

A Positive Theory of Fiscal Federalism*

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Abstract

We study in a dynamic setting the choice of fiscal policy when decisions are taken simultaneously by governments at the local and central level. In particular, we analyze how demographics, technology, or the characteristics of public goods provided by government that benefit the old affect the degree of fiscal decentralization when constitutional reforms are infrequent. We apply the model's insights to the current debate on fiscal integration in Europe, and balanced budget constraints in the U.S.

1 Introduction

The traditional approach to studying fiscal federalism features a static trade-off between an externality problem in the provision of public goods (favoring centralization as the desired institutional arrangement), and a problem of not catering to heterogeneous preferences across local units (favoring decentralization). Oates' (1972) decentralization theorem states that in the absence of spillovers and of cost-savings from centralized provision, decentralization is preferable to uniform provision. But, in a setting of perfect information, nothing will prevent a benevolent central planner to prescribe the right amounts for each jurisdiction (Oates, 1999). Hence, later work has emphasized that the case for decentralization has to be made based on political economy considerations. For example, Kessler (2014) shows in a model of legislative decision making, with an essential role for communication when policy is centralized, that policy uniformity is chosen when there are credibility problems in signaling local tastes to the central government. This can thus be seen as providing a foundation for Oates' decentralization theorem.

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The current crisis in the euro zone is, at least in part, the result of uncoordinated decentralized fiscal policies in a group of highly interconnected economies sharing a common currency. With the benefit of hindsight, some observers regret that the Stability and Growth Pact (SGP), and the way it was implemented, did not prevent public sector over borrowing in some peripheral countries, and some of them argue in favor of strict balanced budget requirements at the national level. Although the crisis accelerated the debate on which elements of fiscal federalism to introduce in Europe, as the threat of a debt crisis subsided so did the discussion on a move towards federalism. This is clearly seen in Figure 1 which plots the Google searches of the terms “euro debt crisis” and “fiscal union” for the years 2010-3.

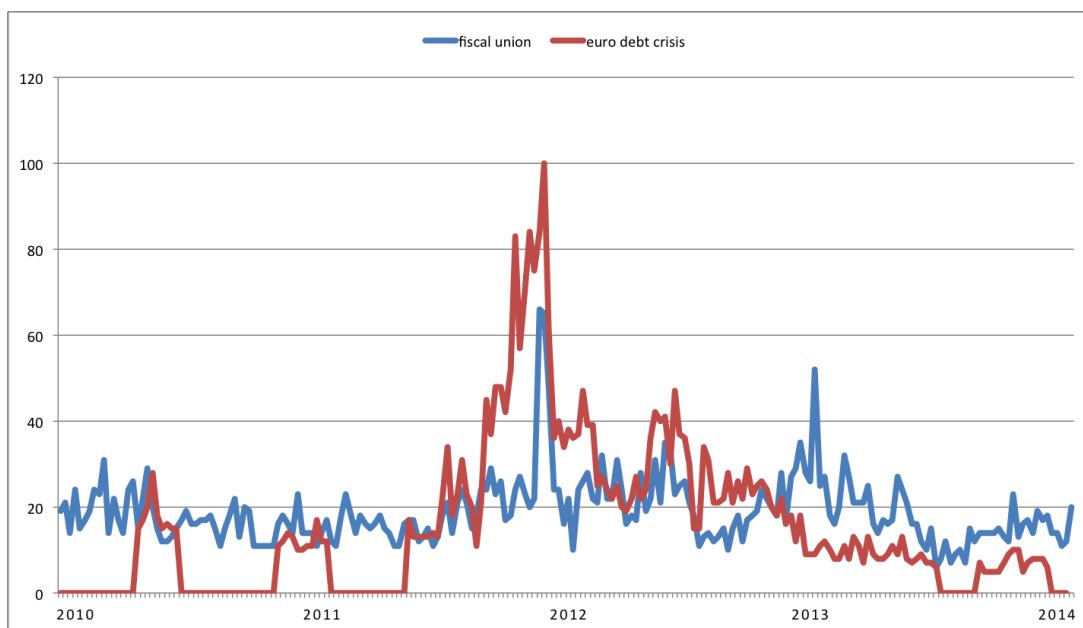


Figure 1: Frequency of Google searches

This observed pattern is not a surprise as it is known that governments tend to reform (and talk of reform) most frequently in times of crisis. But it raises concerns about the usefulness of standard theories of fiscal federalism that base their implications on static models. Voters in Europe have to evaluate not only the current trade-off of a federation (which during the crisis were summarized as Germany paying the bailout of peripheral eurozone countries), but form expectations of what effects a move towards federalism would have in the future. Furthermore, considering that institutional reform is infrequent, even if a federation would be desirable today, voters must evaluate the likelihood that this would not be the case in some future contingency in which frictions prevent further institutional reform.

Thus, in order to design new institutional arrangements, like the Fiscal Compact Theory (FCT), that would make the euro more resilient in the future, we need first to have a better understanding of how fiscal policy is evaluated in a federal state, when the costs and benefits are time varying. Only once such a positive analysis is carried out can

we evaluate the welfare effects of, e.g., imposing more stringent deficit or debt restrictions on member states.

Building on a standard two-period overlapping generations model with physical capital, our framework endogenizes a number of political and economic choices. In their role as economic agents, households take prices, taxes, and public goods provided as given when choosing consumption, and saving. As voters, households choose among office motivated parties that offer policy platforms at the local or central level comprising labor taxes as well as the expenditure for public investments and public goods.

Public goods require different inputs, which can be provided either locally or centrally. We will follow the traditional economic approach of focusing on two forces, one favoring centralization and the other favoring decentralized provision. The former will be captured by having an externality from average provision of local public goods on preferences (and potentially from general equilibrium factor prices), the latter by making the valuation of the public good to differ across regions and forcing the federal government to uniform provision.¹

We focus on three dimensions along which the consequences of policy are perceived differently at the local and central level. First, aggregate and general equilibrium effects of policy are perceived at the central level, but not at the local level. This causes the perceived costs and benefits of policy to differ across levels. Second, when the public good is an investment good, in the sense that units produced in the current period yield benefits in future periods, the benefits of public spending may only be partly internalized at the local level if agents migrate between regions, while for the central government this internal migration is irrelevant.

Third, when both levels of government provide inputs into the production of public goods, local governments might choose different levels of provision. This differential provision will depend on the degree of heterogeneity in preferences for public goods, and on the technology in the production of these goods (e.g. the degree of substitutability of local and central government spending, and the rate of depreciation of the public good).

Fiscal policy choices are of different concern to the different cohorts, workers and retirees. Workers are taxed to finance the provision of a local public good. Both groups benefit from the public good, but while retirees only care about the current provision, workers also care about the future provision. When evaluating the policy platforms on offer in the political arena, the different groups of voters therefore disagree as to which platform should ideally be implemented. We will model the resolution of the ensuing conflict under the assumption of probabilistic voting, representing electoral competition under the presumption that voters' support for a party is subject to a small degree of randomness.

Tax rates and public spending do not only affect capital accumulation, factor prices, and incomes. Absent commitment, they also affect, indirectly, future policy outcomes. In addition to the “economic” repercussions of their policy choices, voters therefore have to internalize the “political” repercussions. In particular, voters must account for the equilibrium relationship between future state variables (which might include demographic,

¹As noted, Kessler (2014) shows that uniform central provision can be interpreted as the outcome of a legislative game with non credible signaling.

technological and preference shocks) and policy choices. We focus on Markov perfect equilibrium, i.e. we assume that only fundamental state variables enter the equilibrium relationship, excluding artificial state variables of the type sustaining trigger strategy equilibria. This restriction reflects our assumption that political choices suffer from a lack of commitment, including commitment to particular enforcement strategies.²

We then model the endogenous choice of the degree of centralization, λ , by assuming that “constitutional” reforms are carried under partial commitment. At the beginning of each period, Nature determines whether or not a constitution reform can take place. Let’s call $0 < \pi < 1$ the probability that the constitution can be reformed.³ Then when the constitution can be reformed society politically chooses the institutions. We assume this is done through the *same* process as that that leads to equilibrium policy platforms.⁴

There are several studies that look at the difference in cost and benefits of decentralization. Alesina and Spolaore (1997, 2003) focus on the classic trade off between economies of scale in the provision of public goods and heterogeneity of preferences across local units to determine the number and size of nations, and the degree of centralization within them, in politico-economic equilibrium. Besley and Coate (1998), Lockwood (2002) and Seabright (1996) present models in which potential benefits of decentralization are derived through endogenous choices under alternative political aggregation mechanisms. Fernández and Rogerson (1996, 1998) study several issues of comparative education finance systems using a political economy approach, both in static and dynamic models. Soares (2005) evaluates the welfare benefits in the U.S. of a move from regional to federal education funding.

There is also a large literature on the welfare effects of a balanced budget provision. Tabellini and Alesina (1990), and Persson and Tabellini (1999) model situations where a balanced budget requirement helps overcome third-best policy outcomes due to common pool problems. Lindbeck and Niepelt (2006) analyze the rationale of Europe’s attempt at imposing some budget discipline on member states through the SGP, and consider alternative options. Poterba (1994), Bohn and Inman (1996), and Rose (2006), among others, have empirically shown that U.S. states with balanced budget restrictions face more stringent constraints in their fiscal policy, specifically investment outlays.

A closely related paper is Song, Storesletten and Zilibotti (2012) who study debt dynamics in a dynamic politico-economic setup with overlapping generations. That paper analyzes the equilibrium in a small open economy where fiscal policy, including the provision of a public good, is determined subject to exogenous prices. Once the equilibrium of a small economy is found, Song et al. (2012) characterize steady states for the world economy, composed by a continuum of small economies. We complement their analysis by adding a new layer of political decision making at the central level. This can represent a supranational government as in the European Union, or a federal government when the “world economy” is a single country and each small open economy a local government (state or municipality). Our analysis is simplified by forcing governments to have balanced

²For a discussion of Markov perfect equilibrium see, for example, Krusell, Quadrini and Ríos-Rull (1997).

³We can allow the probability to be time varying, and even dependent of the state of the economy.

⁴It is usually the case that constitutional assemblies are chosen by electoral rules that are similar to those used for legislative and/or presidential elections.

budgets and allowing them to use non distortionary taxation. It would be interesting to later study how the choice of fiscal institutions is affected when public debt allows deficit financing.

The remainder of the paper is structured as follows. In Section 2, we describe the model and in section 3, we characterize politico-economic equilibrium. Section 4 contains an analysis of several special cases of the model with closed form solutions.

Section 6 concludes.

2 The Model

2.1 Demographics and Institutions

We consider an economy inhabited by two overlapping generations: workers and retirees. Workers supply labor, pay taxes, consume and save for retirement. Retirees enjoy a public service, consume the return on their savings and die at the end of the period. The ratio of workers to retirees in period t equals ν_t which follows a deterministic process.

The economy is partitioned into a continuum of regions of measure one over the unit interval. Each of these regions is populated by a continuum of agents. The mass of these agents and their demographic structure is the same in each region.⁵ The probability of an agent to be born in region j is given by the uniform probability density function. After their first period of life, workers randomly emigrate from their region of birth and settle with equal probability (conditional on outmigration) in any of the other regions. The parameter $\mu \in [0, 1]$ measures the probability of outmigration. Immigration and emigration rates coincide and are identical across regions. At the federal level, the probability of outmigration equals zero.

We identify workers by their region of birth and retirees by their “residency profile,” that is the region of birth as well as the region of residence during old age. Averages of macroeconomic aggregates for groups of individuals with residency profile (j, j') are denoted by a corresponding superscript “ j, j' ” . Averages of macroeconomic aggregates for groups of individuals with current residency j are denoted by a corresponding superscript “ j ” . Note that the probability *density function* for residency profile (j, j') conditional on residency j' as a retiree is given by μ for all $j \neq j'$ and all j' . The probability for residency profile (j, j) conditional on residency j as a retiree equals $1 - \mu$ for all j .

Political decisions are taken by governments at the federal and regional level. The governments act on behalf of the voters in the respective region (or, at the federal level, of all voters) but cannot commit. In each period, governments simultaneously take their decisions.

2.2 Production

A continuum of competitive firms transforms capital and labor into output by means of a linear technology. Capital is owned by retirees and fully depreciates after one period.

⁵All results follow if the demographic structure differs in a set of regions of measure zero.

The economy-wide capital stock per worker, k_t , therefore corresponds to the economy-wide per-capita savings of workers in the previous period, s_{t-1} , normalized by ν_t . Labor is supplied inelastically by workers. Thus in per worker terms output is given by

$$B_y(w + Rk_t) \quad (1)$$

where B_y , w , $R > 0$. Due to perfect competition, production factors are paid their marginal products, w and R .

The public service is produced regionally, using contemporaneous and lagged inputs provided at the regional and the federal level. In particular, the quantity of public services produced in region j and period t , g_t^j , depends on the quantity produced in the preceding period, either in the same region or the country as a whole, g_{t-1}^j and g_{t-1} respectively; and on a contemporaneous input, e_t^j made from a continuum of intermediate investments that affect it symmetrically. The intermediate investments, $i_t^j(x)$, are provided by the regional or federal government according to constitutional restrictions. We thus have the following specification of the production function,

$$g_t^j = B_g [(g_{t-1}^j)^\kappa (g_{t-1})^{1-\kappa}]^{1-\delta} [e_t^j]^\delta, \quad (2)$$

with $B_g > 0$, $0 < \delta \leq 1$ measures the depreciation of public services and $0 < \kappa \leq 1$ the importance of externalities across regions. The economy-wide public service g_t corresponds to the average of the regional levels $\{g_t^j\}_j$. The composite e_t^j is given by

$$e_t^j = \left(\int_0^1 i(x)^{1-1/\eta} dx \right)^{\frac{\eta}{\eta-1}},$$

where $\eta > 0$ is the elasticity of substitution between intermediates.⁶

2.3 Policy Instruments

Governments choose inputs into the production for public services. Expenditures for these inputs are financed by labor income taxes. We assume that there are constitutional restrictions that determine that a fraction λ of labor income corresponds to the tax base for the federal government while the remaining fraction $1 - \lambda$ is the tax base for the local governments. The federal tax rate is τ_t , and regional rates are τ_t^j . All governments balance their budgets in each period. Federal revenue is allocated equally across regions. This implies

$$\left. \begin{aligned} \int_0^1 i_t^j(x) \mathbf{1}_{[x \in L]} dx &= \lambda w \tau_t^j, \\ \int_0^1 i_t^j(x) \mathbf{1}_{[x \in C]} dx &= (1 - \lambda) w \tau_t \quad \forall j. \end{aligned} \right\} \quad (3)$$

Where $\mathbf{1}_{[x \in L]}$ and $\mathbf{1}_{[x \in C]}$ are indicator functions for whether intermediate x is restricted to be produced by the local or central government respectively. Tax rates must be non-negative. We denote a generic combination of instruments in period t by $\kappa_t \equiv (\{\tau_t^j\}_j, \tau_t)$.

⁶Most of our results will be derived for the special cases of $\eta = 1$, and $\eta \rightarrow \infty$.

Because of symmetry, equal resources are allocated to all intermediates at the same level of government. W.l.o.g. we can assume that all investments indexed between zero and $0 \leq \lambda \leq 1$ are undertaken by central government and those indexed between λ and one by the local government.⁷ Following the literature on fiscal federalism we assume that constitutional restrictions are the same across regions, i.e. λ is not region specific. Thus

$$\begin{aligned} i_t^j(x) &= \tau_t w, & x \in [0, \lambda) \\ i_t^j(x) &= \tau_t^j w, & x \in [\lambda, 1] \end{aligned}$$

and the composite input is given by

$$e_t^j = w \left[\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_t^j \tau_t^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}.$$

For future reference note that the previous expression reduces to $e_t = w(\tau_t + \tau_t^j)$ when $\eta \rightarrow \infty$, and to $e_t = w(\tau_t^\lambda \tau_t^{j^{1-\lambda}})$ when $\eta = 1$.

2.4 Household Choices

Workers and retirees in period t value private consumption, $c_{1,t}$ and $c_{2,t}$ respectively, and retirees also value consumption of the regional public service, g_t^j . All agents discount the future at factor $\beta \in (0, 1)$. Preference for the regional public service may be region specific with the parameter $\gamma^j > 0$ measuring its strength.⁸ The parameter γ^j may take J different values, $1 \leq J < \infty$. Since the demographic structure is stationary, the population shares of agents with the same preference parameter are constant over time; we summarize these shares in the $J \times 1$ column vector θ^J . For analytical tractability, we assume that the period utility function is logarithmic. Welfare of a worker in region j who chooses a level of savings s_t^j then is given by

$$\begin{aligned} \max_{s_t^j} \quad & \ln(c_{1,t}^j) + \beta \int_{j'} \text{prob}(j'|j) \left(\ln(c_{2,t+1}^{j,j'}) + \gamma^{j'} \ln(g_{t+1}^{j'}) \right) dj' \\ \text{s.t.} \quad & c_{1,t}^j = w(1 - (1-\lambda)\tau_t^j - \lambda\tau_t) - s_t^j, \quad c_{2,t+1}^{j,j'} = s_t^j R, \end{aligned}$$

where $\text{prob}(j'|j)$ denotes the probability of retirement in region j' conditional on having been born in region j .

Taking prices, policy choices and the exogenous probability of a migration shock as given the worker chooses the level of saving

$$s_t^j = \frac{\beta}{1+\beta} w(1 - (1-\lambda)\tau_t^j - \lambda\tau_t). \quad (4)$$

This results in expected utility (net of constants)

$$(1+\beta) \ln(1 - (1-\lambda)\tau_t^j - \lambda\tau_t) + \beta \int_{j'} \text{prob}(j'|j) \gamma^{j'} \ln(g_{t+1}^{j'}) dj'.$$

⁷We are using the same parameter λ to denote the constitutional restrictions on resources and spending decisions. This has no loss of generality since it corresponds to an adequate normalization.

⁸For example, the public good might be in the form of public parks, and their contribution to households' welfare might depend on the region's weather.

3 Equilibrium

We solve for politico-economic equilibrium in two steps. In the first step, we characterize the allocation conditional on policy. In the second step, we endogenize the policy choices.

3.1 Economic Equilibrium

Since households with identical residency profiles and of the same age are homogeneous, the state in period t is given by the cross section of capital holdings across residency profiles and the cross section of public service production in the preceding period,

$$z_t \equiv \left(\left\{ s_{t-1}^{j,j'} \right\}_{j,j'}, \left\{ g_{t-1}^j \right\}_j \right).$$

Given a policy sequence $\{\kappa_s\}_{s \geq t}$, which determines government spending (from (3)), the state in the subsequent period follows from (2) and (4). In conclusion, conditions (1)–(4) completely characterize the competitive equilibrium in the economy conditional on z_t and $\{\kappa_s\}_{s \geq t}$. Since saving only determine output (in the aggregate) and consumption by retirees (at the individual level), and does not interact with policy choices, we drop its distribution as an argument for the state.

In the following, we focus on a *quasi-symmetric equilibrium* in which all regions with the same preference for the public service, except possibly a few of measure zero, make the same choices. In quasi-symmetric equilibrium, we therefore have J groups of regions. Let Π denote the $J \times J$ matrix whose (m, n) -th element gives the probability of migrating from a region in group m to a region in group n .⁹ For compactness, we denote the cross section of any variable x across the J groups of regions by the column vector x^J . For example, γ^J denotes the column vector of preference parameters. When writing $x^J y^J$ for some variables x and y , we mean the column vector whose J elements correspond to the products of the corresponding elements of the column vectors x^J and y^J ; and when writing $f(x^J)$ for some function $f(\cdot)$, we mean the column vector whose J elements correspond to the function evaluated at the J points x^J . Using this notation, the state for region j can compactly be expressed as

$$z_t^j \equiv (g_{t-1}^j, g_{t-1}),$$

encompassing lagged public service levels g_{t-1}^j and g_{t-1} .

The economic environment as perceived at the regional level differs from the environment perceived at the federal level. On the one hand, this reflects differences between the type of policy instruments under the control of policy makers at the different levels of government (τ_t^j versus τ_t). On the other hand, it is a consequence of the fact that from the federal perspective, the economy-wide public service are endogenous whereas these variables are exogenous from a regional perspective.

⁹The ergodic distribution of the preference parameter in the population, θ^J , thus solves the eigenvector condition $(\theta^J)^\top \Pi = (\theta^J)^\top$ where \top denotes the transpose operator.

Formally, letting $\varphi_t^j \equiv (1 - (1 - \lambda)\tau_t^j - \lambda\tau_t)$ denote the tax wedge, region j in period t perceives the economic environment as follows:

$$\begin{aligned} z_t^j, g_t^J, g_t, \tau_t, \tau_{t+1}^j, \tau_{t+1}^J, \tau_{t+1} \text{ given,} \\ g_t^j &= B_g [(g_{t-1}^j)^\kappa (g_{t-1})^{1-\kappa}]^{1-\delta} w^\delta \left[\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_t^j \frac{\eta-1}{\eta} \right]^{\frac{\eta\delta}{\eta-1}}, \\ g_{t+1}^j &= B_g [(g_t^j)^\kappa (g_t)^{1-\kappa}]^{1-\delta} w^\delta \left[\lambda \tau_{t+1}^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_{t+1}^j \frac{\eta-1}{\eta} \right]^{\frac{\eta\delta}{\eta-1}}. \end{aligned}$$

Accordingly, the indirect utility functions of retirees and workers with residency profile (j', j) and j , respectively, that consider a regional policy change are given by

$$\begin{aligned} \mathcal{R}_t^{j',j}(s_{t-1}^{j',j}, z_t^j, \{\kappa_s\}_{s \geq t}) &= \gamma^j \frac{\eta\delta}{\eta-1} \ln \left[\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_t^j \frac{\eta-1}{\eta} \right] + \text{EPT}, \\ \mathcal{W}_t^j(z_t^j, \{\kappa_s\}_{s \geq t}) &= (1 + \beta) \ln(\varphi_t^j) + \beta(1 - \mu) \gamma^j \left\{ (1 - \delta) \ln [(g_t^j)^\kappa (g_t)^{1-\kappa}] + \right. \\ &\quad \left. \frac{\eta\delta}{\eta-1} \ln \left[\lambda \tau_{t+1}^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_{t+1}^j \frac{\eta-1}{\eta} \right] \right\} + \text{EPT} \end{aligned}$$

subject to the economic environment as perceived on the regional level. Here, ‘‘EPT’’ denotes terms that are exogenous or predetermined, including policy choices in other regions and at the federal level. Due to the migration shock, workers enjoy the benefits of contemporaneous regional public service provision only with probability $1 - \mu$ and even then only if $\delta < 1$ such that future provision depends on current provision. The level of public service provision in any other region that workers might move to is unaffected by the local policy choice.

At the federal level, in contrast, the environment in period t is perceived as follows (with \top denoting the transpose operator):

$$\begin{aligned} z_t^J &\equiv g_{t-1}^J, \tau_t^J, \tau_{t+1}^J, \tau_{t+1} \text{ given,} \\ g_t^J &= B_g [(g_{t-1}^J)^\kappa (g_{t-1})^{1-\kappa}]^{1-\delta} w^\delta \left[\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_t^j \frac{\eta-1}{\eta} \right]^{\frac{\eta\delta}{\eta-1}}, \quad g_t = \prod_J g_t^{J\theta^J}, \\ g_{t+1}^J &= B_g [(g_t^J)^\kappa (g_t)^{1-\kappa}]^{1-\delta} w^\delta \left[\lambda \tau_{t+1}^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_{t+1}^j \frac{\eta-1}{\eta} \right]^{\frac{\eta\delta}{\eta-1}}. \end{aligned}$$

Accordingly, the indirect utility functions of retirees and workers across groups of typical regions when considering a federal policy change are given by

$$\begin{aligned} \mathcal{R}_t^J(s_{t-1}^J, z_t^J, \{\kappa_s\}_{s \geq t}) &= \gamma^J \frac{\eta\delta}{\eta-1} \ln \left[\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_t^j \frac{\eta-1}{\eta} \right] + \text{EPT}, \\ \mathcal{W}_t^J(z_t^J, \{\kappa_s\}_{s \geq t}) &= (1 + \beta) \ln(\varphi_t^J) + \beta \Pi \left\{ \gamma^J (1 - \delta) \ln [(g_t^J)^\kappa (g_t)^{1-\kappa}] + \right. \\ &\quad \left. \frac{\eta\delta}{\eta-1} \ln \left[\lambda \tau_{t+1}^{\frac{\eta-1}{\eta}} + (1-\lambda) \tau_{t+1}^j \frac{\eta-1}{\eta} \right] \right\} + \text{EPT} \end{aligned}$$

subject to the economic environment as perceived at the federal level.

3.2 Politico-Economic Equilibrium

Workers and retirees may vote on candidates whose electoral platforms specify values for the policy instruments, κ_t , as well as other characteristics like “ideology” that are orthogonal to the fundamental policy dimensions of interest. These other characteristics are permanent and cannot be credibly altered in the course of electoral competition. Moreover, their valuation differs across voters (even if voters agree about the preferred policy platform) and is subject to random aggregate shocks, realized after candidates have chosen their platforms. This “probabilistic-voting” setup renders the probability of winning a voter’s support a continuous function of the competing policy platforms, implying that equilibrium policy platforms smoothly respond to changes in the demographic structure.¹⁰

In the Nash equilibrium of the game with two competing candidates in a constituency choosing platforms to maximize their expected vote shares, both candidates propose the same policy platform.¹¹ This platform maximizes a convex combination of the objective functions of all groups of voters, where the weights reflect the groups’ sizes and sensitivity of voting behavior to policy changes. Those groups that care the most about policy platforms rather than other candidate characteristics are the most likely to shift their support from one candidate to the other in response to small changes in the proposed platforms. In equilibrium, such groups of “swing voters” thus gain in political influence and tilt policy in their own favor. If all voters are equally responsive to changes in the policy platforms, electoral competition implements the utilitarian optimum with respect to voters. We assume that across groups of typical regions, voters are equally responsive to proposed changes in policy platforms. However, we allow for age related variation in relative responsiveness, reflected in a per capita political influence weight of unity for young voters and a per capita weight of $\omega \geq 0$ for retired voters.

Elections take place at the beginning of every period, simultaneously in all regions and at the federal level. Since the indirect utility functions of voters at the regional level differ from those of voters at the federal level, the equilibrium policy platforms proposed by candidates for office at the different levels of government differ as well. In particular, the platforms proposed by federal candidates internalise general equilibrium effects of policy while the platforms proposed by regional candidates do not. Formally, the objective function of a political candidate in region j and period t , $V_t^j(\{s_{t-1}^{j'}\}_{j'}, z_t^j, \{\kappa_s\}_{s \geq t})$, is given by (suppressing arguments of functions for clarity)

$$V_t^j(\cdot) \equiv \frac{\omega}{\nu_t} \mathcal{R}_t^{j,j}(\cdot) + \mathcal{W}_t^j(\cdot)$$

while the objective function of a political candidates at the federal level is given by

$$V_t(\cdot) \equiv (\theta^J)^\top \left\{ \frac{\omega}{\nu_t} \mathcal{R}_t^J(\cdot) + \mathcal{W}_t^J(\cdot) \right\}.$$

¹⁰This stands in sharp contrast to the “median-voter” setup where, in a model with only a few generations, an infinitesimal change in the demographic structure has implausibly large effects on policy outcomes if it alters the cohort the median voter is associated with.

¹¹See ? and ? for discussions of probabilistic voting.

Since elections take place every period, candidates cannot commit to future policy platforms. Voters in period t therefore have to form expectations about future policy choices $\{\kappa_s\}_{s \geq t+1}$. We assume that policy choices are Markov that is, they are functions of the fundamental state variables only, $\kappa_s = \tilde{\kappa}_s(Z_t), s \geq t+1$, where $Z_t \equiv (\{z_t^j\}_j, z_t^J)$. (The state variables include demographic variables, thus the time indices of the policy functions.) Conditional on Z_t , a *politico-economic equilibrium* as of period t then is given by policy functions $\tilde{\kappa}_s(Z_s), s \geq t$, and an allocation and price system such that

- i. in each typical region $j = 1, \dots, J$ and each period $s \geq t$, $\tau_s^j \geq 0$ maximizes $V_s^j(\cdot)$ subject to the economic environment as perceived at the regional level;
- ii. at the federal level, in each period $s \geq t$, $\tau_s \geq 0$ maximizes $V_s(\cdot)$ subject to the economic environment as perceived at the federal level;
- iii. in each period $s \geq t$, the policy choices κ_s are consistent with the policy function $\tilde{\kappa}_s(Z_s)$;
- iv. the allocation and price system constitute a competitive equilibrium conditional on Z_t and $\{\kappa_s\}_{s \geq t}$.

4 Analysis

To establish the existence of equilibria with independent policy functions we conjecture that future policy choices are independent of the endogenous state variables; we derive the contemporaneous equilibrium policy choices under this conjecture; and we show that the latter choices are orthogonal to the endogenous state variables, thereby verifying the conjecture. Formally, we solve the following programs of regional and federal decision makers, subject to the economic relations as perceived at the respective levels:

$$\begin{aligned} \max_{\tau_t^j \geq 0} V_t^j(z_t^j, \{\kappa_s\}_{s \geq t}) \text{ s.t. } \tau_t^J, \tau_t, \tilde{\kappa}_{t+1} \text{ given,} \\ \max_{\tau_t \geq 0} V_t(z_t, \{\kappa_s\}_{s \geq t}) \text{ s.t. } \tau_t^J, \tilde{\kappa}_{t+1} \text{ given.} \end{aligned}$$

Let $\bar{\gamma}^J \equiv (\theta^J)^\top \gamma^J$ and $\bar{\tau}_t^J \equiv (\theta^J)^\top \tau_t^J$ denote arithmetic averages.

The first-order conditions characterizing the equilibrium choices of τ_t^j and τ_t , respectively, are given by

$$\begin{aligned} \left[\frac{\omega}{\nu_t} + \beta(1-\mu)(1-\delta)\kappa \right] \delta \gamma^j \frac{\tau_t^{j-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda)\tau_t^{j\frac{\eta-1}{\eta}}} - \frac{1+\beta}{1-\lambda\tau_t - (1-\lambda)\tau_t^j} = 0, \\ \left[\frac{\omega}{\nu_t} + \beta(1-\delta)\kappa \right] \delta \sum_J \theta^J \gamma^J \frac{\tau_t^{-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda)\tau_t^{J\frac{\eta-1}{\eta}}} - \sum_J \theta^J \frac{1+\beta}{1-\lambda\tau_t - (1-\lambda)\tau_t^J} + \\ \beta(1-\delta)(1-\kappa)\delta \bar{\gamma} \sum_J \theta^J \frac{\tau_t^{-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1-\lambda)\tau_t^{J\frac{\eta-1}{\eta}}} = 0. \end{aligned}$$

Note that from the first FOC we can see that regions with a high valuation for the public good will have higher local taxes. We will now consider two polar cases. In the first case there is no heterogeneity, such that $\gamma^j = \gamma$, and there are positive externalities, either because $\kappa < 1$ or $\mu > 0$. In this case it is straightforward to derive the following relation from the FOC

$$\frac{\left[\frac{\omega}{\nu_t} + \beta(1 - \mu)(1 - \delta)\kappa\right] \tau_t^{j-\frac{1}{\eta}}}{\left[\frac{\omega}{\nu_t} + \beta(1 - \delta)\right] \tau_t^{-\frac{1}{\eta}}} = 1,$$

from which we get

$$\tau_t > \tau_t^j.$$

Not surprisingly investment in intermediaries is higher at the central government when there are externalities. Thus if society were to choose λ at a constitutional stage it would choose $\lambda^* = 1$, i.e. a fully centralized fiscal organization.¹²

The second polar case is when there are no externalities, such that $\kappa = 1$ and $\mu = 0$. In this case multiplying each region's FOC by θ^J and summing we get the following

$$\left[\frac{\omega}{\nu_t} + \beta(1 - \delta)\right] \delta \sum_J \theta^J \gamma^J \frac{\tau_t^{J-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1 - \lambda) \tau_t^{J\frac{\eta-1}{\eta}}} = \sum_J \theta^J \frac{1 + \beta}{1 - \lambda \tau_t - (1 - \lambda) \tau_t^j}.$$

Eliminating the RHS by using the central government's FOC we get

$$\sum_J \theta^J \gamma^J \frac{\tau_t^{J-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1 - \lambda) \tau_t^{J\frac{\eta-1}{\eta}}} = \sum_J \theta^J \gamma^J \frac{\tau_t^{-\frac{1}{\eta}}}{\lambda \tau_t^{\frac{\eta-1}{\eta}} + (1 - \lambda) \tau_t^{J\frac{\eta-1}{\eta}}}$$

Thus investment in intermediaries by the central government will be an average of investment by the different regions. Since all regions pay central government taxes and there are no externalities between regions, all regions would prefer that they be in charge of investment in *all* intermediaries. Thus if society were to choose λ at a constitutional stage it would choose $\lambda^* = 0$, i.e. a fully decentralized fiscal organization.¹³

In the general case when there are externalities and heterogeneity in preferences there would be an interior solution for the degree of centralization, i.e. $0 < \lambda^* < 1$, and it would be expected that society chooses to have a more decentralized fiscal organization when the heterogeneity of preferences is larger and/or the importance of externalities lower.

To characterize the politico-economic equilibrium in more detail we impose more structure on the production of the public service. When $\eta = 1$ the above FOC reduce to

$$\begin{aligned} \left[\frac{\omega}{\nu_t} + \beta(1 - \mu)(1 - \delta)\kappa\right] \delta \gamma^j \frac{1}{\tau_t^j} - \frac{1 + \beta}{1 - \lambda \tau_t - (1 - \lambda) \tau_t^j} &= 0, \\ \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)\right] \delta \bar{\gamma} \frac{1}{\tau_t} - \sum_J \theta^J \frac{1 + \beta}{1 - \lambda \tau_t - (1 - \lambda) \tau_t^J} &= 0 \end{aligned}$$

¹²This presumes that policy choice at the constitutional stage is done by a countrywide vote. We will discuss in detail the choice of constitutions later.

¹³More accurately this would correspond to the disintegration of the federation, since there would be no political decision at the central level.

Solving these FOC gives

$$\begin{aligned}
\tau_t &= \frac{\delta \bar{\gamma} \left[\frac{\omega}{\nu_t} + \beta(1 - \delta) \right]}{1 + \beta + \delta \bar{\gamma} \left[\frac{\omega}{\nu_t} + \beta(1 - \delta) [\lambda + (1 - \lambda)(1 - \mu)\kappa] \right]}, \\
\tau_t^J &= \frac{\delta \gamma^J \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)(1 - \mu)\kappa \right]}{1 + \beta + \delta \gamma^J (1 - \lambda) \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)(1 - \mu)\kappa \right]} (1 - \lambda \tau_t) \\
&= \frac{\delta \gamma^J \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)(1 - \mu)\kappa \right]}{1 + \beta + \delta \gamma^J (1 - \lambda) \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)(1 - \mu)\kappa \right]} \\
&\quad \frac{1 + \beta + \delta \bar{\gamma} (1 - \lambda) \left[\frac{\omega}{\nu_t} + \beta(1 - \delta)(1 - \mu)\kappa \right]}{1 + \beta + \delta \bar{\gamma} \left[\frac{\omega}{\nu_t} + \beta(1 - \delta) [\lambda + (1 - \lambda)(1 - \mu)\kappa] \right]}.
\end{aligned}$$

We consider three cases. In the first and second case, the public service is produced out of contemporaneous inputs only, i.e. $\delta = 1$, while in the third case, we assume $\delta < 1$. We refer to the cases with $\delta = 1$ as cases of “current spending” and the case with $\delta < 1$ as “investment spending.” The two cases with current spending (in which the public service drops as a state variable) are distinguished by the degree of substitutability between regionally and federally provided inputs into public service production.

In all three cases, there exist politico-economic equilibria with policy functions that are independent of the endogenous state variables, that is $\tilde{\kappa}_s(Z_s) = \tilde{\kappa}_s$. (It is easy to show that the policy functions $\tilde{\kappa}_s$ are the only equilibrium policy functions in a model with a finite horizon even when the horizon approaches infinity.) In the following, we focus on this type of equilibrium policy function.

To establish the existence of equilibria with independent policy functions we conjecture that future policy choices are independent of the endogenous state variables; we derive the contemporaneous equilibrium policy choices under this conjecture; and we show that the latter choices are orthogonal to the endogenous state variables, thereby verifying the conjecture. Formally, we solve the following programs of regional and federal decision makers, subject to the economic relations as perceived at the respective levels:

$$\begin{aligned}
&\max_{\tau_t^j \geq 0} V_t^j(z_t^j, \{\kappa_s\}_{s \geq t}) \text{ s.t. } \tau_t^J, \tau_t, \tilde{\kappa}_{t+1} \text{ given,} \\
&\max_{\tau_t \geq 0} V_t(z_t, \{\kappa_s\}_{s \geq t}) \text{ s.t. } \tau_t^J, \tilde{\kappa}_{t+1} \text{ given.}
\end{aligned}$$

Let $\bar{\gamma}^J \equiv (\theta^J)^\top \gamma^J$ and $\bar{\tau}_t^J \equiv (\theta^J)^\top \tau_t^J$ denote arithmetic averages. For future reference, note that $d \ln(R_{t+1})/d\tau_t = (1 - \alpha)/(1 - \bar{\tau}_t^J - \tau_t)$ ¹⁴ and similarly, $d \ln(w_{t+1})/d\tau_t = -\alpha/(1 -$

¹⁴We have

$$\begin{aligned}
\frac{d \ln(R_{t+1})}{d\tau_t} &= (\alpha - 1) \frac{d \ln(s_t)}{d\tau_t} = (\alpha - 1) \frac{d \ln((\theta^J)^\top s_t^J)}{d\tau_t} = \\
&= (\alpha - 1) \frac{d \ln((\theta^J)^\top \phi_t^J)}{d\tau_t} = (\alpha - 1) \frac{d \ln(1 - \bar{\tau}_t^J - \tau_t)}{d\tau_t} = \frac{1 - \alpha}{1 - \bar{\tau}_t^J - \tau_t}.
\end{aligned}$$

$\bar{\tau}_t^J - \tau_t$).

4.1 Current Spending, Substitutability

When current spending at the federal and regional levels are perfect substitutes (2) reduces to

$$g_t^j = B_g w_t (\tau_t^j + \tau_t).$$

A federally funded transfer to households that regions may top up constitutes an example for this case. The first-order conditions characterizing the equilibrium choices of τ_t^j and τ_t , respectively, are given by

$$\begin{aligned} \frac{\omega}{\nu_t} \frac{\gamma^j}{\tau_t^j + \tau_t} - \frac{1 + \beta}{1 - \tau_t^j - \tau_t} &\leq 0, \\ (\theta^J)^\top \left(\frac{\omega}{\nu_t} \frac{\gamma^J}{\tau_t^J + \tau_t} - \frac{1 + \beta}{1 - \tau_t^J - \tau_t} \right) &\leq -\beta \frac{1 - \alpha - \alpha \bar{\gamma}^J}{1 - \bar{\tau}_t^J - \tau_t}. \end{aligned}$$

On the regional level, the benefit of publicly provided services for the elderly and the tax burden imposed on young taxpayers are internalized. These effects are represented by the first and second term in the first-order condition, respectively. The benefit increases in γ^j , the preference for the publicly provided service, as well as in ω/ν_t , the relative political weight of the elderly.

On the federal level, the same benefits and tax burdens across all regions are internalized (represented by the two terms in parentheses). In addition, political decision makers at the federal level internalize the general equilibrium effects of higher contemporaneous taxes and thus, lower equilibrium savings. Two such effects arise. On the one hand, interest rates in the subsequent period rise, benefiting the current young who save. The resulting benefit is proportional to $\beta(1 - \alpha)$. On the other hand, wages and thus, the tax base in the subsequent period fall, hurting the current young who are the beneficiaries of government spending in the following period. The corresponding cost is proportional to $-\beta\alpha\gamma^j$ in region j and to $-\beta\alpha\bar{\gamma}^J$ across all regions.

Unless $1 - \alpha - \alpha\bar{\gamma}^J = 0$ it is impossible that all tax rates are strictly positive. Generically (i.e., if $1 - \alpha - \alpha\bar{\gamma}^J \neq 0$), two situations may arise. Either all regional tax rates are interior (strictly positive) and the federal tax rate equals zero (this requires $1 - \alpha - \alpha\bar{\gamma}^J < 0$) or not all of the regional tax rates are interior but the federal tax rate is (which requires $1 - \alpha - \alpha\bar{\gamma}^J > 0$).

Suppose first that $\tau_t = 0$. From the regional first-order conditions, this implies that all regional tax rates must be strictly positive (unless $\omega = 0$ which we rule out). Intuitively, without federally provided public services each region provides some of it at the regional level because retirees depend on it. Accordingly, the net benefit of taxation as perceived in each region equals zero and the left-hand side of the federal decision maker's first-order condition equals zero as well. The case with $\tau_t = 0$ and $\tau_t^j > 0$ thus requires $1 - \alpha - \alpha\bar{\gamma}^J < 0$.

Suppose alternatively that $\tau_t > 0$. From the regional first-order conditions, this implies that the tax rate in a region is strictly positive if $\gamma^j > (1 + \beta)\tau_t/(1 - \tau_t)\nu_t/\omega$ and equal to zero otherwise. All regions can satisfy this requirement only in the non-generic case $1 - \alpha - \alpha\bar{\gamma}^J = 0$.¹⁵ Otherwise, only a strict subset of regions sets interior tax rates and the left-hand side of the federal decision maker's first-order condition is negative; this requires $1 - \alpha - \alpha\bar{\gamma}^J > 0$.

In conclusion, the equilibrium tax structure looks as follows: If $1 - \alpha - \alpha\bar{\gamma}^J < 0$ then all regions levy taxes but the federal government does not. The regional tax rates satisfy the first-order conditions at the regional level with equality, evaluated at $\tau_t = 0$. If $1 - \alpha - \alpha\bar{\gamma}^J > 0$, in contrast, then the federal government and a strict subset of regions (potentially no region) with sufficiently strong preference for the public service levy taxes. The first-order conditions of the regional government and of the subset of regions with strictly positive tax rates then hold with equality. Finally, in the non-generic case $1 - \alpha - \alpha\bar{\gamma}^J = 0$ all regions and the federal government levy taxes.

If the fiscal constitution excludes federal government spending, $\tau_t = 0$, then the regional tax rates follow from the first-order conditions at the regional level with equality, evaluated at $\tau_t = 0$. If the fiscal constitution excludes regional government spending, in contrast, $\tau_t^J = 0$, then the federal tax rate is pinned down by the first-order condition of the federal government with equality, evaluated at $\tau_t^J = \bar{\tau}_t^J = 0$.

4.2 Current Spending, Complementarity

We now turn to the case of complementary government spending on the federal and regional levels, for instance for health or social services. With complementarity, regional tax rates may always be positive, independently of the sign of the term reflecting the general equilibrium effects. We assume a Cobb-Douglas specification for the interaction between federal and regional spending with parameter $0 < \lambda < 1$ such that (2) takes the form

$$g_t^j = B_g w_t (\tau_t^j)^\lambda (\tau_t)^{1-\lambda}.$$

This yields the following first-order conditions characterizing regional and federal choices, respectively:

$$\begin{aligned} \frac{\omega \gamma^j \lambda}{\nu_t \tau_t^j} - \frac{1 + \beta}{1 - \tau_t^j - \tau_t} &\leq 0, \\ (\theta^J)^\top \left(\frac{\omega \gamma^J (1 - \lambda)}{\nu_t \tau_t} - \frac{1 + \beta}{1 - \tau_t^J - \tau_t} \right) &\leq -\beta \frac{1 - \alpha - \alpha\bar{\gamma}^J}{1 - \bar{\tau}_t^J - \tau_t}. \end{aligned}$$

The first-order conditions differ from those in the case with substitutes only insofar as the direct marginal benefit of taxation—the first term on the left-hand side of the conditions—only features the tax rate of choice. If the tax rate equals zero, the direct marginal benefit of taxation therefore equals infinity. As a consequence all equilibrium tax rates are strictly positive and all first-order conditions hold with equality.

¹⁵If all regions and the federal government set interior tax rates then the left-hand side of the federal decision maker's first-order condition equals zero and the first-order condition itself holds with equality. This is only possible if $1 - \alpha - \alpha\bar{\gamma}^J = 0$.

4.3 Investment Spending

Finally, we consider the case of public investment spending that funds the accumulation of a public capital stock which in turn delivers services to households. That is, in contrast to the two scenarios discussed previously we now let the depreciation rate δ be strictly less than unity. Examples of government spending with an investment character are public investments into infrastructure or basic research. As in the case discussed previously we assume a Cobb-Douglas aggregator for regional and federal spending (with coefficients λ and $1 - \lambda$, respectively). Similarly, we assume a Cobb-Douglas aggregator for regional and economy-wide public capital stocks (with coefficients κ and $1 - \kappa$, respectively) such that (2) is given by

$$g_t^j = B_g \left[(g_{t-1}^j)^\kappa (\bar{g}_{t-1}^J)^{1-\kappa} \right]^{1-\delta} \left[w_t (\tau_t^j)^\lambda (\tau_t)^{1-\lambda} \right]^\delta.$$

The first-order conditions now read

$$\begin{aligned} \frac{\omega \gamma^j \delta \lambda}{\nu_t \tau_t^j} - \frac{1 + \beta}{1 - \tau_t^j - \tau_t} &\leq -\beta(1 - \mu)(1 - \delta)\kappa\delta\lambda \frac{\gamma^j}{\tau_t^j}, \\ (\theta^J)^\top \left(\frac{\omega \gamma^J \delta (1 - \lambda)}{\nu_t \tau_t} - \frac{1 + \beta}{1 - \tau_t^J - \tau_t} \right) &\leq -\beta \frac{1 - \alpha - \alpha \delta \bar{\gamma}^J}{1 - \bar{\tau}_t^J - \tau_t} - \beta(1 - \delta)\delta(1 - \lambda) \frac{\bar{\gamma}^J}{\tau_t}. \end{aligned}$$

The first condition which characterizes the choice of regional tax rate contains one additional term relative to the situation with current spending. This term (on the right-hand side of the inequality, thus with a negative sign) represents the benefit of higher regional public services in the subsequent period as perceived by the current young in the region (a share $1 - \mu$ of whom will not migrate). The coefficient $(1 - \delta)\kappa$ in that term reflects the elasticity of regional public services with respect to their lagged value.

The second condition which characterizes the choice of federal tax rate differs twofold from the condition in the case discussed previously. On the one hand, the benefit from higher wages in the subsequent period is muted because the elasticity of public services with respect to wages is reduced from unity to δ . On the other hand, the condition contains an additional term that represents the benefit of higher public services across the economy.¹⁶ From the perspective of the federal level migration patterns are irrelevant because higher contemporaneous taxes increase public services in all regions, by the same proportion.

As in the case with current spending, the marginal benefit of taxation at a tax rate of zero equals infinity. As a consequence all equilibrium tax rates are strictly positive and all first-order conditions hold with equality.

5 Choice of Institutions

The previous analysis showed how different institutions led to different economic outcomes and how these could be ranked in a way that is consistent with the political process

¹⁶In every region j , we have $\partial \ln(g_{t+1}^j) / \partial \ln(\tau_t) = (1 - \delta) \partial \ln \left[(g_t^j)^\kappa (\bar{g}_t^J)^{1-\kappa} \right] / \partial \ln(\tau_t) = (1 - \delta) \partial [\kappa \ln(g_t^j) + (1 - \kappa) \ln(\bar{g}_t^J)] / \partial \ln(\tau_t) = (1 - \delta)\delta(1 - \lambda)$.

assumed to aggregate preferences in the economy. We can now consider the problem of society's choice between these alternative institutions. In general this is a complex problem since we need to specify a different political process for the "constitutional" stage, since it makes little sense to have institutions being decided with the same rules and frequency than policies.

Given that we have a very stylized representation for the political process, there is not much that we can modify with respect to constitutional rules.¹⁷ But we can change the frequency of constitutional reforms. For example, we can have nature determine whether a constitution reform can take place at the beginning of each period. Let's call $0 < \pi < 1$ the probability that the constitution can be reformed.¹⁸ Then when the constitution can be reformed society will politically choose the institutions. We assume this is done through the same process as that that lead to equilibrium policy platforms.

With these assumptions, in periods when there is a choice of institutions probabilistic voting among living candidates will lead to the choice of whether the country adopts a federal form of government or not. In general those that vote should consider how their choices might affect the future choice of institutions, should they be later changed. Since we have agents that live for only two periods, this means that the young should form expectations on how current institutional choice, through its effect on tomorrow's state variables, might affect tomorrow's choice of institutions, should nature determine that the constitution can then be reformed. But we have seen that in our politico-economic equilibria state variables have no effect on policy choice. Thus future preference for federalism is unaffected by today's institutional choice, and we can model the choice of institutions as the one that leads to a higher maximized objective function $V^*(\cdot)$ at the federal level.

So, in our model, and under mild assumptions that make constitutional reforms rare events that aggregate preferences consistently with the ordinary political process, we have thus found that the period t ranking of institutions would determine the choice of institutions should a reform be possible. This does not mean that every period the ranking of institutions is consistent with current institutions being the best for society. Developments from the last constitutional reform might make the current institution inefficient. [This can be seen in our model so far only through changes in demographics. But the model can be generalized to have time varying parameters, δ , ϕ^J , μ , ξ . Generalizing the model in this way is straightforward if these parameters follow deterministic processes. The above reasoning on the independence of constitutional choice on (endogenous) state variables continues to hold.] This has important implications when applying our theory to describe reality. For example, an empirical analysis of federalism across countries must incorporate the time of the last constitutional reform that changed the form of government (or could have changed it, since in reality there are other dimensions of institutions that we do not model), and the changes since then in the relevant parameters (e.g. has a new public good been created that is more/less affected by past spending, how do preferences

¹⁷If we had that policy was decided by a legislature, then it could be the case that a larger majority of votes is required to pass a constitutional reform than for contemporaneous fiscal policy.

¹⁸We can allow the probability to be time varying, and even dependent of the state of the economy. Results are unchanged.

for this public good relate to prior preferences? (both in level and dispersion), do people migrate more/less?, etc.).

To be done.

6 Concluding Remarks

To be written.

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