Federal Governments Should Subsidize State Expenditure that Voters do not Consider when Voting*

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Abstract

This short paper analyzes whether a federal transfer system can be designed to increase welfare, when state governments create political budget cycles to increase the likelihood of reelection. The results show how the federal government may announce a transfer scheme in advance for the post-election year that counteracts the welfare costs of political budget cycles.

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Introduction

Research indicates that politicians at all levels of government use election year budgets to increase the possibility of reelection.[1] Rogoff (1990) provides one possible explanation for this pattern: competent politicians lower taxes and increase visible public expenditures in election years to signal their competence. Rogoff also discusses different approaches to mitigate the budget cycles: restraining incumbents to take new fiscal incentives during election years; forcing incumbents who wants to run for reelection to pay a fee; and allowing incumbents to call for an early election. All these policies are associated with potentially large social costs.

Higher levels of government are most likely interested in curbing lower level political budget cycles, since such budget cycles are associated with welfare costs without increasing the chances for reelection at the higher level. However, no study that we are aware of has examined the policies that higher levels of government may use to reduce the costs of political budget cycles at the lower levels. The purpose of the present paper is to fill this gap by analyzing how an intergovernmental transfer scheme can be designed to increase welfare in the presence of political budget cycles without hindering politicians to signal their competence. Our study is based on the model by Rogoff (1990).

The Model

In this section, we briefly describe the key characteristics of the model by Rogoff (1990), but refer to Rogoff's paper for proofs and details. The representative voter in each state maximizes the expected utility, $E_t^P(W_t)$, where E^P denotes the expectations operator given the general public's information set *p*, and where

[1] For example, Gonzalez (2002) and Shi and Svensson (2006) have found that politicians at the highest level of government use the budget to increase reelection chances. Similar results have been found for state governments (Schneider, 2010; Mechtel and Potrafke, 2013), regional (Blais and Nadeau, 1992; Sjahrir, Kis-Katos and Schulze, 2013) and municipal governments (Veiga and Veiga, 2007; Sakurai and Menezes-Filho, 2011).

$$W_t = \sum_{s=t}^{T} [U(c_s, g_s) + V(k_s)]\beta^{s-t} \tag{1}$$

is the present value of future utility. In equation (1), c denotes private consumption, g a public consumption good, k a public "investment" good, and β the discount factor. Both g and k are expressed per capita. The functions U and V are strictly concave and all goods are normal.

Each voter has an exogenous income y and pays a head tax τ_t in period t, resulting in the budget constraint:

$$c_t = y - \tau_t. \tag{2}$$

The state government is led by a single agent whose competence is indexed by ε, which evolves according to $\varepsilon_t = \alpha_t + \alpha_{t-1}$, where each α is an independent drawing from a Bernoulli distribution with $\rho \equiv prob(\alpha = \alpha^H)$ and $1 - \rho \equiv prob(\alpha = \alpha^L)$, $\alpha^H > \alpha^L > 0$. Elections are held every second period, and the competence process therefore implies that the incumbent leader's competence in the period preceding the election is positively correlated with his/her competence the first period after the election.

The more competent the incumbent, the more public goods he/she can produce for a given tax, which is seen from the state government's budget constraint

$$g_t + \kappa_t = \tau_t + \varepsilon_t. \tag{3}$$

The variable κ_t represents the investment in k such that $\kappa_t = k_{t+1}$. Voters can calculate α_t after observing k_{t+1}. The variable k should not necessarily be interpreted as a good that takes a period to produce. It might more broadly represent goods whose effects are only observed by the representative voter with a lag; for example, depositions to public pension funds.

The incumbent's objective function is

$$E_t^I(W_t) + \sum_{s=t}^{T} \beta^{s-t} X\pi_{s,t}, \tag{4}$$

where I denotes the incumbent, X is ego rents per period in office, and $\pi_{s,t}$ is the incumbent's estimate in period t of his/her probability of being in office in period s. In period t, the incumbent (who knows α_t) chooses the levels of τ_t, g_t, and κ_t. The opposition candidate is a random draw form the constituency and voters have no information about his/her competence. Voters observe τ_t, g_t, k_t, and α_{t-1}^I, but not κ_t, and form expectations about α_t^I before voting. The probability weight voters attach to the possibility that $\alpha_t^I = \alpha^H$ is written $\hat{\rho}(\alpha_{t-1}^I, g_t - \tau_t)$. The delayed visibility of the investment good gives politicians an incentive to reduce investments in election years in order to appear more competent and thus increase their reelection probabilities.

Below, we focus on the final election period, $t = T - 2$. The incumbent knows that voters' beliefs are Bayes-consistent and can calculate $\pi_{t+1,t}$ as a function of $\hat{\rho}(\alpha_{t-1}^I, g_t - \tau_t)$.[2] Given this information, the incumbent sets τ_t, g_t, and κ_t to maximize equation (4), subject to equations (2) and (3). For a given α_{t-1}^I, incumbents with $\alpha_t^I = \alpha^H$ (hereafter called *H*) are prepared to choose a higher value of $g_t - \tau_t$ than incumbents with $\alpha_t^I = \alpha^L$ (hereafter called *L*) to increase their reelection chances. The first reason is that for any value of $g_t - \tau_t$, *H* can spend $\alpha_t^H - \alpha_t^L$ more on κ_t than *L*. Secondly, *H* has more to gain from being reelected, since the outcome of the representative voter, which the incumbent also cares about, will be higher the more skilled the elected leader is. Therefore, we get a separating equilibrium with $\hat{\rho}(\alpha_{t-1}^I, g_t - \tau_t) = 1$ when $\alpha_t^I = \alpha^H$ and $\hat{\rho}(\alpha_{t-1}^I, g_t - \tau_t) = 0$ otherwise.

Now, *L* has nothing to gain by deviating from the first best policy if such deviations do not prevent voters from deducing his/her type. This means that *L* implements a first best policy, i.e., behaves <u>as if</u> his/her objective at any time t is given by W_t. For *H*, on the other hand, there are two possible outcomes: either that *H* is competent enough to separate himself/herself from *L* through a first best policy (in which case *H* also behaves as if the objective is given by W_t), or

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[2] There is also a source of external uncertainty in the election outcome, which both politicians and voters observe just before the election. This can, for example, capture uncertainty in the candidates' performance during the end of the election campaign. The external uncertainty means that the probability to become reelected will be in the interval (0,1) for all incumbents, which allows the pooling equilibrium to be ruled out using the intuitive criterion by Cho and Kreps (1987). The equilibrium described below remains an equilibrium also with multiple elections, with the difference that the expected future benefits from being reelected become larger, since reelection opens the possibility of being reelected once more, etc. This tends to aggravate the political budget cycle. With repeated elections, there could also be a reputational equilibrium with little or no political budget cycle if β is close to one, the external uncertainty is sufficiently small, and the time between elections are short. We share Rogoff judgment that such an equilibrium is unlikely in reality.

that H must increase $g_t - \tau_t$ relative to the first best policy to signal his/her competence. We consider the latter case below.

An intergovernmental transfer

In this section, we analyze whether or not a federal government can increase the social welfare, defined as the sum of voters' utilities, by announcing in advance that it will pay a proportion r of κ_t in the post-election year when k_{t+1} is observed.[3]

In Proposition 1, we consider a benchmark case where this refund is financed by four separate head taxes in period t+1, which are conditioned on the competence history of the politicians. Here, we assume that $\Gamma_{t+1}^{ij} = r\kappa_t^{ij}$ in equilibrium where *i*=*L*, *H* and *j*=*L*, *H* indicate that κ_t is chosen by an incumbent with $\alpha_t^I = \alpha^i$ and $\alpha_{t-1}^I = \alpha^j$. As such, the transfer scheme does not lead to any redistribution between the states in equilibrium. We also assume that the number of states in each such group is large enough to imply that the incumbent treats Γ_{t+1}^{ij} (as well as r) as exogenous.

Proposition 1. *An infinitesimal refund, which is proportional to κ_t and financed through four separate head taxes, weakly increases welfare in all states.*

Note first that irrespective of α_{t-1}^I, the refund will increase the level of investment, κ_t, chosen by both L and H. For type L, who absent the refund chooses the first-best policy satisfying

$$\frac{\partial U_t}{\partial g_t} = \beta \frac{\partial V_{t+1}}{\partial k_{t+1}},$$

the first order welfare effect of an infinitesimal increase in r will be zero (since the welfare change is evaluated in the pre-transfer equilibrium where $r = 0$). Notice also that this reform makes it even less attractive for type L to mimic type H: if an incumbent of type L were to deviate from the pre-transfer equilibrium by mimicking H's choice of τ_t and g_t, the reform

[3] In models with vertical fiscal externalities and benevolent decision makers, Aronsson and Wikström (2001, 2003) show that intergovernmental transfer schemes can, in certain situations, be designed to induce correct incentives for the lower level governments.

would make his/her state a net payer to the federal government.[4] As such, this reduces L's gain from being reelected after mimicking H which, in turn, increases the value of the lowest κ_t that L would be prepared to choose, hereafter denoted $min\_\kappa_t^{Lj}$. H sets $\kappa_t^{Hj} = \text{min\_}\kappa_t^{Lj} + \alpha_t^H - \alpha_t^L$, which is the minimum distortion that allows H to separate himself/herself from L in terms of τ_t and g_t. Since κ_t^{Hj} satisfies

$$\frac{\partial U_t}{\partial g_t} < \beta \frac{\partial V_{t+1}}{\partial k_{t+1}},$$

and the intergovernmental grant increases the investment made by type H, this constitutes a welfare improvement of the first-order.

Let us know consider the case when the refund is financed by a uniform head tax:

$$T_{t+1} = r[\rho^2 \kappa_t^{HH} + \rho(1-p)[\kappa_t^{HL} + \kappa_t^{LH}] + (1-\rho)^2 \kappa_t^{LL}]. \tag{5}$$

Proposition 2. *An infinitesimal refund, which is proportional to κ_t and financed through a uniform head tax throughout the federation, will reduce the mean and median political budget cycle, in the sense of reducing the mean and median deviation between the local policy outcome and the corresponding first best allocation.*

The uniform head tax affects the equilibrium income distribution between the states. In the Appendix, we show that if L were to mimic H, such states would become net payers in the transfer system on average, which increases the mean value of $min\_\kappa_t^L$. Since $\kappa_t^{Hj} = \text{min\_}\kappa_t^{Lj} + \alpha_t^H - \alpha_t^L$, this shows that the mean political budget cycle is reduced. We also show that a sufficient condition for the political budget cycle to be reduced in all states is that $\rho \geq 1/2$ and that the political budget cycle is reduced in, at least, the proportion $(1-\rho)$ of the states where $\alpha_{t-1}^I = \alpha^L$ if ρ<1/2. This shows that the median political budget cycle is reduced by the intergovernmental transfer.

[4] Recall that a mimicker would invest less than type L. As such, although paying the same lump-sum tax, the mimicker receives a smaller subsidy from the federal government than type L.

Corollary 1. *A sufficient conditions for the policy described in Proposition 2 to be welfare improving in the federation as a whole is that the utility is quasi-linear, i.e.,* $U(c_s, g_s) = u(g_s) + c_s$.

Corollary 1 follows directly from Proposition 2, since a quasi-linear utility function implies that the net transfer between states does not affect the sum of utilities and also rules out that the transfer, by affecting L's gain from being reelected, increases the budget cycle in a minority of states.

To conclude, Proposition 1 shows that a subsidy financed through a head tax conditioned on the incumbents' types, or equivalent on their tax and expenditure decisions, will reduce the political budget cycle and increase welfare. The political budget cycle can also be reduced, at least for the majority of states, when using a uniform head tax, which requires no knowledge of state politicians' types and policies.

Appendix

Proof of Proposition 2

Using the following inequalities:

$$min\_\kappa_t^{Lj} < \kappa_t^{Lj}; \qquad j = L, H, \tag{A1}$$

$$min\_\kappa_t^{Lj} < min\_\kappa_t^{Lj} + \alpha^H - \alpha^L = \kappa_t^{Hj}; \qquad j = L, H, \tag{A2}$$

we see that

$$\rho min\_\kappa_t^{LH} < \rho(p\kappa_t^{HH} + (1-\rho)\kappa_t^{LH}) \tag{A3}$$

$$(1-\rho)min\_\kappa_t^{LL} < (1-\rho)(p\kappa_t^{HL} + (1-\rho)\kappa_t^{LL}). \tag{A4}$$

Adding (A3) and (A4) gives $\rho min\_\kappa_t^{LH} + (1-\rho)min\_\kappa_t^{LL} < \rho^2\kappa_t^{HH} + \rho(1-\rho)[\kappa_t^{HL} + \kappa_t^{LH}] + (1-\rho)^2\kappa_t^{LL}$, which is the condition for that states where L mimics H would be net payer in the transfer system on average.

Since the utility function in equation (1) is concave, and L needs $\alpha^H - \alpha^L$ more in net transfers to obtain the same utility as H, the expected utility difference of electing the opposition candidate, for whom $\alpha_t^I = \alpha^H$ with probability ρ, instead or reelecting L is a convex function of the net transfer.[5] This, and that states where L mimics H would be net payer in the transfer system on average, imply that the transfer system will increase the average loss in expected utility for voters of reelecting L. Therefore, the transfer increases the average value of $min\_\kappa_t^L$.

To show that the median political budget cycle is reduced, we show that among states with $\alpha_t^I = \alpha^L$, the majority will get negative net transfers if the incumbent mimics H. Note that $r\ min\_\kappa_t^{LL} - T_{t+1} < 0$ if $min\_\kappa_t^{LL} < \rho^2\kappa_t^{HH} + \rho(1-\rho)[\kappa_t^{HL} + \kappa_t^{LH}] + (1-\rho)^2\kappa_t^{LL}$. The following inequality

$$min\_\kappa_t^{LL} < min\_\kappa_t^{LH}, \tag{A5}$$

which is due to the assumption that k is a normal good, together with equations (A1) and (A2), show that this is the case.

Note that $r\ min\_\kappa_t^{LH} - T_{t+1} < 0$ if

$$min\_\kappa_t^{LH} < \rho^2\kappa_t^{HH} + \rho(1-\rho)[\kappa_t^{HL} + \kappa_t^{LH}] + (1-\rho)^2\kappa_t^{LL}. \tag{A6}$$

Since all goods are normal,

$$min\_\kappa_t^{LH} - min\_\kappa_t^{LL} < \alpha^H - \alpha^L. \tag{A7}$$

Inequalities (A2) and (A7) together imply $min\_\kappa_t^{LH} < \kappa_t^{HL}$. Therefore, a sufficient condition for inequality (A6) to hold is that $min\_\kappa_t^{LH} < \kappa_t^{LL}$. Note that - since $\kappa_t^{LH} - \kappa_t^{LL} < \alpha^H - \alpha^L$ - this condition holds if

$$min_{\kappa_t^{Lj}} + \alpha^H - \alpha^L = \kappa_t^{Hj} < \kappa_t^{Lj}; \qquad \mathrm{j = L, H}. \tag{A8}$$

Another sufficient condition for inequality (A6) to hold is that

[5] That is, since W is concave and $E_t\mathrm{W}_t^O(N) = E_t\mathrm{W}_t^L\big(N + \rho(\alpha^H - \alpha^L)\big)$, where O denotes the opposition candidate and N denotes net transfers, $D(N) \equiv E_t\mathrm{W}_t^O(N) - E_t\mathrm{W}_t^L(N)$ is convex.

$$\big(1-2\rho(1-\rho)\big)min\_\kappa_t^{LH} \leq \rho^2\kappa_t^{HH} + (1-\rho)^2\kappa_t^{LL}. \tag{A9}$$

This can be written as

$$(1-\rho)^2(min\_\kappa_t^{LH} - \kappa_t^{LL}) \leq \rho^2(\kappa_t^{HH} - min\_\kappa_t^{LH}). \tag{A10}$$

Since $min\_\kappa_t^{LH} - \kappa_t^{LL} < \kappa_t^{LH} - \kappa_t^{LL} < \alpha^H - \alpha^L$ and $\kappa_t^{HH} - min\_\kappa_t^{LH} = \alpha^H - \alpha^L$, a sufficient condition for this sufficient condition to hold is that $(1-\rho)^2 \leq \rho^2$, i.e. that $\rho \geq 1/2$. This means that $r\ min\_\kappa_t^{LH} - T_{t+1}$, which is relevant for the fraction ρ of the states, only can be positive if $\rho < 1/2$.

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