Fiscal Transparency and Procyclical Fiscal Policy

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Abstract

This paper examines why fiscal policy is procyclical in developing as well as developed countries. We introduce the concept of fiscal transparency into a model of retrospective voting, in which a political agency problem between voters and politicians generates a procyclical bias in government spending. The introduction of fiscal transparency generates two new predictions: 1) the procyclical bias in fiscal policy arises only in good times; and 2) a higher degree of fiscal transparency reduces the bias in good times. We find solid empirical support for both predictions using data on both OECD countries and a broader set of countries.

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1 Introduction

Fiscal policy is often procyclical: cyclical increases in real income are often accompanied by increases in government spending and/or tax cuts.1 Such a policy may amplify fluctuations

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in real output, thereby leading to prolonged recessions in bad times and inflationary pressures in good times. Moreover, a procyclical fiscal policy is in conflict with the tax smoothing principle (Barro [1979]), which prescribes that tax rates should be unrelated to business cycle fluctuations. Finally, a procyclical fiscal policy may lead to excessive volatility in private- and public consumption, thus violating the principle of consumption smoothing. Thus, most economists would agree with the view that a procyclical fiscal policy is a harmful policy that adds to macroeconomic instability. Nevertheless, procyclical fiscal policies occur frequently in reality. In this paper we provide economic theory as well as empirical evidence in an attempt to explain the occurrence of such procyclical policies.

Some empirical studies have found that procyclicality is a phenomenon confined to developing countries, and especially Latin America. However, Hallerberg and Strauch (2002), Gali and Perotti (2003) and Lane (2003) find evidence of procyclicality in subcomponents of government spending and in overall discretionary government spending in EU and OECD countries.

Gavin and Perotti (1997) suggest that procyclical fiscal policies arise because of binding borrowing constraints. According to their hypothesis, governments in developing countries are likely to become credit constrained in times of economic slowdown, which may force them to run a procyclical fiscal policy. Other authors, such as Tornell and Lane (1999), Talvi and Végh (2005) and Alesina, Campante and Tabellini (2008), have proposed political economy explanations of the occurrence of procyclical fiscal policies. Most of these contributions explicitly aim at explaining why fiscal policy is procyclical in developing countries. In contrast, the procyclicality of fiscal policy in developed countries remains largely unexplained. Moreover, none of the above-mentioned theories are able to explain a “stylized fact” from the empirical literature, namely that the reaction of fiscal policy to output fluctuations is asymmetric: fiscal policy is generally more procyclical in good times than in bad times, especially in developed countries. This is particularly problematic for the

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1 Following Kaminsky, Reinhart and Végh (2004), we define an acyclical policy as a policy where fluctuations in real output have no impact on discretionary government spending and tax rates. We define a procyclical fiscal policy as a policy where increases in real output lead to discretionary increases in spending and/or tax cuts.


borrowing constraints hypothesis, according to which we should expect fiscal policy to be procyclical in bad times when the credit constraints are most likely to become binding.

This paper offers a new explanation of the procyclical nature of fiscal policy. We set up a model in which fiscal policy is set by an incumbent politician who faces a trade-off between pleasing voters and abusing her powers for personal gain. The model builds on the tradition of retrospective voting models, which have their roots in Barro (1973), Ferejohn (1986) and Persson and Tabellini (2000 ch. 4). In particular, our model is closely related to the political agency model of Alesina, Campante and Tabellini (2008). In their model procyclicality comes from voters’ attempt to “starve the Leviathan”. When income rises voters demand more government consumption or tax cuts, fearing that the extra revenue that the economic upturn generates would otherwise be wasted on political rents. The key assumption behind this result is a complete lack of fiscal transparency: politicians are assumed to be able to hide the true size of the government deficit to voters, who are therefore also unable to observe the level of political rents.

It is this restrictive assumption that we relax in our model. Specifically, we allow a positive degree of fiscal transparency, such that voters may detect an excessive deficit with some positive probability. This generates two new predictions. First, fiscal policy becomes asymmetric: departing from a low initial level, an increase in output will not lead to increased demands for government consumption. The reason is that the positive degree of transparency reduces the incentive for politicians to cheat voters, since there is now a positive risk of being exposed. Voters therefore rationally trust the incumbent to deliver a responsible fiscal policy, where increases in income are transmitted on to increases in the government surplus. As a consequence, fiscal policy becomes acyclical. When initial output is high, on the other hand, the reaction of fiscal policy to a further increase in output is different: the higher the level of income, the greater is the potential gain that the incumbent can obtain by cheating voters. In strong booms the incumbent can therefore not be trusted to deliver a responsible fiscal policy. The voters know this and the procyclical pattern of fiscal policy driven by voters’ attempt to “starve the Leviathan” emerges. Thus, the model can explain the stylized fact from the empirical literature that fiscal policy is more procyclical in good times than in bad times. This

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4 Introducing fiscal transparency enriches the range of outcomes considerably but also complicates the algebra. We therefore also make two simplifying assumptions compared to Alesina, Campante and Tabellini (2008): first, we limit our attention to two time-periods. Second, we treat the tax rate as an exogenous variable, thus focusing on the choice of government spending.
is in contrast to Alesina, Campante and Tabellini (2008) where fiscal policy is always procyclical. The second main prediction from the model is that the higher the degree of fiscal transparency, the stronger the boom must be before fiscal policy becomes procyclical. Thus, we expect fiscal policy to be less procyclical in high-transparent countries. Alesina, Campante and Tabellini (2008) note that the procyclicality of fiscal policy is driven by politicians’ ability to collect rents so fiscal policy should be more procyclical in more corrupt countries. However, their model does not explain which institutional factors influence the scope for corruption and, hence, the procyclicality of fiscal policy. The model in this paper suggests one such candidate, namely the degree of fiscal transparency. It is exactly through a reduced incentive to collect rents that fiscal transparency diminishes the procyclicality of fiscal policy.

Fiscal transparency is the extent to which the general public can access truthful information about government budget matters. This issue has received increasing attention in recent years. Both the OECD and the IMF have implemented Codes of Best Practice for Fiscal Transparency, and The IMF and the World Bank publish Reports on Observation of Standards and Codes (ROSC) for the Code of Best Practice for Fiscal Transparency on a regular basis for a broad range of countries. We are not the first to introduce fiscal transparency into a model of fiscal policy. Milesi-Ferretti (2004) analyses the interaction of fiscal transparency and fiscal rules in the determination of fiscal policy. Shi and Svensson (2006) and Alt and Lassen (2006a, 2006b) have highlighted the role of fiscal transparency in the occurrence of political budget cycles. Fiscal transparency, so the argument goes, reduces the scope for manipulating the budget around election time, since the risk that such manipulations are detected is higher. The link described above between fiscal transparency and the cyclical behaviour of fiscal policy is something that we have not come across in the existing literature, however.

We then turn to the empirical evidence and test our model’s predictions on two panel data sets: a sample of OECD countries and a sample of a broader range of countries. The evidence strongly confirms the asymmetry of fiscal policy in OECD countries, where government spending is much more procyclical in good times than in bad times. This does not appear to be the case in non-OECD countries. Our results indicate that fiscal transparency reduces the procyclical bias in good times in OECD countries, although the data also suggest an adverse effect in bad times. For the broad sample of countries, we find encouraging results in favour
of our hypothesis that fiscal policy is less procyclical in good times in countries where voters are better informed.

2 The Model

2.1 The Economic Environment

We consider a model with two time periods. The economy is populated by an incumbent politician in charge of fiscal policy and a number of identical voters. The utility function of the representative voter is given by

\[ U = u(c_t, g_t) + \beta \cdot u(c_{t+1}, g_{t+1}) \]  

(1)

where \( c_t \) and \( g_t \) are the per capita levels of private and government consumption in period \( t \), respectively, and the parameter \( \beta \) is a discount factor. To simplify the model we assume that the period-utility is separable in private consumption and government consumption and that the utility from the latter is a concave function of the CRRA type:

\[ u(c_t, g_t) = v(c_t) + \frac{g_t^{1-\theta}}{1-\theta}, \quad 0 < \theta < 1 \]  

(2)

Per capita income in period \( t \) is \( y_t \). We assume that there is no uncertainty regarding future income. Taxes per capita are \( \tau \cdot y_t \), where \( \tau \) is a constant and exogenous tax rate. The government can issue debt in period 1 with full repayment, including interest, in period 2. Government revenue from tax- and debt financing may be spent in two different ways. First, the government can provide public consumption from which voters derive utility. Second, resources may be spent on political rents. The most straightforward interpretation of political rents is that it is simply cash; the politician secures resources for herself by pocketing money taken from the government budget. However, the size of political rents could also be interpreted in a broad sense, namely as the extent to which the incumbent spends her time on campaigning, networking or leisure or engages in nepotism. The incumbent may also be tempted to spend resources on prestigious projects that serve no other purpose than boosting her own ego. Alternatively, political rents could be interpreted as the amount of contributions from lobbies and interest groups, which enrich the incumbent but lead to inferior policies that are hurtful to the voters. In short, political rents can be any kind of activity that is beneficial
to the incumbent but directs resources away from the voters, to whom it is therefore wasteful. In this broad sense, a low level of rents should be interpreted as “good government”.

With these assumptions the government budget constraints for the two periods (assuming no initial debt) become:

\[
\tau \cdot y_1 = g_1 - d_1 + r_1 \\
\tau \cdot y_2 = g_2 + (1 + \rho)d_1 + r_2
\]  

(3)

where \(d_1\) is the budget deficit in period 1, \(\rho\) is the (constant and exogenous) interest rate and \(r_t\) denotes political rents in period \(t\).

Following Persson and Tabellini (2000) we assume that there is a maximum level of rents, \(\tau > 0\), that the incumbent can extract without being caught and immediately exempt from office. Further, we assume that there is also an upper limit to the size of the deficit, \(\bar{d} > 0\), that cannot be exceeded. The latter assumption should be seen as a simplification of the general idea that even governments are restrained by some checks and balances that prevent them from driving deficits to extreme levels. It should be emphasised that these checks and balances are not necessarily imposed by financial markets. They should rather be thought of as some kind of democratic control that restrains the politicians holding office.\(^5\)

We assume the following relationship between output in period 1 and period 2:

\[
y_1 = \bar{y} + \varepsilon \\
y_2 = \bar{y} - (1 + \rho)\varepsilon
\]  

(4)

where \(\bar{y}\) is a natural output level (or trend level) and \(\varepsilon\) is a short term fluctuation. This specification might seem odd at a first glance; after all, a positive output shock today does not necessarily imply a negative shock next year. However, the specification above allows us to focus on fluctuations in output, holding constant the present discounted value of life-time income. Seen from the point of view of the government, an increase in \(\varepsilon\) shifts revenue from period 2 to period 1, leaving the total discounted value of revenue unchanged. But this is exactly the kind of fluctuation we are interested in, since it allows a comparison between a flat time profile of income (\(\varepsilon = 0\)) against a fluctuating time profile (\(\varepsilon \neq 0\)). Thus, the specification in (4) should merely be seen as an easy way of focusing on what we are really

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\(^5\) We could also interpret the upper limit on the deficit as a consequence of self-imposed fiscal rules such as the Stability and Growth Pact in the EMU or the balanced budget rules that exist in most US states.
interested in, namely how fiscal policy depends on the distribution across time periods of a given present discounted value of income.  

Finally, we assume that the following inequalities hold for all realisations of $\varepsilon$:

$$
\tau (\bar{y} + \varepsilon) + d_i \geq \bar{r}
$$

$$
\tau (\bar{y} - (1 + \rho)\varepsilon) - (1 + \rho)d_i \geq \bar{r}
$$

The first of these assumptions ensures that maximum rents can always be obtained in period 1 without violating the restriction $d_i \leq \bar{d}$ or pushing government consumption below zero. The second assumption correspondingly ensures that the incumbent can extract maximum rents in period 2 and repay any outstanding debt from period 1. Intuitively, the inequalities indicate that the maximum amount of rents that the incumbent can extract is small compared to the “natural” level of income, $\bar{y}$. Thus, an incumbent who extracts rents beyond all boundaries will be removed from office (and perhaps sent to jail) before she manages to bankrupt the government.

Obviously, the optimal policy as seen from the voters’ point of view includes zero political rents, $r_1 = r_2 = 0$. What are the optimal levels of private and government consumption, respectively? The exogeneity of the tax rate and the separability of government and private goods consumption in the voters’ utility function allow us to look at private and government consumption separately, and we therefore focus on government consumption only. Maximising voter utility with respect to $g_1$ and $g_2$ subject to (3) and (4) yields the solution

$$
g_1 = \tau \cdot \bar{y}
$$

$$
g_2 = \tau \cdot \bar{y}
$$

where we have assumed $(1 + \rho)^{-1} = \beta$. The important point to note here is that the shock variable $\varepsilon$ is nowhere present in the solution. The optimal fiscal policy depends only on the present discounted value of income, not on the distribution across time periods. In this sense, the optimal fiscal policy is acyclical: because of voters’ desire for consumption smoothing, the level of public consumption should not vary over the business cycle.

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6 All results of the model still hold qualitatively if we assume no relation between $y_1$ and $y_2$. But then we get an additional effect of an increase in $y_1$ on fiscal policy, namely a wealth effect of higher total discounted revenue. Since this is not what we are interested in, we prefer the specification in (4).

7 Assuming $(1 + \rho)^{-1} \neq \beta$ does not change the results qualitatively, but complicates the algebra.
2.2 The Political Environment

In the first period the incumbent chooses fiscal policy and the voters decide whether or not to re-elect her for period 2. After period 2, the incumbent has no possibility of re-election. As in Persson and Tabellini (2000 ch. 4), voters are backward-looking and condition their voting strategy on already observed outcomes only. Further, since all politicians are assumed to be identical (no adverse selection), elections serve the sole purpose of allowing voters to reward or punish the incumbent. Specifically, voters can choose to punish an ill-performing incumbent by electing an identical opponent.

As in Alesina, Campante and Tabellini (2008) and in most of the modern literature on electoral cycles\(^8\), we assume that voters observe the levels of output, taxes, private consumption and government consumption before the election. Political rents cannot be observed. Further, the size of the deficit is not necessarily observable to the voters. This captures the idea that the government can hide information about its borrowing needs from the public through various creative accounting techniques. For instance, the government may manipulate the official size of the deficit by strategically picking out which items should be kept in and out of the budget. In other words, there is a lack of transparency in the budget process. However, this lack of transparency is not complete: we assume that a deviation between the true deficit and the officially reported deficit is detected with a positive probability \(p\), which is known to everyone. This is an important difference compared to Alesina, Campante and Tabellini (2008) who implicitly assume \(p = 0\). Following Alt and Lassen (2006b), we interpret \(p\) as a measure of the degree of fiscal transparency.

The objective function of the incumbent is:

\[
V = r_1 + \delta \cdot \frac{r_2}{1 + \rho}
\]

(6)

where \(\delta\) is the probability that the incumbent is re-elected. Thus, the incumbent maximises the expected, discounted value of political rents.

The voters realise that the incumbent has an incentive to increase the deficit or lower government consumption in period 1 in order to increase political rents. They therefore condition re-election on observed performance by choosing reservation levels for government consumption and the deficit, \(g^*\) and \(d^*\), respectively. Formulating a reservation level for the

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8 See for example Alt and Lassen (2006a) or Shi and Svensson (2006).
deficit makes sense because there is a positive probability that a deviation from this level will be observed, in which case the voters choose to punish the incumbent. The probability that the voters will re-elect the incumbent is then given by:

\[
\delta = \begin{cases} 
1 & \text{if } g_i \geq g^* \text{ and no detection of } d_i > d^* \\
0 & \text{otherwise}
\end{cases}
\]

(7)

Note that not detecting \( d_i > d^* \) can either mean that the incumbent did actually obey voter demands (so that \( d_i \leq d^* \)), or that an excessive deficit (\( d_i > d^* \)) went undiscovered, which happens with probability \( 1-p \). The key point is that voters cannot distinguish these situations from each other.

The strategy above differs from a traditional voting strategy in the literature of retrospective voting models, in which voters usually formulate their re-election rule in terms of a reservation utility level. Here, voters instead condition re-election directly on fiscal policy variables. In comparison with Alesina, Campanete and Tabellini (2008) the inclusion of a reservation level for the government deficit is also new. The reason is that in their model there is no chance of detecting an excessive deficit, since \( p = 0 \); setting a reservation level for the deficit is therefore pointless. Thus, allowing a positive value of \( p \) opens up for a more sophisticated voter strategy.

The timing of the model is now as follows: (I) At the start of period 1 voters observe trend output \( \bar{y} \) and the output shock \( \mathbf{e} \) as well as the tax rate \( \tau \). They then select the reservation values \( g^* \) and \( d^* \) and the strategy in (7) is known by everyone hereafter. (II) The incumbent observes \( g^* \) and \( d^* \) and chooses fiscal policy for period 1. (III) Voters observe their utility from government consumption and infer the size of \( g_1 \). If the government has set \( d_i > d^* \) this becomes known to everyone with probability \( p \). (IV) Elections are held and the voters now vote according to their declared strategy in (7). In period 2 the elected politician chooses fiscal policy and the model ends.

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\(^9\) Persson and Tabellini (2000, ch. 4) consistently formulate the voters' strategy in terms of utility. However, in a footnote they note that voters could actually do better if they formulate their strategy in terms of policy variables. The same is true in our model. By conditioning re-election on the size of the deficit, voters are implicitly choosing a reservation level for utility in period 2 also, since the deficit has direct consequences for the level of publicly provided goods in period 2.
2.3 Equilibrium Strategies

We start by looking at the optimal strategy for the incumbent, given the voters’ reservation levels \( g^* \) and \( d^* \), using backwards induction. After the election the victorious politician has no re-election motive and therefore sets political rents at the maximum value, \( r_2 = \bar{r} \). Before the election the incumbent has three options: she can (i) satisfy the voters’ demands for government consumption as well as the size of the deficit and secure herself re-election, (ii) satisfy the demand for government consumption only, run an excessive deficit and hope that this will go undetected, or (iii) satisfy none of the demands and forego re-election with certainty. We now look at each of these options in turn: in option (i) the incumbent must set \( g_1 = g^* \) and \( d_1 = d^* \). Using the government budget constraint in (3), this gives us that political rents are \( r_1 = \tau(\bar{y} + \varepsilon) - g^* + d^* \). In this case the incumbent is re-elected with certainty, which has a present value of \( \frac{\bar{r}}{1 + \rho} \). Thus, defining \( V_1 \) as the expected discounted value of political rents in option (i), we get:

\[
V_1 = \tau(\bar{y} + \varepsilon) - g^* + d^* + \frac{\bar{r}}{1 + \rho}
\]  

(8)

In option (ii) the incumbent does not satisfy the voters’ demand for the size of the deficit. Since a larger deficit allows more political rents in period 1, the incumbent will in this case set the deficit at its maximum value, \( \bar{d} \). Re-election now only occurs if the excessive deficit is undiscovered, which happens with probability \( 1 - p \). Defining \( V_2 \) as the expected discounted value of political rents in option (ii) we have

\[
V_2 = \tau(\bar{y} + \varepsilon) - g^* + \bar{d} + (1 - p) \frac{\bar{r}}{1 + \rho}
\]  

(9)

Finally, the incumbent always has the option of completely disregarding the voters’ demands. In this case she will set rents and the deficit at their maximum values in period 1 and forego re-election.\(^{10}\) Defining \( V_3 \) in the same way as \( V_1 \) and \( V_2 \):

\(^{10}\) Technically, the level of the deficit is not well-defined in this case with the current set of assumptions, since the incumbent does not care about the size of \( d_1 \), as long as she obtains maximum rents. To pin down \( d_1 \) in this off-equilibrium path we therefore assume that the incumbent has a form of lexicographic preferences: once she has obtained maximum rents, her next objective is to provide as much public consumption as possible while she is still in office. This implies that she will set the deficit at its maximum value. We can think of many reasons for why an incumbent would prefer to spend more on public goods in her own term. First, she may have
Voters must now choose optimal values of \( g^* \) and \( d^* \) such that the incumbent chooses option (i).\(^{11}\) We can then state the problem of the voters as:

\[
\begin{align*}
\max_{g^*, d^*} & \quad \left( \tau (\overline{y} + (1 + \rho) \varepsilon) - (1 + \rho) d^* - \overline{\tau} \right)^{1-\theta} \\
\text{s.t.} & \quad V_1 \geq V_2 \quad \text{and} \quad V_1 \geq V_3
\end{align*}
\]

where we have used the incumbent response function for \( g_1 \) and \( g_2 \) from option (i). Using equations (8)-(10) and \((1 + \rho)^{-1} = \beta\) we can write the two constraints in this problem as

\[
\begin{align*}
V_1 \geq V_2 &: \quad \tau (\overline{y} + \varepsilon) - g^* + d^* + \frac{1}{1 + \rho} \overline{\tau} \geq \tau (\overline{y} + \varepsilon) - g^* + d - \frac{1}{1 + \rho} \overline{\tau} \iff p \beta \overline{\tau} \geq d - d^* \\
V_1 \geq V_3 &: \quad \tau (\overline{y} + \varepsilon) - g^* + d^* + \frac{1}{1 + \rho} \overline{\tau} \geq \tau (\overline{y} + \varepsilon) - g^* + d - (1 - \beta) \overline{\tau}
\end{align*}
\]

(12)

It is fairly easy to see that the constraint \( V_1 \geq V_3 \) must be binding in equilibrium. If this constraint were satisfied with strict inequality the voters could raise \( g^* \) without violating either of the constraints and we must therefore have \( V_1 = V_3 \) in equilibrium. In contrast, it is of great importance to the equilibrium outcome whether the constraint \( V_1 \geq V_2 \) becomes binding or not.

In the appendix we show that the values of the deficit and the levels of government consumption that solve the problem in (11) are given by

\[
\begin{align*}
\text{(I)} & \quad g_1 = \tau \overline{y} - (1 + \beta)^{-1} \overline{\tau} \\
& \quad g_2 = \tau \overline{y} - (1 + \beta)^{-1} \overline{\tau} \\
& \quad d_1 = -\tau \varepsilon - (1 + \beta)^{-1} \beta^2 \overline{\tau} \\
\text{if} & \quad \varepsilon \leq \left( p - \frac{\beta}{1 + \beta} \right) \frac{\beta \overline{\tau}}{\tau} - \frac{d}{\tau}
\end{align*}
\]

and reputational concerns, hoping that her office period will be remembered as a time of high public service. Further, it may be that the incumbent prefers one type of government spending to another. Fearing that her successor will not share this preference, she therefore ties his hands by leaving a large government debt.

\(^{11}\) It is never optimal for the voters to choose reservation values such that the incumbent chooses option (ii) or option (iii). A proof of this claim can be obtained upon request.
Using the government budget constraint, we then find that political rents are in both of the above solutions given by \( r_i = (1 - \beta) \bar{r} \). If the shock to output in period 1 is sufficiently small, such that relative to period 2 the economy is in a recession or a modest boom, the solution in (I) applies. This solution is similar to the solution of the social planner: fluctuations in output are transmitted directly into the budget surplus, with no effect on the time profile of government consumption. Thus, fiscal policy is acyclical. Compared to the solution of the social planner, the only difference is the lower level of government consumption, which is due to a positive level of political rents. This is necessary to keep the incumbent from choosing option (iii) above.

The solution in (II), which applies in case of a high value of \( \varepsilon \), is very much different from the social planner’s solution, however. Here we see that fluctuations in output are not smoothed at all. An increase in \( \varepsilon \) now increases government consumption in period 1 but has no effect on the deficit. The lower level of revenue in period 2 then implies that government consumption in period 2 falls. The timing of output now matters for the time profile of government consumption and fiscal policy becomes procyclical.

So when does which solution apply? Technically, the difference between solution (I) and solution (II) is that the constraint \( V_i \geq V_2 \) is binding in solution (II), whereas it is satisfied with strict inequality in solution (I). On a more intuitive level, the decisive condition on \( \varepsilon \) reveals an interesting prediction: fiscal policy becomes procyclical only when the economy is in a boom. Consider a shift in output from period 2 to period 1, i.e. an increase in the shock variable \( \varepsilon \). Ideally, this should have no effect on the time profile of government consumption, since such a shift does not affect the intertemporal government budget constraint. To smooth government consumption, voters would therefore prefer a smaller deficit in period 1 when \( \varepsilon \) increases. This is exactly what happens when the economy is in a recession: departing from a low value, a small increase in \( \varepsilon \) makes voters require a smaller budget deficit and an unchanged level of government consumption in exchange for their vote. To secure herself re-election, the incumbent willingly satisfies the voters’ demands and fiscal policy becomes acyclical.
If the economy is in a boom things are different: ideally, voters would now like to run a budget surplus in order to smooth government consumption over the two time periods. But the high level of revenue during a boom provides the incumbent with an alternative that is too tempting to resist: since there is a chance an excessive deficit will go undetected, the incumbent will be tempted to drive the deficit to its maximum and pocket the bulk of the extraordinarily high revenue. In technical terms, the temptation to choose option (ii) instead of option (i) is too big. The constraint $V_i \geq V_2$ now becomes binding. Realising this, voters will adjust their demands in such a situation. So when output increases further, voters now demand a higher level of government consumption in stead of a deficit reduction. The result is that fiscal policy now reacts strongly to output fluctuations in a procyclical manner. In sum, the model predicts that there is an asymmetry in the cyclical behaviour of fiscal policy: during recessions fiscal policy is acyclical. During booms, however, the political agency problem becomes more severe and fiscal policy becomes procyclical.

We now focus on the transparency variable $p$. The condition on $\epsilon$ for the solution in (I) to apply can be rewritten as $p \geq (\tilde{d} - d_i)\beta \bar{r}$, where $d_i = -\epsilon (1 + \beta)^{-1} \beta^2 \bar{r}$ is the solution for the deficit given in (I). First, as a benchmark, consider the case $p = 0$: since $d_i$ is by definition smaller than $\tilde{d}$, the inequality above is never satisfied for $p = 0$. Thus, we conclude that fiscal policy is always procyclical when fiscal transparency is completely absent, which is also the case in Alesina, Campante and Tabellini (2008). However, with a positive value of $p$ the inequality may be satisfied. Let $\tilde{\epsilon}$ be the maximum value of the shock $\epsilon$ that is consistent with solution (I):

$$\tilde{\epsilon} = \left( p - \frac{\beta}{1 + \beta} \right) \frac{\beta \bar{r}}{\tau} - \frac{\tilde{d}}{\tau}$$

(13)

A higher value of $p$ increases this critical value, such that for any distribution of $\epsilon$ a higher $p$ increases the probability that solution (I) applies. A higher degree of transparency makes procyclical fiscal policy occur less frequently, as illustrated in Figure 1 below. To understand this result, remember that fiscal policy becomes procyclical in good times because voters rationally adjust their demands for government consumption upwards, fearing that the incumbent would otherwise waste the high level of revenue on political rents and run an excessive deficit. But a higher degree of transparency makes it less attractive to run an excessive deficit for the incumbent, since it increases the risk of being exposed. Thus, the
higher the degree of transparency, the stronger must the boom be before the incumbent falls into temptation and runs a maximum deficit. This implies that voters will be willing to trust the incumbent with a larger amount of resources before they alter their demands for government consumption. In countries with a high degree of fiscal transparency we should therefore expect to see a procyclical reaction of fiscal policy in strong booms only. In countries with a low degree of transparency, on the other hand, procyclical fiscal policy could occur at a much higher frequency.

2.4 Discussion

The reason that fiscal policy is only procyclical in good times according to our model is that the temptation to cheat voters is stronger in booms. This is due to the fact that the amount of available resources is higher in booms than in recessions. For this to be a convincing story for developed countries we must emphasise the broad interpretation of political rents: when the level of income rises the incumbent can deliver the same level of government consumption with less effort, requiring a less careful conduct of fiscal policy, and with more room for superfluous spending on “ego-boosting” projects etc. Moreover, the model captures a general mechanism, which we believe is important in developed countries, namely that the pressure on the government from outside watchdogs such as the media, the opposition, international organisations and various interest groups is plausibly much stronger in recessions than in booms. Thus, the major benefit to the incumbent of a strong economy is the quiet life: with attention removed from budgetary issues it becomes easier to engage in all the activities that we have previously labelled as “extracting rents”. The result, just as in our model, is that the temptation to increase rent extraction at the expense of a deficit reduction is higher in booms than in recessions. This is exactly what drives the asymmetric cyclical response of fiscal policy, since rational voters will then only demand a procyclical pattern in good times, when the temptation to cheat would otherwise dominate the fear of not earning re-election.

2.5 From Theory to Evidence – The Model’s Predictions for the Real World

In the empirical analyses in the following sections we distinguish discretionary fiscal policy from the effects of “automatic stabilisers”. Whenever possible, we use cyclically
adjusted fiscal variables to focus exclusively on the discretionary part of fiscal policy. We must therefore be precise about what our model predicts for these cyclically adjusted fiscal variables, versus the “actual” or cyclically unadjusted variables.

In our model, economic fluctuations has an “automatic” impact on the government budget through the revenue side only, so all changes in government spending are by definition discretionary. On the other hand, all changes in government revenue are by construction “automatic”, since the assumption of a constant tax rate rules out any discretionary changes on the revenue side. Denoting cyclically adjusted variables with a circumflex, we thus have \( \hat{g}_t = g_t \) and \( \hat{R} = \tau \cdot \bar{y} \), where cyclically adjusted revenue, \( \hat{R} \), is defined as the level that would occur if GDP were at its potential level, \( \bar{y} \). Equivalently, the cyclically adjusted primary surplus is the difference between cyclically adjusted revenue and total spending (public goods plus rents):

\[
\hat{s}_t = \hat{R} - \hat{g}_t - r_t = \tau \cdot \bar{y} - g_t - r_t = \tau y_t - g_t - r_t - \tau(y_t - \bar{y}) = -d_t - \tau(y_t - \bar{y})
\]

In period one we have \( y_1 - \bar{y} = \varepsilon \) so \( \hat{s}_1 = -d_1 - \tau \cdot \varepsilon \). Inserting the solution for \( d_1 \) gives

\[
\hat{s}_1 = \begin{cases} 
(1 + \beta)^{-1} \beta^2 \bar{R} & \text{if } \varepsilon < \bar{\varepsilon} \\
\beta p \bar{R} - \bar{d} - \tau \cdot \varepsilon & \text{if } \varepsilon > \bar{\varepsilon}
\end{cases}
\]

The difference between the cyclically adjusted budget balance, \( \hat{s}_t \), and the cyclically unadjusted balance, \( s_t = -d_t \), is that a change in \( \hat{s}_t \) exclusively reflects an active change of policy initiated by the incumbent, whereas a change in \( s_t \) can also reflect an automatic effect from fluctuations in output that runs through the revenue side of the budget. Table 1 summarises the model’s predictions for the fiscal variables.

[Table 1 about here]

As mentioned above, the prediction that cyclically adjusted revenue is unaffected by income fluctuations follows directly from our assumption of a constant tax rate. In reality, politicians may very well use tax rates as discretionary policy instruments. A second note concerns the equality between cyclically adjusted spending and unadjusted spending: the model does not take into account that automatic stabilisers are also likely to affect government spending through spending items such as unemployment benefits. Taking this into account, we would expect unadjusted government expenditure to be decreasing in the level of economic activity in bad times. In good times, the expected sign could be either
positive or negative, depending on the relative strengths of automatic stabilisers and the discretionary response.

We expect a higher degree of fiscal transparency to pull all fiscal variables in a countercyclical direction in good times. For spending variables this means that the positive sign in good times should become weaker as the degree of transparency increases. The model predicts that there is no effect of fiscal transparency on the cyclicality of fiscal policy in bad times. In practice, the validity of this prediction depends on how we identify good times and bad times. But the essential message from the model is that the effect of fiscal transparency should be stronger in good times than in bad times, for any reasonable definition of these terms.

3 Empirical Methodology

We next turn to the data to test the implications of the model presented in the previous section. We do this on two different panel data sets: the first data set consists of annual observations for 21 OECD countries in the period 1989-2003. The second data set broadens the sample of countries and the time period considered, covering 59 countries in the years 1980-1998. The sample of countries corresponds to Persson and Tabellini’s (2003) data set.

To uncover the causal effect from business cycle fluctuations to fiscal policy we regress a fiscal indicator variable on a cyclical indicator interacted with variables of interest and a range of control variables. Moreover, we include a lag of the dependent variable to take into account any lags in the political decision process. We also include time- and country fixed effects. Thus, the baseline specification of the fiscal policy equation that we estimate is

$$F_{i,t} = \alpha_0 + \alpha_1 \cdot F_{i,t-1} + \beta' Y_{i,t} + \gamma' X_{i,t} + \eta_i + \lambda_t + \nu_{i,t}, \quad i = 1,2,...,N, \ t = 2,...,T$$

(14)

where $F_{i,t}$ is our indicator of fiscal policy. $Y_{i,t}$ denotes a vector containing one or more interaction terms between the cyclical indicator and some variable of interest. The vector $X_{i,t}$ denotes a set of control variables. We estimate equation (14) using OLS and Within. However, it is well known that both these estimators are biased in the presence of a fixed effect and a lagged dependent variable. To account for this we also use the GMM system.

12 The countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and USA.
estimator developed in Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). In addition, to account for the possible reverse causality running from fiscal policy to macroeconomic conditions we always instrument the cyclical indicator with its own lags.

4 The Data

Indicator of Fiscal Policy: As our measures of fiscal policy we focus on government expenditure. To isolate the discretionary part of fiscal policy we use cyclically adjusted current disbursement excluding interest (from the OECD EO data base) as our fiscal indicator for the OECD sample. To allow for comparisons across countries we express our fiscal variables relative to trend GDP. We use trend GDP instead of actual GDP to avoid ambiguities with the interpretation of the $\beta$ coefficients, which occurs when dividing the fiscal indicator with a variable that fluctuates over the business cycle. For the broader sample of countries only unadjusted fiscal data is available and so we use government spending relative to GDP from the Persson and Tabellini data set. When using unadjusted data, a note of caution is in order: the working of automatic stabilizers will pull our estimates in a countercyclical direction. We therefore concentrate on the relative size of the coefficients within the $\beta$ vector, and not so much on the actual signs of the individual $\beta$ coefficients in this case.

Cyclical Indicator: For the OECD sample we use the output gap (OECD EO database) as our cyclical indicator. For the broader sample of countries we use the output gap from the Persson and Tabellini data set (based on HP filtering). Our model predicts that the response of fiscal policy to economic fluctuations during good times differs from the response in bad times. We therefore interact the output gap with dummy variables for good times (positive

13 Corresponding results for government surplus and revenue are not reported but are available upon request.
14 All fiscal variables used in the OECD sample are general government budget variables from the OECD Economic Outlook (EO) database.
15 Remember, that we defined a procyclical fiscal policy as a policy where an increase in economic activity leads to discretionary policy changes in the form of a higher level of government spending and/or tax cuts. If expenditure increases with economic activity the expenditure to GDP ratio may increase, decrease or stay unchanged when income rises. Thus, any sign of $\beta$ could be consistent with a procyclical policy when expenditure is expressed relative to actual GDP. Dividing with trend GDP solves this problem, since trend GDP does not vary over the business cycle. For trend GDP we use OECD’s calculation of potential GDP (using the production function method) available in the OECD EO database. For the Persson and Tabellini sample potential GDP is not available and so we divide with actual GDP, keeping in mind the caveats that arise from doing so.
output gap) and bad times (negative output gap). We also include the dummy for positive output gap \( (d^{pos}) \) in the regression to control for any level differences in government spending.\(^{16}\)

**Fiscal transparency:** In addition we also include a measure of fiscal transparency interacted with the output gap (in both good and bad times). For our OECD sample we use the fiscal transparency index developed in Alt and Lassen (2006b). This index ranges from 0 to 11 where each point represents an affirmative answer to a question concerning fiscal transparency sent to all budget directors of OECD member countries. The questions are presented in table 3.\(^{17}\) For the broader sample of countries no explicit index for fiscal transparency is available. However, our theoretical prior is that a higher degree of fiscal transparency reduces the procyclicality of fiscal policy through an improvement of the voters’ ability to monitor the actions of the incumbent. Such an improvement of the monitoring technology may come about through other channels than direct reforms of the budget procedure. First of all, we expect the media to play a key role in this respect. Greater popular access to independent media is likely to enhance the general public’s insight into fiscal affairs. Shi and Svensson (2006) develop an indicator to proxy for the share of informed voters in the population. The indicator is the product of the number of radios per capita and a dummy variable equal to one if the country is classified as having freedom of broadcasting (based on information from Freedom House). We use this indicator, which is available for 54 countries in our sample in the years 1980-1995.

**Exogenous control variables:** The vector \( X_{it} \) contains the control variables used in our benchmark specification, of which many have become standard in cross-sectional and panel data studies of fiscal policy. We use the following benchmark control variables: the demographic dependency ratio, the sum of exports and imports as a ratio to GDP, the inflation rate, a dummy for election year, a measure of trend or structural unemployment, the government debt to GDP ratio in the previous year, a dummy for majoritarian electoral system and the natural log of trend real GDP per capita. In the broad sample we also include a dummy for democracy and a dummy for presidential form of government. By default we

\(^{16}\) A similar approach is used in Hercowitz and Strawczynski (2004) and Persson and Tabellini (2003). However, these authors do not include the level dummy for positive output gap.

\(^{17}\) Compared to Alt and Lassens’s index we drop the question shown in column (6) in Table 3 due to missing observations for Greece, Portugal and Spain. Further, we also include the question in column (11). Note that the index is constant over time.
include time dummies to control for sample-wide exogenous shocks. However, we sometime remove these dummies to restore degrees of freedom. For the OECD sample the data for inflation, NAIRU and government debt are from the OECD EO database, the dummies for election year and majoritarian systems are taken from the Persson and Tabellini data set and the IEFS election guide\(^{18}\). The data for trend income, openness to trade and the dependency ratio are from WDI (2005). For the broader sample we use the Persson and Tabellini data set as the source except for inflation and trend income, which is taken from WDI (2005). Due to lack of data availability trend unemployment and debt are omitted from the regressions based on this sample.

5 Empirical Evidence from OECD Countries

5.1 Fiscal Policy and Asymmetric Responses to Economic Activity

Columns (1) to (6) in Table 2 show estimation results for cyclically adjusted government spending for the OECD countries. Columns (1)-(3) report the results using a specification where the output gap is included without any interaction terms. The coefficient on \( \text{gap} \) is statistically insignificant in all three columns, indicating that government spending is acyclical. This is in line with what previous studies have found for the OECD countries (e.g. Talvi and Végh (2005) and Alesina, Campante and Tabellini (2008))\(^{19}\). However, this result comes about from mixing up two regimes. Columns (4)-(6) split the output gap into good and bad times and include a dummy for positive output gap. The result from doing so is striking. The coefficient on the output gap interacted with a dummy for good times (\( \text{gap} \cdot d^{pos} \)) is clearly positive and highly significant for all estimators considered. The corresponding coefficient for bad times is insignificant and very close to zero. Thus, government spending seems to be procyclical in good times and acyclical in bad times, which is in line with our model’s predictions.\(^{20}\) Our estimates suggest that, during good times, the increase in government spending in reaction to a one percentage point increase in the output gap could

\(^{18}\) Data for elections after 1998 are taken from the IEFS Election guide.

\(^{19}\) Previous studies obtaining this result often use cyclically unadjusted variables as well as using dependent variables relative to GDP, rather than trend or potential GDP.

\(^{20}\) Looking at government revenue we do not find the same clear asymmetric response, in fact, revenue seems acyclical or counter cyclical in good times. The results for the government surplus are similar to the spending results, only weaker, and we therefore conclude that this procyclical result comes from the spending side of the government budget.
be as large as one percent of potential GDP. The lowest estimate (GMMSYS) suggests an increase of about 0.25 percent of potential GDP. The level dummy $d^{pos}$ is negative, indicating that spending drops a little in level when the output gap becomes positive, however, the coefficient is not significant.  

In Column (7) we consider the unadjusted current disbursements as the dependent variable. This serves as a robustness check since as explained above, we expect the results to be pulled in a countercyclical direction due to the presence of automatic stabilisers. The result is the same clear profile as with the adjusted data: government spending is significantly more procyclical in good times than in bad times. In columns (8) to (10) we look at subcomponents of (unadjusted) government spending. Government consumption is procyclical in good times, and more so than in bad times, although the difference is less pronounced than for overall spending. Even Social Security Benefits, which we would expect to be heavily influenced by automatic stabilisers, display a procyclical behaviour in good times (and countercyclical behaviour in bad times).

### 5.2 Fiscal Transparency

The next step of our analysis is to include a measure of fiscal transparency in our econometric specification. We start by interacting the output gap in good and bad times with each of the dummies used to construct the transparency index in Alt and Lassen (2006b), using one dummy at a time. The results are summarised in Table 3 below: using the GMMSYS estimator we find that most of the fiscal transparency dummies reduce the procyclicality of cyclically adjusted spending in good times. Some questions have a very clear significant effect: a legal requirement of an ex post comparison between projected and actual expenditures (question [5]) reduces the procyclicality of spending in good times, and

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21 To test whether our results are affected by the introduction of the EMU, we experimented with including an interaction term between a dummy for EMU participation (equal to 1 after 1994) and the output gap in good and bad times. The results suggested that the procyclical response in good times is halved from EMU membership, but the coefficient on $gap \cdot d^{pos}$ was in all cases still positive and significant. The effect of EMU participation in bad times was insignificant for OLS and Within, however, GMMSYS suggested that spending policies are more countercyclical in bad times in EMU countries.

22 We present the results for 12 questions on transparency (the dummies are equal to 1 in case of transparency). The index used in Alt and Lassen (2006b) includes 11 of these questions, since the question in column 11 in Table 3 is not included in their original index.
this effect is significant at the 1% level. The same strong effect appears if the government is
required to produce actuarial estimates for social security spending (question [11]). The first
of these results fits particularly nicely with our theoretical priors: large discrepancies between
projected and actual spending seem like a strong warning sign that the government may be
trying to hide a large deficit. Thus, a legal requirement of an ex post comparison makes it
quite likely that “cheating” governments will be exposed. We therefore believe that this
question picks up the idea behind our model parameter of fiscal transparency, \( p \), quite
accurately and the accordance with our theoretical priors is encouraging.

Next we move on to consider the aggregation of the dummies in Table 3 into a full index
\((\text{transp}^{11})\).\(^{23}\) Columns (1)-(3) in Table 4 show the results for cyclically adjusted government
spending. The coefficient on \( \text{transp}^{11} \) interacted with the output gap in good times is negative
and significant at a 10% level. This is in nice accordance with our theory: a back-of-the-
envelope calculation suggests that in a country scoring zero in the transparency index,
government spending increases by 0.32 percent of potential GDP in reaction to an increase of
1 percentage point in the output gap during good times. The corresponding reaction in a
country at the other end of the transparency scale is an increase of \( 0.32 - 11 \cdot 0.029 = 0.00 \).\( \)
Thus, going from a complete lack of transparency to full disclosure eliminates the procyclical
reaction of government spending in good times.

One result that apparently goes against our model’s predictions is the result for the question
in column 9 in Table 3, which suggests that fiscal policy becomes more procyclical in good
times if the budget discusses the impact of variations in key economic assumptions on the
budget outcome. However, we are not convinced that this unambiguously reflects a higher
degree of fiscal transparency: discussions of key economic assumptions may be used to divert
attention from the most likely outcome by side ordering several different scenarios. Stating
such multiple budget scenarios without a proper weighting of relevance can be seen as a
move away from the principle of ‘one bottom line’ (Poterba and von Hagen [1999]). In this
way, a “discussion of key economic assumptions” can be a convenient euphemism for
submitting multiple scenarios, with the purpose of clouding, rather than clarifying, the actual
budgetary prospects. In light of this ambiguity, we tried removing this question from the

[Table 3 and Table 4 about here]

\(^{23}\) We drop question 6 in all cases due to missing observations.
transparency index. The resulting index is labeled $\text{transp}^{10}$ in Table 4. We obtain a negative and significant (at a 5% level) coefficient on the term interacting this transparency index with the output gap in good times. Thus we confirm the above spending profile and effect of transparency, but with question 9 omitted from the index the statistical significance is much stronger.

So far we have avoided the results for transparency in bad times. The story is not quite as we expected: in most estimations we find that the coefficient on the interaction between the output gap in bad times and the transparency indices are positive and significant (on a 1% level). This suggests that fiscal policy in bad times becomes more procyclical when transparency increases. This does not square with our theory. Taken at face value, our results indicate that the countries that have a high degree of fiscal transparency are also the countries that have been most prone to running procyclical policies during bad times. However, it is likely that the high degree of fiscal transparency is caused by the exact same procyclical policies, rather than the other way around. In other words, we suspect that the counterintuitive sign arises due to a problem of reverse causality. Procyclical fiscal policies during recessions can be extremely damaging and may trigger reforms that increase the degree of fiscal transparency. If this is indeed the case, and we estimate an equation like (14) with a time invariant measure of fiscal transparency, we may falsely conclude that the causation runs in the opposite direction, that is, that a higher degree of fiscal transparency leads to a procyclical fiscal policy during periods of low economic activity. In the lack of obvious candidates for instrumental variables we do not attempt to correct this problem. Rather, we advice that the potential endogeneity of fiscal transparency should be kept in mind when interpreting our results. Note however, that the main driver behind this result seems to be question 3 in Table 3, whereas the effect seems much weaker for the other questions. Also note that this type of bias is also likely to affect our results for good times. This cannot explain the obtained results, however. On the contrary, the presence of such reverse causality in good times would work against our theoretical priors and pull the coefficient on $\text{transp}^{11} \cdot \text{gap} \cdot d^{pos}$ in a positive direction. On this background, the obtained negative coefficients are even more noteworthy.

As another robustness check we also consider the effect of transparency when using the unadjusted current disbursements as the dependent variable. From Table 4 we see now that we obtain a negative and significant coefficient (at a 1% level) on $\text{transp}^{11} \cdot \text{gap} \cdot d^{pos}$. The
results are only further confirmed when using transp\textsuperscript{10}. The same effect is present in the subcomponents of spending, although it seems to be somewhat weaker for social security benefits (insignificant but with the correct sign). The effect of fiscal transparency on the procyclicality of fiscal policy in good times seems to be stronger when using unadjusted data than when using adjusted data. This suggests that the degree of fiscal transparency matters not only for the discretionary part of fiscal policy, but also for the strength and magnitude of automatic stabilisers.\textsuperscript{24}

6 Evidence from a Broader Sample of Countries

We next move on to consider the evidence of asymmetric spending policies and the effect of voter information in a broad sample of countries. Having a sample of both developed and developing countries enables us examine whether fiscal policy is inherently less procyclical in developed countries than in developing countries, as claimed in some studies.\textsuperscript{25}

6.1 Asymmetries in Fiscal Policy

In Table 5 we look at the cyclical response for government expenditure. The coefficients on the output gap in columns (1)-(3) are all positive, albeit only mildly statistically significant in column (2). Remember that the sign of the coefficient on the output gap generally does not have an unambiguous interpretation when the dependent variable is cyclically unadjusted and in percent of actual GDP. However, a positive coefficient when the dependent variable is government spending to GDP provides a single exception from this rule, since the positive relationship can neither be caused by automatic stabilisers, nor by the division by actual GDP (both should pull in the direction of a negative relationship). Thus, there is in fact evidence of a procyclical spending pattern among the countries considered in this section.

Splitting the output gap variable into positive and negative values as in columns (4)-(7) only provides very weak evidence of an asymmetry in the spending pattern – unlike in the

\textsuperscript{24} Large automatic stabilisers make the government budget more sensitive to fluctuations in economic activity. In good times this implies that a larger amount of resources are left at the discretion of the incumbent. Our theory suggests that voters will only accept this if fiscal policy is sufficiently transparent. Thus, it is possible that greater fiscal transparency makes voters more willing to accept large automatic stabilisers (more generous unemployment benefits and higher tax progression), yielding a more countercyclical fiscal policy. In this sense, fiscal transparency could also have a long term effect by altering the legislation that governs the automatic stabilisers, which again has an effect on the short term stabilisation of the economy.

\textsuperscript{25} See e.g. Gavin and Perotti (1997) and Talvi and Végh (2005).
OECD sample. The coefficient on the output gap in good times is in all columns except (7) higher than the coefficient on the output gap in bad times, but in all cases a t-test fails to reject the hypothesis that they are in fact equal.

6.2 OECD Countries versus Non-OECD Countries

Judging from the results in the previous section, it seems that the results that we obtained for the OECD countries do not apply to a more heterogeneous group of countries. We now explore this issue in further detail, explicitly distinguishing OECD countries from non-OECD countries. In Table 6 columns (1)-(3) we find indications of a procyclical pattern in OECD countries which does not seem to be present in non-OECD countries. This is in contrast to earlier results in the literature, e.g. the results in Talvi and Végh (2005). Note however, that the hypothesis of equal output gap coefficients in the spending equation for the two groups of countries is only rejected in column (1).26 In columns (4)-(8) we dig deeper into the spending policy differences between OECD and non-OECD countries. In addition to separating OECD countries from non-OECD countries we now also distinguish good times from bad times. Since the Within estimates in column (5) are very large and imprecisely determined, we report results from a Within estimation where the level dummies for positive output gaps have been removed in column (6). The GMMSYS estimates in column (7) have high standard errors and we therefore also report GMMSYS estimates omitting time dummies in column (8). The coefficient on $gap \cdot d^{pos} \cdot OECD$ is positive in all cases and statistically significant in all other columns than (5) and (7). The coefficient on $gap \cdot (1 - d^{pos}) \cdot OECD$, on the other hand, has an alternating sign and is never statistically significant. We are able to reject a null hypothesis that the two coefficients are equal against a one-sided alternative (again, with the exception of columns (5) and (7)). Hence, the data suggest that government spending policies are procyclical in good times in OECD countries. There is no solid evidence of the same procyclical pattern in bad times. This confirms the results from the OECD sample. A

26 Looking at the surplus we find that in OECD countries, the budget surplus in percent of GDP seems to be unrelated to the output gap, whereas there is a clear negative relationship between these variables in non-OECD countries, despite the presence of automatic stabilisers in the dependent variable (note, this difference might be due to differences in the size of automatic stabilisers for the two groups, since we expect automatic stabilisers to have a stronger effect on overall fiscal policy in the OECD countries). Looking at revenue, we find solid evidence of a more procyclical pattern of government revenue in non-OECD countries than in OECD countries. Hence the procyclical pattern for the surplus in non-OECD countries stems from the revenue side.
similar asymmetry does not seem to be present in non-OECD countries. The coefficients on \( \text{gap} \cdot d^{\text{po}} \cdot \text{nonOECD} \) and \( \text{gap} \cdot (1 - d^{\text{po}}) \cdot \text{nonOECD} \) are never statistically significant and we fail to reject the hypothesis that they are equal in all cases.\(^{27}\)

6.3 Fiscal Policy and Voter Information

In Table 6 columns (9) and (10) we interact the Shi and Svensson (2006) indicator, \( \text{INFO} \), with the output gap in good and bad times to explore the effect of voter information on the cyclical pattern of government spending. \( \text{INFO} \) is highly correlated with the dummy variable for OECD countries, with a correlation coefficient of 0.54. Thus, to obtain reliable estimates of the effect of increased media access we must control for OECD membership, since we have seen that the cyclical pattern of fiscal pattern is very different in OECD countries than in non-OECD countries.\(^{28}\) This involves a great number of interaction terms with the output gap. At the same time, the inclusion of \( \text{INFO} \) means that the number of observations available for analysis falls. Combining these two things, we fear that we may be stretching the data too far and we therefore choose to omit time dummies in order to restore degrees of freedom. The OLS estimates in column (9) and the GMMSYS estimates in column (10) both suggest that high-information countries run less procyclical spending policies in good times. The effect of a higher value of \( \text{INFO} \) is quite large and statistically significant at the five percent level in both cases. There does not seem to be a similar effect in bad times, at least not of the same magnitude. Further, the positive coefficients on \( \text{gap} \cdot d^{\text{po}} \cdot \text{nonOECD} \) indicate that low-information countries among the non-OECD members also run procyclical spending policies in good times.\(^{29}\)

\[\text{Table 6 about here}\]

\(^{27}\) The results for the budget surplus are very similar to the ones for spending. We do not find any solid evidence of an asymmetric cyclical pattern in government revenue, neither among OECD countries, nor among non-OECD countries. It is worth noting, however, that there are weak signs of a negative relationship between government revenue and the output gap in bad times in non-OECD countries. Thus, the negative relationship between the surplus to GDP ratio and the output gap in this group of countries (see note 26) seems to work through the revenue side of the government budget in bad times, rather than the expenditure side in good times.

\(^{28}\) We have also tried running estimations with \( \text{INFO} \) included without controlling for OECD membership. The results were similar to the results in section 6.2, with \( \text{INFO} \) playing the same role as \( \text{OECD} \) did in section 6.2. We suspect that this merely reflects the strong correlation between \( \text{INFO} \) and \( \text{OECD} \), rather than a true causal effect of \( \text{INFO} \).

\(^{29}\) As a robustness check we included terms of trade as exogenous variable as done in e.g. Gavin and Perotti (1997). All our main results were roughly unaffected.
A final note concerns the role of voter information versus the role of corruption. Alesina, Campante and Tabellini (2008) find evidence that fiscal policy is more procyclical in countries with widespread corruption. In column (11) of Table 6 we confirm this finding, using the same control of corruption measure as Alesina, Campante and Tabellini. However, the results in column (12) show that the significant sign on the control of corruption measure vanishes when we also control for voter information. The effect of INFO is largely unaffected by the inclusion of control of corruption and still significant in good times. These observations are consistent with the argument of this paper: a higher degree of voter information reduces the scope for corruption and thereby also reduces the degree of procyclicality.

7 Interpreting the Results

Panel A in Figure 2 illustrates the impact of output fluctuations on the level of government spending in a typical OECD country, based on the coefficients reported in Table 2. The figure is constructed such that an output gap equal to zero corresponds to a neutral effect on government spending. The picture drawn here is in many ways reminiscent of figure 1, which illustrated the profile of government spending according to the model that we presented in section 2: fiscal policy is more or less acyclical when the output gap is negative, but reacts procyclically to changes in income when the output gap is positive. Panel A shows a level drop in government spending at a zero output gap in OECD countries, which we do not model theoretically, but this is quite small and statistically insignificant. We interpret the similarity between the two figures as evidence in favour of our theory of fiscal policy. In advanced economies, such as the OECD countries, a strong economy does in fact seem to generate spending pressures that intensify as the output gap increases further. The same dependency between fiscal policy and output is absent in bad times.

The asymmetric spending pattern found for the group of OECD member states does not apply directly to a broader sample of countries. The econometric analyses in section 6 shed some light on the differences between the highly developed group of OECD countries versus

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31 In estimations not reported, we tested out the level difference between good and bad times. Doing so pulls the positive coefficient in good times closer to zero. However, the coefficients are still large, positive and clearly significant.
the heterogeneous group of non-OECD countries. The results are illustrated in panel B in Figure 2. For the OECD countries, we confirm the results from section 5: fiscal policy is procyclical in good times but not in bad times. The picture is slightly more blurred in the group of non-OECD countries, where government spending does not appear to react to fluctuations in output. However, in results not reported we find some evidence on the revenue side of the government budget, which indicate that fiscal policy is more procyclical in bad times in this group of countries.

These differences lead us to believe that we need two different explanations for the occurrence of procyclical fiscal policies, depending on which group of countries we consider. For the middle- and low income countries in the group of non-OECD members, the classic Gavin and Perotti (1997) theory could provide an explanation, which is consistent with our empirical observations: when the economy hits a slump, falling government revenue may necessitate a procyclical fiscal contraction due to binding credit constraints. Fiscal policy is therefore likely to become procyclical in bad times. In the high income OECD member states, on the other hand, governments are not credit constrained, and the above-mentioned explanation cannot account for the occurrence of procyclical fiscal policies among these countries. Instead, the model presented in this paper can explain the observed pattern of government spending in OECD countries.

An interesting question is then, why the same spending pattern appears to be absent (or at least not very strong) among the non-OECD countries in good times. A natural point to make here is that the average quality of democracy among the OECD countries is higher than in the remainder of countries in the broad country sample. Unless the populations in less democratic countries have some alternative means of holding the incumbent accountable (such as revolts or strikes), we expect spending pressures to have limited impact on actual spending policies in countries where the political accountability mechanism imposed by the electoral process is not as strong as in mature democracies.

We find that in good times both a higher degree of fiscal transparency and voter information decrease the procyclical bias found in government spending. This is in nice accordance with our theory and it confirms that what is important is the ability of the electorate to monitor the actions of the incumbent. This can come about through a higher
degree of fiscal transparency, but also through a free and active press that facilitates the propagation of information about fiscal policy to the public.

8 Conclusions

Procyclical fiscal policies occur in OECD countries as well as in less advanced economies. However, the exact way in which the procyclical patterns occur differs between these groups of countries. In OECD countries we find a strong asymmetry between good and bad times. A procyclical fiscal policy is a phenomenon that is typically associated with times of economic prosperity in these advanced economies. During times of economic slowdown, on the other hand, fiscal policy is typically acyclical or countercyclical. Matters are different in less advanced economies where procyclicality is a phenomenon that is more likely to occur in bad times.

This paper offers a novel explanation of these observations by highlighting the role of fiscal transparency: a lack of fiscal transparency gives scope for rent seeking behaviour in fiscal policymaking. In times of economic slowdown or moderate economic activity, voters can restrain such rent seeking behaviour by conditioning re-election of the politicians holding office on observed performance. However, when the economy is booming it becomes easier for politicians to extract rents. The abundance of resources provides the incumbent with a temptation that is too great to resist. Fully aware of this change in circumstances, voters increase their spending demands in good times. Voters not only tolerate, but actually demand a seemingly suboptimal procyclical fiscal policy in good times. These demands are not a result of irrational or myopic thinking. Rather, the strategy of the voters ensures a second-best solution to the fiscal policy problem.

This argument can explain why fiscal policy is more procyclical in good times than in bad times in advanced economies. However, it cannot explain why the opposite would be true, i.e. that fiscal policy is more procyclical in bad times than in good times, as is the typical case in middle- and low-income countries. This brings new life to the borrowing constraints hypothesis, as proposed by Gavin and Perotti (1997).

Our model of fiscal policy also generates an original auxiliary prediction: the procyclical bias in good times should be less severe in countries where fiscal transparency is high, since a transparent budget practice alleviates the moral hazard problem between voters and politicians by improving voters’ ability to monitor the actions of their elected representatives.
We find empirical evidence in support of this prediction in OECD countries as well as in a broader sample of countries: better access to information about government policies does reduce the procyclical bias in government spending in good times.

9 References


Lane, P. R., 2003. The cyclical behaviour of fiscal policy: evidence from the OECD. Journal of Public Economics 87 2661-2675


OECD, 2005. Economic Outlook database 79. OECD

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10 Appendix

Solving the problem of the voters

Using the reduced form expressions of the constraints in (12), the Lagrangian for the problem in (11) can be written as

\[
L = \frac{g^{\frac{n-\theta}{1-\theta}} + \beta \cdot \left( (\tau(y - \beta^*e) - \beta^*d^* - \bar{p})^{\frac{1-\theta}{1-\theta}} \right)}{1-\theta} \\
- \lambda_1 \left( -(\tau(y + e) - g^* + d^*) + (1-\beta)\bar{p} \right) - \lambda_2 \left( \bar{d} - d^* - \beta p\bar{p} \right)
\]

The Kuhn-Tucker first-order conditions necessary for interior optimum are then given by

\[
\frac{\partial L}{\partial g^*} = 0 \text{ and } \frac{\partial L}{\partial d^*} = 0
\]

and the complementary slackness conditions:

\[
\lambda_1 \left[ -(\tau(y + e) - g^* + d^*) + \bar{p}(1-\beta) \right] = 0, \lambda_1 \geq 0 \\
\lambda_2 \left[ \bar{d} - d^* - \beta p\bar{p} \right] = 0, \lambda_2 \geq 0
\]

As explained in the text, the constraint \( \tau(y + e) - g^* + d^* \geq (1-\beta)\bar{p} \) must be satisfied with equality in optimum, since voters could otherwise raise \( g^* \) without violating either of the constraints. Thus, we are left with two possible cases:

**Case 1**: \( \lambda_2 = 0 \) (the constraint \( \bar{d} - d^* \leq \beta p\bar{p} \) is unbinding). Combining the Kuhn-Tucker first-order conditions with the complementary slackness conditions then gives the solution candidate

\[
g^* = \tau y - \bar{p}(1+\beta)^{-1} \\
d^* = -\tau e - (1+\beta)^{-1} \beta^*\bar{p} \tag{A.1}
\]

The solution candidates for political rents and government consumption in period 2 can then be found by substituting these expressions into the government budget constraint. For this to
be a solution candidate, we must at the same time ensure that the constraint $\bar{d} - d^* \leq \beta p \bar{r}$ is indeed satisfied. This implies that (A.1) is only a solution candidate if

$$p \geq \frac{\bar{d} - d^*}{\beta \bar{r}} \iff \varepsilon \leq \frac{p - \beta}{1 + \beta} \left( \frac{\beta \bar{r}}{\tau} - \frac{\bar{d}}{\tau} \right)$$ (A.2)

Case 2): $\lambda_2 > 0$ (the constraint $\bar{d} - d^* \leq \beta p \bar{r}$ is binding). In this case both constraints are satisfied with equality and we can find a solution candidate directly by solving these two equations for the two unknowns, $g^*$ and $d^*$. This yields the solution candidate

$$g_i^* = \tau \cdot y_1 - \tau (1 - \beta (1 - p)) + \bar{d}$$
$$d^* = \bar{d} - p \beta \bar{r}$$ (A.3)

We must now determine which of the two candidates is the actual solution. First, note that if the condition in (A.2) is not satisfied (case 1) does not deliver any solution candidate. Hence, in this situation case 2) gives a unique solution candidate and, given the concavity of the objective function, this must then be the solution. On the other hand, if (A.2) is in fact satisfied then the solution candidate in case 1) yields the highest voter utility and it must therefore be the actual solution (this can be seen by noting that government consumption in case 1) is in each period a weighted average of the case 2) levels of government consumption in period 1 and period 2. The concavity of the utility function then implies that the case 1) candidate yields higher utility than the case 2) candidate).

To sum up, whenever the condition in (A.2) is satisfied, the solution to the voters’ problem is given by the expressions in (A.1). Whenever (A.2) is not satisfied, the solution is given by the expressions in (A.3) Comparing with the expressions in section 2.3, we see that this is indeed the solution postulated in the text.
Figure 1. The reaction of government consumption to a positive output shock

*Panel A: Low transparency*  
*Panel B: High transparency*

Figure 2: The impact of output fluctuations on government spending

**Table 1: Theoretical predictions about the effect of output fluctuations on fiscal policy**

<table>
<thead>
<tr>
<th>Predicted effect of an increase in the level of economic activity</th>
<th>Unadjusted variables</th>
<th>Cyclically adjusted variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expenditure</td>
<td>Revenue</td>
</tr>
<tr>
<td><strong>Good times</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Bad times</strong></td>
<td>0</td>
<td>+</td>
</tr>
</tbody>
</table>

Notes:
(1) The graphs in Panel A are based on estimation results from Table 2, columns(4)-(6)
(2) The graphs in Panel B are based on estimation results from Table 6, column (8)
Table 2: Asymmetric Response of the Spending Side of the Government Budget

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyc. Adj. Current Disbursements excl. interest as percentage of potential GDP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimation method:</td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
</tr>
<tr>
<td>$\text{gap} \cdot \text{Cyc. Adj. Current Disbursements excl. interest as percentage of potential GDP}$</td>
<td>0.053</td>
<td>0.018</td>
<td>0.019</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$(0.05)$</td>
<td>$(0.05)$</td>
<td>$(0.05)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{gap} \cdot d_{it}^{\text{pos}}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.799</td>
<td>0.990</td>
<td>0.268</td>
<td>0.200</td>
<td>0.135</td>
<td>0.125</td>
<td>0.078</td>
</tr>
<tr>
<td>$(0.25)$</td>
<td>$(0.38)$</td>
<td>$(0.08)$</td>
<td>$(0.07)$</td>
<td>$(0.05)$</td>
<td>$(0.03)$</td>
<td>$(0.04)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{gap} \cdot (1 - d_{it}^{\text{pos}})$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.036</td>
<td>-0.069</td>
<td>0.023</td>
<td>-0.021</td>
<td>0.082</td>
<td>0.067</td>
<td>-0.092</td>
</tr>
<tr>
<td>$(0.06)$</td>
<td>$(0.08)$</td>
<td>$(0.04)$</td>
<td>$(0.05)$</td>
<td>$(0.02)$</td>
<td>$(0.02)$</td>
<td>$(0.03)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$d_{it}^{\text{pos}}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-1.478</td>
<td>-1.480</td>
<td>-0.428</td>
<td>-0.241</td>
<td>-0.255</td>
<td>-0.156</td>
<td>-0.220</td>
</tr>
<tr>
<td>$(0.73)$</td>
<td>$(0.93)$</td>
<td>$(0.22)$</td>
<td>$(0.19)$</td>
<td>$(0.12)$</td>
<td>$(0.06)$</td>
<td>$(0.11)$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time dummies: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Control variables included: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
No of observations: 257 257 257 257 257 257 257 257 244 257

Notes:

1. * *, **, and *** indicate significance on a 10%, 5% and 1% level, respectively.
2. The following control variables are included in all columns: lagged dependent variable, inflation rate, NAIRU, public debt in previous year, election year dummy, log of trend income, sum of exports and imports as a share of GDP and demographic dependency ratio. A time invariant dummy for majoritarian electoral system is included in columns (1) and (4).
3. For OLS and Within estimations all output gap variables are instrumented with their one time lagged level value.
4. GMMSYS uses level lags from 2 to 12 of the lagged dependent variable in its differenced equation. In this equation the output gap variables are instrumented using their own two times lagged level values. For the level equation of GMMSYS the lagged dependent variable as well as the output gap variables are instrumented by their own one time lagged differed values.
5. In no case, except for Social Security Benefits, did the m2 test for no second order autocorrelation in the differenced equation reject. Since the m3 test for no third order autocorrelation did not reject we used the level lags 3 to 12 as instruments of the lagged dependent variable for Social Security Benefits.
6. Columns (7) to (10) only show results using the GMMSYS estimator, however, the results using OSL and Within are roughly the same and are thus omitted.
Table 3: Interacting the output gap with single fiscal transparency dummies

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cyc. Adj. Cur. Dis. excl. interests / pot. GDP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Estimation method:</strong></td>
<td>Accrual accounting (yes = transparent)</td>
<td>Whether the government generally presents more than one supplementary budget to the legislature in each fiscal year (no = transparent)</td>
<td>Whether non-financial performance data is routinely included in the budget documentation presented to the legislature (yes = transparent)</td>
<td>Whether there is a legal requirement that the budget documentation contain a projection of expenditure beyond the next fiscal year (yes = transparent)</td>
<td>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)</td>
<td>Whether the in-year financial reports are audited (yes = transparent)</td>
<td>Whether special reports on the fiscal outlook are released prior to an election (yes = transparent)</td>
<td>Whether the economic assumptions used in the budget are subject to independent review (yes = transparent)</td>
<td>Whether the budget discusses the impact that variations in the key economic assumptions would have on the budget outcome (yes = transparent)</td>
<td>Whether the government regularly produces a report on the long term (10-40 years) outlook for public finances as a whole (yes = transparent)</td>
<td>Whether the government is required to make regular actuarial estimates for social security programs (yes = transparent)</td>
<td>Whether the government is required to report contingent liabilities on a regular basis (yes = transparent)</td>
</tr>
<tr>
<td><strong>Sign on transparency dummy interacted with positive output gap</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>****</td>
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<td>***</td>
<td>***</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sign on transparency dummy interacted with negative output gap</strong></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>***</td>
<td>*</td>
<td>*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time dummies:</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>No of observations</strong></td>
<td>257</td>
<td>257</td>
<td>257</td>
<td>257</td>
<td>257</td>
<td>223</td>
<td>257</td>
<td>257</td>
<td>257</td>
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</tr>
</tbody>
</table>

**Notes:**

1. * *, **, and *** indicate significance on a 10%, 5% and 1% level, respectively.
2. GMMSYS uses level lags from 2 to 12 of the lagged dependent variable in its differenced equation. In the difference equation the output gap variables are instrumented using their own two times lagged level values. For the level equation of GMMSYS the lagged dependent variable as well as the output gap variables are instrumented by their own one time lagged differenced values.
3. The m2 test was performed for all estimations and in no case was the validity of the instruments rejected.
Table 4: Interacting the output gap with transparency

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation method:</td>
<td>GMMSYS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$gap_{it} \cdot d_{it}^{pos}$</td>
<td>0.322 (0.08) ***</td>
<td>0.396 (0.08) ***</td>
<td>0.373 (0.09) ***</td>
<td>0.418 (0.09) ***</td>
<td>0.248 (0.08) ***</td>
</tr>
<tr>
<td>$gap_{it} \cdot (1 - d_{it}^{pos})$</td>
<td>-0.289 (0.10) ***</td>
<td>-0.299 (0.08) ***</td>
<td>-0.325 (0.08) ***</td>
<td>-0.312 (0.08) ***</td>
<td>-0.163 (0.03) ***</td>
</tr>
<tr>
<td>$\text{transp}<em>{11} \cdot gap</em>{it} \cdot d_{it}^{pos}$</td>
<td>0.029 (0.02) *</td>
<td>- (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.01) ***</td>
<td>- (0.01) ***</td>
</tr>
<tr>
<td>$\text{transp}<em>{11} \cdot gap</em>{it} \cdot (1 - d_{it}^{pos})$</td>
<td>0.066 (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.01) ***</td>
<td>- (0.01) ***</td>
</tr>
<tr>
<td>$\text{transp}<em>{10} \cdot gap</em>{it} \cdot d_{it}^{pos}$</td>
<td>- (0.02) **</td>
<td>- (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.01) ***</td>
<td>- (0.01) ***</td>
</tr>
<tr>
<td>$\text{transp}<em>{10} \cdot gap</em>{it} \cdot (1 - d_{it}^{pos})$</td>
<td>- (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.02) ***</td>
<td>- (0.01) ***</td>
<td>- (0.01) ***</td>
</tr>
<tr>
<td>$d_{it}^{pos}$</td>
<td>-0.219 (0.16)</td>
<td>-0.268 (0.17)</td>
<td>-0.081 (0.16)</td>
<td>-0.129 (0.16)</td>
<td>-0.172 (0.12)</td>
</tr>
</tbody>
</table>

Notes:
1. See notes (1) to (5) in Table 2.
2. $\text{transp}_{11}$ is the aggregation of the dummies in Table 3 (except for question 6).
3. $\text{transp}_{10}$ is $\text{transp}_{11}$ without question 9 from Table 3.

Time dummies: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
Control variables included Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes
No of observations 257 257 257 257 257 244 244 257 257
Table 5: Central government expenditure and the output gap

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation method</td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
<td>OLS-IV</td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
</tr>
<tr>
<td>$gap_{i,t}$</td>
<td>0.275</td>
<td>0.284</td>
<td>0.050</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.170)</td>
<td>(0.156) *</td>
<td>(0.057)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$gap_{i,t} \cdot d_{it}^{pos}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.574</td>
<td>0.558</td>
<td>0.902</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(0.455)</td>
<td>(0.292) *</td>
<td>(0.673)</td>
<td>(0.113)</td>
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<tr>
<td>$gap_{i,t} \cdot (1 - d_{it}^{pos})$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.318</td>
<td>0.064</td>
<td>0.164</td>
<td>0.135</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(0.382)</td>
<td>(0.190)</td>
<td>(0.629)</td>
<td>(0.141)</td>
</tr>
<tr>
<td>$d_{it}^{pos}$</td>
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<td>-</td>
<td>-</td>
<td>-1.377</td>
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<td>-</td>
<td>(2.188)</td>
<td>(3.225)</td>
<td>(3.225)</td>
<td>(0.374)</td>
</tr>
</tbody>
</table>

| Time dummies        | Yes | Yes | Yes | Yes | No | Yes | Yes |
| Control variables included | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of observations | 934 | 939 | 939 | 934 | 934 | 939 | 939 |

Notes:

(1) *, **, and *** indicate significance on a 10%, 5% and 1% level, respectively.
(2) The following control variables are included in all columns: lagged dependent variable, inflation rate, election year dummy, log of trend income, sum of exports and imports as a share of GDP and demographic dependency ratio. The OLS estimations include time invariant dummy variables for the electoral system and democracy which limits the sample size.
(3) For OLS and Within estimations all output gap variables are instrumented with their one time lagged level value.
(4) GMMSYS uses level lags from 2 to 12 of the lagged dependent variable in its differenced equation. In this equation the output gap variables are instrumented using their own two times lagged level values. For the level equation of GMMSYS the lagged dependent variable as well as the output gap variables are instrumented by their own one time lagged differenced values.
(5) The m2 test was performed in each of the GMM estimations and in no case was the validity of the instruments rejected.
Table 6: Expenditure reactions in OECD versus non-OECD countries and effect of voter information

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
<td>OLS-IV</td>
<td>Within-IV</td>
<td>GMMSYS</td>
<td>OLS-IV</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
<td>GMMSYS</td>
</tr>
<tr>
<td>gap_{it} \cdot \text{OECD}_{it}</td>
<td>0.689</td>
<td>0.429</td>
<td>0.009</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>(0.93)</td>
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<td>(2.98)</td>
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<td>(22.66)</td>
<td>(0.61)</td>
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<td>(3.60)</td>
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**Notes:**
(1) See Table 5.
(2) Test for nonOECD vs. OECD and gap \cdot d^{pos} vs. gap \cdot (1 - d^{pos}) are all one-sided t-tests.