to use debt to appear competent, even when they are not. If transparency is low, the probability that debt is observed before voters decide whether to reelect the current incumbent is also low -- and, hence, the incumbent can use debt to appear competent. More generally, optimistic forecasts, including lack of (independent) verification, complicated budget processes and lack of expenditure control makes it possible for incumbents to increase spending without revealing, or, perhaps, knowing, the consequences for debt accumulation. Here we develop the model in just enough detail to motivate the implications for the effects of transparency, partisanship, and polarization. A fuller derivation of the model, including the time line, is given in the Appendix.

3.1 Model set-up

The economy consists of voters and political parties. Each voter *i* has preferences

$$U_t^i = g_t + \alpha^i u(c_t)$$

where *g* is a public good and *c* is private goods consumption. The function *u* is a standard strictly concave utility function. Private consumption must obey the private budget constraint $c_t = y - \tau_t$ where *y* is exogenous income. The parameter α^i represents the relative weight put on private goods consumption by voter *i*. We assume that α is distributed uniformly on $[1-1/2\xi, 1+1/2\xi]$

[7] For a more detailed discussion of aspects of transparent financial reporting, refer to the IMF web site on fiscal transparency (http://www.imf.org/external/np/fad/trans/).

with expected and median value equal to one and density ξ. Public goods production is provided by politicians, organized in two parties, *A* and *B*. Each party $j \in \{A, B\}$ has preferences

$$V_t^j = g_t + \alpha^j u(c_t) + \chi$$

where χ represents office- or ego-rents to the party, which can be construed as having proposal power over issues unrelated to fiscal policy.[8] We designate the high public spending party *A*, such that $\alpha^A < \alpha^B$. Furthermore, since the median (and average) voter has $\alpha = 1$, it is natural to assume that $\alpha^A < 1 < \alpha^B$ such that the parties are positioned on either side of the median voter.

The production of public goods takes place under the budget constraint

$$g_t = \tau_t + d_t - D(d_{t-1}) + \eta_t^j.$$

Public goods can be financed by taxes τ and debt *d*, under consideration of last period debt retiring. *D* is the cost of repaying last period debt. We assume that $D(0) = 0, D' > 0, D'(0) \geq 1$ and that $D'' > 0$. This implies that no debt will be incurred under full information, as well as in the hypothetical case without elections. The shape of the debt repayment function implies that issuing debt is associated with a deadweight loss. This is equivalent to assuming a distortionary tax, with the distortion increasing in the tax rate. Incumbent ability η is assumed to be a moving average of shocks to ability in the current and previous period, such that

$$\forall t \; \eta_t^j = \mu_t^j + \mu_{t-1}^j, \; j \in \{A, B\}.$$

where μ is distributed according to the distribution function *F* with mean zero and is serially uncorrelated (see also Persson and Tabellini, 2000).

3.2 Voting

Suppose that the incumbent is from party *A*. A voter *i* will prefer the incumbent *A* to the challenger *B*, about whom the electorate has no information, iff

$$E_t\left[U_{t+1}^i(A)\right] \geq E_t\left[U_{t+1}^i(B)\right]$$

which can be transformed into the following condition (see the appendix):

$$E_t\left[\mu_t^A\right] \geq \gamma^i \equiv \alpha^i\left[u\left(y - \hat{\tau}^B\right) - u\left(y - \hat{\tau}^A\right)\right] - \left(\hat{\tau}^A - \hat{\tau}^B\right)$$

[8] Including χ is not necessary for the analysis, but it has the intuitive implication that a party prefers to be in office, even if the two parties propose similar platforms.

where $\hat{\tau}^j$ is party *j*'s (time-invariant) optimal choice of tax level, in the following denoted its platform. The parameter γ^i represents voter *i*'s utility gain from seeing party *B*'s platform implemented instead of party *A*'s, for equal levels of competence. If γ^i is negative, voter *i* leans towards party *A*. This means that voters who prefer larger government will be less demanding in terms of competence of the party *A* incumbent. They may prefer a less competent incumbent implementing a policy they like to a more competent incumbent implementing a platform far away from their ideal point.

Incumbent *A* is concerned with winning the election. Invoking the distributional assumption, incumbent *A* can calculate his expected share of votes, V^A, as

$$\begin{aligned} V^A\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) &= \Pr\left\{E_t\left[\mu_t^A\right] \geq \alpha^i\left[u\left(y-\hat{\tau}^B\right)-u\left(y-\hat{\tau}^A\right)\right]-\left(\hat{\tau}^A-\hat{\tau}^B\right)\right\} \\ &= \frac{1}{2}+\frac{\xi}{u\left(y-\hat{\tau}^B\right)-u\left(y-\hat{\tau}^A\right)}E_t\left[\mu_t^A\right]-\frac{\xi}{u\left(y-\hat{\tau}^B\right)-u\left(y-\hat{\tau}^A\right)}\gamma^m. \end{aligned} \tag{1}$$

where γ^m is γ^i for $\alpha^i = 1$; i.e. the utility gain for the median voter from seeing platform *B* implemented instead of platform *A*. If all politicians are similar in ability and the two parties propose platforms that keep the median voter indifferent $\left(\gamma^m = 0\right)$, party *A* can expect to get half the votes. However, more competence delivers more public goods (or at lower taxes), which is valued by voters. The fact that the chance of reelection increases with unobserved ability creates scope for influencing voter expectations. We assume that government debt *d* (or, more generally, the consequences of current economic policy for government debt accumulation) cannot always be observed instantaneously and, from the government budget constraint, this implies that the incumbent can raise debt in order to appear more able in providing public goods.

As noted in the introduction, budget transparency affects voters' ability to monitor government budgetary policies, or to observe and accurately assess government debt before the election. We associate the government's *degree of transparency* with the probability *p* that voters observe the current debt level d_t and are thus able to calculate incumbent competence η_t^A before the election. With probability $1-p$ voters observe nothing and must form an estimate $\tilde{d}_t$ on the basis of observables τ_t and g_t.

In the case of full disclosure, voters can determine incumbent *A*'s competence as

$$\mu_t^A = g_t^A - \hat{\tau}^A - d_t - \mu_{t-1}^A$$

while in the case of no disclosure, they form an estimate $\tilde{\mu}_t^A$ on their basis of their estimate of the current debt level $\tilde{d}_t$ according to

$$\tilde{\mu}_t^A = g_t^A - \hat{\tau}^A - \tilde{d}_t - \mu_{t-1}^A = \mu_t^A + \left(d_t - \tilde{d}_t\right).$$

We are now able to derive the probability that incumbent *A* wins the election as a function of current competence and policy platforms. The probability that incumbent *A* wins the election is the probability that the *expected* vote share, over full and no information, is greater than or equal to one half. Inserting the values of μ_t^A and $\tilde{\mu}_t^A$ into (1) yields

$$\rho\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) = \Pr\left\{ p\left(\frac{1}{2} + \frac{\xi}{u\left(y-\hat{\tau}^B\right) - u\left(y-\hat{\tau}^A\right)}\left(\mu_t^A - \gamma^m\right)\right)\right.$$
$$\left. + (1-p)\left(\frac{1}{2} + \frac{\xi}{u\left(y-\hat{\tau}^B\right) - u\left(y-\hat{\tau}^A\right)}\left(\mu_t^A + d_t - \tilde{d}_t - \gamma^m\right) \geq \frac{1}{2}\right)\right\}$$

which reduces to

$$\rho\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) = 1 - F\left((1-p)\left(\tilde{d}_t - d_t\right) + \gamma^m\right).$$

Having determined incumbent *A*'s chance of reelection allows us to characterize the incumbent's maximization problem.

3.3 Equilibrium

Incumbent *A* aims to maximize expected utility and has at his disposal two policy instruments, taxes and debt. As noted above, the incumbent's optimal tax rate $\hat{\tau}^A$ is a function only of his relative preferences for public goods, expressed by α^A. Therefore, we can take $\hat{\tau}^A$ (and $\hat{\tau}^B$) as given when considering the incumbent's optimal choice of debt. The maximization problem becomes

$$\begin{aligned}\max_{d_t \geq 0} \Phi^A = E_t[&\hat{\tau}^A + d_t + \eta_t^A + \alpha^A u\left(y-\hat{\tau}^A\right) + \chi \\ &+ \left[1 - F\left((1-p)\left(\tilde{d}_t - d_t\right) + \gamma^m\right)\right]\left[\hat{\tau}^A - D\left(d_t\right) + \eta_{t+1}^A + \alpha^A u\left(y-\hat{\tau}^A\right) + \chi\right] \\ &+ F\left((1-p)\left(\tilde{d}_t - d_t\right) + \gamma^m\right)\left[\hat{\tau}^B - D\left(d_t\right) + \eta_{t+1}^B + \alpha^A u\left(y-\hat{\tau}^B\right)\right]].\end{aligned} \tag{2}$$

The optimal debt level for *A* can, using that expectations must be correct in equilibrium ($d_t = \tilde{d}_t \equiv d^A$), be written as

$$1 + f\left(\gamma^m\right)(1-p)\left(\chi - \gamma^A\right) - D'\left(d^A\right) = 0, \tag{3}$$

where $\gamma^A < 0,$ using the notational convention established earlier, represents party *A*'s utility gain from seeing party *B*'s platform implemented instead of its own and *f =F'*.

As noted above, strategic considerations aside incumbent *A* equates marginal benefits (equal to one) with marginal costs $\left(D'\right)$, which, from the assumptions on the *D*-function, implies that equilibrium debt is zero. The additional terms in (3) arise from the presence of less than full transparency, the presence of electoral rents and differences in party platforms. When transparency is imperfect the incumbent can use debt to increase expected utility. Expected utility increases from the possibility of enjoying a second period of electoral rents and from the possibility of implementing *A*'s own preferred policy platform rather than seeing *B*'s platform implemented.

In this model, transparency unambiguously decreases deficits and debt, which are costly and have no other function than transmitting information about incumbent competence, a transmission that, in equilibrium, has no effect. Therefore, transparency improves expected welfare.

3.4 Comparative statics

We are now able to investigate how differences in transparency and party policy positions affect debt accumulation by incumbents. Specifically, we consider the effect of transparency, political polarization and party platforms on the equilibrium size of government debt.

We define political polarization simply as the absolute difference between platforms, $\alpha^D = \left|\alpha^A - \alpha^B\right| > 0.$ To focus on the pure polarization effect, we define an increase in political polarization as an increase in α^D that leaves the median voter's assessment of party platforms unchanged $\left(d\gamma^m = 0\right).$ Then the following proposition summarizes the results (proofs are in the Appendix):

Proposition 1: Comparative statics of equilibrium debt

a) For both parties $j \in \{A, B\}$ equilibrium debt d^j decreases as the degree of transparency p increases.

b) For both parties $j \in \{A, B\}$ equilibrium debt d^j increases as the degree of political polarization α^D increases.

c) When the median voter is indifferent between platforms $(\gamma^m = 0)$, equilibrium debt is higher under low-spending governments, $d^B \geq d^A$, if $\alpha^A + \alpha^B \geq 2$.

Increasing transparency makes it more likely that debt accumulation will be discovered and, thus, will be ineffective in altering voter perceptions. Regardless, however, of whether the electoral benefits from increasing debt materialize, the costs of issuing debt will be unchanged and, as a result, debt accumulation will decrease.

Note also that a feature of the model is that incumbents issue debt to feign competence before elections and that debt is repaid in the post-election period. Therefore another implication is that there should be an electoral cycle in fiscal imbalance that has this pattern. Further, the cycle should have greater amplitude where transparency is lower. Shi and Svensson (2002) also obtain this result.[9]

Political polarization, by definition, increases the distance between party platforms. This implies that, for both parties, γ^j decreases (becomes more negative): it becomes more desirable to stay in office, as the utility loss from seeing the opponent in office increases, which leads to more debt accumulation by both parties.[10] This result was obtained by Alesina and Tabellini (1990), in their case depending on specific parameter assumptions that restrict preferences.

Why do right-wing parties accumulate more debt in this model? In Persson and Svensson (1989), right-wing parties run a deficit for strategic reasons, so as to affect the possibilities for spending should the successor government be left-wing, while left-wing governments run a surplus. In this model, both high and low public spenders accumulate debt so as to signal their

[9] Shi and Svensson represent the electoral cycle as a shift in debt only in the pre-election period. Persson and Tabellini (2003) find an electoral cycle in debt with pre- and post-election shifts, but do not consider transparency. Brender and Drazen (2003) question their results for OECD countries. See also Hallerberg et al. (2002).

[10] If party platforms are *not* symmetric around the median voter, we can generally not sign the effect for either party, since the increase in political polarization affects the median voter's relative assessment of the two parties.

competence to voters. When the condition on party platforms is fulfilled, right-wing parties will, however, be willing to incur more debt than left-wing ones. The reason is that the total cost of debt is lower for low-spending parties: debt has real costs in the economy, but since right-wing governments value public spending relatively less, this has less impact on total utility of a right-wing incumbent. Therefore, the right-wing incumbent is willing to chance a higher level of debt in order to secure reelection.[11]

4. Data and specification

Political parties are an important part of politics. By introducing parties into a career-concerns model of debt politics, we integrate three hypotheses from the positive political economy literature on public debt in one model. We now turn to an empirical investigation of whether and how more fiscal transparency is associated with lower debt, whether a higher degree of political polarization is associated with higher debt, and whether governments that prefer low public spending also have more public debt. We describe the construction of a cross-sectional index of budget transparency and the control variables used in estimating long-run effects of transparency on debt. We then describe the more limited specification we use to investigate the connection between transparency and the electoral cycle.

4.1 Transparency index

The empirical analysis uses self-reported measures of fiscal transparency for 19 countries taken from a 1999 OECD questionnaire sent to all Budget Directors of OECD member countries (OECD 1999).[12] The survey contained 76 items. Many of those asked about process characteristics that did not seem to have anything to do with transparency, so these were not included in the index. Moreover, some questions were repetitive, and there was no cross-country variation on some others. This left at most about 15 possible variables, of which we ultimately included ten, but all the results are robust to the precise composition of the transparency index and the inclusion or exclusion of individual items. Nine out of these ten variables are a part of OECD's *Best Practices for Budget Transparency* (OECD, 2001).[13]

[11] The condition in proposition 1.3 is related to the concavity of the utility function; see the appendix.
[12] The countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, (West) Germany, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, the UK, and the USA.
[13] The requirement that economic assumptions used in the budget should be subject to independent review is not part of the OECD Best Practices; excluding this variable only strengthens the results reported below, though.

Relative to many measures in existing empirical research, this survey data has the advantage that it focuses directly on transparency, and is comprehensive. However, relying on survey responses does have two drawbacks. First, they are self-reported and some countries are likely to rate themselves too highly. Second, the questions focus on formal rules and procedures that may differ from actual practice. Overall, however, we believe this to be good source of fiscal transparency data that captures the main characteristics of transparency in our model.

To the ten included indicators we added a measure of whether the financial statements are prepared using accrual accounting.[14] These 11 measures are aggregated additively into a simple index. In terms of the four broad criteria we outlined above, the index contains:

- *More information*, other things equal, in *fewer documents*
  - Whether non-financial performance data is routinely included in the budget documentation presented to the legislature (yes = transparent)
  - Whether special reports on the fiscal outlook are released prior to an election (yes = transparent)
  - Whether the government regularly produces a report on the long term (10-40 years) outlook for public finances as a whole (yes = transparent)
  - Whether the government is required to report contingent liabilities on a regular basis (yes = transparent)
  - Whether the government generally presents more than one supplementary budget to the legislature in each fiscal year (no = transparent)
- *Independent verification*
  - Whether the in-year financial reports are audited (yes = transparent)
  - Whether the economic assumptions used in the budget are subject to independent review (yes = transparent)
- *Non-arbitrary language*
  - Whether the government uses accrual accounting in its financial statements (yes = transparent)
- *More justification*

[14] Cash accounting simply records cash receipts and payments, items that give rise to a cash transaction. Accrual accounting allocates revenues and expenses to the period in which they are generated or incurred. Thus, if an expense is incurred today (a service is provided on credit) but not paid until next period, it would be recorded as a liability in this period under accrual accounting.

- Whether there is a legal requirement that the budget documentation contain a projection of expenditure beyond the next fiscal year (yes = transparent)
- Whether it is a legal requirement that the budget include an ex post comparison between projected expenditure in future years and the actual expenditures in those years (yes = transparent)
- Whether the budget discusses the impact that variations in the key economic assumptions would have on the budget outturn (yes = transparent)

There is considerable variation in the transparency of the fiscal reporting, ranging from an index value of 0 (Japan) to an index value of 11 (New Zealand) out of a maximum index value of 11. Individual country scores are shown in Figure 1.

[Figure 1 about here]

To verify that this coding is appropriate, we compared our fiscal transparency index with indices created elsewhere. For example, von Hagen (1992) constructs a transparency index for 8 European countries that includes measures of whether there are special funds, whether the budget is submitted in one document, an assessment of transparency by respondents, whether there is a link to the national accounts, and whether loans to non-governmental entities are included. de Haan et al. (1999) provide a partial update of this index. There is a positive correlation between our index and these indexes, although there are some differences. Notably Italy is rated more highly in our transparency index.

We also compare this index against more subjective estimates of fiscal transparency. Case-study evidence is supportive of the rankings at the extremes. For example, Campos and Pradhan (1999) report on the transparent New Zealand system, while Wright (1999) provides a detailed discussion of the opaque and complex budget reporting in Japan. von Hagen (1992, p. 64) provides a subjective overall assessment, which broadly confirms the rankings in our index. The most obvious difference is that France and Germany receive high subjective assessments but receive relatively low scores on our index. Note therefore that any errors we made in our index would bias the results *against* supporting our predictions, given that both of these countries have relatively good fiscal records in the period studied. Finally, Alesina and Perotti (1996) argue that Italy has a highly non-transparent system of fiscal reporting, and uses special accounts and off

budget items extensively, which is a more negative assessment than is provided by our coding. Again, this discrepancy would bias the results *against* our predictions.[15]

To summarize the relationship between the fiscal transparency index and the level of general government debt in 1999, we can divide countries into those with low, medium and high fiscal transparency.[16] In *low* transparency countries (those with an index value of 3 or less), 1999 gross debt averaged 77.2 per cent of GDP. In *medium* transparency countries (index value of 4), debt comprised 66.4 per cent of GDP, while in *high* transparency countries (index value of 5 or greater) debt was 51.8 per cent of GDP. These summary statistics suggest that more fiscal transparency is associated with lower levels of debt though significant debt persists even at high transparency. The bivariate relationship between the fiscal transparency index and the level of gross debt in 1999 is shown in Figure 2. Again, there is a clear negative relationship. It is this relationship we explore further below. It is worth repeating that if our transparency index overstates fiscal transparency in Italy and understates it in France and Germany, this relationship is possibly even stronger than it appears in our analysis.

[Figure 2 about here]

4.2 Specification: political and economic controls

We examine the relationship between transparency and general government debt in more detail by controlling for additional factors. The dependent variable is general government debt in 1999, expressed as a percentage of GDP. These empirical tests are cross-sectional in nature because the transparency index captures fiscal transparency as it existed in 1999, and no time series variation is available.

First, we include two variables that our model, summarized in proposition 1, implies have equilibrium relationships with debt: political polarization and average frequency of right-wing governments (who are assumed to be the low spenders). The measure of political polarization comes from an expert survey. Country specialists were asked to assign scores on a 20-point scale representing the parties' priorities between raising taxes to increase public services and cutting

[15] One item that was included in our American study but for which we could not collect data on all countries is the presence of an independent agency that monitors the budget process. Hallerberg at al. (2001) find the presence of such an agency to be associated with caution in forecasting growth and related budget quantities, and also with the inclusion of budget targets in coalition agreements.

[16] Average transparency is an index value of 4.2.

public services to cut taxes.[17] Our variable is the standard deviation of party-by-party mean raw scores on this rating for each country. The variable for right-wing government is the proportion of years from 1990-1999 with a right-wing party in office.[18]

Because our index captures transparency in 1999, and there have been changes in transparency over the past decade, we control for the level of debt in 1990 so that we focus on the effect of fiscal transparency on recent fiscal policy settings. To control for economic circumstances, we include average growth over the 1990s as an economic control. This is highly correlated with the average change in the unemployment rate, so we include only the former. Our base empirical model thus includes as explanatory variables the transparency index, party polarization, average Right government, lagged debt, and average growth. The economic and fiscal data is drawn from the OECD Economic Outlook databank.

To demonstrate that these results stand up independent of other conjectures outside our model, we also include a number of economic and political explanatory variables suggested in the large literature on debt accumulation. We control for several institutional variables used to describe the budget process: centralization, whether there is a dominant Minister of Finance, and whether there is a system of fiscal targets. These measures are based on Hallerberg and von Hagen (1997) and extended using data in OECD (1995). We controlled for the average frequency of coalition governments, important in many accounts of fragmentation.[19] We include a control for participation in the fiscal requirements of the Maastricht Treaty.

We also controlled for a wide range of other economic and political variables found relevant in the literature on sources of debt (see Alesina and Perotti 1999 or Persson and Tabellini 2003), including federalism, the effective number of legislative districts, economic openness and the terms of trade, proportions of young and old in the population, income inequality, income per capita, and the level of spending.[20] We even include a variable reflecting legal tradition. A recent literature has argued that countries with common law systems (typically

[17] Party-by-party raw scores appear in Laver and Hunt (1992, Table 3 for each country, pp. 136-312). The number of respondents is in Table A1, p. 123. The party scale is in Table A2, p. 124.

[18] Apart from polarization, the source of political data until 1997 is the results reported in Budge, Keman, and Woldendorp (1993, 1998) and the 1998 *European Journal of Political Research Political Yearbook.* Political data for 1998 and 1999 is obtained from various Economist Intelligence Unit *Country Reports.*

[19] We examined separately those countries where Hallerberg et al (2001) identify "commitment" norms as providing fiscal discipline. These turn out to have average levels of transparency. Moreover, those components of our index that relate to multi-year plans pick up some of the variation they identify in effective commitment strategies.

[20] See Franzese (1998) and Lambertini (2000) for empirical evaluations of existing political economy hypotheses about debt accumulation.

those with histories of British rule) are more market, and less government, oriented than civil law countries, so that.the greater protection of property against the state found in common law systems improves various aspects of government performance (La Porta et al. 1999). This may manifest itself directly on outcomes, or through increased attention paid to governance.[21]

Furthermore, we include a measure of political competition, measured as turnover.[22] This is slightly problematic. In our model, if there is no competition, there is no incentive to borrow (zero debt is optimal) because there is no reason to pretend to be competent. The same is true if there is no probability of staying in office (our model precludes issuing debt for office rents). So any relationship between competition and debt would be nonlinear (positive at low levels of competition; negative at higher levels). Moreover, the probability of reelection (and hence turnover) is endogenous in our model. Finally, existing literature provides no clear expectations. Models in which debt is a strategic variable predict that competition increases debt (Alesina and Tabellini 1990) while others have found some support for the opposite conjecture (Skilling 2001; Skilling and Zeckhauser 2002).

Below, we also argue that political competition matters for the adoption of transparent fiscal institutions. In our subsequent econometric analysis, a test for overidentification in a two-stage least squares setting suggests that political competition should be included also in the main regression. Therefore, while our model makes no simple prediction about the effects of political competition, as a practical matter we include competition (and its square) in the regression.[23]

4.3 An electoral cycle in debt

Brender and Drazen (2003: 3) write "an incumbent might be rewarded at the polls only if he can hide the manipulation and make the public believe that the good economic conditions reflect the success of his policy or his high ability." However, no surveys provide time series data on fiscal transparency in a comprehensive manner across OECD countries. Having such data would allow

[21] In our model, higher fiscal transparency simply maps into more information. However, as noted by Besley and Prat (2001), government transparency, while necessary, may not be a sufficient condition for information to reach the voters; this depends on the structure of the media sector. We did try to interact transparency with the share of state ownership of television (from Djankov et al. 2002), to see whether the effect of fiscal transparency is stronger where the media is privately owned, but were unable to obtain significant estimates of such an effect.

[22] The political competition index is calculated as 1 minus a Herfindahl 'political concentration index', a direct extension of its use as a market concentration index. Formally, the political competition index is calculated as $1 - \Sigma k_i^2$ where k_i is the proportion of time in office for party (or coalition) i between 1960 and 1999, and $\Sigma k_i = 1$. The competition index moves from 0 to 1 as political competition increases. See Skilling and Zeckhauser (2002) and Beck et al. (2000) for more on the use such indices.

[23] Excluding political competition increases the estimated coefficient on transparency slightly and reduces the significance of political polarization somewhat, but has no other discernible effects.

a direct test of the prediction of the model that electoral cycles in debt accumulation would be dampened where the budget process is more transparent.

Instead we replicate the analysis of Persson and Tabellini (2003), using their data for 60 countries in the period 1960-98, but extracting the subset of observations that correspond to the 19 countries for which we can construct the transparency index, for the decade 1989-98 that is closest to the date of the index. The Persson-Tabellini model includes a measure of the annual central government fiscal surplus/deficit as the dependent variable, and its own lagged values, the output gap, logged per capita income, trade dependence, age structure of the population, interactions with presidentialism and majoritarianism, a full set of year and country fixed effects, and dummy variables for pre-election and post-election years as explanatory variables. We divide our sample into eleven higher and eight lower transparency countries (transparency 4 or more is higher, 3 and less is lower: see Figure 1) and add to their specification the interactions of higher and lower transparency with the election shift variables, to see whether the estimated cycle is larger where transparency is lower. For details of their data see the Data Appendix in Persson and Tabellini (2003).[24]

5. Effects of Fiscal Transparency

We describe the results in four sections. First, we review the cross-section analysis. Then we describe the electoral cycle test. The third section reviews sensitivity analyses, and the final section considers endogeneity issues.

5.1 Multiple regression analysis.

We estimate the following "base case" cross-sectional model:

$$\text{Debt} = \beta_0 + \beta_1 \text{fiscal transparency index} + \beta_2 \text{debt level (1990)} + \beta_3 \text{average real growth rate} + \beta_4 \text{political polarization} + \beta_5 \text{average right-wing government} + \varepsilon$$

The results, reported in Table 1 with robust standard errors in parentheses, support the predictions of the model. The first column reports the base specification, including only the three main theoretical variables, and the two economic controls, lagged debt and average growth.

[Table 1 about here]

[24] We replicate the result shown as Table 8.7, column 6 "corrected" under "Errata_Corrige" at their website: www.igier.uni-bocconi.it/tabellini.

This base regression produces strong support for two of the three predictions in Proposition 1. Fiscal transparency is strongly associated with lower debt levels. Furthermore, political polarization and average frequency of right-wing governments both have the positive sign expected from our model. The latter is significant at the 99 percent level, but in the base regression, the former is not significant, *p*-value of .31. In terms of the other variables, we observe that average real growth has a powerful effect on fiscal performance. Higher levels of real growth are associated with lower levels of debt. Furthermore, the debt level observed in 1990 is strongly significant: unsurprisingly, countries that had high debt in 1990 are more likely to have high debt in 1999.

The second column of Table 1 includes political competition as a control. For simplicity, we present here only the case where competition enters in a linear way. (The quadratic specification yielded no significantly different results.) In column 2, a higher degree of political competition is significantly associated with lower debt, which is the opposite of predictions of the models in which debt is a strategic variable.[25] Furthermore, the inclusion of competition increases the significance of the polarization measure, now with a *p*-value of .101.

Because we do not have many observations, we first added all the potential explanatory variables discussed in the previous section to this model one-by-one. When we did so, we found significant effects (with sign) for the following: centralization (-), strength of the Minister of Finance (hereafter MoF) (-), average level of spending (-). No significant effects were found for the frequency of coalition government, federal countries, and all the other economic and demographic variables. Importantly, polarization and average right-wing government incumbency remained significant in most specifications and the fiscal transparency index did so in all 13 cases. The transparency coefficient varied across specifications from 2.33 to 4.05 with a standard error of 0.27, while its t-statistic varied from 1.88 to 4.39 with a standard error of 0.67.

When we add combinations of the one-by-one-significant variables to the specification in Table 1, column 2, only the average strength of MoF remained significant. The final model, in column 3, therefore includes only this in addition to the variables already included in column 2. In this specification, transparency, political competition, a stronger MoF, and real growth decrease debt, while political polarization, right-wing government, and higher lagged debt are

[25] Note, though, that the measure of political competition really is backward looking, while the Alesina-Tabellini model focuses on forward-looking replacement risk. We return to this issue in the next section.

associated with higher current government debt. Note that the inclusion of the MoF variable also leads to polarization being significant at the 95 % level. In sum, then, once other factors are controlled, we find support for all three conjectures in proposition 1.

To give a sense of the magnitude of the effect of fiscal transparency on debt, consider that the average transparency index value is 4.2. The difference between the index value of the average 'low transparency' country and the average 'medium transparency' country is almost 2. An average medium transparency country is therefore predicted, using the estimate from the final model in column three, to have a gross debt level that is about 4.8 percentage points lower than a low transparency country. Some caution needs to be exercised when interpreting the coefficients on an index variable, but the results are certainly suggestive of a positive relationship between fiscal transparency and debt reduction.[26] We also estimate sizeable effects for the other independent variables. A one standard-deviation increase in each of the three political variables (with percentage point effects in parentheses) yields the following: average incumbency of right-wing governments (+8.9), political polarization (+6.5) and average strength of MoF (-5.9).

5.2 An electoral cycle in debt

Is there an electoral cycle in the fiscal balance, and is it diminished where transparency is higher? The answer to both questions is apparently "yes". We replicate the Persson-Tabellini (2003) regression that includes dummy variables for the pre-election and post-election years. Consider the estimated effects of these last two variables. In terms of fiscal balance, the pre-election shift is expected to be negative and the post-election shift positive. The sum of (minus one times) the estimated coefficient of the former plus the coefficient of the latter is the total amount by which the surplus shrinks before *and* expands after the election, that is, the total amplitude of the electoral cycle in debt, if it exists. For example, in the results as shown "corrected" on their website, for 53 countries over up to 38 years, the pre-election dummy has an estimated coefficient of -.19 and the post-election coefficient is .42, so the magnitude of the "cycle" is –1*-.19 + .42, or .61.

Brender and Drazen (2003) argue that such a cycle is confined to newer democracies and is absent in OECD countries. We concur: in the subset of the data for the 19 OECD countries for which we have a transparency measure, the magnitude of the cycle is .4, two-thirds the value in

[26] The partial R^2 of transparency conditional on the control variables is .39.

the larger sample, and no longer statistically significant. When we interact higher and lower transparency with each of the two election year dummy variables, adding the interactions to the Persson -Tabellini specification (restricting the sample 1989-98, for 147 observations in 19 countries from 1989-98) gives the results shown in Table 2.

[Table 2 about here]

In this case, the estimated two-period effect across the electoral cycle in the lower transparency countries is -1* -.2344 + .975 = 1.21, while in the high transparency countries it is smaller and has the wrong sign (-.26). The estimated magnitude of the electoral cycle in lower transparency countries is nearly twice its estimated standard error.[27] For higher transparency countries and the resulting estimated cycle magnitude is half its estimated standard error. So we conclude that there is a statistically significant political business cycle in fiscal balance, in the last decade, in OECD countries, but the effect is confined to those with lower budget process transparency. It could indeed be that, in comparison with new democracies, the electoral cycle in debt is indeed smaller in OECD countries, where (consistent with the spirit of the Brender-Drazen conjecture) it is confined to countries with lower budget process transparency. For more details, see Alt and Lassen (2003).

For an idea of the importance of the estimated cycle effect, consider that the average absolute yearly change in the surplus/deficit is (coincidentally) 1.21. This is the same magnitude as the estimated effect of the cycle in low transparency countries. Since our measure of the cycle contains two average annual changes, the estimated electoral cycle in the lower transparency countries is half the size of the average absolute change in the surplus/deficit. That is a substantively as well as statistically significant effect.

5.3 Robustness issues

To see whether any individual items in the index were important to the cross-country results, we first replicated the regression of Table 1, column 1 eleven times with each item dropped from the index. The resulting coefficients on transparency vary from -2.24 to -2.80, with a standard deviation of 0.21. The *t*-statistics vary from -1.91 to -2.93, with a standard deviation of .31. We feel comfortable that the results do not depend strongly on the inclusion or exclusion

[27] Because the two parameter estimates are correlated, for the lower transparency countries, we generate a random variable with 10000 draws from a bivariate normal distribution with means equal to the estimates (-.2344, .975) and

of any particular item. We emphasize that throughout these searches, none of the omitted control variables, not Maastricht, not the legal tradition indicator, not even the level of spending, had any important independent effect on debt or qualitatively altered any of the transparency effects reported in Table 1. Indeed, the level of significance of that variable is never below 95 % is these specifications. The transparency result also remains significant if we substitute average yearly growth in debt as the dependent variable. We also included three regional dummies for Europe, Scandinavia and North America and found that these had no effect on the results. Finally, we could identify no outliers in the multivariate sample.

Regarding the fiscal cycle effects of transparency, we note that there are issues with estimating a specification that includes both fixed effects and a lagged dependent variable, and, therefore, we try a variety of alternative estimating procedures. Using a straightforward method of fixed effects regression with robust standard errors (Kedzi 2002) yields the same point estimate with test-statistic = 1.21 / .597 = 2.03. GMM re-estimation of the model[28] yields a test statistic for lower transparency countries' cycle of 1.10 / .56 = 1.93, and a robust GMM estimation yields 1.09 / .42 = 2.60, so changing estimation procedures changes nothing of substance in the results. The pattern of results remains qualitatively the same, but the size and precision of the estimates declines monotonically as the data are extended further and further back in time, since every earlier year is further from the time at which we measure transparency.

5.4 Endogeneity issues: competition and transparency

Above, we would like to believe that transparency has a causal effect on debt. However, anecdotal accounts of fiscal performance over the past decade suggest that enhancements to fiscal transparency are often part of a larger package of fiscal consolidation. When governments decide to tighten fiscal policy, they may try to improve fiscal transparency as well (for example, New Zealand in the early 1990s). Politicians who do "well" want to give voters a "better" look. So to some extent, governments that have a propensity to generate good fiscal performance are exactly the governments most likely to establish more transparent fiscal reporting. Then, fiscal transparency results from improved fiscal performance as well as causing it. Estimating this potential endogeneity of transparency requires identifying the relationship between

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a variance-covariance matrix equal to those of the estimates. This variable has mean 1.21 and standard deviation 0.64, so it is 1.89 times its standard error.

characteristics of the political system and variation in fiscal transparency. While time-series measures of transparency are unavailable, we can still make some progress on this issue.

Recall from above that transparency improves expected welfare. However, as Alesina and Perotti (1996, p. 403) note, "… politicians typically do not have an incentive to adopt the most transparent practices." Can we identify situations where politicians will implement transparent budget procedures? We argue that just as "political institutions constitute *ex ante* agreements over cooperation among politicians" (North 1990, p. 191), fiscal institutions allow cooperation towards desired fiscal outcomes by competing political parties. North's suggestion is to look at parties behind the veil of uncertainty about the identity of future office holders.

Parties, not knowing the ability of future candidates, or the identity of future office holders, will cooperate on increasing transparency as long as they find it equally likely that either party will be in government in the future.[29] On the other hand, if one party thinks it is more likely that it will be in office in the next period, it is less likely to improve transparency, as this would make it more likely that a less able party incumbent would be ousted from office, and vice versa. Accordingly, if there is frequent political turnover it could be in the interests of all parties to implement transparent budget institutions with the aim of decreasing opportunistic behaviour and debt accumulation in political equilibrium. On the other hand, a dominant incumbent in a non-competitive political system will not be as concerned about a political opponent's opportunism, as this opponent is unlikely to be in power much if at all.

While (expected) political competition can be hard to measure, also for parties themselves, past turnover is often used as an indicator for future electoral competition.[30] Therefore, we expect fiscal transparency to be higher where competition, measured by past turnover, is higher. The data support this. Figure 3 reveals a positive relationship between political competition and the transparency index, in particular if correcting for New Zealand.[31]

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[28] Kedzi's method is implemented in STATA as *areg* with *robust* option. GMM estimation was done with Stata's *xtabond* procedure.

[29] In a similar vein, Hanssen (2001) argues (and provides empirical evidence) that more politically competitive American states choose more independent judiciaries.

[30] Byers, Davidson and Peel (2000) document mean reversion in aggregate vote shares for a number of countries. Therefore, past political competition over a long time-horizon can be used as a proxy for future competition.

[31] Transparency in New Zealand is thus much higher than its history of political competition would predict. However, the increased transparency followed a change in government in 1990, when the new incumbent found a big undisclosed obligation that prevented it from carrying out its election promises (Campos and Pradhan 1999).

Non-competitive countries such as Italy and Japan have relatively non-transparent procedures, whereas more competitive countries tend to have more transparent procedures.[32]

[Figure 3 about here]

Furthermore, greater transparency may come about if other political actors demand it. We have not included institutional detail in modeling government budget decisions, to keep the analysis tractable, but following this logic we would expect transparency to be higher where there is the possibility of divided government.[33] In that case the legislature could demand more transparency from the executive (and vice versa). Divided government can occur, but does not always do so, in presidential systems. Therefore, we also conjecture that presidential systems should exhibit more transparency. We also allow for the possibility that common law countries have more a more pro-market emphasis (La Porta et al., 1999) and thus more transparent budget institutions

To sum this up, observed pattern of transparency should depend on political competition (though with a correction for New Zealand), presidential vs. parliamentary systems, and legal tradition (common law vs. civil law countries). The impact of these variables on budget transparency is interesting in its own right. Moreover, estimating this relationship also enables us to correct for possible endogeneity with respect to the transparency index in the equation estimated above by including the endogenous (or, alternatively, the historical) debt variable as an explanatory variable for transparency. Accordingly, we estimate the following two-equation system by two- and three-stage least squares:

$$\text{Fiscal transparency index} = \gamma_0 + \gamma_1 \text{political competition index} + \gamma_2 \text{debt level} + \gamma_3 \text{common law} + \gamma_4 \text{New Zealand dummy} + \gamma_5 \text{presidential system} + \nu$$

$$\text{Debt} = \beta_0 + \beta_1 \text{fiscal transparency index} + \beta_2 \text{debt level (1990)} + \beta_3 \text{average real growth rate} + \beta_4 \text{political polarization} + \beta_5 \text{average right-wing government} + \beta_6 \text{political competition index} + \beta_7 \text{average strength of MoF} + \varepsilon$$

[32] This relationship between political competition and fiscal transparency also obtains with respect to the von Hagen (1992) fiscal transparency index.

The results are reported in Tables 3 and 4, where robust small-sample corrected standard errors are reported in parentheses. These results also provide strong support for our conjectures. First, consider the results reported in Table 3, two-stage least squares estimates of the specifications in Table 1. The estimated effects of transparency are very close to, though slightly smaller than, the estimates obtained by OLS. The table also reports the first-stage regression *F*-test statistic for the excluded instruments. Its magnitude suggests that the instruments do well in explaining variation in transparency. The *J*-statistic associated with a test for overidentification of the instrumented variable that is reported in the first column suggests that this equation is in fact overidentified. This is the result (referred to above) that suggested including political competition in the debt equations. The results reported in Table 3 do not in fact depend on the particular set of instruments. Excluding any of the four instruments does not invalidate the results regarding transparency, but does of course make the instruments somewhat weaker.

[Table 3 about here]

Does the debt level have an effect on the degree of transparency? To find out, we estimate the full simultaneous system by three-stage least squares. These results are reported in Table 4. First, consider system (I) where the debt variable possibly influencing the level of transparency is the debt level in 1990. Hence, the system is recursive. Overall, the results are broadly similar to the OLS results reported above in the third column of Table 1. In this specification, all variables are significant at the 95 % level.

[Table 4 about here]

The second column reports results from estimating fiscal transparency. Political competition is correctly signed (positive for transparency) and just significant at the 90 % level. This suggests that more competitive political systems have more transparent budget processes, correcting for the (significant) outlier New Zealand. Lagged debt enters with a negative sign, but is nowhere near significant. Both the common law dummy and the dummy for presidential systems have positive and significant effects on the prevalence of transparent budget procedures. In system (II) in Table 4, we include the current debt level in the estimating equation for transparency. Once again, the results are similar to those reported above. Current debt affects

[33] We thank Ken Shepsle for this observation. Another possibility is that international organization could influence budgetary procedures, such as participation in the European Monetary Union. We find no effect on the prevalence of transparent procedures of including a dummy for Maastricht Treaty participation.

transparency positively, but, as above, this is not a statistically significant effect. The inclusion of a variety of other control variables (not shown) does not affect these main results.

6. Conclusion

We believe this paper provides a new, persuasive account of some effects of fiscal transparency. We obtained predictions about the effect of fiscal transparency, political polarization, and partisan government on government debt and deficits. The predictions that fiscal transparency leads to substantially lower deficits and debt accumulation in many cases received solid empirical support. Robust findings are reported in which there is a negative relationship between a fiscal transparency index and debt levels. Within our sample of OECD countries, lower transparency is also associated with a markedly larger electoral cycle in issuing debt. These results suggest that increasing fiscal transparency is an important element of improving fiscal performance, and that fiscal institutions really do affect fiscal outcomes.

We further claim that incumbents in reasonably competitive political systems have incentives to establish fiscal transparency. This argument receives some support in the data. We show that politically competitive countries (correcting for the outlier New Zealand) and, in general, common law countries and presidential systems have more transparent institutions, and we use these estimates to correct for possible endogeneity of transparent institutions in explaining debt accumulation. Accounting for such endogeneity confirms the earlier results.

Under what circumstances does increased transparency increase voter welfare? In our agency model, increasing transparency leads to reduced use of deficit finance. This unambiguously improves voter welfare, since deficit finance is assumed not valuable to voters. However, the effect of transparency on voter welfare is fundamentally ambiguous in political agency models that combine adverse selection and moral hazard (Besley 2003, based on Besley and Smart 2003). In these models greater transparency reduces the incentives of "bad" (venal or incompetent) incumbents to mimic good ones, and this has costs in the short run. Against this must be set "screening benefits", the fact that with greater transparency it is easier to identify and kick out bad incumbents.

Transparency, that is, how far debt cannot be hidden from the public, plays a key role. In our model, voters can end up paying for the short run re-election efforts of incumbents to the extent these are in the form of debt that they repay in the future. By contrast, perfect

transparency, that is perfectly observable debt, creates a situation where an incumbent pays for her own efforts at getting re-elected, that is, enjoys less rent from being in office. Incumbents have to make personal sacrifices to be re-elected, so the Besley/Smart results apply. In the opposite limiting case where debt is perfectly unobservable, all re-election effort by incumbents is shifted to voters in future, and improved discipline by incumbents is not relevant. Then all that matters is whether screening benefits are positive. But this is unambiguously true with greater transparency so transparency must be welfare improving (which is our result).

We show here why and how fiscal transparency can reduce the level of debt. We have not yet isolated the effect of transparency on fiscal scale (spending), net of its effect on debt, and cannot say with confidence what effect it has. In the context of the US states, we showed empirically that fiscal transparency increased the scale of government, consistent with Ferejohn's model of transparency and accountability, but had no effect on deficit finance, probably due to the frequent presence of balanced budget constraints (Alt, Lassen and Skilling 2002). One reason for the conflicting results regarding spending is that the effect of transparency on spending could be non-linear, such that increasing transparency will increase the level of spending if this is “too low” due to mistrust in the government, while it will decrease spending if for some reason spending exceeds the “optimal” level. Extending this logic, one could imagine increasing transparency leading to increased spending in developing countries, while implying lower spending in developed welfare states.

Many further questions remain. Does transparency also affect political outcomes like turnout (that is, do people vote more where they have better information)? Does it affect incumbency advantage (does information monopoly reduce turnover)? Is retrospective voting more common where transparency is high? Are some of the government accounting conventions we analyze just taken from or reflections of private sector accounting practices, which have been shown to differ substantially across countries (La Porta, Lopez-de-Silanes and Shleifer, 2002)? These questions, and the relationship between different models of fiscal transparency and fiscal outcomes, will be dealt with further in future papers.

References

Alesina, Alberto, Ricardo Hausmann, Rudolf Hommes, and Ernesto Stein. 1999. "Budget Institutions and Fiscal Performance in Latin America." *Journal of Development Economics* 59, 233-253.

Alesina, Alberto and Roberto Perotti. 1996. "Fiscal Discipline and the Budget Process." *American Economic Review* 86, 401-407.

Alesina, Alberto and Roberto Perotti. 1999. "Budget Deficits and Budget Institutions," in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

Alesina, Alberto, and Guido Tabellini. 1990. "A Positive Theory of Budget Deficits and Government Debt." *Review of Economic Studies* 57, 403-414.

Alt, James E., David Dreyer Lassen and David Skilling. 2002. "Fiscal Transparency, Gubernatorial Popularity, and the Scale of Government: Evidence from the States," *State Politics and Policy Quarterly* 2, 230-250.

Alt, James E. and David Dreyer Lassen. 2003. "The Electoral Cycle in Debt is Where You Can't See It." Working paper.

Beck, Thorsten, George Clark, Alberto Groff, Philip Keefer and Patrick Walsh. 2000. "New Tools and New Tests in Comparative Political Economy: The Database of Political Institutions." *World Bank Working Paper* no. 2283, February.

Besley, Timothy. 2003. *Principled Agents? Motivation and Incentives in Government*. Forthcoming, Oxford University Press.

Besley, Timothy and Andrea Prat. 2001. "Handcuffs for the Grabbing Hand: Media Capture and Government Accountability." Manuscript, LSE, November.

Besley, Timothy and Michael Smart. 2003. "Fiscal Restraints and Voter Welfare." Manuscript, LSE, October.

Budge, Ian, Hans Keman, and Jaap Woldendorp. 1993. "Political Data 1945-1990: Party government in 20 democracies." *European Journal of Political Research* 24, 1-107.

_____. 1998. "Party government in 20 democracies: an update (1990-1995)." *European Journal of Political Research* 33, 1-38.

Byers, David, James Davidson, and David Peel. 2000. "The Dynamics of Aggregate Political Popularity: Evidence from Eight Countries." *Electoral Studies* 19, 49-62.

Campos, J. Edgardo and Sanjay Pradhan. 1999. "Budgetary Institutions and the Levels of Expenditure Outcomes in Australia and New Zealand," in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

de Haan, Jakob, Wim Moessen, and Bjorn Volkerink. 1999. "Budgetary Procedures – Aspects and Changes: New Evidence for Some European Countries," in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

Djankov, Simeon, Caralee McLiesh, Tatiana Nenova and Andrei Shleifer. 2002. "Who Owns the Media?" *Journal of Law and Economics*, forthcoming.

Easterly, William. 1999. "When is fiscal adjustment an illusion?" *Economic Policy* April, 57-76.

Faust, Jon and Lars E. O. Svensson. 2001. "Transparency and Credibility: Monetary Policy with Unobservable Goals." *International Economic Review* 42, 369-97.

Ferejohn, John. 1999. "Accountability and Authority: Towards a Model of Political Accountability," in A. Przeworski, B. Manin and S. C. Stokes (eds.), *Democracy, Accountability, and Representation*, New York: Cambridge University Press.

Franzese, Robert J. Jr. 1998 "The Positive Political Economy of Public Debt: An Empirical Examination of the OECD Postwar Experience." University of Michigan, mimeo.

Hall, Peter, and Rosemary Taylor. 1996. "Political Science and the Three New Institutionalisms" *Political Studies* 936-957.

Hallerberg, Mark and Jürgen von Hagen. 1997. "Electoral Institutions, Cabinet Negotiations, and Budget Deficits within the European Union." *CEPR* Discussion Paper 1555.

Hallerberg, Mark, Rolf Strauch, and Jürgen von Hagen. 2001. "The Use and Effectiveness of Budgetary Rules and Norms in EU Member States." Report prepared for the Dutch Ministry of Finance.

Hallerberg, Mark, Lucio Vinhas de Souza, and William Clark. 2002. "Political Business Cycles in EU Accession Countries." *European Union Politics* 3(2): 231-50.

Hanssen, F. Andrew 2001. "Is There a Politically Optimal Degree of Judicial Independence?" Manuscript, Montana State University.

Jensen, Henrik. 2002. "Optimal Degrees of Transparency in Monetary Policymaking." *Scandinavian Journal of Economics* 104, 399-422.

Kedzi, Gabor. 2002. "Robust Standard Error Estimation in Fixed Effects Panel Models" at http://www.econ.lsa.umich.edu/~kezdi/FE-RobustSE-2002-feb.pdf .

Kontopoulos, Yianos and Roberto Perotti. 1999. "Government Fragmentation and Fiscal Policy Outcomes," in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

Kopits, George, and Jon Craig. 1998. "Transparency in Government Operations," IMF Occasional Paper 158.

Lambertini, Luisa. 2000. "Are Budget Deficits Used Strategically?" Working paper, UCLA, March.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. "What Works in Securities Laws?" Working paper, Harvard University, October.

La Porta, Rafael, Florencio Lopes-de-Silanes, Andrei Shleifer and Robert W. Vishny. 1999. "The Quality of Government." *Journal of Law, Economics and Organization* 15, 222-279.

Laver, Michael and W. Ben Hunt. 1992. *Policy and Party Competition*. New York: Routledge.

Lowry, Robert C., James E. Alt, and Karen E. Ferree. 1998. "Fiscal Policy Outcomes and Electoral Accountability in American States." *American Political Science Review* 92, 759-774.

Milesi-Ferretti, Gian Maria. Forthcoming. "Good, Bad or Ugly? On The Effects of Fiscal Rules with Creative Accounting." *Journal of Public Economics*.

Nadeau, Richard, Richard Niemi, and Antoine Yoshinaka, 2002. "A Cross-national Analysis of Economic Voting: Taking Account of the Political Context Across Time and Nations." *Electoral Studies* 21, 403-423.

North, Douglass C. 1990. “Institutions and a transaction-cost theory of exchange,” in J. E. Alt and K. A. Shepsle (eds.), *Perspectives on Positive Political Economy*, Cambridge University Press.

OECD. 1995. *Budgeting for Results: Perspectives on Public Expenditure Management*, Paris.

OECD. 1998. *Survey of Budgeting Developments – Country Responses*, PUMA/SBO(98)3/ANN.

OECD. 2001. *OECD Best Practices for Budget Transparency.* PUMA/SBO(2000)6/FINAL, May.

Paldam, Martin. 1991. “How Robust is the Vote Function? A Study of Seventeen Nations over Four Decades,” in H. Norpoth, M. Lewis-Beck and J.-D. Lafay (eds.) *Economic and Politics: The Calculus of Support,* Ann Arbor: University of Michigan Press.

Persson, Torsten, and Lars E. O. Svensson. 1989. “Why a Stubborn Conservative Would Run a Deficit; Policy with Time Inconsistent Preferences.” *Quarterly Journal of Economics* 104, 325-346.

Persson, Torsten, and Guido Tabellini. 2000. *Political Economics: Explaining Economic Policy*, MIT Press.

Persson, Torsten, and Guido Tabellini. 2003. *The Economic Effect of Constitutions*. MIT Press.

Poterba, James, and Jürgen von Hagen. 1999. “Introduction,” in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance,* University of Chicago Press.

Powell, G. Bingham and Guy Whitten. 1993. “A Cross-national Analysis of Economic Voting: Taking Account of the Political Context.” *American Journal of Political Science* 37, 391-414.

Rodden, Jonathan and Erik Wibbels. 2002. “Beyond the Fiction of Federalism: Macroeconomic Management in Multitiered Systems.” *World Politics* 43(4): 494-531.

Rogoff, Kenneth. 1990. “Equilibrium Political Business Cycles.” *American Economic Review* 80, 21-36.

Shi, Min and Jakob Svensson. 2002. “Conditional Political Budget Cycles.” Manuscript, IIES, Stockholm, October.

Skilling, David. 2001. “The Debt of Nations: A Deficit of Democracy.” Dissertation chapter, Harvard University, March.

Skilling, David, and Richard J. Zeckhauser. 2002. “Political Competition and Debt Trajectories in Japan and the OECD.” *Japan and the World Economy* 14, 121-35.

Stasavage, David. 2003. “Transparency, Democratic Accountability, and the Economic Consequences of Monetary Institutions.” *American Journal of Political Science* 47, 389-403.

Tanzi, Vito, and Ludger Schuknecht. 2000. *Public Spending in the 20th Century: A Global Perspective*, Cambridge University Press.

Tsebelis, George. 2002. *Veto Players: How Political Institutions Work and Why*. Princeton: Princeton University Press.

Volkerink, Bjorn and Jakob de Haan. 2001. “Fragmented Government Effects on Fiscal Policy: New Evidence.” *Public Choice* 109: 221-42.

von Hagen, Jürgen. 1992. “Budgeting Procedures and Fiscal Performance in the European Community.” *EEC Economic Papers* 96.

Wright, Maurice. 1999. “Coping with Fiscal Stress: Illusion and Reality in Central Government Budgeting in Japan, 1975-1997,” in J. M. Poterba and J. von Hagen (eds.) *Fiscal Institutions and Fiscal Performance*, University of Chicago Press.

Table A.1. Descriptive statistics for included explanatory variables

Variable	mean	std. dev.	min	max
Gross debt	67.1	28.8	26.8 (NOR)	128.0 (ITA)
Transparency index	4.2	2.5	0 (JPN)	11 (NZL)
Political competition	0.39	0.18	0 (CHE)	.65 (NLD)
Debt, 1990	57.1	29.0	14.4 (FIN)	125.7 (BEL)
Average growth	2.4	1.3	.8 (CHE)	7.1 (IRL)
Average right wing gov.	0.43	0.37	0	1
Political polarization	4.7	1.1	2.18 (NZ)	6.63 (USA)
Average MoF strenght	0.23	0.42	0	1
Presidential regimes	0.11	0.32	0	1
Common law regimes	0.32	0.48	0	1

Table 1

Multiple Regression of Transparency and Debt

	Gross debt	Gross debt	Gross debt
Transparency Index	-4.255**	-3.09**	-2.338**
	(1.574)	(1.159)	(0.915)
Political Polarization	2.845	5.20	5.750**
	(2.686)	(2.908)	(2.016)
Average right-wing government	15.994***	15.50**	23.913***
	(5.081)	(6.902)	(5.669)
Gross debt (1990)	0.659***	0.49***	0.402***
	(0.073)	(.091)	(0.086)
Average real growth	-12.805***	-10.17***	-9.827***
	(2.108)	(1.867)	(1.828)
Political competition		-56.97*	-68.164***
		(26.090)	(21.443)
Average MoF strenght			-13.648***
			(3.997)
N	18	18	18
R^2	0.88	0.92	0.94

Robust standard errors are in parentheses. Variables that are significant at the 90% level are denoted by *, at the 95% level by **, and at the 99% level by ***. A constant term was included in all regressions, but is not reported.

Table 2: Electoral Cycle in Surplus/Deficit

	Coefficient	Std. error
Higher transparency countries		
Pre-election	-.0419	.455
Post-election	-.3009	.437
Lower transparency countries		
Pre-election	-.2344	.564
Post-election	.9750	.607

Note: N = 147, country groups = 19. Estimation by Stata's *xtreg*. Dependent variable is annual central government fiscal surplus/deficit. Controls (omitted from table) include lagged values of surplus/deficit, the output gap, logged per capita income, trade dependence, age structure of the population, interactions with presidentialism and majoritarianism, and a full set of fixed effects. Included in the table are dummy variables for the pre-election and post-election years interacted with higher (11 countries with index 4 or more) and lower (eight countries with index 3 or less) transparency. Data from Persson and Tabellini (2003).

Table 3

Two-stage least squares estimation of Transparency and Debt

	Gross debt	Gross debt	Gross debt
Transparency Index	-4.005**	-2.609**	-2.139**
	(1.255)	(0.992)	(0.764)
Political Polarization	2.962	5.562*	5.896**
	(2.662)	(2.763)	(1.915)
Average right-wing government	15.691***	14.972*	24.017***
	(5.147)	(7.194)	(5.741)
Gross debt (1990)	0.662***	0.488***	0.397***
	(0.071)	(0.095)	(0.088)
Average real growth	-12.805***	-9.977***	-9.748***
	(2.135)	(1.871)	(1.814)
Political competition		-61.069**	-70.009***
		(26.577)	(20.462)
Average MoF strenght			-14.118***
			(4.384)
N	18	18	18
Centered R^2	0.88	0.92	0.94
F-statistic first stage	18.36	18.36	27.13
(p-value)	(0.000)	(0.000)	(0.000)
J-statistic	6.935	3.372	1.590
(p-value)	(0.074)	(0.185)	(0.452)

Estimated using STATA IVREG2. Robust, small-sample corrected standard errors are in parentheses. Variables that are significant at the 90% level are denoted by *, at the 95% level by **, and at the 99% level by ***. Instruments: As reported in text. A constant term was included in all regressions, but is not reported.

Table 4: Systems estimation of Transparency and Debt

	System I		System II	
	Gross debt	Transparency index	Gross debt	Transparency index
Transparency Index	-2.128**		-2.096**	
	(.899)		(.898)	
Political Polarization	5.895***		5.889***	
	(1.885)		(1.884)	
Average right-wing government	23.857***		23.333***	
	(6.173)		(6.168)	
Gross debt, lagged§	0.398***	-.003	0.401***	0.007
	(.087)	(.011)	(.086)	(.018)
Average real growth	-9.800***		-9.925***	
	(1.543)		(1.543)	
Average MoF strength	-14.017**		-13.701**	
	(5.635)		(5.629)	
Political competition	-69.802***	3.739*	-69.515***	5.103
	(17.097)	(2.088)	(17.092)	(3.137)
Presidential system		2.881**		2.777**
		(1.265)		(1.291)
Common law		1.537**		1.578**
		(.672)		(0.680)
New Zealand dummy		6.457***		6.635***
		(1.285)		(1.374)
N	18	18	18	18
F	39.3	12.9	39.2	12.7
R^2	0.94	0.78	0.94	0.78

The small-sample corrected standard errors are in parentheses. Variables that are significant at the 90%, 95% and 99 % level, respectively, by *, **, and ***. Note that R^2 does not have its usual interpretation IV-models. A constant term was included in all regressions, but is not reported.

§ The lagged debt variable is gross debt in 1990 in the debt equations, while in the transparency equations it is gross debt in 1990 in system I, and gross debt in 1999 in system II.

Figure 1: Fiscal Transparency Index

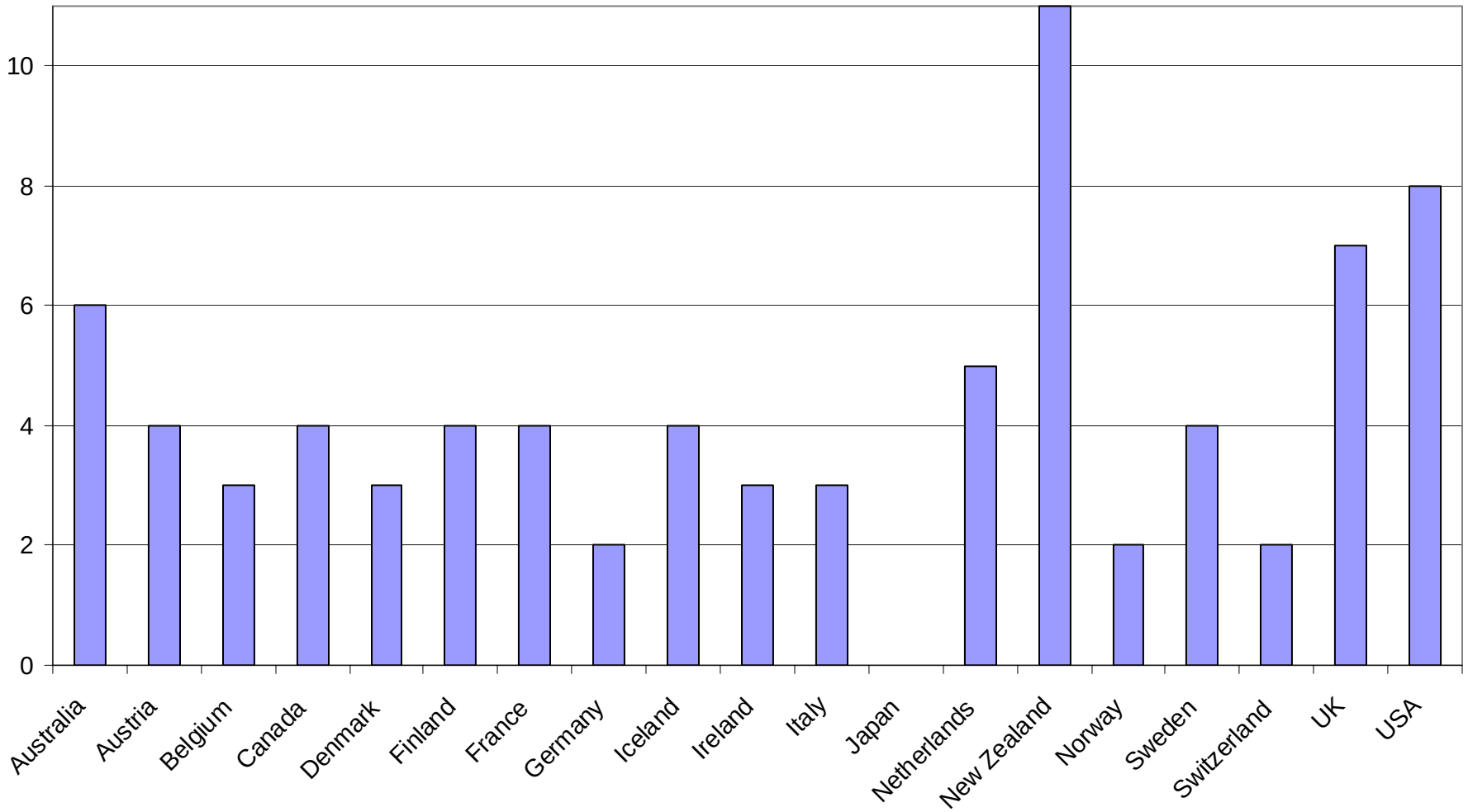


FIGURE 2

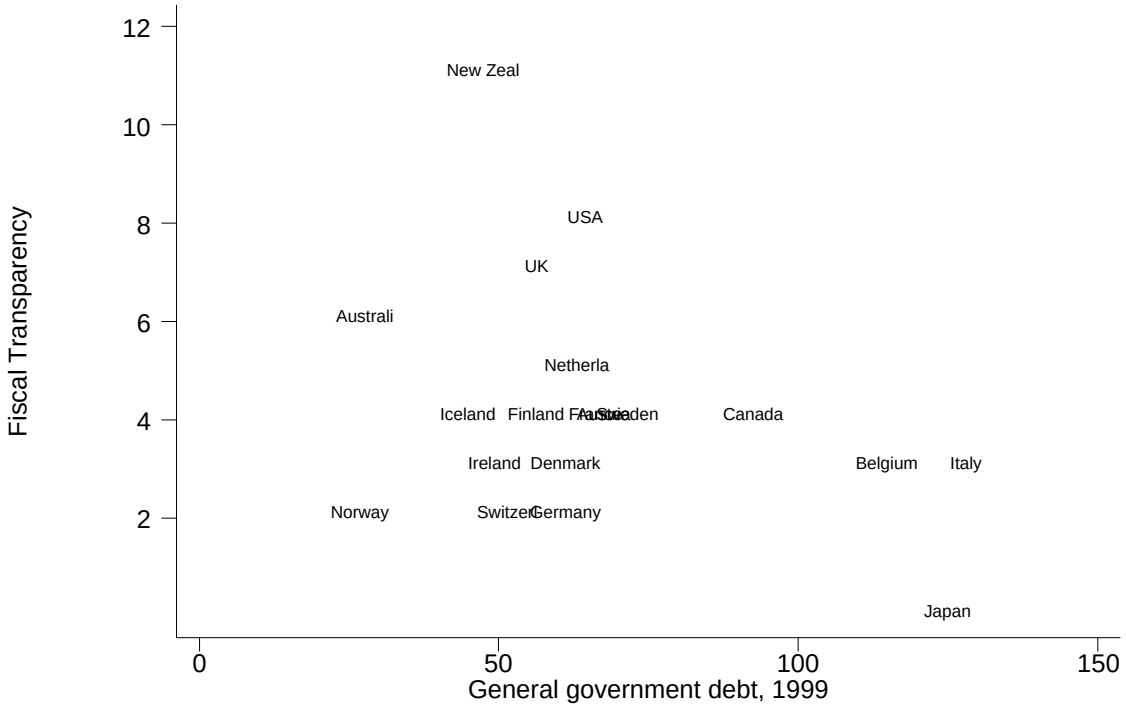
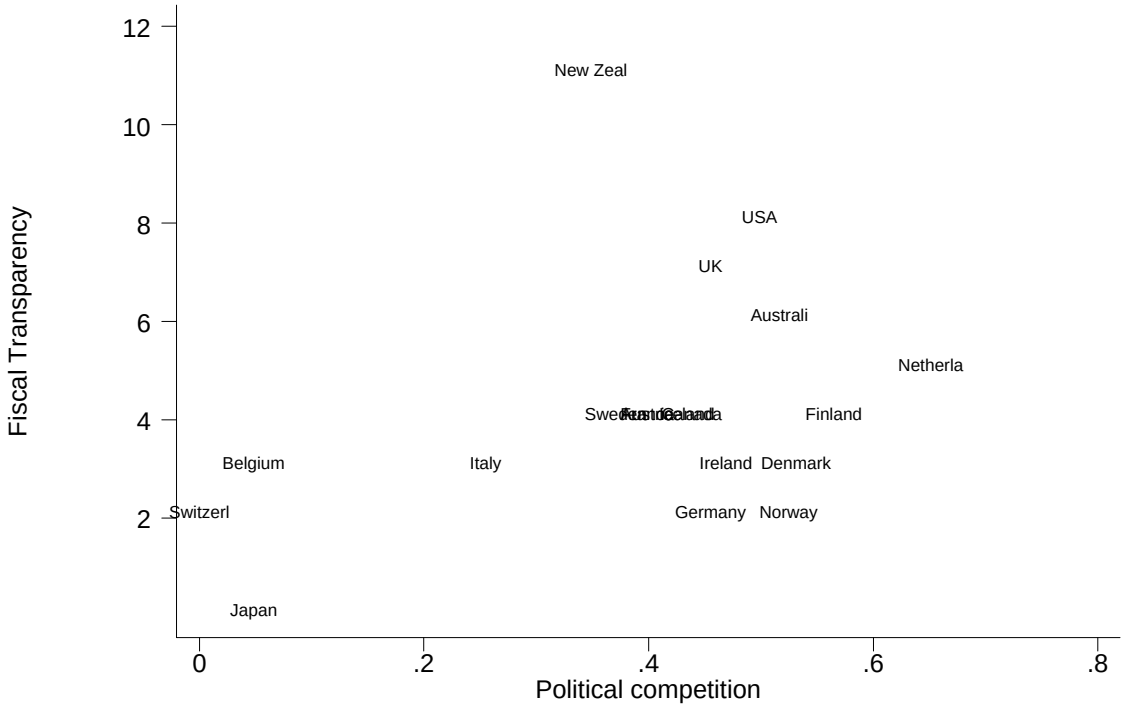

Fiscal Transparency
12
10
8
6
4
2
0
50
100
150
General government debt, 1999
New Zeal
USA
UK
Australi
Netherla
Iceland
Finland
Canada
Ireland
Denmark
Belgium
Italy
Norway
Switzer
Germany
Japan

FIGURE 3


Fiscal Transparency
12
10
8
6
4
2
New Zeal
USA
UK
Australi
Netherla
Finland
Belgium
Italy
Ireland
Denmark
Switzerl
Germany
Norway
Japan
0
.2
.4
.6
.8
Political competition

FISCAL TRANSPARENCY, POLITICAL PARTIES, AND DEBT IN OECD COUNTRIES

MODEL APPENDIX

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This appendix supplements the presentation of the model presented in the main text. It presents the key derivations and a proof for proposition 1; for motivation of the model set-up, please see the main text.

Model set-up

The economy consists of voters and political parties. Each voter *i* has preferences

$$U_t^i = g_t + \alpha^i u(c_t).$$

Private consumption is given by private budget constraint $c_t = y - \tau_t$ where y is exogenous. α is assumed to be uniformly distributed on $[1-1/2\xi, 1+1/2\xi]$ with expected and median value equal to one and density ξ. Public goods production is provided by politicians, organized in two parties, *A* and *B*. Each party $j \in \{A, B\}$ has preferences

$$V_t^j = g_t + \alpha^j u(c_t) + \chi.$$

The production of public goods takes place under the budget constraint

$$g_t = \tau_t + d_t - D(d_{t-1}) + \eta_t^j$$

where we assume that η is a moving average of shocks to ability in the current and previous period, such that

$$\forall t \; \eta_t^j = \mu_t^j + \mu_{t-1}^j, \; j \in \{A, B\}.$$

We assume that μ is distributed according to the distribution function *F* with mean zero and is serially uncorrelated.

Elections take place every other period. The timing of the model is as follows: At the beginning of an election period, *t*, the incumbent observes past debt and past ability. At this point, the incumbent chooses policy (τ, d). Thereafter, current competence, a function of past and current ability, is realized and with it the outcome *g*. Based on observables τ and *g*, and given the degree of transparency, voters form expectations about the ability of the current incumbent. Finally, elections take place on whether to keep the incumbent or replace him with a candidate of unknown ability from the other party.

If there is no asymmetric information such that voters always observes the true debt level, there is no scope for influencing voter beliefs and, hence, it will be optimal not to issue debt. In that case the optimal choice of a party *j* incumbent becomes

$$\hat{\tau}^j \equiv \hat{\tau}_t^j = y - u_c^{-1}\left(1/\alpha^j\right).$$

Naturally, the preferred tax level depends on the identity of the office holder. Realized spending is

$$g_t^j = \hat{\tau}^j + \eta_t^j.$$

Voting

Consider a party *A* incumbent. From the observation of public goods provision in the first period, the electorate forms expectations regarding the incumbent's ability, $E_t\left(\mu_t^A\right)$. Therefore, the expected levels of taxation and public goods provision in the second period are

$$\tau^A = \hat{\tau}^A$$
$$E_t\left[g_{t+1}^A\right] = \hat{\tau}^A - E_t\left[D\left(\hat{d}_t^A\right)\right] + E_t\left[\mu_t^A\right]$$

where $\hat{d}_t^A$ is the solution to the incumbent's first-period maximization problem (which will be solved below). A voter *i* will prefer the incumbent *A* to the challenger *B*, about whom the electorate has no information, iff

$$E_t\left[U_{t+1}^i(A)\right] = \left(\hat{\tau}^A - E_t\left[D\left(\hat{d}_t^A\right)\right] + E_t\left[\mu_t^A\right]\right) + \alpha^i u\left(y - \hat{\tau}^A\right) \geq$$
$$E_t\left[U_{t+1}^i(B)\right] = \left(\hat{\tau}^B - E_t\left[D\left(\hat{d}_t^A\right)\right]\right) + \alpha^i u\left(y - \hat{\tau}^B\right)$$

which reduces to

$$E_t\left[\mu_t^A\right] \geq \gamma^i \equiv \alpha^i\left[u\left(y - \hat{\tau}^B\right) - u\left(y - \hat{\tau}^A\right)\right] - \left(\hat{\tau}^A - \hat{\tau}^B\right).$$

Invoking the distributional assumption, incumbent *A* can calculate his expected share of votes, V^A, as

$$V^A\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) = \Pr\left\{E_t\left[\mu_t^A\right] \geq \alpha^i\left[u\left(y - \hat{\tau}^B\right) - u\left(y - \hat{\tau}^A\right)\right] - \left(\hat{\tau}^A - \hat{\tau}^B\right)\right\}$$
$$= \frac{1}{2} + \frac{\xi}{u\left(y - \hat{\tau}^B\right) - u\left(y - \hat{\tau}^A\right)} E_t\left[\mu_t^A\right] - \frac{\xi}{u\left(y - \hat{\tau}^B\right) - u\left(y - \hat{\tau}^A\right)} \gamma^m. \quad (1)$$

where γ^m is γ^i for $\alpha^i = 1$; i.e. the utility gain for the median voter from seeing platform *B* implemented instead of platform *A*.

With probability *p*, voters observe the current debt level d_t and are thus able to calculate incumbent competence η_t^A before the election. With probability $1-p$ voters observe nothing and must form an estimate $\tilde{d}_t$ on the basis of observables τ_t and g_t.

In the case of full disclosure, voters can determine incumbent *A*'s competence as

$$\mu_t^A = g_t^A - \hat{\tau}^A - d_t - \mu_{t-1}^A$$

while in the case of no disclosure, they form an estimate $\tilde{\mu}_t^A$ on their basis of their estimate of the current debt level $\tilde{d}_t$ according to

$$\tilde{\mu}_t^A = g_t^A - \hat{\tau}^A - \tilde{d}_t - \mu_{t-1}^A = \mu_t^A + \left(d_t - \tilde{d}_t\right).$$

The probability that incumbent *A* wins the election is the probability that the *expected* vote share, over full and no information, is greater than one half. Inserting the values of μ_t^A and $\tilde{\mu}_t^A$ into (1) yields

$$\rho\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) = \Pr\left\{ p\left(\frac{1}{2} + \frac{\xi}{u\left(y-\hat{\tau}^B\right) - u\left(y-\hat{\tau}^A\right)}\left(\mu_t^A - \gamma^m\right)\right)\right.$$
$$\left. + (1-p)\left(\frac{1}{2} + \frac{\xi}{u\left(y-\hat{\tau}^B\right) - u\left(y-\hat{\tau}^A\right)}\left(\mu_t^A + d_t - \tilde{d}_t - \gamma^m\right) \geq \frac{1}{2}\right)\right\}$$

which yields reduces to

$$\rho\left(\mu_t^A, \hat{\tau}^A, \hat{\tau}^B\right) = 1 - F\left((1-p)\left(\tilde{d}_t - d_t\right) + \gamma^m\right).$$

Equilibrium

Incumbent *A* aims to maximize expected utility and has at his disposal two policy instruments, taxes and debt. As shown above, the incumbent's optimal tax rate $\hat{\tau}^A$ is a function only of his relative preferences for public goods, expressed by α^A. Therefore, we can take $\hat{\tau}^A$ (and $\hat{\tau}^B$) as given when considering the incumbent's optimal choice of debt. The maximization problem becomes

$$\begin{aligned}\max_{d_t \geq 0} \Phi^A &= E_t[\hat{\tau}^A + d_t + \eta_t^A + \alpha^A u\left(y - \hat{\tau}^A\right) + \chi \\ &+ \left[1 - F\left(\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right)\right]\left[\hat{\tau}^A - D\left(d_t\right) + \eta_{t+1}^A + \alpha^A u\left(y - \hat{\tau}^A\right) + \chi\right] \\ &+ F\left(\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right)\left[\hat{\tau}^B - D\left(d_t\right) + \eta_{t+1}^B + \alpha^A u\left(y - \hat{\tau}^B\right)\right]].\end{aligned} \tag{2}$$

The first order condition for the incumbent's optimal choice is

$$\begin{aligned}&E_t\left[1 + \left(1-p\right)F'\left[\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right]\left(\hat{\tau}^A - D\left(d_t\right) + \eta_{t+1}^A + \alpha^A u\left(y - \hat{\tau}^A\right) + \chi\right)\right. \\ &-\left(1 - F\left[\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right]\right)D'\left(d_t\right) \\ &-\left(1-p\right)F'\left[\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right]\left(\hat{\tau}^B - D\left(d_t\right) + \eta_{t+1}^B + \alpha^A u\left(y - \hat{\tau}^B\right)\right) \\ &\left.-F\left[\left(1-p\right)\left(\tilde{d}_t - d_t\right) + \gamma^m\right]D'\left(d_t\right)\right] = 0,\end{aligned}$$

which can be simplified to

$$1 + f\left(\left(1-p\right)\left(\tilde{d}_t^A - d_t\right) + \gamma^m\right)\left(1-p\right)\left(\chi - \gamma^A\right) - D'\left(d^A\right) = 0$$

and, using that expectations must be correct in equilibrium ($d_t = \tilde{d}_t \equiv d^A$), be written as

$$1 + f\left(\gamma^m\right)\left(1-p\right)\left(\chi - \gamma^A\right) - D'\left(d^A\right) = 0, \tag{3}$$

where $\gamma^A < 0,$ and $f = F'$.

Proof of Proposition 1:

(1) Total differentiation of (3) with respect to p and d^A yields

$$\begin{aligned}&-f\left(\gamma^m\right)\left(\chi - \gamma^A\right)dp - D''\left(d^A\right)dd^A = 0 \Leftrightarrow \\ &\frac{dd^A}{dp} = \frac{-f\left(\gamma^m\right)\left(\chi - \gamma^A\right)}{D''\left(d^A\right)} < 0\end{aligned}$$

since D is strictly convex.

(2) Total differentiation of (3) with respect to $\alpha^D \equiv \alpha^A - \alpha^B$ and d^A yields

$$f'\left(\gamma^m\right)(1-p)\left(\chi-\gamma^A\right)\frac{\partial\gamma^m}{\partial\alpha^D}d\alpha^D - f\left(\gamma^m\right)(1-p)\frac{\partial\gamma^A}{\partial\alpha^D}d\alpha^D$$
$$-D''\left(d^A\right)dd^A = 0 \Leftrightarrow$$
$$\frac{dd^A}{d\alpha^D} = \frac{f'\left(\gamma^m\right)(1-p)\left(\chi-\gamma^A\right)\frac{\partial\gamma^m}{\partial\alpha^D} - f\left(\gamma^m\right)(1-p)\frac{\partial\gamma^A}{\partial\alpha^D}}{D''\left(d^A\right)}.$$

As above, the denominator is positive. Regarding the numerator, the first multiplicative term is zero, as we have defined an increase in political polarization as increasing the distance between party platforms keeping the median voter's assessment of party platforms unchanged, $\partial\gamma^m/\partial\alpha^D = 0.$ Since $\partial\gamma^A/\partial\alpha^D < 0$, the entire expression is positive.

(3) As noted in the text, the sign of $d^A - d^B$ depends on the sign of $\gamma^B - \gamma^A.$ We have

$$\begin{aligned}\gamma^B - \gamma^A &= \alpha^B u\left(y-\hat{\tau}^A\right)+\hat{\tau}^A-\alpha^B u\left(y-\hat{\tau}^B\right)+\hat{\tau}^B \\ &\quad -\left(\alpha^A u\left(y-\hat{\tau}^B\right)+\hat{\tau}^B-\alpha^A u\left(y-\hat{\tau}^A\right)+\hat{\tau}^A\right) \\ &= \left(\alpha^A+\alpha^B\right)\left[u\left(y-\hat{\tau}^A\right)-u\left(y-\hat{\tau}^B\right)\right]+2\left(\hat{\tau}^A-\hat{\tau}^B\right)\end{aligned}$$

Recall that we assumed that parties have positioned themselves so as to make the median voter indifferent $\left(\gamma^m = 0\right).$ Therefore, $\left(u\left(y-\hat{\tau}^B\right)-u\left(y-\hat{\tau}^A\right)\right)=\left(\hat{\tau}^A-\hat{\tau}^B\right)>0,$ which, inserted above, implies the condition noted in the text:

$$d^B > d^A \Leftrightarrow \gamma^B - \gamma^A < 0 \Leftrightarrow \alpha^A + \alpha^B > 2.$$

This condition is equivalent to the condition that $\alpha^B - 1 > 1 - \alpha^A.$ This means that for the condition to hold, party platforms should be positioned around the median voter in an asymmetric way, such that party *B*'s platform should be further away, in terms of α, from the median voter's preferred platform than should party *A*'s platform. Due to the quasi-linear form of the utility function, this is consistent with the assumption that the median voter is indifferent, in terms of utility, between party platforms, $\gamma^m = 0.$ To see this note that if party platforms are symmetric around the median voter, such that $\overline{\alpha}^B = 1+\alpha$ and $\overline{\alpha}^A = 1-\alpha$, then

$$\gamma^m \equiv u\left(u_c^{-1}\left(1/\alpha^B\right)\right) - u\left(u_c^{-1}\left(1/\alpha^A\right)\right) - \left(y - u_c^{-1}\left(1/\alpha^A\right) - \left(y - u_c^{-1}\left(1/\alpha^B\right)\right)\right)$$
$$= u\left(u_c^{-1}\left(1/\left(1+\alpha\right)\right)\right) - u\left(u_c^{-1}\left(1/\left(1-\alpha\right)\right)\right) - \left(u_c^{-1}\left(1/\left(1+\alpha\right)\right) - u_c^{-1}\left(1/\left(1-\alpha\right)\right)\right) > 0$$

i.e. the median voter strictly prefers party *B*'s platform. This holds when *u* is sufficiently concave, and is satisfied for example for the CRRA-class (which includes the logarithmic utility function). By implication, for the median voter to be indifferent, α^B must be further away from the median voters' preferences, which implies to above condition to be satisfied.