Decentralization and Economic Performance in a Cooperative Federation – Evidence from Germany

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Abstract

Even though the link between decentralization and economic performance has been subject to a large bulk of empirical studies, so far no clear-cut conclusions prevail. This may be due to the fact that it is not fiscal federalism per se but rather particular features of federalism's institutional design that determine its impact on economic progress. In this paper, the empirical analysis on the influence of fiscal federalism on productivity in the German states from 1975 to 2005 does not only consider expenditure and revenue decentralization, but also includes intergovernmental transfers. The evidence suggests that revenue decentralization is favorable to economic performance, whereas expenditure decentralization has a negative impact on economic performance. Horizontal transfers appear to decrease productivity, even though this influence becomes insignificant in instrumental variable analyses.

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1 Introduction

Even though the link between decentralization and growth has been subject to a bulk of theoretical as well as empirical studies, so far no unambiguous relationship could be established. A possible explanation is that it is not fiscal federalism per se but rather specific elements in the institutional design of fiscal federalism that facilitate growth. This paper aims at shedding some light on the role of intergovernmental transfers in this relationship.

Oates (1993) was among the first to contemplate the role of fiscal federalism for economic development. He suggests that in a dynamic setting, the efficiency-enhancing effects of fiscal decentralization should also be conducive to economic growth. In a nutshell, competition for tax bases (Tiebout 1956) or for votes (Salmon 1987; Besley and Case 1995) is expected to induce sub-national governments to conduct investor-friendly policies (Oates 1972) and experiment with new policy solutions (Oates 1999). Barring possible downsides, such as a "race to the bottom" of tax rates (e.g. Zodrow and Mieszkowski 1986) or free-riding behavior on other states' innovations (Rose-Ackerman 1980; Strumpf 2002), these effects of decentralization are assumed to affect economic performance positively. Empirical studies which attempt to test this link, however, yield contradicting results (cf. Feld et al. 2008 for an overview).

Weingast's (1995) concept of market-preserving federalism was an influential attempt to emphasize the importance of certain features of fiscal federal systems for a beneficial effect on economic development. Provided that sub-national governments have sufficient autonomy and authorities are delineated, competition may be facilitated, in turn fostering economic growth. In fact, many countries deviate from the optimal structure required for growth-enhancing effects of fiscal federalism. This is for example reflected in imperfect devolution of competences to sub-national governments, cooperation in revenue collection or wide-ranging intergovernmental transfer schemes. Federations exhibiting such structures, such as Germany or South Africa, are commonly labeled cooperative in contrast to competitive (Shah 2007).

As the prime example of a cooperative federation, scholars often refer to Germany (Arnold 2005). Due to constitutional regulations, Germany's sub-national governments, the *Laender* (states) and the municipalities, are constrained in their ability to independently determine expenditures. A substantial fraction of sub-national revenues stems from a revenue-sharing arrangement, limiting competition for tax bases. Furthermore, German fiscal relations are characterized by a comprehensive scheme of horizontal and vertical intergovernmental transfers that potentially reduces the incentives especially of governments of relatively poor developed states to outperform their counterparts.

A compelling question is how the different features of the German fiscal federal structure influence the economic performance of the German *Laender*. We employ information on budgetary decentralization and intergovernmental transfers to analyze their impact on productivity of the German states in the years 1975 to 2005. We hypothesize that budgetary decentralization has a growth-increasing effect and that intergovernmental transfers decrease economic performance. In fact, we find evidence for revenue decentralization being favorable to economic performance. Contrary to our expectations, our results indicate a negative influence of expenditure decentralization. As expected, recipient states of horizontal transfers appear to have a smaller productivity than their counterparts, even though this influence becomes insignificant if instrumental variable analysis is applied.

The remainder of the paper is organized as follows. The first part of section 2 provides a review of theoretical arguments regarding the link between decentralization and growth. The second part of section 2 discusses the validity of these arguments in the context of cooperative federations. Section 3 describes the specific features of the German fiscal federal system. In section 4, we introduce the econometric approach and present the empirical results. Concluding remarks are given in section 5.

2 Linking decentralization and growth

2.1 Theoretical considerations

In recent years, the impact of the devolution of responsibilities to lower levels of governments on economic growth has received much attention. Oates (1993) argues that the efficiency-enhancing effects of fiscal decentralization should also increase economic growth if a long-run dynamic perspective is adopted. Much of the subsequent literature centered on this approach. If preferences are heterogeneous, it is reasonable to assume that local governments can do a better job in formulating appropriate policies for their jurisdiction (e.g. Oates 1972). On the one hand, this is substantiated in informational advantages compared to a unitary government (Hayek 1948). Services can be better targeted to the needs of a jurisdiction's residents and sub-national governments urged to higher accountability. Additionally, decentralization offers the virtue of exposing governments to competition. In a decentralized setting, politicians – whether interested in revenue-maximization (Brennan and Buchanan 1980) or in securing their (re-) election (Downs 1957, Buchanan and Wagner 1977) – have to take into account that voters can compare taxation and public good provision among regions and migrate to the region offering the best "package" according to their preferences (Tiebout 1956).

In the Tiebout world, it is assumed that individuals with similar preferences sort themselves into a jurisdiction in the migration process. The possibility to tackle regionally centered policy requirements can have beneficial effects for capital accumulation. Brueckner (2006) shows in an endogenous overlapping generations-model how this feature of decentralization affects growth. In his model, the young and old exhibit heterogeneous demands for public goods and in a federal system sort themselves into regions by age.[1] Assuming income to rise over the life-cycle, the demand for public goods is age-dependent, in that it is low for the young generation and high for the old one. If responsibilities are decentralized, public good provision can be adjusted to these different demands, increasing the income of the young and thus their incentive to save. The consequential increase in (human capital) investments is then responsible for beneficial effects on the economy's growth rate in comparison to a unitary state where an intermediate level of public goods is provided.

Furthermore, the Tiebout mechanism ensures that policies are formulated in order to attract mobile tax bases. Assuming no cost of relocation, mobile factors will shop around and trace the jurisdiction where they expect the most favorable policies. Standard tax competition models assume capital to be mobile across regions while labor and land are considered to be immobile (consult e.g. Wilson 1999). This mobility of capital induces politicians to tailor policies to the necessities of local businesses in order to attract new investments (Oates 1972). However, a large body of literature also deals with drawbacks of such competition for capital, such as a race to the bottom or inefficiencies in resource use (e.g. Zodrow and Mieszkowski 1986). Although the literature does not provide an unambiguous conclusion on this topic, the possible downside of tax competition nonetheless has to be taken into account.

This process of competition takes place independently from the assumption of a perfectly functioning sorting mechanism, whose validity is indeed rather disputable. As a matter of fact, competition can also be important in a world without any mobility, if voters compare the performance of their region to that of other regions and judge politicians according to these criteria at the polls. In this case, governments are exposed to what has been called yardstick competition (Salmon 1987, Besley and Case 1995).

Another advantage of (mobility-based or yardstick) competition is that governments may be more willing to take risks. Sub-national jurisdictions can serve as a "laboratory" (Oates 1999) in which politicians experiment with policy solutions and test their success locally without threatening to harm the whole nation. Successful innovations can then be adopted by

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1. The author himself considers this assumption as not very realistic.

other jurisdictions of each level of government. The higher aptitude to take risks can also have merits for the management of structural change (Feld et al. 2008). Restructuring implies directing industrial policies to the evolution of new industries with the expectation of an uncertain outcome. Due to their exposition to competition, there is reason to believe that local governments have stronger incentives than unitary governments to run this risk. If competition gives rise to policies that can be considered innovative it is conceivable to integrate previous ad hoc considerations into classical growth models. Traditional growth theory assumes that only technological progress has a long-run influence on economic growth (Solow 1956, Swan 1956). Accepting progress in the public sector as such, decentralization can be interpreted as a part of the Solow residual.

However, the emergence of positive externalities also gives rise to objections to the innovation producing-mechanism of decentralization. It has to be taken into account that sub-national governments may have an incentive to refrain from taking the risk of policy innovation and instead free-ride on the experiments of their counterparts (Rose-Ackerman 1980). This is most likely to be the case if the failure of innovation is connected to decreasing chances of re-election. Strumpf (2002), however, points out that opportunistic behavior is less likely in federations with heterogenous jurisdictions.

The heterogeneity of regions in terms of initial endowment might also influence the outcome of competition. Provided that migration processes lead to a reinforcement of the initial endowments of a region such that poor regions become poorer and rich regions richer, divergence rather than convergence of regional incomes is likely to be the consequence (e.g. Rodden and Rose-Ackerman 1997, Feld 2002). Nonetheless, New Economic Geography – a field concerned with the spatial allocation of productive activities – provides arguments why this might not be the case. According to this approach, movements are initiated by the expectation of economies of scale or knowledge spillovers (for surveys see Ottaviano and Thisse 2004, Döring and Schnellenbach 2006). In line with the competition argument stated above, regions are yet not at the mercy of evolving patterns. Instead, less developed (or peripheral) regions can exploit fiscal policy to compensate for their locational disadvantages and catch up with more developed regions (Weingast 1995; Brakman et al. 2002; Baldwin and Krugman 2004). If this does not only imply a shift of capital from one region to another but the accumulation of additional capital, it is sound to assume a positive effect of decentralization on growth.

Cai and Treisman (2005) object that governments only enter tax base competition if the initial resource endowment of their region is not too undeveloped in comparison to their coun-

terparts. Governments of poorly endowed regions, while being aware of their lack in competitiveness, refrain from conducting business-friendly policies and instead tend towards predatory behavior or bring their policies into line with local citizens' demands. Indeed, further limitations are necessary. Weingast (1995, 2006) restrains the occurrence of beneficial properties to those federations in which a number of conditions are satisfied. He argues that federalism facilitates political institutions that "credibly commit the state to preserving markets" if there are at least two hierarchical but autonomous levels of government, authorities are delineated, sub-national governments have substantial responsibility over the economy, a common market is ensured and soft budget constraints are absent. According to him, only a system that complies with these conditions deserves to be called "market-preserving federalism."

2.2   Realities of (cooperative) federations

The previous analysis has presented growth-enhancing effects that arise in a competitive fiscal federal setting. However, it is debatable whether one federation complies with the requirements that are necessary to be fulfilled. Shah (2007) states that competitive federalism is a theoretical construct which does not exist in its pure form anywhere. Likewise, Rodden and Rose-Ackerman (1997) argue that the conditions required for market-preserving federalism are unrealistic to be perfectly met and are thus missed in most nations. This brings up the question how the link between decentralization and economic performance obtains in federations that are characterized by cooperation rather than competition.

The above section draws on the assumption of fiscal equivalence. The correspondence of taxpayers and beneficiaries of public goods as a principle to extract the beneficial effects of decentralization has been demanded since the advent of fiscal federalism theory by authors such as Wicksell (1896), Olson (1969) and Oates (1972). In this setting, sub-national governments are endowed with sufficient revenue sources. Vertical transfers or horizontal equalization schemes are unnecessary, except for those that are intended to equalize horizontal spillovers. In fact, deviations from the correspondence principle are the rule rather than the exception. In many nations, revenue authorities are much less decentralized than expenditure responsibilities. In addition to advantages in the collection of taxes by a central institution due to economies of scale, rationales are to avoid harsh tax competition and tax exporting as well as inequity in fiscal capacities to finance public goods (Oates 1999, Boadway 2007).

Such lack of own-revenue sources can yet have serious adverse consequences. If sub-national governments have only few or no responsibilities for own revenues, tax competition, which has shown to be crucial for the emergence of growth-enhancing effects, is likely to

suffer or even be abandoned. Filling emerging vertical fiscal imbalances by transfers from higher level governments has further effects on incentive. Firstly, local constituents only bear a share of the national taxes that finance vertical transfers. As a consequence, politicians over-estimate the benefits of public goods relative to their costs leading to a systematic bias to-wards a larger than efficient supply of public goods (Weingast et al. 1981). Likewise, trans-fers that compensate jurisdictions for adverse effects of higher taxation efforts – whether gap-filling or equalizing – decrease the marginal costs of raising public funds. Such costs arise if the governments' levy of an additional dollar of taxes imposes a burden on the private sector that leads to behavioral changes which lower the tax base. On the assumption that grants off-set a negative impact of higher tax rates on the tax base, the perceived marginal cost of public funds are biased downwards, inducing governments to raise taxes (Dahlby 2002).

The effect of horizontal equalization transfers on outcomes is more complex. Provided that fiscal capacities differ between regions, individuals will receive different net fiscal benefits depending on where they reside. If horizontal equity is desired, such possible drawbacks of competition are used as a justification for the establishment of equalization schemes. On the one hand, these provisions can produce a more even economic development across regions with possible positive effects on the overall growth of a country (Buettner 2002; von Hagen 2007). Assuming that otherwise a race to the bottom of tax rates has to be expected, a prop-erly designed equalization scheme can lead to efficient tax rates and thus avoid inefficiencies (Bucovetsky and Smart 2006; Koethenbuerger 2002). However, it has to be taken into account that different levels of public good provision are not necessarily a consequence of different fiscal capacities but of different regional choices. In this case, horizontal equalization can be in strong conflict with the merit of fiscal federalism that different tastes of residents can be targeted more accurately (Boadway 2007). The emergence of growth-enhancing effects in the sense of Brueckner (2006) is then possibly averted from the outset.

Vertical or horizontal grants are also used to provide an interregional insurance mechanism against region-specific shocks. Risk sharing can mitigate differing cyclical fluctuations within a country and thus give rise to convergence. However, such provisions may also influence the risk-taking behavior of sub-national governments. According to Persson and Tabellini (1996), governments will exert less effort to avoid negative asymmetric shocks if risk sharing is pos-sible. If this also affects the incentives to test new policy solutions, adverse effects on growth have to be expected. Moreover, the effectiveness of market mechanisms for adjustments such as Tiebout movements or structural change can be reduced if states receive transfers (von

Hagen 2007). Obstfeld and Peri (1998) identify European transfer programs as an explanation for lower interregional migration in comparison to the United States. Similarly, Berthold (1997) argues that transfers often cloud necessary structural adjustments in regions that are hit particularly hard by shocks.

Since growth-enhancing effects also stem from the authority to determine how to spend local revenues and direct them towards growth-enhancing policies economic growth may still be facilitated. Sub-national governments may yet be restricted in their authorities to use own revenues or grants. In an extreme case, regional governments only act on behalf of central government with grants as restitution of costs (Spahn 1997). In this case, they are unable to bring their spending decisions into line with investors' interests. Furthermore, problems arise if regional policies in the tradition of New Economic Geography remain without impact. For instance, Devereux et al. (2007) find that a firm's responsiveness to subsidies decreased when the number of other firms already located in the respective region was small. If failure of local policies leads to unequal outcomes, another rationale for transfers can be given.

Consequently, the arguments that linked decentralization and growth are less strong or even counterproductive in countries in which cooperative elements predominate in fiscal relations. The implementation of those can however provide further adverse incentives, as can be seen in the case of Germany.

3   Idiosyncrasies of the German system

The German fiscal federal system comprises many characteristics of a cooperative federation that have been described in the previous section. Recognizing that its design created perverse incentives, the intergovernmental equalization scheme was made subject to a new legislation, effective from 2005 onwards. Likewise, a (modest) reform of the relationship between the federal government and state governments took place in 2006. Since our data only cover the period from 1975 to 2005, these amendments are yet neglected. Instead, this paper focuses on the provisions in effect prior to the reform.

In general, the existence of two levels of government, namely federal and state, is guaranteed in article 20 (1) of the German *Grundgesetz (GG)* of 1949, the Basic Law, thus legally declaring Germany to be a federation. Although this status is not specified for the lowest of the fiscal tiers, the municipal governments, Art. 28 *GG* commits the *Laender* to provide municipalities with adequate authority to organize local matters autonomously. It is, nevertheless, doubtable whether sub-national governments are beyond these provisions endowed with the authorities necessary to create favorable conditions for growth.

A principal question is whether a policy field is the domain of a sub-national tier. The *Laender* have legislative authority only if the respective field is not defined to be a federal responsibility (Art. 70 *GG*). In fact, a number of fields are subject to exclusive federal legislation (Art. 71, 73 *GG*). Within these fields, *Laender* are only assigned authorities via explicit definition in a federal law. Many policy functions are regulated by concurrent legislation, as defined in Art. 72 and 74 *GG*, meaning that the *Laender* only have legislative authority as long as the federal government has not used its legislative power. Since the federal government uses this authority to a large extent, the dominant fraction of policies is determined by the federal government.[2] Furthermore – prior to its abolition in the reform in 2006 – the federal government made extensive use of framing legislation (Art. 75 *GG*, old version), which allowed it to set up main pillars of *Laender* legislation. In contrast, the *Laender* have broad responsibility for the execution not only of their but also of federal legislation (Art. 83 GG).

In principle, each level of government is responsible for the financing of its assigned tasks, as stated in Art. 104 (4) *GG*. Art. 91a *GG* further defines so called "joint tasks" which commit the federal government to contribute to the realization of certain responsibilities provided that the task is important for the society as a whole and the federal contribution is necessary to improve living conditions. As the promotion of regional economic structure is one of those tasks, the ability of sub-national governments to autonomously determine regional economic policies is limited.[3] Besides, it is possible that federal laws which are executed by the *Laender* also imply financial obligations for them, as determined in Art. 104a *GG*. In any event, administrative costs arising from the execution of federal tasks are not compensated for. Seitz (2008) found that 11% to 19.5% of the states' expenditures are caused by federal legislation with the main fraction of these expenditures accounting for social welfare spending.

All these provisions leave the *Laender* with limited authorities to decide autonomously on policies and spending. Even worse, *Laender* have deliberately decided to coordinate some of the remaining competencies, such as education (Feld and von Hagen 2007). The assessment that Weingast's conditions of autonomous and delineated responsibilities, as required for federalism to be market-preserving, are contradicted in Germany is inevitable. This is, however, not confined to the states' legislative powers but also extends to federal legislation. Most federal legislation requires approval of the first chamber (*Bundestag*) as well as the second

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2. The reform in 2006 attempted to expand exclusive responsibilities of the federal government for nationally important policy fields and of state governments for regionally important ones.
3. The fields covered by article 91a have also been reformed in 2006. Since that time, the construction and expansion of universities is not anymore a joint task.

chamber (*Bundesrat*) – with the latter one being the representation of the *Laender* governments. The advantage of this arrangement is that it gives the *Laender* a strong position that possibly counterbalances their loss of individual sovereignty (Spahn 1997). However, it also creates a "joint decision trap", as Scharpf (1988) puts it, since neither the federal government nor the *Laender* can decide much individually and mostly extensive bargaining is necessary to bring about consent of both chambers.

Likewise, taxes (rates and bases) are largely determined by common competencies. The federal government has the exclusive responsibility regarding tariffs and financial monopolies and is further allowed (within concurrent legislation) to enact laws that relate to taxes for which it has (full or partial) revenue authority, Art. 105 (2) *GG*. In comparison, *Laender* have the right for legislation of excise taxes as long as there are no similar federal taxes, Art. 105 (2a) *GG*. Art. 106 (1) and (2) *GG* assigns the authority to obtain revenues from certain taxes to the federal and state governments, respectively. Despite having authorities for further taxes, the federal government can only decide on the mineral oil tax, insurance tax, tobacco tax and surcharges on income taxes without the agreement of the *Bundesrat*. Similarly, the state governments have basically no independent authorities for taxes since the federal government has used its right to enact laws for those taxes that are actually assigned to the *Laender* within concurrent legislation. However, local governments can decide autonomously on the rate of assessment of the property and local business tax (Art. 106 (6) *GG*).

The largest fraction of tax revenues stems from a system of joint taxation. Art. 106 (3) *GG* defines that revenues from personal and corporate income taxes and value-added taxes (VAT) are to be shared between the federal and sub-national governments. Since this revenue-sharing arrangement is defined in the Basic Law it can only be altered by agreement of the two chambers, thus making the altering of tax legislation subject to the described high political barriers.

Hence, only a small fraction of revenues of *Laender* and municipalities can be determined autonomously while most revenues stem from a revenue-sharing system for which no level of government has individual responsibility. As a consequence, the revenue side provides few elements of competition. Nonetheless, the provisions give sub-national governments some leeway to compete. Their responsibility for tax collection makes it possible to strategically employ (lax) tax enforcement in order to attract businesses.

The revenue-sharing arrangement is executed in a system of intergovernmental transfers, called the *Laenderfinanzausgleich (LFA)* or Federal Financial Equalization Scheme. Its name reveals that this scheme is not restricted to the distribution of joint taxes but also comprises a

comprehensive system of fiscal equalization. The aims are to establish "a reasonable equalization of the disparate financial capacities of the *Laender*" (Art. 107 (2) *GG*) and to fulfill the "uniformity-of-living-condition" (Art. 72 (2) *GG*). The formula driven system has the intention to redistribute tax revenues between poor and rich states via horizontal transfers so that the standard provision of public goods in every state is related to the average fiscal performance of all *Laender*.

Primarily, the joint taxes are distributed according to a principle of local revenue accrual. In this process, the distribution of the VAT already contains redistributive elements. While 75% of the states' revenues from the VAT are distributed regionally on a per capita basis, the remaining 25% are used to ascertain that every state receives up to 92% (90% since 2005) of the average per capita tax revenue of all states. The amount of transfers distributed to a state decreases with increasing own tax revenues. In a second step, on the basis of a comparison of fiscal capacities and fiscal needs, so called *Laenderfinanzausgleichszahlungen* (*LFA*) flow from fiscally well to poorly-endowed states. States that exhibit higher fiscal needs than capacities are granted transfers from states with a more than sufficient fiscal endowment. These flows are determined by a marginal granting/skimming rate that rises with a state's deviation from the average fiscal capacity. To further equalize standards of living, the federal government provides states whose fiscal capacity is still beneath 99.5% (97.5% since 2005) of average per capita revenues with so called *Bundesergänzungszuweisungen (BEZ)* or supplementary federal grants, so that the gap to this measure is filled.

Figure 1: Average horizontal payments in the Federal Financial Equalization Scheme
((-) = contributor, (+) = recipient)
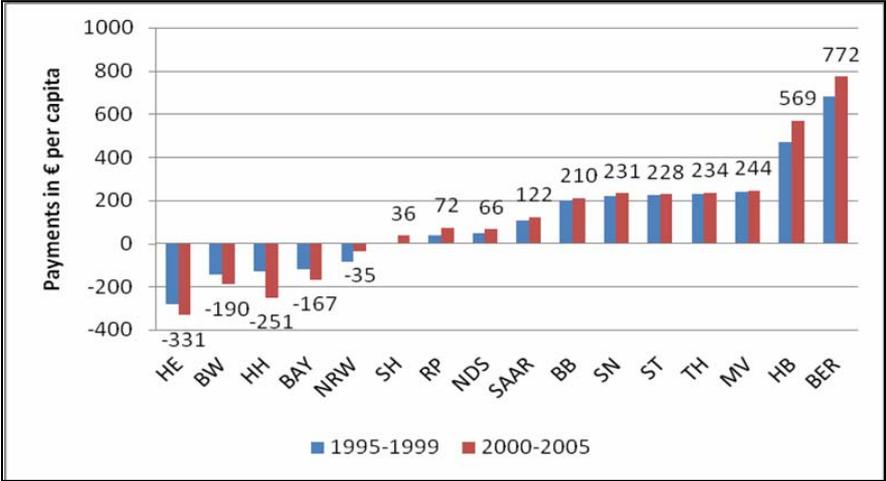
Source: Federal Ministry of Finance, own calculations.

Figure 1 shows that the majority of states receive horizontal payments, whereas contributions stem from a minority of states. Furthermore, transfer flows have gained in the more recent period under consideration. Such excessive availability of transfers is prone to make it irrational for governments to compete for resources. Entering competition is connected to costs such as investments in infrastructure, offering favorable conditions for the acquisition of industrial land to attract businesses or costs in the shape of pollution. Provided that their efforts are successful, resulting additional revenues of a "rich" state imply that contributions to the equalization scheme rise whereas additional revenues of a "poor" state decrease the transfers received from the equalization scheme. Costs and benefits of policy efforts thus have to be weighed against each other. Baretti et al. (2002) argue that these "taxes on a state's tax revenues" affect tax efforts especially of poor states.

Furthermore, high skimming rates potentially lead to a bias of economic policy decisions towards consumptive instead of investment spending. Whereas the benefits of public investment, namely higher tax revenues, cannot be fully appropriated, public consumption such as higher spending on social benefits fully benefits the residents of a region (Berthold and Fricke 2007). Fiscal equalization can also destroy the incentive for sub-national governments to induce structural change. Since the transfer system guarantees that the costs of structure-preserving policies are shared among all states, *Laender* governments might be more willing to support perishing sectors (Berthold et al. 2001).

Similar shortcomings exist at the local level. The business tax is actually intended to give incentives for municipalities to maintain their economic basis. More investor-friendly policies should imply higher revenues from the business tax which are to be obtained by local governments. However, a communal equalization scheme exists that is connected to adverse effects similar to those described for the Federal Financial Equalization Scheme. Furthermore, the business tax has lost its importance as a revenue source while local governments increasingly receive means from the revenue-sharing arrangement (Baretti 2002). As a consequence, local competition is also impaired.

However, Spahn (1997) points out that the Federal Financial Equalization Scheme also "generated comprehensive welfare among regions and thus fostered economic growth in general." On the one hand, this might be due to the implicit risk-sharing mechanism. Buettner (2002) finds that equalization transfers contributed to a smoothing of regional shocks in Germany. According to his results, this mechanism seems to work more effectively for the German *Laender* in comparison to the US states. On the other hand, it is reasonable to assume

that competition is not completely eliminated. For instance, Berthold et al. (2005) find that a substantial fraction of movements of individuals between German states was attributable to higher economic dynamics and better labor market situation. Likewise, yardstick competition might provide incentives for sub-national governments to conduct policies that are favorable to economic growth. Politicians are possibly judged by economic growth of their region in comparison to other regions thus increasing the interest of politicians to attract investments. The following empirical analysis attempts to illuminate whether these effects or the adverse effects of the availability of transfers predominate.

4 Empirical investigation

4.1 *Related empirical studies*

It has already been noted that the relationship between decentralization and growth has been subject to a large bulk of empirical studies. Feld et al. (2008) provide an extensive overview of these analyses. Since the inclusion of different features of decentralization might influence the comparability of the results, here the focus is on those studies that explicitly take into account intergovernmental transfers.

The impact of Germany's equalization scheme on economic growth has already attracted interest. Baretti (2001) tests whether the marginal rate of contribution to the equalization scheme – defined as the potential share of additional tax revenues skimmed via higher contributions (for rich states) or lower transfers (for poor states) – and the amount of finances available in the equalization scheme influences the economic growth of the German *Laender*. In his ordinary least squares (OLS), fixed effects and Hausman-Taylor regressions, he finds an increase in the marginal rate of contribution to decrease growth by 0.14%. No significant effect of an increase in the available assets in the Federal Financial Equalization Scheme is reported. His analysis, however, neglects other institutional elements of decentralization and does not differentiate between recipient and contributor states.

Berthold et al. (2001) investigate the influence of equalization and vertical transfers on the economic performance of the German *Laender* between 1991 and 1998. Their fixed effects as well as instrumental variable estimates indicate that vertical and horizontal transfers lead to a decrease of growth by 1.7%. More recently, Berthold and Fricke (2005, 2007) conduct a similar analysis of the influence of horizontal and vertical transfers and local revenue decentralization on the economic impact of the Federal Financial Equalization Scheme in Germany. They find horizontal and vertical transfers to be growth-decreasing while the influence of revenue

decentralization is found to be growth-enhancing. It must, however, be noticed that the validity of the instruments employed in their instrumental variable regressions is questionable.

The influence of various features of fiscal federalism on the economic performance of Swiss cantons in the period of 1980 to 1998 is studied by Feld et al. (2004). The authors use OLS as well as instrumental variable regressions to determine the influence of revenue and expenditure decentralization and grants on the level of GDP. Whereas revenue and expenditure decentralization are insignificant according to their estimations, matching grants have a significantly negative impact on economic performance.

To our knowledge, the related empirical evidence is limited to these studies.[4] A comprehensive analysis of the effects of grants (as one feature of fiscal federalism) on economic growth of regions is thus expected to bring valuable insights. Germany's wide-ranging intergovernmental transfer scheme offers an excellent opportunity to do so.

4.2 *Empirical specification*

The following empirical analysis resembles several existing studies in that we test the hypothesis that decentralization of budgetary competences increases economic performance. Moreover, we hypothesize that the availability of horizontal and vertical transfers decreases economic performance. The basic econometric model employed is as follows:

$$Y_{it} = \omega_t + \beta DEC_{it} + \gamma X_{it} + v_{it} \tag{1}$$

Dependent variables, represented by Y_{it}, are the level and the growth rate of real GDP per employee of the German *Laender* (states), with $i = 1, \ldots, 16$ and $t = 1975, \ldots, 2005$. To control for common shocks, we include time fixed effects via the ω_t's. The focus of our analysis is on the decentralization variables which are captured by the vector DEC_{it}. The vector X_{it} contains a set of control variables, which presumably describe the process determining the economic performance of German states appropriately.

In a first step, these panel data are investigated with pooled OLS analysis. However, there is reason to believe that unobserved heterogeneity between the states exists. State-specific effects can for example arise from different structural conditions such as differing geographical conditions or location. In order to avoid biased estimates which would be the consequence if existing cross-sectional effects are neglected, we also perform a two-way fixed effect analysis by extending the model described in equation (1) to:

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4. Behnisch, Büttner and Stegarescu (2002) conduct a time series analysis for the German federal level to test on the impact of centralization on productivity growth. They do however not explicitly study the *Laender*.

$$Y_{it} = \omega_t + \alpha_i + \beta DEC_{it} + \gamma X_{it} + v_{it} \tag{2}$$

where the α_i's are state-specific effects.

To consider possible correlations of error terms within groups and not identically distributed disturbances, we estimate all regressions with a cluster-robust variance-covariance estimator. This procedure allows consistent estimates when the i.i.d.-assumption fails.

However, there is reason to believe that some of the decentralization variables are endogenous. Legal provisions on which the Federal Financial Equalization Scheme is based determine that states with poorer economic growth and thus lower tax revenues receive higher per capita transfers. The relationship between transfers and growth is hence likely to suffer from simultaneity bias. We perform a Two-Stage Least Squares (TSLS) analysis to tackle these endogeneity concerns. This procedure is meant to exclude the possibility that not only growth is dependent on transfers but also the flows within the equalization scheme are due to economic growth. We employ three political variables as instruments.

Except for a difference with respect to control variables, we apply the same specifications for both, level and growth regressions. The exact specifications are detailed in connection with the results.

4.3 Data

The basic dataset consists of information on economic performance, fiscal decentralization, and the endowment with labor, human and physical capital for the 16 German states in the years 1975 to 2005. The five East German *Laender* only became part of the Federal Republic of Germany in 1991, so that observations prior to that year are missing for these states. The dataset is thus characterized by an unbalanced panel. The definition and sources of all variables are given in Table 1.

Subsequently, the growth and level of real GDP per employee are the dependent variables. Figure 2 depicts the average productivity growth of the German *Laender* between 1995 and 2005. Unsurprisingly the East German states were growing at a higher pace especially in the 1990s, as these only exhibited a low level of GDP per employee at the time of unification and were supported by large public investments to offset this disparity. Studying only the growth rates, however, dismisses valuable information. We thus also analyze the level of real GDP per employee to get an insight into the long-run equilibrium properties of the data.

Table 1: Definition and sources of variables.

Variables	Description	Source
Dependent variables		
Productivity	Level (in logs)/growth of real GDP per employee	Regional Accounts of *Länder*
Decentralization variables		
Rev. decentralization	Local share in total sub-national revenues	Ministry of Finance, Hesse
Exp. decentralization	Local share in total sub-national expenditures	Ministry of Finance, Hesse
LFA Payments	Real horizontal payments (LFA) per capita from Federal Financial Equalization Scheme	Federal Ministry of Finance
BEZ Payments	Real vertical payments (BEZ) per capita from Federal Financial Equalization Scheme	Federal Ministry of Finance
Controls		
Physical capital	Real capital stock (in logs)/ Real investments to GDP-ratio	Regional Accounts of Länder
Human capital	Share of high school graduates on total students	Federal Statistical Office
Population	Level (in logs)/growth of population	Federal Statistical Office
City-state	Dummy=1 if state is a city-state	
East Germany	Dummy=1 if state is located in Eastern Germany	
Pre-Unification	Dummy=1 if year is prior to unification	
Instruments		
Bundestag-Vote	Population represented by one vote in Bundestag	Pitlik et al. (2005) and own calculations
Bundesrat-Vote	Population represented by one vote in Bundesrat	Pitlik et al. (2005) and own calculations
Party Affiliation	Dummy=1 if federal and state government are of the same parties	Internet presence of regional and federal governments

Figure 2: Average economic growth of the German Laender
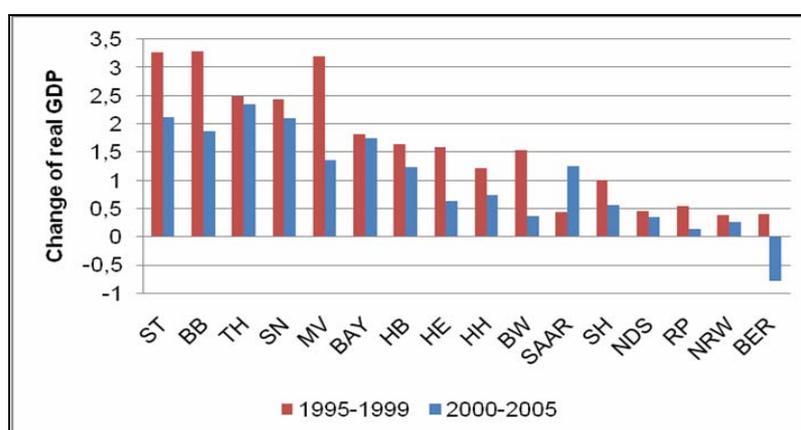
Source: Regional Accounts of the Laender, own calculations.

In the analysis we focus on the decentralization of revenues and expenditures – to which we refer as budgetary decentralization variables – as well as on the per capita amounts of horizontal and vertical transfers – to which we refer as transfer variables. The first two measures are calculated as the share of local revenues or expenditures from total sub-national revenues or expenditures, respectively.[5] As city-states do not possess municipalities, measures of

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5. A frequently criticised issue concerning sub-national revenue and expenditures data is the lack of distinction between autonomously decided and centrally determined financial flows, e.g. Ebel and Yilmaz (2002). Existing measures rather crudely describe the actual level of autonomy. However, no better measure is available.

budgetary decentralization cannot be calculated for those. In Figures 3 (a) and (b) the two measures of budgetary decentralization are plotted against economic growth. The bivariate correlations suggest some mild positive relationship.

Figures 3 (a)-(b): Bivariate correlations between economic growth and budgetary decentralization measures

a)

b)
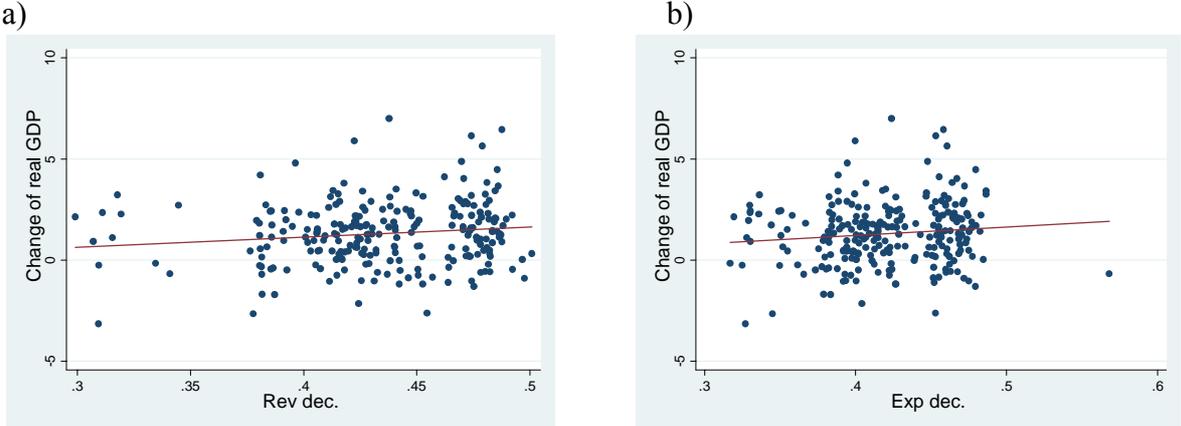
Notes: Observations on city- and East German states are excluded.

The two transfer variables relate to transfers flowing within the Federal Financial Equalization Scheme. *LFA payment* refers to horizontal payments that *Laender* below the average income receive within the second step of the scheme. *BEZ payments* captures vertical transfers that fiscally disadvantaged states receive from the federal government in the third step. Figures 4 (a) and (b) illustrate the correlations between these two variables and economic growth. A negative relationship seems to be given particularly for vertical grants.
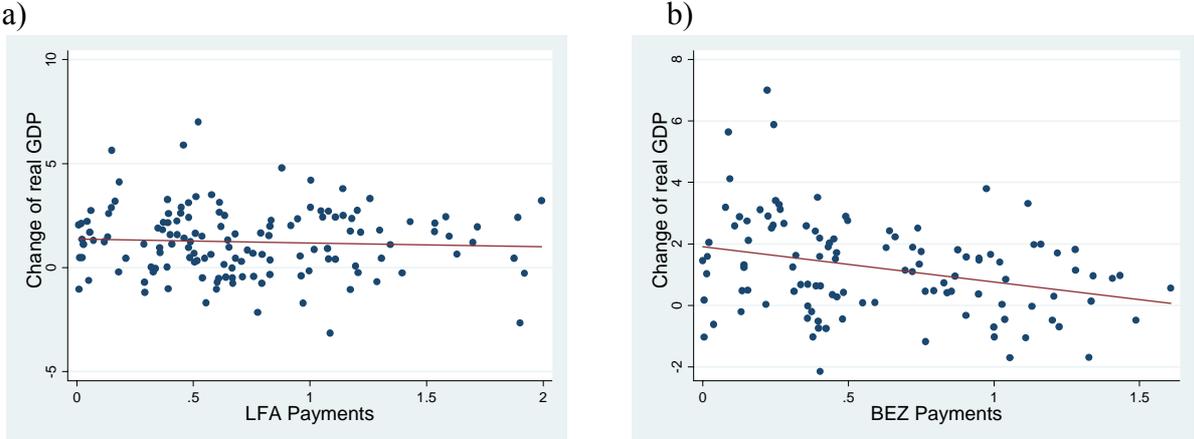
Figures 4 (a)-(b): Bivariate correlations between economic growth and transfers

a)

b)

Notes: Observations on city- and East German states are excluded; LFA Payments also without states that did not receive horizontal grants; BEZ Payments also without states that did not receive vertical grants and Saarland. Saarland is excluded as it received extraordinarily high grants.

However, a full assessment of the impact of German fiscal federalism on economic growth needs to control for further variables. The selection of control variables is motivated by the growth model of Mankiw, Romer and Weil (1992). This model adds human capital to the inputs of the classical Solow model, physical capital and labor. In the level regressions we thus include the real capital stock, population and the share of high school graduates on total students as controls. For the growth regressions we basically include the same variables. The real investment to GDP-ratio is our measure of physical capital, while the human capital variable is identical to that of the level regressions. Moreover population growth is included. Following theoretical predictions, we hypothesize physical and human capital to enhance productivity and population (growth) to decrease productivity. In addition, the growth regressions contain a control for the productivity level of the previous period to capture the influence of existing production capacities and structures. As a consequence of catching-up processes, we expect this variable to exert a negative impact.

Table 2: Summary statistics on control variables

Variable		Observations	Mean	Std. Dev.	Min	Max
Real capital stock	overall	395	596043.3	549156.3	59426.4	2217282.0
	between	16		504546.5	80436.2	1722876.0
	within	24.75		175188.7	-14918.0	1232116.0
Population in 1000	overall	395	5437.2	4795.4	660.1	18075.1
	between	16		4562.0	679.8	17419.1
	within	24.75		366.5	4721.9	6427.3
Human capital	overall	395	0.233	0.062	0.007	0.401
	between	16		0.039	0.165	0.302
	within	24.6875		0.046	-0.020	0.343
Lagged productivity	overall	395	41608.1	11716.6	19156.0	75967.0
	between	16		3263.3	37841.9	51554.4
	within	24.6875		11228.7	15212.6	66020.6
Share of real gross investments	overall	395	21.497	6.297	11.895	52.737
	between	16		6.315	16.248	34.071
	within	24.75		4.092	9.2674	41.121
Population growth	overall	395	0.202	2.527	-2.233	47.727
	between	16		0.654	-0.957	1.789
	within	24.6875		2.455	-3.320	46.140

Notes: Summary statistics are calculated for the largest available sample. The number of within variation is uneven due to the unbalanced nature of the panel. The within numbers refer to the deviation from each state's mean and can thus adopt negative values.

In Table 2, summary statistics are given for all control variables. Variation of most variables is largely influenced by differences between the German states. Only variation of human capital, lagged productivity and population growth is mainly due to differences within states.

Moreover, we have to take into account that "institutional conditions" might influence our results. Due to agglomeration effects, it is reasonable to expect a difference between city-states and ordinary *Laender*. We thus include a dummy for city-states. A prediction on the sign of its coefficient is difficult, as these states exhibited medium growth. In addition, being located in East Germany might influence the economic performance of a state. It has already been pointed out that the East German states experienced a period of rapid growth particularly in the early 1990s. We consequently expect the coefficients on the East-Germany dummy to be positive. The peculiarity of Germany's division until 1991 makes it further necessary to include a dummy for years being prior to unification. We hypothesize this coefficient to enter the models with a negative sign.

In addition, we need to identify instruments that are suited to explain fiscal equalization payments and federal (vertical) grants. Pitlik et al. (2001, 2005) argue that the amount of transfers German states received from the Federal Financial Equalization Scheme depend on their bargaining position in the political arenas provided by the constitution. This in turn is determined by the number of citizens represented per seat in the first and second chamber. We include these two measures as instruments. Similarly, Grossman (1994) argues that state governments with a closer political affinity to the federal government are more likely to receive higher transfers in the United States. We construct a dummy that equals 1 if the federal and state government are of the same political parties and also employ it as an instrument.

4.4 Estimation results

In order to provide benchmark results, we first estimate a model that does not include any of the decentralization variables. In a second step, we jointly include the two transfer variables, and add the two budgetary decentralization measures in a final step. We apply this procedure for level and growth regressions as well as OLS and fixed effects models.

In Table 3, we present the results of the level regressions. In the OLS specifications, most coefficients of the control variables show the expected signs and are significant. Physical capital and human capital have positive effects on economic performance whereas an increase in population has a negative impact. The influence of being a city-state only becomes significantly positive when the transfer variables are included. A possible explanation for this result is that the higher productivity of city states is blurred if transfer variables are not included in

the model. The dummy then not only covers being a city-state but also their specific status in the transfer scheme.[6] No significant difference seems to exist between East and West German states if it is controlled for the remaining variables. As expected, our estimates indicate that economic performance was lower prior to unification.

Table 3: Determinants of productivity level, OLS and FE regression analysis

Productivity in German States, OLS, 1975-2005						
	OLS 1	OLS 2	OLS 3	FE 1	FE 2	FE 3
	b/se	b/se	b/se	b/se	b/se	b/se
Real Capital Stock	0.476***	0.355***	0.365***	0.221*	0.228*	0.217*
	(0.110)	(0.071)	(0.061)	(0.121)	(0.108)	(0.116)
Population	-0.443***	-0.336***	-0.357***	-0.493***	-0.464***	-0.457***
	(0.109)	(0.075)	(0.068)	(0.065)	(0.072)	(0.081)
Human Capital	0.746***	0.640***	0.559***	-0.327	-0.293	-0.275
	(0.246)	(0.186)	(0.189)	(0.205)	(0.200)	(0.192)
City-State	0.058	0.093***	0.243**			
	(0.034)	(0.030)	(0.089)			
East Germany	-0.050	-0.088*	-0.071			
	(0.057)	(0.046)	(0.041)			
Pre-Unification	-0.160***	-0.168***	-0.173***	-0.176***	-0.092***	-0.091***
	(0.014)	(0.015)	(0.015)	(0.015)	(0.021)	(0.020)
LFA Payment		-0.025***	-0.027***		-0.005	-0.005
		(0.005)	(0.004)		(0.004)	(0.003)
BEZ Payment		0.001	0.002		-0.001	-0.001
		(0.004)	(0.003)		(0.002)	(0.002)
Rev. Dec.			0.829***			0.207
			(0.158)			(0.359)
Exp. Dec.			-0.483***			-0.451***
			(0.127)			(0.109)
F	.	.	.	427.801	356.896	913.958
Adj. R2	0.967	0.976	0.978	0.988	0.989	0.989
Root MSE	0.056	0.047	0.046	0.033	0.032	0.032
N	396	396	396	396	396	396

t-values in parenthesis. *** significance at 1% level, ** significance at 5% level, * significance at 10% level. The coefficients on revenue and expenditure decentralization do not significantly differ when included individually in the regression.

Of the two transfer variables, only LFA payments enter the regression significantly. Apparently, vertical (BEZ) payments do not have a significant effect on productivity.[7] Even so, the estimates provide evidence for the hypothesis that receiving horizontal payments reduces the level of GDP. An extra Euro of LFA Payments decreases the productivity level per employee by 0.025%. While revenue decentralization shows the expected positive sign, expenditure decentralization appears to be productivity-decreasing. The latter result contradicts our expectations. A possible explanation is that the availability of intergovernmental transfers renders it irrational for local governments to behave fiscally prudent but instead spend imprudently on projects. An increase of public spending in general (as predicted by the flypaper effect) and the choice of expenditures are potentially responsible for a negative impulse.

6. City states are privileged with respect to the calculation of fiscal needs. Their number of inhabitants is notionally increased by 35%.
7. Vertical payments are also insignificant when included individually without horizontal payments.

The re-estimation of the models with fixed effects analysis changes the results. Physical capital is now significant only at the 10 percent level. Human capital loses any significance and also enters with a negative sign, which contradicts our expectations. More importantly, the coefficients on horizontal payments also lose significance so that none of the transfer variables have significant effects in the fixed effects models. Likewise, revenue decentralization does not have a significant impact, while the effect of expenditure decentralization remains unchanged. An increase of expenditure decentralization by 1 percentage point reduces the level of GDP per employee by about 0.5%. Another interesting result is that the inclusion of the decentralization variables decreases the magnitude of the pre-unification coefficient in the fixed effects regressions. As transfers increased substantially after unification, part of this might be captured by the pre-unification variable if transfer variables are not included.

Table 4: Determinants of productivity growth, OLS and FE regression analysis

Productivity Growth in German States, OLS, 1975-2005	OLS 1	OLS 2	OLS 3	FE 1	FE 2	FE 3
	b/se	b/se	b/se	b/se	b/se	b/se
Lagged Productivity	-18.220***	-24.566***	-24.593***	-28.077***	-29.388***	-29.078***
	(5.595)	(3.644)	(3.627)	(4.835)	(3.260)	(3.110)
Real Gross Investments	0.044	-0.033	-0.045	-0.041	-0.057	-0.069
	(0.052)	(0.042)	(0.037)	(0.048)	(0.041)	(0.039)
Population Growth	-0.042	-0.090**	-0.092**	0.024**	-0.016	-0.018
	(0.038)	(0.032)	(0.035)	(0.010)	(0.013)	(0.012)
Human Capital	0.954	3.265	-0.983	-20.215*	-15.312	-15.551
	(6.930)	(5.976)	(5.686)	(11.492)	(10.499)	(10.575)
City-State	1.787	3.627**	10.310***			
	(1.357)	(1.323)	(2.879)			
East Germany	-3.198	-3.545**	-2.632**			
	(1.842)	(1.340)	(1.027)			
Pre-Unification	-2.089**	-2.777***	-2.956***	-3.036***	-3.041***	-3.023***
	(0.823)	(0.692)	(0.665)	(0.855)	(0.777)	(0.781)
LFA Payments		-0.975***	-1.012***		-0.649***	-0.698***
		(0.230)	(0.202)		0.053	(0.126)
BEZ Payments		0.010	0.078		(0.104)	0.071
		(0.133)	(0.085)			(0.077)
Rev. Dec.			17.274**			15.829
			(7.540)			(12.151)
Exp. Dec.			-2.501			-6.539
			(8.352)			(5.802)
F				23.928	31.953	43.127
Adj. R2	0.665	0.770	0.783	0.779	0.815	0.817
Root MSE	2.183	1.811	1.759	1.588	1.455	1.447
N	400	400	400	400	400	400

t-values in parenthesis. *** significance at 1% level, ** significance at 5% level, * significance at 10% level. The coefficients on revenue and expenditure decentralization do not significantly differ when included individually in the regression.

Table 4 contains the results of the growth regressions. Of the control variables, only the coefficients on lagged productivity and the pre-unification dummy perform reasonably and show the expected negative signs. Neither physical capital nor human capital significantly affects productivity growth. The coefficients on population growth and the dummies for city-

and East German states are only significant conditional on the inclusion of the decentralization variables. This indicates a higher appropriateness of the more comprehensive models. Here, too, LFA payments are significantly negatively related to productivity growth. An additional million Euro of horizontal payments increases the growth of GDP per employee by about 1%. In contrast, BEZ payments again are neither harmful nor beneficial for economic growth. With respect to the decentralization variables, the coefficient on revenue decentralization once again shows the expected positive sign and is significant, while expenditure decentralization exhibits an unexpected sign, but is insignificant.

Similar to the level regressions, we observe a loss of significance in the fixed effects regressions. Like in the OLS regressions, lagged productivity and the pre-unification dummy are significantly negatively related to economic growth. Independently of whether decentralization variables are included, the other control variables are insignificant. The findings on the transfer variables confirm the previous results. LFA payments have a significantly negative effect while no significant results are found for BEZ payments. However, the negative influence of one additional million Euro of LFA payments drops to about 0.7%. In contrast to OLS estimates, in the fixed effects analyses neither a significant impact of revenue nor expenditure decentralization is found.

The results consequently support the hypothesis that intergovernmental transfers have a negative influence on economic performance which consistently holds in the level and growth regressions, even though in the former case the coefficients are significant in the OLS regressions only. With respect to the decentralization variables, ambiguous results are obtained.

4.5   Robustness check

To check the robustness of our results with respect to endogeneity, we re-estimate both, level and growth models with TSLS for both dependent variables. Our procedure regarding the instrumental variable analysis is explained best in connection with the results.

The results of the level regressions are shown in Table 5. To start with, we estimate two models which contain, in addition to the usual control variables, both decentralization variables and one of the transfer variables each. A look at the Sargan's statistic and the instrument relevance test reveals that the equations are identified and the instruments are valid. The coefficients on LFA and BEZ payments are, however, insignificant. In contrast, the control variables perform as expected and are highly significant, except for the city-state dummy.

Table 5: Determinants of productivity level, Two-Stage Least Squares Analysis

Productivity in German States, TSLS, 1975-2005	TSLS 1	TSLS 2	TSLS 3	TSLS 4	TSLS 5
	b/se	b/se	b/se	b/se	b/se
Real Capital Stock	0.450***	0.426***	0.330	0.393***	0.432***
	(0.060)	(0.041)	(0.202)	(0.041)	(0.044)
Population	-0.395***	-0.374***	-0.296*	-0.352***	-0.379***
	(0.052)	(0.040)	(0.167)	(0.039)	(0.041)
Human Capital	0.821***	0.777***	0.604	0.726***	0.788***
	(0.127)	(0.096)	(0.370)	(0.093)	(0.101)
City-State	-0.016	0.018	0.150	0.097***	0.009
	(0.086)	(0.060)	(0.280)	(0.014)	(0.065)
East Germany	-0.097***	-0.105***	-0.132**	-0.100***	-0.103***
	(0.023)	(0.024)	(0.060)	(0.020)	(0.023)
Pre-Unification	-0.277***	-0.283***	-0.309***	-0.305***	-0.281***
	(0.030)	(0.025)	(0.060)	(0.024)	(0.026)
LFA Pay.	0.009		-0.033		
	(0.011)		(0.067)		
BEZ Pay.		0.003	0.013		
		(0.003)	(0.022)		
Transfers				0.001	0.002
				(0.002)	(0.003)
Rev. Dec.	0.391*	0.487**	0.826		0.462**
	(0.205)	(0.192)	(0.730)		(0.190)
Exp. Dec.	-0.674***	-0.705***	-0.789***		-0.698***
	(0.179)	(0.186)	(0.253)		(0.184)
F	343.331	362.357	360.787	386.669	357.902
R2	0.976	0.978	0.978	0.978	0.977
Sargan test	0.408	0.418	0.213	0.080	0.416
I. relevance test	0.000	0.000	0.507	0.000	0.000
N	354	354	354	354	354

t-values in parenthesis. *** significance at 1% level, ** significance at 5% level, * significance at 10% level. The coefficients on revenue and expenditure decentralization do not significantly differ when included individually in the regression.

In principle, the three instruments allow for also serving as instruments for both transfer variables simultaneously. In the third model we find that this procedure deprives the instruments of validation. Thinking back to the results of the OLS and fixed effects regressions, BEZ payments did not have a significant impact on economic performance. It is thus reasonable to assume that it is the overall amount of receipts that matters for policy efforts. Consequently, we construct a new variable by calculating the sum of the two transfer variables (called "Transfers" in the table). Like the original transfer variables, the new variable is insignificant however. Even though problems with irrelevance of the instruments for the explanation of the transfers might influence the result in model 4, this is not the case according to model 5.

The TSLS level regressions thus cast some doubts as to the robustness of a negative impact of transfers on the level of GDP per employee as reported above. Nonetheless, the results confirm the theoretically expected impact of revenue decentralization and the unexpected influence of expenditure decentralization mentioned before. While revenue decentralization increases productivity, though this influence is not always significant, expenditure decentralization decreases productivity.

Table 6: Determinants of productivity growth, Two-Stage Least Squares Analysis

Productivity Growth in German States, TSLS, 1975-2005	TSLS 1	TSLS 2	TSLS 3	TSLS 4	TSLS 5
	b/se	b/se	b/se	b/se	b/se
Lagged Productivity	-22.529***	-22.579***	-22.022***	-26.163***	-22.599***
	(2.200)	(2.051)	(2.784)	(1.733)	(2.099)
Real Gross Investments	-0.010	-0.036	-0.065	-0.123***	-0.027
	(0.044)	(0.063)	(0.106)	(0.044)	(0.055)
Population Growth	-0.440	-0.522*	-0.677	-0.409	-0.489*
	(0.274)	(0.282)	(0.516)	(0.299)	(0.273)
Human Capital	-3.532	-3.349	-3.293	-0.211	-3.405
	(3.124)	(3.240)	(3.788)	(3.294)	(3.173)
City-State	12.205***	11.135***	9.743**	4.780***	11.527***
	(1.765)	(2.525)	(4.613)	(0.543)	(2.221)
East Germany	-2.887***	-2.346**	-1.501	-1.860**	-2.553***
	(0.646)	(0.968)	(2.432)	(0.815)	(0.817)
Pre-Unification	-8.509***	-8.485***	-8.233***	-9.572***	-8.507***
	(1.191)	(1.169)	(1.508)	(1.187)	(1.168)
LFA Pay.	-0.350		0.747		
	(0.447)		(1.902)		
BEZ Pay.		-0.240	-0.641		
		(0.259)	(1.066)		
Transfers				-0.505***	-0.146
				(0.096)	(0.164)
Rev. Dec.	18.388***	12.271	2.701		14.611*
	(6.143)	(10.163)	(27.104)		(8.339)
Exp. Dec.	1.159	5.229	12.890		3.591
	(6.028)	(6.211)	(20.809)		(5.655)
F	29.212	27.420	19.512	24.787	28.520
R2	0.786	0.772	0.689	0.737	0.781
Sargan test	0.753	0.883	0.866	0.382	0.837
I. relevance test	0.001	0.026	0.473	0.000	0.005
N	356	356	356	356	356

t-values in parenthesis. *** significance at 1% level, ** significance at 5% level, * significance at 10% level. The coefficients on revenue and expenditure decentralization do not significantly differ when included individually in the regression.

In Table 6, we present the results of the TSLS growth regressions. Although the two transfer variables show the expected negative sign when included individually, they are insignificant, as shown in model 1 and 2. In these regressions, the models seem to be identified and the instruments valid. However, when both transfer variables are instrumented simultaneously, the same problems with respect to the Sargan and instrument relevance test arise as in the TSLS level regressions. Hence, we choose the previously applied procedure. Here, the sum of the transfers is significant as long as it is included without the decentralization measures. The coefficient, however, loses significance when these measures are included additionally. Moreover, the results indicate that revenue and expenditure decentralization significantly affect economic growth. We thus find only very limited correspondence between TSLS regressions and comparable OLS and fixed effects estimates.

5 Conclusions

The aim of this paper consists in contributing to the research on the link between decentralization and growth by focusing on this relationship in a cooperative federation. The theoretical discussion emphasizes the importance of competition for tax bases and votes for beneficial effects of fiscal federalism on economic performance. However, in federations that are characterized by cooperative rather than competitive federalism, such as Germany or South Africa, those features play a minor role or are even abolished. On the one hand, this insight can serve as an explanation for ambiguous results of previous empirical studies that did not take into account cooperative elements. On the other hand, it also indicates that in such analyses, fiscal federalism should not only be incorporated by the sub-national share of revenues and expenditures. It hints to the necessity to additionally include intergovernmental transfers.

We follow these arguments in our empirical investigation. As expected, horizontal transfers negatively affect economic performance of the German *Laender*. On the contrary, no significant impact could be detected for vertical transfers. While revenue decentralization increases productivity, expenditure decentralization surprisingly diminishes productivity. A possible explanation for the latter result is that the availability of intergovernmental transfers renders it irrational for local governments to behave fiscally prudent but instead spend imprudently on projects, which potentially adds a negative impulse to the economic performance.

Since these results could be driven by reverse causality, we additionally perform instrumental variable regressions to investigate the robustness of the results. As instruments we use population represented by one vote in the Bundestag and that represented in the Bundesrat as well as party congruence at the federal and state levels. In these regressions, the significance of the instrumented transfer variables disappears, thus questioning the results of the OLS and fixed effects models. We only find limited evidence that the overall sum of transfers has a significantly negative impact on productivity growth. Even though tests confirm the appropriateness of the instruments, an extension of the analysis to other instruments would be useful.

The results indicate that in particular re-distribution between states provides adverse incentives for sub-national governments to compete for resources. Apparently, the extent to which additional own revenues would be "taxed" makes it unattractive for sub-national governments to conduct business-friendly policies. From their perspective, it is irrelevant whether their resources originate from own efforts or from transfers, as their funds remain basically the same. Since productivity-increasing policies are costly, it seems to be more attractive to sub-national governments to spend on public consumption which increases the chances to be re-

elected by the beneficiaries. Provided that equalization schemes lead to imprudent fiscal policies, negative effects do not only arise from the scheme itself but also from its effect on spending behavior. The negative incentives emanating from the availability of intergovernmental transfers seem to drown out beneficial effects that could for example arise from the risk-sharing mechanism. However, not only the existence but also the design of the German system might bear responsibility for adverse effects. An analysis of the effects of grants on economic performance in further countries would be appealing to shed some light on this question.

Consequentially, countries that aim at fiscal equalization should take into account that intergovernmental transfer schemes might impair policy efforts and thus the economic performance of their sub-national jurisdictions. In fact, this insight emerges from German evidence. If respective reform efforts are put into practice, beneficial effects for the economic development of German states can be expected.

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