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Willem SAS
Public Economics

Faculty of Economics
And Business

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The effect of regional affiliation

Willem Sas*

Abstract

This paper revisits the soft budget constraint problem, pushing sub-central (state) borrowing to the limit in multi-tiered countries. Accounting for the institutional design and political practice common to many federations, bargaining and log-rolling are introduced to the analysis. In our intertemporal model, a federal legislature of *regionally* elected representatives bargains on federal grants going to the states. As a result, voters will elect federal candidates in favour of looser state public spending than otherwise expected. This strategic voting not only leads to overly generous bailout policies. Also, and compared to a setting where federal decision making does *not* follow from bargaining and regional affiliation, states over-borrow more inefficiently. Allowing for heterogeneity in state income and population does not affect this inefficient outcome. Lower relative per capita incomes even boost federal generosity and subsequent over-borrowing by the states.

*CES, KU Leuven

1 Introduction

In most multi-tiered countries today, sub-central governments only partially cover expenditures with own revenue raising. Indeed, the share of lower-level spending left unfinanced by subnational revenues was 35,4% across OECD countries in 1998 (World Bank, 2000), and runs a lot higher in non-OECD countries. Such a 'vertical fiscal gap' is usually bridged by use of grants going from the federal to the state level, or by state borrowing when allowed.[1] Now, whereas convincing arguments in favour of vertical fiscal gaps abound[2], this paper zooms in on a potentially substantive drawback. The 'soft budget constraint' (SBC) problem.

Following Rodden et al. (2003), a state government faces a soft budget constraint when it can 'manipulate its access to funds in undesirable ways'. Whenever a central government is willing to finance subnational deficits the argument goes, forward-looking state politicians have an incentive to over-borrow (Besfamille and Lockwood, 2008). A dynamic commitment problem in other words, where the center cannot credibly commit to a 'no bailout' policy ex ante, and states tap into the common pool of national funds by piling up debt.[3] Various studies have empirically identified such commitment problems, which can result both in last minute rescue attempts in the face of imminent defaults, or in routine gap-filling discretionary transfers.[4]

Contributing to the growing body of theoretical work on soft budget constraints, we focus on what is key to the issue. Why would the center be willing to step in when public finances take a turn for the worse at state-level?[5] So far this systematic federal intervention has mainly been rationalised from a *size* or an *equalisation* perspective (Breuillé and Vigneault, 2010). Wildasin (1997) finds a state's size to positively affect its likelihood of obtaining a bailout. This 'too big to fail' argument is challenged by Crivelli and Staal (2013), by modeling the spill-overs of state public provision differently. In both papers however, the central government's incentive to prop up public spending in under-performing states stems precisely from the size of these spill-overs. Not so in most work, where the aim of *equalising* marginal utility of public provision across regions is what compels the central government

[1] In what follows we only focus on the regional tier within a federation, being the state level. Much of our results would also apply to the municipal level however.

[2] See e.g. Boadway & Shah (2009) for an overview of the extensive literature on Fiscal Federalism.

[3] See also Kornai et al. (2003) for a wider discussion of the soft budget constraint problem in economics, and Vigneault (2007) for a specific overview in fiscal federalism.

[4] For country specific studies see e.g. Jones, Sanguinetti and Tommassi (1999) for Argentina, Poterba (1995) and Von Hagen (1991) for US States, Fink and Stratmann (2011) and Baskaran (2012) for Germany, Borge and Rattso (2003) for Norway, Von Hagen and Dahlberg (2004) for Sweden, Garcia-Mila, Goodspeed and McGuire (2002) or Sorribas-Navarro, (2010) for Spain and Bordignon (2000) for Italy. A cross-country analysis was undertaken by Rodden (2002).

[5] Which of course does not mean that other aspects deserve less attention. Breuillé et al. (2006) or Köthenburger (2004) e.g. discuss the effect of tax competition on the SBC problem. Inman (2001) incorporates a reputation for hard budget constraints on the part of the federal government. Besfamille and Lockwood (2008) question whether a hard budget constraint is always best from an efficiency point of view. Akai and Silva (2009) cover the impact of income redistribution on over-borrowing. Breuillé and Vigneault (2010) lastly, look at a federal setup consisting of three tiers of government, in stead of the usual two.

to intervene.[6] The intuition here is that a benevolent central government keeps the well-being of all of its citizens close to heart, to the extent that bailing out a profligate state becomes inevitable as soon as e.g. police departments or schools start closing. So even in the absence of spill-overs, bailouts may come about. Now, even though both size and equalisation go a long way in explaining soft budget constraints, surely other considerations have a part to play as well.

Strikingly, the question whether *political* and *institutional* factors give rise to overly generous central governments has remained on the fringe of theoretical analysis. Goodspeed's (2002) political economy model is a notable exception. Here too a central government nudges up grants in response to state borrowing. To keep welfare from falling as before, but just as well to maximize expected votes. Depending on a probability of re-election which is assumed different across states, the federal level decides 'as one' in which states to keep welfare up and collect the most votes. Arguably, such a model may explain bailout behaviour in multi-tiered countries where the central level holds sway over much of regional policy or legislation (e.g. the Netherlands or Italy).[7] In such a setting, a central government can indeed relatively unilaterally decide on bailouts, united in its goal of re-election. Favouring one region over the other would then be a rational and doable strategy.[8] In full-fledged federations however, political decision making is rarely this top-down oriented, and federal politicians are far less like-minded once in office.

Consider e.g. the case of Belgium, where nationwide parties have long since disappeared from the political arena. As a result, the federal government can hardly be described as a single entity independent of state interests. Once parties win the election in their respective state and find themselves in the federal coalition, they will always defend the interests of those that keep them there: the voters of their own state. Federal decision making is therefore to a large degree interwoven with regional interests, with bargaining at the federal level serving as the mediating process.

This kind of *regional affiliation* isn't limited to the Belgian case moreover, as complex regional bargaining and log-rolling often characterize the legislative process in federations (Rodden, 2002, 2003; Cremer and Palfrey, 1999). In terms of Ducacheck's (1985) continuum, whenever majority rule starts losing ground to consensus based democracy (consociationalism), and locally elected politicians start behaving like state representatives, bargaining and logrolling become common practice in the federal government (Lijphart, 1977, 1985). By consequence, institutional design and political practice may prompt a federal government to bail out *all* states in financial distress, and not just the ones where the most votes are to be found. Since each state is to a certain extent represented in the federal government, not a single state will be allowed to fail. By trading policy votes on bailouts, federal representatives in turn secure regional public provision whenever their state runs

[6] See Caplan et al., 2000; Köthenburger, 2004; Breuillé et al., 2006; Breuillé and Vigneault, 2010; Akai and Sato, 2008; Akai and Silva, 2009.

[7] Although typically such a top-down institutional setup leaves less borrowing autonomy in regional hands. See Rodden (2002) for a cross country overview of regional borrowing autonomy indeces.

[8] Also Robinson and Torvik (2009) conceptualise bailouts as a means to transfer income to potential supporters, yet focusing on entrepreneurs, not citizens of a specific region.

into financial trouble.

On the surface, regional affiliation generates the exact same results equalisation would bring about. In both cases every single profligate state is bailed out, the impact of default on other states or on the macro-economic stability of the federation notwithstanding. Dig a little deeper though, and substantial differences emerge. We size up this specific effect of regional affiliation using the citizen-candidate approach, following Besley and Coate (2003). In such a setup, representatives participate in a federal legislature once elected locally, and start bargaining on public spending. They agree on an allocation which maximises their joint surplus, exactly the outcome regional affiliation is expected to produce. Moreover, by focusing on an intertemporal setting where states are allowed to borrow and the federal government co-finances regional spending, our model sets the stage for bailout incentives to take shape.

Putting the model to work, voters are shown to elect federal representatives with a higher preference for debt accumulation than their own preference type. Such types will mind less when the state they represent accumulates debt, or may even advocate loose regional spending. As a result, they are more generous when compensating for state borrowing as they tap the national common pool and increase federal grants. Knowing this in advance, voters will turn this behaviour to their advantage by voting in precisely such generous types.[9] Such strategic voting behaviour not only leads to overly generous bailout policies. Also, and compared to a setting where federal decision making does not follow from bargaining and regional affiliation, states over-borrow more inefficiently because of this federal generosity. Allowing for heterogeneity in state income and population does not affect this inefficient outcome lastly. Lower relative per capita incomes even boost federal generosity and subsequent over-borrowing by the states.

The rest of this paper is organised as follows. In section 2 we discuss the citizen-candidate approach in further detail, and introduce the framework of the model. Sections 3 to 5 derive the main findings regarding federal, voter and state decision making subsequently. Section 6 brooches the subject of state heterogeneity, after which section 7 concludes.

2 The framework

In the citizen-candidate model developed by Besley and Coate (1997), public provision is determined by a legislature of *locally* elected representatives. This pans out as follows in our federal configuration. Each state of the federation marks a constituency, from which one candidate is chosen to represent this respective state in the federal legislature. Representatives then band together, and start bargaining on federal public spending based on their *personal* preferences. Their behaviour at this point is described by the *utilitarian bargaining solution*, which means they will

[9] An alternative interpretation here would be that federal candidates market themselves as advocates of regional interests, to attract more votes. Such regional profiling will perform better whenever the shared sense of national unity goes wanting.

agree to a specific allocation which maximises their joint surplus.[10] This makes it a *cooperative* legislature, as opposed to e.g. minimum winning coalition systems. As for regional political decision making, state governments in our model follow the state median voter and get re-elected as long as they do.[11]

Much like Goodspeed (2002), we then set up a two-period game between our two types of players: state governments on the one hand, and the federal government on the other. Timingwise, state governments decide on taxation in both periods, and on borrowing in period 1. All built up regional debt has to be fully repaid in period 2, with interest. The federal government secondly, has only one decision to make. In period 2 it will set the grants which co-finance state public provision in that period. We assume it already decided on an initial level of grants for period 1 before play begins. This initial decision, albeit exogenous to the game, has no role to play in its dynamics.

Strategic interactions between the players on the other hand, are crucial. The *interaction between state governments* is modeled as a simultaneous Nash game, where each state takes decisions of the other states as given when deciding on taxation and borrowing in period 1. The same goes for the states' decisions on taxation in period 2. The *interaction between the federal and state governments* however, follows from a sequential Stackelberg game.

More specifically, states are Stackelberg leaders vis-à-vis the federal government, and can anticipate federal decision making. The intuition here is that state governments, over the years, have grown accustomed to the institutional set-up of the federation. Because of this, anticipating the federal government's general tendency to bargain on political consensus comes easy.[12] Each state thus takes federal bargaining into account when it decides on borrowing and taxation in period 1. Put differently, states will maximise the welfare of the median voter subject to the *reaction function* of the federal government. This function will describe how federal grant allocation in period 2 responds to state borrowing in period 1. If its derivative with respect to state borrowing is positive, state governments face a soft budget constraint and will be tempted to over-borrow.[13]

Closing the model, the *federal election process* itself is defined by a second Stackelberg game, which runs parallel to the first. This time it's the voters who, as first movers, take into account the reaction function of the federal legislature. They vote accordingly, by picking that citizen *from their ranks* whose preferences they

[10] This Utilitarian solution is motivated by the literature on universalism in legislatures (see Weingast, 1979, as well as Inman and Fitts (1990))

[11] Of course, political decisions on a state level are typically made by legislatures consisting of elected representatives as well. Our simplification here aims to capture the greater commonality of interests across districts of a single state than across states. Besley and Coate (2003) essentially maintain the same assumption when they model state decision making as done by a *single* elected representative. Since the preference type of each state's median and mean voter is assumed to be identical, an assumption we maintain in what follows, both approaches coincide.

[12] Regional affiliation thus also directly explains where actual bailout expectations of state politicians come from, unlike other theoretical models.

[13] A second interaction with the federal government comes about in period 2 however, when the state governments again decide on taxation. Here the states move simultaneously with the federal government, taking its decision on second period grants as given. This assumption captures the intuition that state governments only anticipate federal behaviour with respect to borrowing decisions, but have no clue how the centre will respond to state taxation.

expect will maximise individual welfare. By consequence, each citizen is a potential candidate for federal office. The elections are held only once, and simultaneously to state decision making in period 1. This means that state governments take federal election outcomes as given, just as voters take state policy as given, which is a logical assumption. Both state governments and voters are Stackelberg leaders with respect to the federal political apparatus and its bargaining dynamics, but neither can predict the actual outcome of elections. Foreseeing which exact *type* of politician will 'man' the political institutions once elected, be it on the state or federal level, lies beyond their grasp.

As Besley and Coate (2003) have shown lastly, this citizen-candidate approach 'creates incentives for voters to *strategically delegate* by electing representatives with high demands for public spending'. Especially when spill-overs are absent, this will lead to over-provision in a centralized system. Now, whilst Besley and Coate use their model to provide stronger footing for the Oates decentralisation theorem (the higher the spill-overs, the better the case for centralisation), we employ it here to capture federal decision making in light of the soft budget constraint problem.[14]

Since our model is to be solved using backward induction, the following section starts out with the federal government's problem. The federal government's reaction function and its derivative, which will determine whether the federal government follows a hard or soft budget constraint, is discussed here in detail. Section 4 then tackles the federal voting process, followed by the regional government's decision making presented in section 5.

3 The federal government

We assume a federation with m states, governed by a cooperative legislature on the federal level, and where the federal legislators (representatives) will maximise the following objective function:

$$Max_{g_{i2}} \sum_{i}^{m} \{U_{iE}\} \tag{1}$$

As explained above and expressed by (1), the m elected representatives E decide on public spending according to the Utilitarian bargaining solution. Maximising the sum of their own utilities, they arrive at the optimal level of period 2 per capita grants for each state (g_{i2}). How a specific voter of type j rose to power in state i, in other words why his preferences were chosen above the preferences of the n_i voters living in a specific state i, will be dealt with in section 4. For now, it suffices to see how utility of an elected legislator E representing state i is defined by per-

[14] By embracing the citizen-candidate approach we also circumvent the usual problems related to Downsian models. In models with a Downsian tinge, such as Goodspeed's, citizens care about policies whilst politicians are infinitely pliable and simply want to get re-elected. A selection/voting mechanism explaining how the government rose to power to begin with, is lacking as well. The citizen-candidate model remedies both problems by having citizens select a candidate which acts on his *own* preferences once in office, whatever these may be. See Besley (2011) for further argumentation.

capita public spending in his state in period $1(X_{i1})$ and period $2(X_{i2})$, as well as his private consumption in period $1(C_{i1})$ and period $2(C_{i2})$:

$$U_{iE} = ln(X_{i1}) + ln(X_{i2}) + z\,(C_{i1}) + w\,(C_{i2})$$

With z and w increasing and concave. Laying out the constraints under which the objective function is maximised, will clarify things further. We begin with public spending in period 1 in state i:

$$X_{i1} = g_{i1} + t_{i1}Y_{i1} + \lambda^*_{iE}B_{i1}$$

Here g_{i1} will be the per capita federal grant allocated to state i in period 1. As specified above, this grant will be exogenous to the game. With t_{i1} the tax rate set by state i in period 1, and Y_{i1} the per-capita private income (exogenous) of voters living in state i, $t_{i1}Y_{i1}$ will be the *state*'s portion in public spending. Notice that we have assumed all voters living in the same state to have identical private incomes. In fact, the only difference between voters within a certain state, will be their preference type regarding *debt accumulation*. We assume people to have preferences when it comes to state debt, which may be psychologically tinged (dislike of being indebted) or simply irrational (some people just don't like the word). Yet myopia, rational expectations or a belief in loose spending policies could also be reflected by such preferences. The state government will then make its borrowing decision in period $1(B_{i1})$ taking into account these preferences (which will be the median voter's), but more on this in section 5.

Each state is thus characterised by a range of debt preference types $\left[0, \bar{\lambda_i}\right]$, one type per citizen, where we assume the mean type λ_{im} will be equal to the median type. We denote the preference type of the representative elected in state i as λ^*_{iE} . His utility, and also the federal grant g_{i2} as we will see, is thus defined by public spending X_{i1} set according to this personal preference type. Actual public spending may diverge from this preferred amount however, since the state government follows the median voter. Moving on to public spending in period 2, which has the borrowed amount of period 1 subtracted at the going (exogenous) interest rate r, we get:

$$X_{i2} = g_{i2} + t_{i2}Y_{i2} - \lambda^*_{iE}B_{i1}(1+r) \tag{2}$$

Private consumption subsequently, will simply be the remaining after tax private income:

$$C_{i1} = Y_{i1}(1 - t_{i1})$$

$$C_{i2} = Y_{i2}(1 - t_{i2} - t_{f2})$$

With t_{f2} the federal tax rate in period 2. The federal budget constraint itself lastly, is always balanced through taxes on national incomes:

$$t_{f2}\sum_{i}^{m} n_i Y_{i2} = \sum_{i}^{m} n_i g_{i2}$$

Keeping things simple, we assume the number of voters as well as per-capita private incomes are identical *across* states. Deriving and rewriting the first order conditions of the problem, we get an expression for the optimal level of the per capita federal grant going to state i (see Appendix A):

$$g_{i2}^{*} = \frac{\partial C_{i2}}{\partial w} - t_{i2}Y_{i2} + \lambda_{iE}^{*}B_{i1}(1+r) \tag{3}$$

First of all, the grant size and the marginal utility of private consumption of voters living in state i, are shown to be inversely related. Equally logical, we see that grants will be lower the higher state i's spending will be. Lastly, and most importantly here, (3) tells us how the federal government responds to state borrowing. The first derivative of this reaction function w.r.t. state i's borrowing decision in period 1 will be positive:

$$\frac{\partial g_{i2}^{*}}{\partial B_{i1}} = \lambda_{iE}^{*}(1+r) > 0 \tag{4}$$

As is the case in Goodspeed's (2002) model, we have thus modeled a situation where the federal government finds it optimal to increase grant allocation when states borrow more. The reason is simple. Since state borrowing hollows out welfare in period 2 as can be seen in (2), the federal response will be to compensate for this drop in public spending by use of its grants system. This is what Goodspeed calls a 'soft budget constraint policy' which will lower the opportunity cost of borrowing for the state governments, as we will see in section 5. So far the story runs parallel to the equalisation approach to modeling soft budget constraints. Yet we also learn from (4) that the federal response to state borrowing depends on the preference type of the respective elected legislator for that state. If a state is represented by a legislator who for some reason isn't too keen on accumulating debt, the grant increase will be tempered. The question then evidently becomes, of which preference type will this legislator be? Examining the federal voting process provides us with an answer.

4 The federal voting process

Voters in each state will pick a federal representative from among their ranks, knowing full well how this representative will behave once in office. In other words, voters are perfectly informed of the federal bargaining *process* described above. Deciding on which preference type to send to the federal level (λ_{iE}), they will consequently maximise personal welfare based on this knowledge. In other words, the federally optimised decision on grants (g_{i2}^{*}) is included in their optimisation. Voter j of state i will thus solve the following problem to decide on his vote:

$$Max_{\lambda_{iE}} ln(X_{i1}) + ln(X_{i2}) + z\left(C_{i1}\right) + w\left(C_{i2}\right)$$

Subject to the same constraints as before, only now with g_{i2} specified by the federal government's reaction function $g_{i2}^{*}(\lambda_{iE})$:

$$g_{i2}^{*} = \frac{\partial C_{i2}}{\partial w_i} - t_{i2}Y_{i2} + \lambda_{iE}B_{i1}(1+r) \tag{5}$$

Rewriting the first order conditions of this problem, we get the following expression (see Appendix B):

$$\lambda_{iE} = \lambda_{ij} + \frac{\frac{\partial C_{i2}}{\partial w}\sum_{j\neq i}^{m}(n_j Y_{j2})}{n_i Y_{i2} B_{i1}(1+r)} \tag{6}$$

As (6) shows, a voter of type j will vote for a candidate which is more favourably inclined towards accumulating debt than he himself is ($\lambda_{iE} > \lambda_{ij}$). He will vote strategically, making full use of the knowledge that if he votes for a candidate with such preferences, his welfare will go up. Indeed, as can be seen in (5), the per capita grant increases in λ_{iE}. The fact that the lion's share of this grant increase is financed by the rest of the federation makes this a welfare improving strategy from voter j's perspective. This is a manifestation of the 'common pool problem', which can also be seen in (6) where λ_{iE} increases as state i's share in total national income decreases. Now, for n_i voters in region i, and assuming preferences are single peaked, the median voter with preference λ_{im} will embody the majority in this state. The representative of state i will thus be of the following preference type:

$$\lambda_{iE}^{*} = \lambda_{im} + \frac{\frac{\partial C_{i2}}{\partial w}\sum_{j\neq i}^{m}(n_j Y_{j2})}{n_i Y_{i2} B_{i1}(1+r)} \tag{7}$$

We summarise in proposition 1:

> **Proposition 1.** *In a federation where a cooperative legislature of locally elected representatives bargains on federal grants going to the states, voters will elect candidates with a higher preference for debt accumulation than their own preference.*

The intuition here is that such candidates will mind less when the state they represent accumulates debt, or may even advocate looser regional spending. As a result, they are more generous when compensating for state borrowing as they tap the national common pool and increase federal grants. Knowing this in advance, voters will turn this behaviour to their advantage by voting in precisely such generous types. An alternative interpretation here would be that federal candidates market themselves as champions of regional interests, to attract more votes. Such regional profiling will perform better whenever a shared sense of national unity goes wanting. In any case, this result which will prove crucial when analysing the decision making of state governments in what follows.

5 The state government

As explained above, a government of state i will maximise the welfare of the median voter of type λ_{im}. To decide on spending and borrowing furthermore, it also takes

federal bargaining into account. However, since the federal vote is held simultaneously to state decision making, state governments cannot predict its outcome. In other words, the state government will take up the reaction function g^*_{i2} in its optimisation problem without knowing of which type λ^*_{iE} its representative on the federal level will be. We consequently get the following problem:

$$Max_{B_{i1},t_{i1},t_{i2}} U_{im} = ln(X_{i1}) + ln(X_{i2}) + z\left(C_{i1}\right) + w\left(C_{i2}\right)$$

Subject to the same constraints as before. Deriving and rewriting the first order conditions of this problem, we arrive at the following expression (see Appendix C):

$$\frac{\frac{\partial U_{im}}{\partial X_{i1}}}{\frac{\partial U_{im}}{\partial X_{i2}}} = \left\{ R_i \frac{\partial g^*_{i2}}{\partial B_{i1}} + \left(\lambda_{im}(1+r) - \frac{\partial g^*_{i2}}{\partial B_{i1}} \right) \right\} \frac{1}{\lambda_{im}} \tag{8}$$

With $R_i = \frac{n_i Y_{i2}}{\sum_i^m n_i Y_{i2}}$, or state i's share in total federal income. Similar to Goodspeed's result, (8) is crucial to the model. It expresses the Marginal Rate of Substitution (MRS) between public spending in period 1 and period 2, and will thus be the implicit cost of borrowing faced by state i. The incentive for the state government to over-borrow emerges here. To see this, assume first of all that the federal government would follow a hard budget constraint policy ($\frac{\partial g^*_{i2}}{\partial B_{i1}} = 0$), so that the MRS reduces to $(1+r)$. State borrowing would then be efficient. Now, when the federal government follows a SBC policy (where $\frac{\partial g^*_{i2}}{\partial B_{i1}} > 0$) on the other hand, this clearly will have an impact on the MRS. As soon as the cost of borrowing comes out below $(1+r)$, we know the state will inefficiently over-borrow. This will be due to a trade-off between two sorts of costs, being the tax cost and the opportunity cost of borrowing.

The first term on the LHS of (8) describes the tax cost of borrowing. As the federal grant increases when state i borrows federal taxation follows suit, to which state i contributes according to its share in total federal revenue. The second term in (8) subsequently, represents the opportunity cost of X_{i1} in terms of foregone X_{i2}. This cost will be reduced since the federal government increases grants if state i borrows, as can be seen in (8). Less second period public consumption will need to be given up to pay off the debt incurred in period 1 in this case. Now, when this reduction in opportunity costs outweighs the increase in tax costs, state i will over-borrow. Since states carry but a fraction of the tax cost, again because of the common pool effect, we expect this to be the case.

Indeed, plugging (4) into our expression for the MRS (8) and rewriting, we obtain:

$$\frac{\frac{\partial U_{im}}{\partial X_{i1}}}{\frac{\partial U_{im}}{\partial X_{i2}}} = \left\{ 1 + \left(R_i - 1\right) \frac{\lambda^*_{iE}}{\lambda_{im}} \right\} (1+r) < (1+r)$$

Keeping in mind that R_i as a share of total federal income will always be smaller than 1, the MRS will clearly be smaller than $(1+r)$. We have thus shown that when federal decision making is modeled by use of the citizen-candidate model, states will not only face a soft budget constraint but over-borrow because of it. What is more, the borrowing cost faced by states in our setting will be lower compared to

a situation where the federal government simply follows the median voter in each state. In this case λ_{im} would be equal to λ^*_{iE}, so that the MRS reduces to:

$$\frac{\frac{\partial U_{im}}{\partial X_{i1}}}{\frac{\partial U_{im}}{\partial X_{i2}}} = \{\lambda_{im} R_i\} \frac{(1+r)}{\lambda_{im}} < (1+r)$$

Which is clearly larger than the MRS obtained in our model, rewritten by plugging in (7) for λ^*_{iE} in (8):

$$\frac{\frac{\partial U_{im}}{\partial X_{i1}}}{\frac{\partial U_{im}}{\partial X_{i2}}} = \left\{ \lambda_{im} R_i + \left(\frac{\frac{\partial C_{i2}}{\partial w} \sum_{j \neq i}^{m} (n_j Y_{j2})}{n_i Y_{i2} B_{i1} (1+r)} \right) (R_i - 1) \right\} \frac{(1+r)}{\lambda_{im}} \lll (1+r)$$

This result suggests the soft budget constraint to be an even more pressing problem when regional affiliation has the upper hand. Compared to a federal government which behaves in the usual Downsian fashion and follows the median voter, a cooperative legislature over-borrows more inefficiently. Set against a benevolent government which maximises the welfare of representative consumers, we get the same result. Indeed, in such a setting each state's representative consumer is also its median voter. We summarise in proposition 2:

> **Proposition 2.** *In a federation where a cooperative legislature of locally elected representatives bargains on public spending, states face a soft budget constraint and over-borrow inefficiently. Compared to a setting where federal decision making does* ***not*** *result from bargaining and regional affiliation, states over-borrow more inefficiently.*

At first glance, such a result may readily be harnessed as further critique on vertical fiscal imbalances. On the other hand, and in light of the arguments in favour of imbalances as referred to in our introduction, a more constructive stance is also at hand. From this perspective, proposition 2 can be seen as adding more weight to recent calls for installing truly *federal* constituencies.[15] Indeed, when federal politicians are held accountable by all voters of a federation, and not just by a favoured regional fraction, we return to the outcome obtained in a median voter model (or a benevolent government model with representative consumers). The excess in inefficiency would thus be undone without altering grant policies, grants which can be welfare enhancing for a variety of other reasons.[16]

Secondly, proposition 2 might also render Goodspeed's (2002) proposed solution to the SBC problem more effective. As Goodspeed pointed out, when the federal government responds to increased state borrowing not only by bumping up grants going to the borrowing state in question, but to *all* states, things take a turn for the better. In this case the tax cost to borrowing could have a disciplining effect, since states would realise they are indeed also partially financing grants going to *other* states. When footing this bill becomes too costly compared to the decrease in opportunity cost (which stays the same), state governments are less tempted to over-borrow. If this increase in tax costs exactly offsets the drop in opportunity

[15] For Belgium, see e.g. Horowitz (2009), or Deschouwer & Van Parijs (2009).
[16] Again, see Boadway & Shah (2009).

costs, the SBC policy would even result in efficient borrowing decisions. Since our model has the federal government doling out overly generous grants, it could deliver a stronger disciplining mechanism. Of course, such a setting needs to be modeled to fully grasp its dynamics, which is why Goodspeed suggests adding spill-overs to the model after all. When state public spending also affects the welfare of non-residents, the federal government may indeed have good reason to increase all grants when only one state borrows more. A promising avenue for further research.

Question also remains how our model of regional affiliation responds to state heterogeneity in population size and income. We tackle this issue in the next paragraph.

6 Heterogeneous states

Allowing for variety in state population size as well as incomes, we now solve the same optimisation for the federal government and the federal voting process (see appendix D). This gives us the following result for the federal vote in state i:

$$\lambda^*_{iE} = \lambda_{im} + \left(\frac{\partial C_{i2}}{\partial w_i} \frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} - \frac{1}{\sum_k^m \frac{\partial w_k}{\partial C_{k2}} \frac{n_i Y_{k2}}{\sum_k^m n_k Y_{k2}}} \right) \frac{1}{B_{i1}(1+r)} \tag{9}$$

Keeping things simple, and to focus ideas, we assume the marginal utility of private consumption to be equal across states, so that:

$$\lambda^*_{iE} = \lambda_{im} + \frac{\partial C_{i2}}{\partial w_i} \left(\frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} - \frac{1}{\sum_k^m \frac{n_i Y_{k2}}{\sum_k^m n_k Y_{k2}}} \right) \frac{1}{B_{i1}(1+r)}$$

The question whether the elected preference type in region i will be larger than the median voter's type now boils down to the following trade-off:

$$\frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} \lessgtr \frac{1}{\sum_k^m \frac{n_i Y_{k2}}{\sum_k^m n_k Y_{k2}}}$$

Simplified this becomes:

$$\frac{1}{Y_{i2}} > \frac{1}{\sum_k^m Y_{k2}} \tag{10}$$

By consequence, when per capita income differs across states, voters will also elect federal candidates with higher debt preferences than their own. Moreover, lower relative per capita incomes has voters elect even more generous federal representatives. Indeed, plugging (10) into (9) yields:

$$\lambda^*_{iE} = \lambda_{im} + \left(\frac{1}{Y_{i2}} - \frac{1}{\sum_k^m Y_{k2}} \right) \frac{1}{B_{i1}(1+r)}$$

Where we see between brackets how lower per capita income in state i as compared to incomes in other states, drives up the federal voting outcome λ^*_{iE} in that

same state. The inefficient over-borrowing resulting from this federal generosity will thus be more outspoken in states with lower relative per capita incomes.

7 Concluding remarks

This paper revisited the soft budget constraint problem, empirically shown to arise in many multi-tiered countries. New light was shed on the incentives at work when lower-level (state) governments over-borrow, and are later on bailed out by the federal level. Since complex regional bargaining and log-rolling often characterize political decision making on this federal level, we sized up the effect of such 'regional affiliation' using the citizen-candidate approach pioneered by Besley and Coate (1997).

In our theoretical setup, representatives join a federal legislature once elected regionally, and start bargaining on public spending. They agree on an allocation which maximises their joint surplus, which is exactly the outcome regional affiliation produces in real life. Whenever locally elected politicians start behaving like state representatives in the federal government, the compromise will be a well-balanced mix of regional preferences. Moreover, by focusing on an intertemporal setting where state governments are allowed to borrow and the federal government co-finances regional spending, our model sets the stage for bailout incentives to take shape. Not only were these bailout policies shown to be overly generous because of strategic voting. Also, and compared to a setting where regional affiliation does not bear on federal decision making, states over-borrowed more inefficiently because of this generosity. Allowing for heterogeneity in state income and population did not affect this inefficient outcome lastly. Lower relative per capita incomes even boost federal generosity and subsequent over-borrowing by the states.

To neutralize the additional inefficiencies of regional affiliation, a case can be made for *federal* constituencies where politicians are elected from across the entire federation. This would eliminate most regional ties of federal politicians. Secondly, since large swaths of EU policy are settled in the European Council, and thus by consensus, our model also captures the European dimension. Political leaders always keep their own member state in mind whilst bargaining, to the extent that the council may just be the epitome of regional affiliation. A prediction would then be that poorer member states, in terms of per capita income, send more bailout-prone representatives to the table and over-borrow more.

Lastly, our results also put the effect of grant-based regional finance on over-borrowing in a different light. The larger the vertical fiscal gap the argument goes, the bigger the soft budget constraint problem (see e.g. Rodden, 2002, 2003; Blankart and Klaiber, 2006, or Baskaran, 2012). Yet if regional affiliation *itself* inflates the share of grant-based finance, the size effect of the vertical fiscal gap on over-borrowing may be biased upwards. Indeed, and also argued by Rodden (2006), when federal decision making is to a large degree interwoven with regional interests, lower-level governments tend to be more grant financed. As such, a tentative conclusion would be that the political and institutional setup of a federation not only shapes bailout expectations, but determines the size of the vertical fiscal gap in much the same way. In any case, when political power is distributed across different

levels of government in a clear cut way, and one level is not able to influence the other, we expect bailouts as well as grant finance to play a smaller part.

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Appendix

A Calculations federal government's problem

Deriving the only first order condition gives us:

$$\frac{\partial \sum_k^m \{U_{iE}\}}{\partial g_{i2}} = \frac{1}{g_{i2} + t_{i2}Y_{i2} - \lambda^*_{iE}B_{i1}(1+r)} - \sum_k^m Y_{k2}\frac{\partial w}{\partial C_{k2}}\frac{n_i}{\sum_k^m n_k Y_{k2}} = 0$$

Which, under our simplifying assumptions, reduces to:

$$\frac{\partial \sum_i^m \{U_{iE}\}}{\partial g_{i2}} = \frac{1}{g_{i2} + t_{i2}Y_{i2} - \lambda^*_{iE}B_{i1}(1+r)} - \frac{\partial w}{\partial C_{i2}} = 0$$

Or:

$$g_{i2} = \frac{\partial C_{i2}}{\partial w} - t_{i2}Y_{i2} + \lambda^*_{iE}B_{i1}(1+r)$$

B Calculations voting process

Voter j in state i maximises his utility whilst voting:

$$Max_{\lambda_{iE}} ln(X_{i1}) + ln(X_{i2}) + w\left(C_{i1}\right) + z\left(C_{i2}\right)$$

Subject to:

$$X_{i1} = g_{i1} + t_{i1}Y_{i1} + \lambda_{ij}B_{i1}$$

$$X_{i2} = g^*_{i2} + t_{i2}Y_{i2} - \lambda_{ij}B_{i1}(1+r)$$

$$C_{i1} = Y_{i1}(1 - t_{i1})$$

$$C_{i2} = Y_{i2}(1 - t_{i2} - \frac{\sum_i^m n_i g^*_{i2}}{\sum_i^m n_i Y_{i2}})$$

$$t_{f2}\sum_i^m n_i Y_{i2} = \sum_i^m n_i g_{i2}$$

$$g^*_{i2} = \frac{\partial C_{i2}}{\partial w_i} - t_{i2}Y_{i2} + \lambda_{iE}B_{i1}(1+r)$$

Which yields the following first order condition:

$$\frac{U_{ij}}{\partial \lambda_{iE}} = \frac{1}{\frac{\partial C_{i2}}{\partial w_i} - t_{i2}Y_{i2} + \lambda_{iE}B_{i1}(1+r) + t_{i2}Y_{i2} - \lambda_{ij}B_{i1}(1+r)}B_{i1}(1+r) - \frac{\partial w}{\partial C_{i2}}\frac{n_i Y_{i2}}{\sum_i^m n_i Y_{i2}}B_{i1}(1+r) = 0$$

Or:

$$\frac{\partial C_{i2}}{\partial w_i} + \left(\lambda_{iE} - \lambda_{ij}\right)B_{i1}(1+r) = \frac{\partial C_{i2}}{\partial w}\frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}}$$

Which gives us:

$$\lambda_{iE} = \lambda_{ij} + \frac{\partial C_{i2}}{\partial w}\left(\frac{\sum_{j\neq i}^m n_j Y_{j2}}{n_i Y_{i2}}\right)\frac{1}{B_{i1}(1+r)}$$

C Calculations state government's problem

$$Max_{B_{i1},t_{i1},t_{i2}} U_{im} = ln(X_{i1}) + ln(X_{i2}) + z\left(C_{i1}\right) + w\left(C_{i2}\right)$$

Subject to the same constraints as before.

$$X_{i1} = g_{i1} + t_{i1}Y_{i1} + \lambda_{im}B_{i1}$$

$$X_{i2} = g^*_{i2} + t_{i2}Y_{i2} - \lambda_{im}B_{i1}(1+r)$$

$$C_{i1} = Y_{i1}(1 - t_{i1})$$

$$C_{i2} = Y_{i2}(1 - t_{i2} - t_{f2})$$

$$t_{f2}\sum_{i}^{m} n_i Y_{i2} = \sum_{i}^{m} n_i g^*_{i2}$$

$$g^*_{i2} = \frac{\partial C_{i2}}{\partial w} - t_{i2}Y_{i2} + \lambda^*_{iE}B_{i1}(1+r)$$

The optimisation problem yields the following first order conditions:

$$\frac{\partial U_{im}}{\partial X_{i1}}Y_{i1} - \frac{\partial z}{\partial C_{i2}}Y_{i1} = 0$$

$$\frac{\partial U_{im}}{\partial X_{i2}}Y_{i2} - \frac{\partial w}{\partial C_{i2}}Y_{i2} = 0$$

$$\frac{\partial U_{im}}{\partial B_{i1}} = \frac{\partial U_{im}}{\partial X_{i1}}\lambda_{im} + \frac{\partial U_{im}}{\partial X_{i2}}\frac{\partial X_{i2}}{\partial B_{i1}} - \frac{\partial w}{\partial C_{i2}}\frac{n_i Y_{i2}}{\sum_k^m n_k Y_{k2}}\frac{\partial g^*_{i2}}{\partial B_{i1}} = 0 \tag{11}$$

So that we can rewrite (11) as:

$$\frac{\partial U_{im}}{\partial X_{i1}}\lambda_{im} = -\frac{\partial U_{im}}{\partial X_{i2}}\left(\frac{\partial g^*_{i2}}{\partial B_{i1}} - \lambda_{im}(1+r)\right) + \frac{\partial U_{im}}{\partial X_{i2}}\frac{n_i Y_{i2}}{\sum_k^m n_k Y_{k2}}\frac{\partial g^*_{i2}}{\partial B_{i1}}$$

Or:

$$\frac{\frac{\partial U_{im}}{\partial X_{i1}}}{\frac{\partial U_{im}}{\partial X_{i2}}} = \left\{R_i\frac{\partial g^*_{i2}}{\partial B_{i1}} + \left(\lambda_{im}(1+r) - \frac{\partial g^*_{i2}}{\partial B_{i1}}\right)\right\}\frac{1}{\lambda_{im}} = 0$$

D Calculations Heterogeneous States

D.1 Federal government

$$Max_{g_{i2}} \sum_{i}^{m} \{U_{iE}\}$$

$$U_{iE} = ln(X_{i1}) + ln(X_{i2}) + z_i\,(C_{i1}) + w_i\,(C_{i2})$$

$$X_{i1} = g_{i1} + t_{i1}Y_{i1} + \lambda^*_{iE}B_{i1}$$

$$X_{i2} = g_{i2} + t_{i2}Y_{i2} - \lambda^*_{iE}B_{i1}(1+r)$$

$$C_{i1} = Y_{i1}(1 - t_{i1}) \tag{12}$$

$$C_{i2} = Y_{i2}(1 - t_{i2} - t_{f2}) \tag{13}$$

$$t_{f2}\sum_{i}^{m} n_i Y_{i2} = \sum_{i}^{m} n_i g_{i2} \tag{14}$$

Deriving the only first order condition gives us:

$$\frac{\partial \sum_k^m \{U_{iE}\}}{\partial g_{i2}} = \frac{1}{g_{i2} + t_{i2}Y_{i2} - \lambda^*_{iE}B_{i1}(1+r)} - \sum_{k}^{m} Y_{k2}\frac{\partial w_k}{\partial C_{k2}}\frac{n_i}{\sum_k^m n_k Y_{k2}} = 0$$

So that:

$$g_{i2} = \frac{1}{A} - t_{i2}Y_{i2} + \lambda^*_{iE}B_{i1}(1+r)$$

With

$$A = \sum_{k}^{m} \frac{\partial w_k}{\partial C_{k2}}\frac{n_i Y_{k2}}{\sum_k^m n_k Y_{k2}} \tag{15}$$

D.2 Federal voting process

Voter j in state i maximises his utility whilst voting:

$$Max_{\lambda_{iE}} ln(X_{i1}) + ln(X_{i2}) + w_i\,(C_{i1}) + z_i\,(C_{i2})$$

Subject to:

$$X_{i1} = g_{i1} + t_{i1}Y_{i1} + \lambda_{ij}B_{i1}$$

$$X_{i2} = g^*_{i2} + t_{i2}Y_{i2} - \lambda_{ij}B_{i1}(1+r)$$

$$C_{i1} = Y_{i1}(1 - t_{i1})$$

$$C_{i2} = Y_{i2}(1 - t_{i2} - \frac{\sum_i^m n_i g_{i2}^*}{\sum_i^m n_i Y_{i2}})$$

$$t_{f2} \sum_i^m n_i Y_{i2} = \sum_i^m n_i g_{i2}$$

$$g_{i2}^* = \frac{1}{A} - t_{i2} Y_{i2} + \lambda_{iE} B_{i1}(1 + r)$$

Which yields the following first order condition:

$$\frac{U_{ij}}{\partial \lambda_{iE}} = \frac{1}{\frac{1}{A} - t_{i2} Y_{i2} + \lambda_{iE} B_{i1}(1 + r) + t_{i2} Y_{i2} - \lambda_{ij} B_{i1}(1 + r)} B_{i1}(1+r) - \frac{\partial w_i}{\partial C_{i2}} \frac{n_i Y_{i2}}{\sum_i^m n_i Y_{i2}} B_{i1}(1+r) = 0$$

Or:

$$\frac{1}{A} + (\lambda_{iE} - \lambda_{ij})\, B_{i1}(1 + r) = \frac{\partial C_{i2}}{\partial w_i} \frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}}$$

$$(\lambda_{iE} - \lambda_{ij}) = \left(\frac{\partial C_{i2}}{\partial w_i} \frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} - \frac{1}{A} \right) \frac{1}{B_{i1}(1 + r)}$$

So that:

$$\lambda_{iE} = \lambda_{ij} + \left(\frac{\partial C_{i2}}{\partial w_i} \frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} - \frac{1}{A} \right) \frac{1}{B_{i1}(1 + r)}$$

And, plugging in (15):

$$\lambda_{iE}^* = \lambda_{im} + \left(\frac{\partial C_{i2}}{\partial w_i} \frac{\sum_k^m n_k Y_{k2}}{n_i Y_{i2}} - \frac{1}{\sum_k^m \frac{\partial w_k}{\partial C_{k2}} \frac{n_i Y_{k2}}{\sum_k^m n_k Y_{k2}}} \right) \frac{1}{B_{i1}(1 + r)}$$