Decentralization, Growth and Wasteful Governments

Christiane Schuppert *

February 19, 2008

While the empirical literature on the relation between fiscal federalism and growth is ambiguous, a newly emerging theoretical literature mainly argues that decentralization positively affects a country's growth rate. Yet, these theoretical contributions focus on saving effects of decentralization and fail to incorporate human capital as the most important engine of growth. Accounting for this shortcoming, we show that decentralization is harmful for growth: Since wasteful governments try to prevent mobility-increasing education, the level of human capital available locally and, consequently, the growth rate of the economy decline.

Keywords: fiscal federalism, migration, growth

JEL-Classification: H77, F22, O4

*University of Dortmund, Economics Department, 44227 Dortmund, Germany, email: christiane.schuppert@uni-dortmund.de, phone: +49-231-7554374.

This paper was written while I was a visiting fellow at the Economic Research and Policy Unit (EPRU) of the University of Copenhagen. I am very grateful for their support. Financial support by the German Research Foundation DFG is gratefully acknowledged.

1 Motivation

In recent years, decentralization has become more and more popular as a development strategy that promotes growth and disciplines corruptive governments. E.g. the Worldbank argues that "decentralization permits a degree of institutional competition between centers of authority that can (...) reduce the risk that governments will expropriate wealth" ((Worldbank, 2004), p. 53). This view is supported by the literature on fiscal federalism that detects welfare improving aspects of tax competition in the presence of wasteful governments.[1] It remains unclear, however, whether this translates into higher growth rates in decentralized setups.

A large body of empirical literature has explored the link between decentralization and growth, but the evidence is ambiguous depending on measures of fiscal decentralization and estimation technique. While e.g. Davoodi and Zou (1998), Woller and Phillips (1998), Zhang and Zou (1998) find a zero or even a negative relationship between decentralization and growth, Akai and Sakata (2002), Iimi (2005) and Stansel (2005) show the opposite. At the same time, theoretical contributions linking decentralization and growth and exploring the underlying mechanism are nearly absent.

Lejour and Verbon (1997) develop an endogenous, AK-style growth model focusing on welfare rather than growth effects of fiscal competition. Their analysis reveals a growth-enhancing effect of decentralization: Since tax competition for mobile capital leads to lower tax rates that in turn increase incentives to save and invest, decentralization has a positive effect on growth.[2] Similarly, decentralization might enhance growth via increased savings incentives if tax competition is a means to restrain excessive taxation of rent-seeking politicians.[3] Yet, Rauscher (2005, 2007) demonstrates in different variants of endogenous growth models with Leviathan governments that the growth effects of increased competition are ambiguous.

Brueckner (2006) develops an endogenous growth model with overlapping generations in which young and old individuals live in separate regions and differ with respect to their preferred level of public good provision. Starting from a centralized system with uniform provision, decentralization can better match the different demands of consumers increasing the incentive to save. To partially compensate the increase in savings, working time falls and time devoted to schooling rises, implying that the impact on growth is

[1] E.g., Kehoe (1989) shows that the possibility of capital flight reintroduces the elasticity of the tax base and prevents selfish governments from excessive taxation of previously accumulated mobile factors.

[2] This basic mechanism has also been established in a political economy model by Hatfield (2006). He derives a definite welfare-enhancing effect under both a median-voter regime as well as given a rent-extracting government.

[3] The idea that fiscal competition in federalist systems can serve to restrain Leviathan governments is due to Brennan and Buchanan (1980).

positive.[4]

A common feature of these studies is the focus on saving effects of tax competition as the single channel by which decentralization affects growth. Yet, decentralization directly influences the incentives to invest in education and, thereby, determines the major engine of growth: human capital.[5] While previous studies have failed to incorporate human capital driven growth, we consider the growth effects of decentralization if educational investments are affected by tax competition. We set up a simple growth model based on technology diffusion from a more advanced, technologically superior "frontier" country. The rate of technology diffusion is endogenous and depends on the level of human capital available locally. This reflects the fact that only qualified labor is capable of implementing new technologies. The growth rate of the economy is, therefore, endogenously determined by the amount of high-skilled labor available as well as by the rate of (frontier) technology growth.

Given this framework, we consider optimal education policies of wasteful governments in the presence of high-skilled mobility. The standard literature on fiscal federalism argues that tax competition can reduce wasteful government expenditures and improve welfare as it increases the elasticity of the tax base. However, this reasoning does not carry over to the case of human capital and optimal education policies. Still, Leviathan governments engaging in excessive taxation of high-skilled labor in a closed economy are constrained to do so if competition for educated workers is introduced. However, they find other, more expensive ways of rent extraction, namely preventing mobility-increasing education in the first-place. As Andersson and Konrad (2003) show, competition for qualified labor induces Leviathan governments to increase the private cost of education, even if such an education policy is costly.

Our model is closely related to the work of Andersson and Konrad (2003), who consider a two period model in which private educational investments increase future income prospects. In contrast, we develop a dynamic model of intergenerational altruism in which parents invest in the education of their children. Additionally, we incorporate a production sector and allow for technology growth. The standard results of Andersson and Konrad (2003) carry over to our dynamic setting: While wasteful governments have an incentive to promote human capital formation under centralization, but try to prevent education in a decentralized setup. This has important implications for the growth process of regions: since migration between symmetric regions will not occur ex-post, preventing education lowers the number of high-skilled workers available locally. Consequently, the rate of technology diffusion falls, implying a lower growth rate under decentralization.

[4] A stimulating effect on savings as a result of better preference matching as well as a positive impact on growth during the transition to the new steady state has already been derived by Brueckner (1999) in an exogenous growth model.

[5] Although Brueckner (2006) considers schooling, saving incentives remain the crucial mechanism linking decentralization and growth.

2 The Model

Consider a federation that is populated by successive generations. Every household or parent has one offspring and invests an amount e_t^n in the education of this child, where $n = H, L$ indicates the respective type of the parent. This educational investment determines the child's probability of becoming high-skilled. Thus, while the overall size of the federal population is fixed over time with $\bar{N} = \sum_{i=1}^{m} \left(N_{t,i}^H + N_{t,i}^L\right) \forall t \geq 0$, the evolution of types depends on the regional investments in education.

We compare the outcome of two different scenarios: under centralization, a single Leviathan government subsuming all regions maximizes it's tax revenue. This scenario coincides with the case of a closed economy with no competition between regional governments. In contrast, the federal economy is divided into a large number of small, symmetric jurisdictions $i = 1, ..., m$ under decentralization.[6] Each of these jurisdictions represents a revenue-maximizing tax authority that can raise lump-sum taxes and provide public education g. Jurisdictions are assumed to be entirely symmetric. This implies that, initially, and before any migration takes place, the population of any region i consists of a fixed number of high-skilled (N_0^H) and low-skilled households (N_0^L). Still, under decentralization regions compete for mobile high-skilled workers.

2.1 Production and Productivity Growth

In every period $t \geq 1$, firms produce a single aggregate good that can be used for consumption and investments in education. Labor is the only input factor with high-skilled ($N_{t,i}^H$) and low-skilled households ($N_{t,i}^L$) being perfect substitutes. Households supply z^n efficiency units of labor inelastically, with $n = H, L$ denoting the respective skill group, and it is assumed that high-skilled labor is more productive ($z^H > z^L$). Aggregate effective labor supply can be written as $Z_{t,i} = z^H N_{t,i}^H + z^L N_{t,i}^L$.[7]

Firms in every region have access to the production function $F(A_{t,i}, Z_{t,i})$ with $F'(A_{t,i}, Z_{t,i}) > 0 > F''(A_{t,i}, Z_{t,i})$. $A_{t,i}$ denotes labor-augmenting technological progress in region i that is exogenous to the firm. As an example one can think of the following production technology

$$F(A_{t,i}, Z_{t,i}) = (A_{t,i} Z_{t,i})^{\alpha} \tag{1}$$

where $0 < \alpha < 1$ denotes the production elasticity of labor. Labor markets are compet-

[6] This assumption allows to abstract from any strategic interaction between regions.

[7] The basic model setup follows Boadway et al. (2003), who analyze fiscal equalization in a static model with two types of mobile labor. Their work is extended to a dynamic framework with successive generations, endogenous human capital formation and growth.

itive, therefore the wage rate w^n equals the marginal product of labor.

As the production function exhibits decreasing returns to scale, local rents arise. The rent income of region i is given by $R(A_{t,i}, Z_{t,i}) = F(A_{t,i}, Z_{t,i}) - A_{t,i}Z_{t,i}F'(A_{t,i}, Z_{t,i})$ with $R'(A_{t,i}, Z_{t,i}) = -A_{t,i}Z_{t,i}F''(A_{t,i}, Z_{t,i}) > 0$. It is assumed that these rents accrue to the regional government.[8] Since regions have access to the same production technology, that is fiscal capacities of local jurisdictions do not differ, there is no need for federal equalization. This implies that it is irrelevant whether the rents are appropriated by the regional or central government. In contrast, with private ownership of the fixed factor, source income arises that induces an additional fiscal externality of migration. To focus on the impact of migration on optimal education policies, additional inefficiencies resulting from private rent income should be avoided, and it is assumed that the local governments receive the entire rent income.

Now consider a situation in which regions do not invest in research but adopt existing technology from the rest of the world. Moreover, assume that the world technology frontier $\overline{A}_t$ grows exogenously by the constant rate $\overline{\gamma}_A$. Depending on the amount of high-skilled labor available locally, a single region i can adopt a fraction $\phi(N^H_{t,i})$ of the existing technology, $\overline{A_t}$, in period t. This indicates that the rate of technology diffusion is larger the higher the level of human capital available regionally.[9] The technological progress in the domestic economy evolves according to

$$A_{t,i} = \phi(N^H_{t,i})\overline{A}_{t-1} + A_{t-1,i}. \tag{2}$$

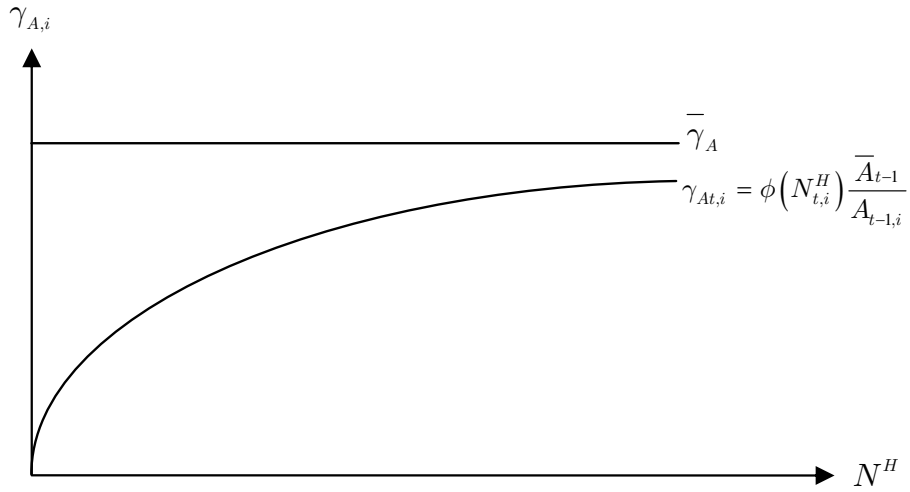
The growth rate of technology can be derived as

$$\gamma_{At,i} = \frac{A_{t,i} - A_{t-1,i}}{A_{t-1,i}} = \phi\left(N^H_{t,i}\right)\frac{\overline{A}_{t-1}}{A_{t-1,i}}. \tag{3}$$

with $\phi(N^H_{t,i})$ exhibiting positive, but diminishing returns, $\lim_{N^H_{t,i}\to 0}\phi(N^H_{t,i}) = 0$ and $\lim_{N^H_{t,i}\to\infty}\phi(N^H_{t,i}) = 1$. Equation (3) indicates that the country grows faster the farer it is from the world technology frontier and the higher it's level of human capital.

[8] This can be justified by the implicit assumption that either the local jurisdiction is the owner of the fixed factor who generates the rents, or that it has access to a rent tax to fully appropriate the pure profit.

[9] According to Eaton and Kortum (1996), the rate of technology diffusion is rising in the local level of human capital. It should be noted, however, that the literature on technology diffusion has also discussed other channels by which new technologies can be adopted, e. g. import of high-technology products.



Clearly, this is a very simple and stylized way of introducing growth to the model setup, and there are other sources such as innovation that contribute to technology growth. One might even argue that technology diffusion as the major source of growth is only relevant for a small number of developing countries not capable of financing R&D expenditures themselves. Yet, empirical studies indicate that frontier growth, that is the creation of new technology, is generated in only few, relatively rich countries. For most countries, foreign R&D plays a crucial role. Providing an overview over recent literature on technology diffusion, Keller (2004) concludes that "for most countries, foreign sources of technology are of dominant importance (90 percent or more) for productivity growth" (see (Keller, 2004), p.776). Moreover, other sources of growth such as innovation are also directly linked to the level of human capital available locally, implying that our results will carry over to such scenarios.

2.2 Household Behavior

Following Cremer and Pestieau (2006),[10] successive generations of two types of labor, namely low-skilled (N_t^L) and high-skilled (N_t^H), are assumed. Each of these workers has one offspring and is, hence, also referred to as a parent. Parents invest an amount e_t^n in the education of their children and thereby determine - together with publicly provided education - the probability of their child to become high-skilled, $h(e_t^n, g_t)$. While young, children undergo education, but only enter the model explicitly when old, that is, once they have completed their education and start working as either high- or low-skilled. Note that individuals do not decide on their own education, but only on the amount invested in their children. Thus, the model rather depicts basic or early education as compared to college or university education.

[10] Cremer and Pestieau (2006) consider an immobile workforce and study optimal education policies when private investment, which can be supplemented by public investment, is not observable.

The probability to become high-skilled and, thus, high-productive is derived endogenously as a function of the different educational investments of the respective type of parent: The probability to become high-skilled is $h(e_t^H, g_t)$ if parents are high-skilled, and $h(e_t^L, g_t)$ if they are low-skilled. Since children of high- and low-skilled parents both face a positive probability of becoming high-skilled, the model allows for social mobility across skill types.

However, in the absence of any fiscal policy, children of high-skilled parents face a higher probability of becoming high-skilled themselves. This is due to the fact that high-skilled parents are more productive and earn a higher wage income. Consequently, they spend more resources on education than low-skilled parents do. As the amount invested by parents is determined by the net earnings realized by the respective type, social mobility is contingent on the productivity and eventually on the educational background of parents. Therefore, the model additionally captures intergenerational earnings persistence which can, however, be reduced using educational subsidies.

The proposed framework replicates basic findings of the recent literature that stress the importance of early investments in shaping the cognitive ability of children that in turn determines their future educational success as well as their income prospects. Restuccia and Urrutia (2004) calibrate a model in which innate ability, acquired ability, based on parental investments in early education, and college education determine the probability of successful college graduation. They show that parental investments in education, especially early education, account for nearly one-half of the observed intergenerational earnings persistence. This evidence suggests that social mobility can be increased substantially by the provision of educational subsidies on private investments in early education. Additionally, Carneiro and Heckman (2002) stress the importance of long-run factors to explain the positive correlation between college enrolment and family income. They argue that children from high-income families have better access to resources that provide them with higher quality of education early in life leading to superior cognitive ability in the long-run.

Assuming large numbers, the high-skilled labor supply in a particular region i prior to migration is fully determined by previous local investments. More precisely, the number of high-skilled workers in period $t+1$ can be derived on the basis of parent's educational investment in period t,

$$N_{t+1,i}^H = N_{t,i}^H \cdot h(e_{t,i}^H, g_{t,i}) + N_{t,i}^L \cdot h(e_{t,i}^L, g_{t,i}). \tag{4}$$

Analogously, the number of low-skilled workers can be deduced,

$$N_{t+1,i}^L = N_{t,i}^H \cdot (1 - h(e_{t,i}^H, g_{t,i})) + N_{t,i}^L \cdot (1 - h(e_{t,i}^L, g_{t,i})). \tag{5}$$

After the educational process determined the respective type, the child enters the work-

ing period as either high- or low-skilled, supplying z^n efficiency units of labor inelastically to firms in the region of residence. The after-tax labor income is spend on consumption as well as investment in the education of children. Denoting the net income by $\widetilde{w}^H_{t,i}$ and consumption by $c^n_{t,i}$, the household's budget constraint can be expressed as

$$\widetilde{w}^H_{t,i} = c^n_{t,i} + e^n_{t,i}. \tag{6}$$

Preferences of different skill types are identical and additively separable between consumption and educational investments. They can be expressed by the strictly concave utility function

$$U(c^n_{t,i}, e^n_{t,i}) = c^n_{t,i} + \upsilon(e^n_{t,i}) = \widetilde{w}^H_{t,i} - e^n_{t,i} + \upsilon(e^n_{t,i}) \tag{7}$$

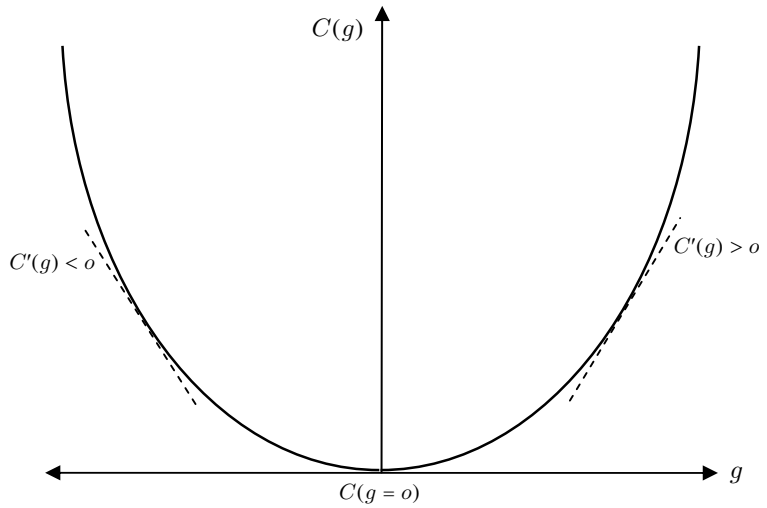
Note that parents are altruistic in the sense that they experience a joy of giving when supporting their children's education (warm glow altruism).

2.3 Central and Local Governments

The governments are assumed to behave like Leviathans in the sense that they maximizes tax revenues to finance wasteful government consumption c^G_t. It is assumed that taxation is restricted to confiscating a share exceeding some minimum income w^{min}. Additionally including the regional rent and the costs of the education policy, $C(g_t)$, the budget of both the central government as well as a representative local jurisdiction can be written as

$$\sum_n N^n_t \left(w^n_t - w^{min}\right) - C(g_t) + R(Z_t) = c^G_t. \tag{8}$$

In the present model, public education policy is interpreted in a very general way. It comprises the conventional understanding of public education such as provision and quality of public schools, universities, and libraries, but additionally captures other factors that can enhance but also diminish the success of education, $h(e^n_t, g_t)$. E.g., it can reflect a poor learning environment due to low quality of teachers, oversized classrooms, and restricted access to public education facilities, in which case $g_t < 0$ as it diminishes the probability of successful education. It is assumed that improving public education as well as actively restricting access to high-quality education imposes positive costs. More precisely, the cost function is assumed to be U-shaped with $C(0) = 0$.



3 The Leviathan equilibrium under centralization

First, consider a central government that maximizes tax revenue net of expenditures for public provision of education,

$$\max_{g_t} \sum_{t=0}^{\infty} \beta^t \left[\sum_n N_t^n \left(w_t^n - w^{min} \right) - C(g_t) + R(Z_t) - c_t^G \right]. \tag{9}$$

When optimizing, the Leviathan takes into account the law of motion governing the evolution of types in the local economy (equations (4) and 5). The first-order condition of the maximization problem is

$$\frac{\partial N_t^H}{\partial g_{t-1}} \left(w_t^H - w_t^{min} \right) + \frac{\partial N_t^L}{\partial g_{t-1}} \left(w_t^L - w_t^{min} \right) \tag{10}$$

$$+ \left[N_t^H \frac{\partial w_t^H}{\partial A_t Z_t} + N_t^L] \frac{\partial w_t^L}{\partial A_t Z_t} + \frac{\partial R(A_t Z_t)}{\partial A_t Z_t} \right] \frac{\partial A_t Z_t}{\partial g_{t-1}} = C'(g_{t-1}) \tag{11}$$

With a fixed federal population size, the number of low-skilled individuals can be written as $N_t^L = N_t - N_t^H$,

$$\frac{\partial N_t^H}{\partial g_{t-1}} \left(w_t^H - w_t^L \right) + \left[N_t^H \frac{\partial w_t^H}{\partial A_t Z_t} + N_t^L \frac{\partial w_t^L}{\partial A_t Z_t} + \frac{\partial R(A_t Z_t)}{\partial A_t Z_t} \right] \frac{\partial A_t Z_t}{\partial g_{t-1}} = C'(g_{t-1}) \tag{12}$$

The first term on the left-hand side of equation (12) captures the direct effect of a change of the number of high-skilled workers on the amount of rent extraction. Since high-skilled

workers are high-productive ($w_t^H > w_t^L$), a rising number of educated labor increases the amount of tax revenue the Leviathan government can appropriate. The second term on the left-hand side comprises two effects that are related to the production side of the economy ($\frac{\partial A_t Z_t}{\partial g_{t-1}}$): A rise in the size of the high-skilled workforce affects the aggregate effective labor supply Z_t positively, and consequently raises output, wages and local rents. Moreover, high-skilled workers increase the rate of technology diffusion ($\phi_{N_t^H} > 0$). This implies that more education raises output even further as it fosters technological progress. Note that this growth effect of public education is more pronounced in less developed countries that are characterized by a low amount of educated workers, entailing a higher marginal productivity in terms of technology adoption.

Since the overall effect of public educational spending is positive, a Leviathan government chooses an educational policy that is characterized by a positive marginal cost of public investment, $C'(g) > 0$. This indicates that the government has an incentive to promote human capital formation, $g > 0$ as such a policy increases the share of high-skilled in the economy, therby raising output, and inducing a higher growth rate.

Proposition 1 *In the absence of migration, a wasteful government has incentives to provide public education even though this policy induces costs. This is partly due to the fact that a wasteful government benefits from promoting the growth process.*

A similar result has been derived by Andersson and Konrad (2003), who consider a two period model in which individuals invest in education to raise their second period income. The Leviathan can lower the private cost of education, but education policy is costly. The main difference to our approach is that Andersson and Konrad (2003) do not consider the production side of the economy. Rather, they focus on the first, direct effect on rent extraction capacities, while production and growth effects are ignored.

4 Education Policies with High-Skilled Migration

4.1 Migration

To reflect the observable trend that mobility increases with the skill level, we consider mobility of high-skilled labor while low-skilled workers are assumed to be immobile. For simplicity, the analysis abstracts from any migrations costs such as language barriers, moving costs or attachment to the home country. Migration takes place at the beginning

of every period $t \geq 1$, before households decide on consumption and educational spending. Hence, migration flows determine the current working population of a respective region i in every period t.

A potential migrant is indifferent between migrating or staying as soon as the net income is equalized across regions.[11] Denoting the net income attainable in region i by $\widetilde{w}^H_{t,i}$, a migration equilibrium between any region $i \neq j$ and an arbitrarily chosen reference region j is characterized by

$$\widetilde{w}^H_{t,i} = \widetilde{w}^H_{t,j} \tag{13}$$

Equation (13) implicitly defines the quantity of mobile labor allocated in a particular region after a migration equilibrium has been reached. It is important to note that the locally available size of the high-skilled population is entirely determined by migration flows, while previous education policies are irrelevant ($\frac{\partial N^H_t}{\partial g_{t-1}} = 0$). Yet, public investments in education still affect the size of the locally available low-skilled workforce ($\frac{\partial N^L_t}{\partial g_{t-1}} < 0$).

4.2 The Leviathan equilibrium under decentralization

Consider a wasteful government in region i that maximizes tax revenue, accounting for the possibility of migration as well as respecting the law of motion that determines the number of low-skilled workers available (equation 5). Note that, with a binding migration constraint, the net income of high-skilled workers is given by their outside option. This implies that the Leviathan government can no longer tax high-skilled workers. This changes the government's objective function to

$$N^L_{t,i}\left(w^L_{t,i} - w^{min}\right) - C(g_{t,i}) + R(Z_{t,i}) = c^G_{t,i}. \tag{14}$$

The first order condition for the optimization problem is

$$\frac{\partial N^L_{t,i}}{\partial g_{t-1,i}}\left(w^L_{t,i} - w^{min}\right) + \left[N^H_{t,i}\frac{\partial w^H_{t,i}}{\partial A_{t,i}Z_{t,i}} + N^L_{t,i}\frac{\partial w^L_{t,i}}{\partial A_{t,i}Z_{t,i}} + \frac{\partial R(\cdot)}{\partial A_{t,i}Z_{t,i}}\right]\frac{\partial A_{t,i}Z_{t,i}}{\partial g_{t-1,i}} = C'(g_{t-1,i}) \tag{15}$$

[11] Typically, a migration equilibrium in the presence of mobile labor is characterized by an equalization of the net wage rate. As long as the entire net income is spend on consumption, this corresponds to an equalization of utility levels. Yet, in the present setup, the net income can be spend on consumption and educational investments, implying that migration should react to differences in utility levels. However, households are confronted with interregionally identical shadow prices for education. Consequently, an equalization of net wage rates ensures that spending levels and the resulting utility levels are equalized as well.

The direct effect on rent extraction now becomes negative since public education no longer determines the size of the high-skilled workforce, but only reduces the number of (taxable) low-skilled workers ($\frac{\partial N^L_{t,i}}{\partial g_{t-1,i}}$). Moreover, a lower number of low-skilled workers affects the aggregate effective labor supply negatively, while the rate of technology diffusion remains unaffected. As a consequence, a Leviathan government no longer faces incentives to provide mobility-increasing public education. Rather, the chosen education policy is characterized by negative marginal costs, $C'(g) < 0$, indicating that a wasteful government intends to prevent mobility-increasing education despite of the fact that such policy involves additional resource costs. To see this, observe that the marginal costs of providing public education in the optimum are negative (the left-hand side of equation (15)). This implies that increasing public education would raise government consumption. Still, a wasteful government is willing to spend resources to prevent mobility-increasing education.[12]

Yet, since all regions are entirely symmetric, migration will not occur in equilibrium. This implies that in equilibrium, the size of the local high-skilled workforce is still determined by previous regional education. Given the Leviathan's education policy, however, the probability of successful education declines, entailing that number of qualified labor falls and, consequently, the rate of technology diffusion declines.

Proposition 2 *In the presence of high-skilled mobility, a wasteful government refrains from providing mobility-increasing public education. Consequently, decentralization lowers economic growth.*

5 Conclusion

The present paper considers the link between decentralization and growth in a simple growth model of technology diffusion. In doing so, we focus explicitly on one aspect of fiscal competition that has been discussed in the literature, namely that increased mobility can discipline wasteful governments. Moreover and in contrast to the recent theoretical literature, we incorporate human capital as the most important determinant of growth. We consider two scenarios, a closed economy setup that represents a benchmark for the results derived under perfect mobility of high-skilled labor.

We show that wasteful governments have incentives to promote education. This is due to the fact that education (1) raises the amount of (taxable) high-income households,

[12] Again, this result is in line with the findings of Andersson and Konrad (2003) for the case of Betrand competition between two Leviathan governments.

(2) raises the wage income of all (taxable) households due to increased output via higher aggregate labor supply, and (3) raises wage income even further as education increases the rate of technology diffusion and, thus, promotes technological progress.

In contrast, wasteful governments try to prevent education if perfect mobility of high-skilled labor is introduced. Since the amount of locally available educated workers is no longer determined by previous local investments in education, public education only reduces the number of (taxable) low-skilled workers. Moreover, fewer low-skilled workers imply lower wages since the aggregate effective labor supply declines. To avoid these negative implications, wasteful governments opt for a policy that restricts access to public education.

However, in a symmetric setup, no migration will occur in equilibrium, and the size of the high-skilled workforce available locally is - ex post - still depending on previous local investments in education. With an education policy aiming at restricting human capital formation, the number of qualified labor will decline, and so does the rate of technology diffusion. Thus, that competition for qualified labor is not only harmful as it induces other, more expensive ways of rent extraction, but decentralization additionally lowers the growth rate of the economy.

References

Akai, N. and M. Sakata (2002): Fiscal decentralization contributes to economic growth: evidence from state-level cross section data for the United States, *Journal of Urban Economics*, Vol. 52, p. 93–108.

Andersson, Frederik and Kai A. Konrad (2003): Globalization and Risky Human-Capital Investment, *International Tax and Public Finance*, Vol. 10, No. 3, pp. 211–228.

Boadway, Robin, Katherine Cuff and Maurice Marchand (2003): Equalization and the Dezentralization of Revenue-Raising in a Federation, *Journal of Public Economic Theory*, Vol. 5, No. 2, pp. 201–228.

Brennan, Geoffrey and James M. Buchanan (1980): *The power to tax: Analytical foundations of a fiscal constitution*, 1 Edn., London: Cambridge University Press.

Brueckner, Jan K. (1999): Fiscal Federalism and Capital Accumulation, *Journal of Public Economic Theory*, Vol. 1, No. 2, pp. 205–224.

Brueckner, Jan K. (2006): Fiscal federalism and economic growth, *Journal of Public Economics*, Vol. 90, No. 10-11, pp. 2107–2120.

Carneiro, Pedro and James J. Heckman (2002): The evidence on credit constraints in post-secondary schooling, *The Economic Journal*, Vol. 112, pp. 705–734.

Cremer, Helmuth and Pierre Pestieau (2006): Intergenerational Transfer of Human Capital and Optimal Education Policy, *Journal of Public Economic Theory*, Vol. 8, No. 4, pp. 529–545.

Davoodi, H. and H. Zou (1998): Fiscal decentralization and economic growth: a cross-country study, *Journal of Urban Economics*, Vol. 43, p. 244–257.

Eaton, Jonathan and Samuel Kortum (1996): Trade in Ideas: Patenting and Productivity in the OECD, *Journal of International Economics*, Vol. 40:3-4, p. 251–78.

Hatfield, John (2006): *Federalism, Taxation, and Economic Growth*, Stanford graduate school of business researach paper no. 1929.

Iimi, A. (2005): Decentralization and economic growth revisited: an empirical note, *Journal of Urban Economics*, Vol. 57, p. 449–461.

Kehoe, Patrick J. (1989): Policy Cooperation Among Benevolent Governments May Be Undesirable, *Review of Economic Studies*, Vol. 56, pp. 289–296.

Keller, Wolfgang (2004): International Technology Diffusion, *Journal of Economic Literature*, Vol. XLII, p. 752–782.

Kydland, Finn E. and Edward C. Prescott (1977): Rules rather than discretion: The inconsistency of Optimal Plans, *Journal of Political Economy*, Vol. 85, No. 3, pp. 473–491.

Lejour, Arjan M. and Harrie A. A. Verbon (1997): Tax Competition and Redistribution in a Two-Country Endogenous-Growth Model, *International Tax and Public Finance*, Vol. V4, No. 4, pp. 485–497.

Rauscher, Michael (2005): Economic Growth and Tax-Competing Leviathans, *International Tax and Public Finance*, Vol. V12, No. 4, pp. 457–474.

Rauscher, Michael (2007): Tax Competition, Capital Mobility and Innovation in the Public Sector, *German Economic Review*, Vol. 8, No. 1, pp. 28–40.

Restuccia, Diego and Carlos Urrutia (2004): Intergenerational Persistence of Earnings: The Role of Early and College Education, *American Economic Review*, Vol. 94, No. 5, pp. 1354–1378.

Stansel, D. (2005): Local decentralization and economic growth: a cross-sectional examination of US metropolitan areas, *Journal of Urban Economics*, Vol. 57, p. 55–72.

Woller, G. K. and K. Phillips (1998): Fiscal decentralization and LDC growth: an empirical investigation, *Journal of Development Studies*, Vol. 34, p. 138–148.

Worldbank (2004): *World Development Report*, Washington D.C.

Zhang, T. and H. Zou (1998): Fiscal decentralization, public spending and economic growth in China, *Journal of Public Economics*, Vol. 67, p. 221–240.