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DISTRIBUTIONAL CONSEQUENCES OF POLITICAL REPRESENTATION

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ABSTRACT

We investigate the geographical concentration of representatives and the distribution of fiscal transfers both theoretically and empirically. We develop a model which predicts that funds to an area are positively correlated with the number of representatives residing in that area. Our empirical analysis uses the fact that due to the electoral rules for German state elections the number of representatives varies quasi-randomly across electoral districts. Controlling for various socio-economic and demographic variables and using a variety of estimation techniques, we find that areas with greater number of representatives receive more government funds.

KEYWORDS: representation, redistribution, vote-buying, transfers, comparative political economy

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I. Introduction

Does asymmetric legislative representation of citizens translate into an asymmetric allocation of government funds? The concern not to get their "fair share" of public funds motivates many struggles for greater representation, e.g., by minority groups, groups challenging legislatures' apportionment, or EU's heads of governments in their negotiations on voting rules for the Council. The consequences of asymmetric representation also feature prominently in recent work on the political economy of fiscal policy (e.g. Gibson et al. 2004; Knight 2008; Rodden and Dragu 2011).

An interesting question is whether only the groups whose interests a legislator is supposed to represent benefit from fiscal redistribution, or whether the individuals in the geographic area where the legislator resides can expect additional funds. In the latter case distribution of federal funds is divorced from representation suggesting that legislators have more discretion in allocating funds than traditionally modeled in voting models, where legislators might allocate funds to voters based on whether they are swing voters or supporters, but not based on where the legislator resides.

This paper studies the link between representation and redistribution in the context of a – basically proportional – electoral system used in German states where variation in the geographical concentration of representatives is quasi-random rather than institutional. Our results demonstrate that geographic areas in which a greater number of legislators reside, receive larger fiscal transfers. These effects are more pronounced for discretionary funds as opposed to formula funds. We also examine the importance of the governing party in distributive politics. Here, we find some evidence that areas with more government party representatives receive larger state transfers. The paper thus challenges the widespread assumption that proportional rule in unitary states is inherently exclusive to geographically concentrated spending (Carey and Shugart 1995; Milesi-Ferretti et al. 2002; Crisp et al. 2004; Ashworth and Bueno de Mesquita 2006).

We develop a simple theoretical model of a central government that uses its discretion over the geographical distribution of local public goods to build legislative coalitions to get its proposals passed. One of the model's contributions is that it demonstrates a link between the number of representatives from an area and the amount of funds that the area receives. It does so with a view to how many legislatures operate, first by assuming that legislative leaders introduce legislative proposals and second by assuming that votes in the legislature are cast predominantly on ideological issues rather than on the geographical allocation of benefits.

We create a unique dataset of fiscal transfers to geographic areas for electoral districts in three large German states (*Laender*) between 1990 and 2009, and analyze the effect of the geographical distribution of representatives on the geographic allocation of government transfer spending.

The reason for studying German states is that their electoral system provides an especially useful opportunity to identify the impact of differential geographical representation. While the eventual strength of the parties in a state legislature is determined at-large according to the principle of party-list proportional representation, electoral districts serve to personalize the vote by allowing voters in each district to elect one candidate directly by plurality rule.[1] State electoral laws stipulate that electoral districts be of roughly equal population size,[2] and limit deviations from equal population size. For example, in Bavaria, a district's population shall not deviate by more than 15 percent from the average district.[3]

However, a district's presence in parliament is often not limited to its directly elected representative, but reinforced by party-list representatives who live in the electoral district and have an office there at which citizens can contact them. We expect these representatives to have ties to the district where they reside for several reasons: Some are losers of the direct race in that district, but have entered the legislature via the party list; others have long records in local politics or action groups; probably all have better information on conditions and problems in their own neighborhood.[4] District representation in this sense is considerably more variable than district representation by the directly elected members of the legislature.

Our empirical identification strategy rests on these quasi-random variations in the number of representatives affiliated with some district. To address the concern that some common unobserved factor might lead to both more representatives living in a district and to the district receiving larger state transfers, we take advantage of the fact that persons ranked very low on a party list sometimes become members of parliament in order to restore proportionality. For legislators who hold such 'proportionality seats' (*Ausgleichmandate*), obtaining a seat is not endogenous to some unobserved district characteristic, but to an

[1] More details on electoral systems in German states are provided in Section IV.

[2] Districting is conducted on the basis of total population, including persons not entitled to vote such as minors. Recent jurisdiction (2 BvC 3/11, January 31, 2012), however, requires that close attention be paid to the number of *eligible* individuals across districts.

[3] In fact, population differences across electoral districts in our sample states are very similar to those of US congressional districts both in terms of the coefficient of variation – 0.09 in the US, and 0.11 on average in our sample – and the ratio between the smallest and the largest district – 2.22 in the US, and 1.68 on average in our sample (own calculations comparing American Community Survey data (5-Year averages 2006-2010) obtained from the National Historical Geographic Information System, see www.nhgis.org, with the most recent electoral period in our dataset).

[4] Indeed, anecdotal evidence from newspapers and representatives' websites indicates that credit claiming for funds and activities in the district is common and pertains to all sorts and political colors of representatives.

electoral rule in combination with the vote totals. The allocation of these seats could have hardly been anticipated and thus district representation by 'surprise' representatives provides a plausible instrument for district representation.

To date, evidence for the relevance of formal political representation for distributional outcomes has come exclusively from two types of political environments: First, legislative bodies which represent member states in federations or unions (e.g., U.S. Senate, German Bundesrat, Council of the European Union), focusing on the overrepresentation of the smaller units (Rodden 2002; Pitlik, Schneider, Strotmann 2006; and Fink and Stratmann 2011). Second, legislatures whose members are elected under plurality rule from single-member districts, for example, as in most U.S. state legislatures. This electoral system is associated with targeted spending because representatives have incentives to build a personal base of support within their geographic district (Cain et al. 1984; Cox and McCubbins 2001, p. 37; Ashworth and Bueno de Mesquita 2006). Differences in district populations – as existed for example between state legislative districts in the U.S. prior to the Supreme Court's *Baker v. Carr* (369 U.S. 186, 1962) and *Reynolds v. Sims* (377 U.S. 533, 1964) decisions – could lead to an unequal per-capita distribution of government funds (Ansolabehere et al. 2002).

The structure of the paper is as follows. The next section briefly summarizes the relevant literature. Section III introduces our theoretical model. Section IV contains information about the electoral system in German states. We describe the data and our empirical model in Section V. Our empirical findings are presented in Section VI. A final section concludes the paper.

II. Related literature

From a theoretical perspective, a link between representation and redistribution is shown in various legislative bargaining models (for example, Baron and Ferejohn 1987, 1989; Snyder et al. 2005; Knight 2008). These models show that larger legislative representation increases a region's proposal power, and that more representation makes a region a more attractive coalitional partner for other regions.

Another approach that we follow in this paper is to model the distribution of discretionary government expenditures across districts as "legislative targeting". In these models the leaders in the legislature or party allocate funds to legislators to optimize legislative outcomes. Examples for such studies can be divided into those that emphasize pivotal legislators as the primary determinants of legislative outcomes (e.g., Krehbiel 1998;

King and Zeckhauser 2003), and those that emphasize the importance of senior majority-party legislators (e.g., Cox and McCubbins 2005).

Empirical work on representation and redistribution has mostly focused on democracies that are structured as federal unions. All federal unions are characterized by asymmetries in the population, size, and economic power of their constituent parts, and their political institutions interact with these asymmetries. For example, smaller units are typically overrepresented by a federation's foundational bargain to accommodate their fears of domination by larger units. In contrast to these studies which explore the effects of deliberate over-representation of some regions, our work investigates the effects of the geographic concentration of legislators.

Examining a diverse set of federations around the world, Rodden and Dragu (2011) show that overrepresented states or provinces tend to get a larger share of federal funds. Gibson et al. (2004) report large overrepresentation effects for expenditures in Brazil and Argentina. Ansolabehere et al. (2002) analyze the allocation of money by U.S. states to counties. They use variations in representation over time due to the U.S. Supreme Court's *Baker v. Carr* decision and subsequent cases. These decisions mandated a shift from highly unequal representation of citizens across state legislative districts to 'one person, one vote'. The authors find that state transfers to counties favored overrepresented counties prior to redistricting, and that the allocation of transfers became more balanced after the implementation of the court decision.

Considerable attention has been paid to the distributional effects of unequal representation of the states in the U.S. Senate. Single-country studies that focus on the U.S. include Atlas et al. (1995) and Lee (1998). They find that federal expenditures and net transfers per capita are significantly greater in smaller, overrepresented states. Knight (2008) points out that the U.S. Senate does not allow to disentangle the effects of representation from the independent effects of population size; as the number of senators is uniform all variation comes from variation in population across states.[5] To overcome this shortcoming, Knight (2008) makes use of the fact that the same state is represented differently in the House and in the Senate. He finds that states with greater representation receive more funding from appropriations bills that originate in the U.S. Senate relative to appropriations bills that originate in the House. Single-country studies that focus on Germany include Pitlik, Schmid, and Strotmann (2001), Pitlik, Schneider, and Strotmann (2006) and Fink and Stratmann

[5] Disentangling the effect of legislative representation from the effects of population size is nontrivial in empirical analysis (see Acemoglu 2005).

(2011) who find that states with high per-capita representation in the German *Bundesrat* receive more net funds per capita from the German intergovernmental transfer system. Similarly, Rodden (2002) reports a positive and linear relationship between per-capita redistribution and the unequal per-capita representation of citizens in the Council of the European Union and the European Parliament.

Our work also relates to the growing empirical political economy literature on legislative organization and government expenditures. For example, Baqir (2002) finds that public spending increases in the size of U.S. city councils. Further, Egger and Koethenbuerger (2010) find a positive effect of council size on government spending using municipality-level data from the German state of Bavaria.

III. Theoretical framework

Here we present a theoretical model building on work by Young (1978a, 1978b) in which he characterizes the equilibrium in a game where two players exchange political favors. In our model, players are legislative leaders and representatives in the legislature. Our model predicts that government funds are concentrated in highly represented areas.

3.1 Economic environment

Consider a partition of n citizens into $m < n$ geographically distinct electoral districts indexed by k. Each of the n_k citizens in k is assumed to have the following quasilinear preference over consumption of a local public good g_k and consumption of the private good x_k:

$$U(g_k, x_k) = h\left(g_k / n_k^{\gamma}\right) + x_k, \tag{1}$$

where h is strictly increasing and normalized so that $h(0) = 0$. The congestion parameter $\gamma \in [0,1]$ captures the degree of rivalry in consumption: both private goods ($\gamma = 1$) and pure public goods ($\gamma = 0$) are special cases. Finally, each citizen in k is endowed with w_k units of the private good which can be converted into public goods at a dollar-for-dollar rate.

The allocation of local public goods is determined by a centralized legislature. We normalize total expenditure $\sum_k g_k$ to 1 and assume that public good provision is financed by a uniform head tax $1/n$ on all citizens. Private consumption is determined residually and equals $x_k = w_k - 1/n$.

3.2 Political environment

The legislative assembly R is composed of r ($m \leq r$) representatives who decide by *simple majority rule* on a succession of proposals made by an external player whom we refer to as the legislative leaders. The set of representatives affiliated with district k is denoted by D_k. We assume that $\bigcup_k D_k = R$ and $D_k \cap D_l = \emptyset$ for all $k \neq l$.

We begin with the assumption that the legislative leaders value the passage of their proposals sufficiently high that they offer local public goods to some set of legislators in exchange for their votes in favor of the proposal in order to have a measure pass with certainty, rather than merely with some high probability, and that they have the requisite funds to do so.

For any given issue there exists some subset R_Y of representatives who strictly prefer the leaders' proposal to the status quo and hence vote in favor, whereas a subset R_N of representatives is opposed. Any representative in the remainder $R_I \equiv R \setminus (R_Y \cup R_N)$ is indifferent between voting for or against the proposal by his ideological preferences. Yet, legislative leaders can increase the representative's payoff from voting in favor by allocating a local public good, or project, to the district with which that representative is affiliated, and thus sway him to support the measure. Formally, if a proposal is made, each representative i chooses an action a_i from the action set $A_i = \{Y, N, I\}$ indicating whether i is in favor, against, or neutral towards the proposal. We take these choices to be the consequences of rational and strategic reasoning based on ideology, reputation concerns, etc. Assuming that the outspoken opponents are in the minority ($R_N < \lceil 0.5 \cdot R \rceil$), legislative leaders can always build a coalition of R_Y and at least $\lceil 0.5 \cdot r \rceil - |R_Y|$ votes to ensure passage of the bill.

3.3 Equilibrium

A project will only be acceptable to representative i ($i \in D_k$ and $i \in R_I$) if the benefits accruing to a k-constituent exceed the tax costs associated with public good provision:

$$h\left(g_k / n_k^{\gamma}\right) \geq 1/n. \tag{2}$$

The amount g_k^0 that sets (2) to be just binding will be referred to as i's *supply price* and can be expressed as

$$g_k^0 = \kappa n_k^{\gamma} \tag{3}$$

where κ is a constant that depends on the function h as well as total population n. It is increasing in the population size of the electoral district when some congestion is present ($\gamma > 0$).

Importantly, if $|D_k \cap R_I| > 1$, i.e., more than one representative affiliated with district k is among the independents, then g_k^0 is the supply price for those $|D_k \cap R_I|$ votes, and the representatives in $D_k \cap R_I$ can be treated as a single player with $|D_k \cap R_I|$ votes. We will denote the set of players so consolidated by J, and

$$(\hat{g}_1^0, \dots, \hat{g}_{|J|}^0) := \left(\frac{g_1^0}{|D_1 \cap I|}, \dots, \frac{g_m^0}{|D_{|J|} \cap I|}\right) \tag{4}$$

denotes the profile of supply prices *per vote* for players in J.

Let $\mathcal{W}$ be the collection of subsets (called *winning coalitions*) S of J such that $|R_Y \cup S| \geq \lceil 0.5 \cdot r \rceil$. Then $\mathcal{W}$ and supply prices for players in J give rise to a *political favors game* (Young 1978a, 1978b) in which quoting any g_j ($g_j \geq g_j^0$) is a strategy for player $j \in J$ and for any given vector $(g_1, \dots, g_{|J|})$ of demands the government chooses a set $S \subset J$ sufficient to pass the measure such that $\sum_{j \in S} g_j$ is a minimum. The payoff of player j is g_j if j is chosen for the government's coalition and zero otherwise. Legislative leaders are treated as a single optimizing actor who will choose the least expensive collection $S \in \mathcal{W}$ of representatives.

We focus on the case that no player $j \in J$ enjoys veto power (i.e., no player is indispensable to reach the majority threshold). For this situation Young (1978b) defines the following strengthening of Aumann's (1959) *strong equilibrium* concept:

The strategy vector $(g_1^*, \dots, g_{|J|}^*)$ is a *canonical equilibrium* if it is (i) a strong equilibrium, i.e., no set of players can change their demands and each do better, and (ii) no subset of players who received government offers can redistribute its collective payoff among themselves such that every player in that subset receives at least his supply price and is strictly better off than before, and (iii) all players who are not included in the government's coalition demand their supply prices.[6]

Supposing that no two electoral districts have exactly the same population size all supply prices will differ, and the *critical set*

[6] Refinement (iii) serves to rule out uninteresting equilibria where players who receive no offer make unrealistically high demands.

$$S^0 = \left\{ S \in \mathcal{W}: \sum_{j \in S} \hat{g}_j^0 = \min_{S' \in \mathcal{W}} \sum_{l \in S'} \hat{g}_l^0 \right\} \quad (5)$$

is uniquely determined. Young (1978a) establishes that $(g_1^*, \dots, g_{|J|}^*)$ is a canonical equilibrium if and only if

$$g_j^* \geq g_j^0 \text{ for every } j \in J \text{ and } g_j^* = g_j^0 \text{ for all } j \notin S^0, \quad (6)$$

$$\sum_{j \in S^0} g_j \leq \sum_{l \in S} g_l \text{ for all } S \in \mathcal{W}, \quad (7)$$

$$\sum_{j \in S^0} g_j \text{ is maximum over all } (g_1, \dots, g_{|J|}) \text{ satisfying (6)and (7)}, \quad (8)$$

and proves its existence and uniqueness.

In the canonical equilibrium the legislative leaders' coalition coincides with the critical set defined in (5); a player in the critical set can raise his price above the supply price up to the point where his inclusion is only marginally more attractive to the government than some other subset $S \in \mathcal{W}$, $S \neq S^0$ and players outside the critical set receive nothing. It is interesting to note that larger variations in district populations, or in the numbers of representatives affiliated with the districts, imply that the demands of players in the critical set are less restricted. This is because other independent players become poorer substitutes. To summarize, among districts k which are represented by at least one independent representative the equilibrium coalition chosen by the legislative leaders consists of those that enjoy the most attractive $\hat{g}_k^0$, i.e., the lowest ratios of supply price to votes at stake, until the associated votes are sufficient to make the proposal pass. Note, however, that if the underlying voting game with player set J and winning coalitions $S \in \mathcal{W}$ contains any veto players, no equilibrium exists because in that case there will be no finite maximum in (8).[7] If no veto players exist, the expected utility of a k-constituent depends on the probability $\Pr(S_k^0 = 1)$ that district k is included in the critical set. Fix some set J and let $S_k^0 \in \{0,1\}$ indicate whether district k is a member of the critical set. This event as well as the amount a player can successfully demand depends on the whole profile $(\hat{g}_1^0, \dots, \hat{g}_{|J|}^0)$ which is determined by population sizes and numbers$|D_k|$. The probability $\Pr(S_k^0 = 1)$ can be computed by making probabilistic assumptions over the set of all action profiles $(a_1, a_2, \dots, a_r)$. For example, under the prioristic assumption that representatives decide independently of each other whether they

[7] Equilibrium could be restored also in the game with veto players by introducing a budget limitation for the legislative leader and making the veto player a residual claimant.

are in favor, against, or neutral towards some proposal and each has the same probability to be neutral, the probability that district k is represented in J increases linearly in$|D_k|$.

Thus, the expected share of expenditures for local public goods benefitting district k is

$$\boldsymbol{E}[g_k] = \Pr(S_k^0 = 1) g_k^*. \tag{9}$$

Taking the derivative of (9) with respect to $|D_k|$ we obtain:

$$\frac{\partial \boldsymbol{E}[g_k]}{\partial |D_k|} = \underbrace{\frac{\partial\, Pr\,(S_k^0 = 1)}{\partial |D_k|}}_{\geq 0} g_k^* + \Pr\,(S_k^0 = 1) \underbrace{\frac{\partial g_k^*}{\partial |D_k|}}_{\geq 0} \geq 0. \tag{10}$$

A district's share of government expenditures on local public goods is thus positively related to its number of representatives and this effect can be decomposed into two effects: The *desirability effect* embodied in the first summand in (10) reflects the fact that a greater number of (independent) k-representatives translates through the ratio $\hat{g}_k^0$ into a big increase in the probability of being included in the critical set. The *bargaining power* effect in the second summand captures that the aggregated vote of (independent) k-representatives is structurally more important the greater $|D_k|$ is, and therefore affords a higher equilibrium payoff g_k^*. If differences in districts' population sizes are not too great they will be trumped by differences in the numbers of representatives affiliated with a single district. Note, that if districts' populations do not differ, the model predicts that the per-capita level of local public goods increases in the number of representatives.

Example: Suppose there are eight independent representatives A1, A2, A3, B1, B2, C, D, E and the legislative leader needs five more votes. Representatives A1, A2, A3 and B1 and B2, respectively, come from the same electoral district, so the consolidated set of players is $J = \{A, B, C, D, E\}$ and the set of minimum winning coalitions is given by $\mathcal{W}_{min} = \big\{\{A, B\}, \{A, C, D\}, \{A, C, E\}, \{A, D, E\}, \{B, C, D, E\}\big\}$. For simplicity, let supply prices all be equal to 1. Thus we obtain

$$\big(\hat{g}_1^0, \dots, \hat{g}_{|J|}^0\big) = \big(\tfrac{1}{3}, \tfrac{1}{2}, 1, 1, 1\big),$$

and the unique critical set is $S^0 = \{A, B\}$. The equilibrium prices satisfying (6)-(8) are $g_A^* = 3,\ g_B^* = 2$ and $g_C^* = g_D^* = g_E^* = 1$.

IV. Institutions: Electoral Systems in German States

Article 1 of Germany's Federal Election Law (*Bundeswahlgesetz*) stipulates that elections should be held "in accordance with the principle of proportional representation combined with the personal election of candidates". This applies to elections to both the German Bundestag and the legislatures of German states.[8]

Most states allow voters to cast two votes which have distinct functions. The 'first vote' (*Erststimme*), sometimes referred to as 'vote for a person', allows a voter at the polls to elect an individual candidate of his electoral district. The winner of this election is the candidate who receives a plurality of 'first votes' in that district. The 'second vote' (*Zweitstimme*) is cast for a party list and the total number of seats in the legislature that is allocated to each party is proportional to its list vote share.[9] Seat allocation is compensatory, that is, for each direct seat in the legislature won by one of its candidates a party receives one seat less that it obtains from the second vote.[10]

If a party receives more seats through the party-list ballot than it has won seats from the 'first vote' elections, candidates from the party list fill the remaining slots in order of their rank on that list. Conversely, if a party receives more mandates from district races than it is entitled to according to its vote share which is determined by the 'second vote', then the party is awarded those excess seats (*Überhangmandate*).[11] In state elections these excess seats are compensated by additional 'proportionality seats' (*Ausgleichsmandate*) to other parties to counteract the disproportionality arising from the excess seats.[12] Germany's election system has been described as mixed member system or as 'personalized proportional rule' (*Personalisierte Verhältniswahl*). In a number of rulings (see BVerfGE 16, 130, LS2) the German Supreme Court has emphasized proportional rule as being the "basic nature" (*Grundcharakter*) of the election system which is not to be compromised by the plurality

[8] Although the institutional structure is identical for German Bundestag and state legislatures, the former does not lend itself to a study as the one we conduct here. The reason is that the federal government allocates funds to the states rather than to municipalities, so that flows from the federal level into electoral districts cannot be measured.

[9] Access to parliament is however conditional on passing a 5% threshold.

[10] In our sample we have only one state where the overall seat allocation in state elections is not based on parties' state-wide results. This is Bavaria, a state that is subdivided into seven regions. For these regions, seats are allocated in the state parliament in proportion to their population numbers. Seats not taken by a party's district winners in some region are filled from the party's corresponding regional list, i.e., proportional rule is applied on a regional basis.

[11] In most states half of the total seats in parliament are to be filled by direct winners and the other half from party lists which makes excess seats a rare phenomenon.

[12] In elections for the German Bundestag 1949 – 2009 excess seats were left uncompensated and the legislature became larger only by the amount of additionally gained seats. Yet, acting on a ruling by the Federal Constitutional Court (BVerfG 2 BvF 3/11, July 25, 2012), the Bundestag adopted legislation which requires excess mandates to be compensated in future federal elections.

element.[13] Hence, the 'first vote' is irrelevant for a party's eventual strength in the legislature, but has an impact on the legislature's composition as the respective winners of the plurality rule elections in each of the single member districts become members of parliament.

Some German states' election rules differ from the rules outlined above. For example, during our observation period, voters in North Rhine-Westphalia cast only one vote that determined two outcomes.[14] One, the candidate who wins in the district, who is the candidate who receives the plurality of vote, and two, the number of the party's seats in the legislature, determined by the party's statewide share of votes. Seats not allocated to district winners were filled from party list.

State legislatures vary in size: The minimum number of legislators is currently 181 (201 until 2000) in North Rhine-Westphalia, 180 (204 until 1998) in Bavaria and 135 (155 until 1998) in Lower Saxony. While a party's number of seats is determined by proportional rule, states differ in how total seats in the legislature are divided between district winners and party list representatives. While the share of party list members is mostly half the total, it is noticeably smaller in North Rhine-Westphalia (approx. 25% until 2000, approx. 30% since 2005), and Lower Saxony (approx. 34% until 1998, approx. 36% since 2003).

The size and the geographical shape of the electoral districts for state elections are revised by the respective state Ministry of the Interior and eventually agreed upon by the state parliament. Still, incentives and scope for gerrymandering are very limited; first of all, because of the proportional rule system and secondly, because state constitutions and court rulings require district boundaries to be as continuous as possible, only allowing gradual adaptations to changing population numbers.[15] It is thus very unlikely that the setting of electoral districts is endogenous to political power or other district characteristics.

V. Data and Empirical Model

We analyze annual data on transfer spending and representation in three large German states between 1990 and 2009, Bavaria, Lower Saxony, and North Rhine-Westphalia. About fifty percent of Germany's population resides in these three states. The unit of analysis in our data set is a state electoral district. To obtain district level data, we summed fiscal and socio-economic municipality data to electoral districts. As the three states have a mixed member

[13] For overviews of Germany's electoral and party system see, e.g., Capoccia (2002) and Kitschelt (2003).
[14] North Rhine-Westphalia changed its state election system to the more common two-ballot model in 2010.
[15] State constitutions and rulings by state constitutional courts limit tolerable deviations in population numbers across electoral districts.

electoral system, not all legislators represent an electoral district, but of course all reside in one of the districts in the state. We collected information on residency and included each legislator's residence and his or her party affiliation in our data set. We obtained that information from various official handbooks (*Volkshandbücher*) of the state legislatures. The state statistical offices (*Statistische Landesämter*) provided us with data on local government finances as well as socio-economic and demographic characteristics.

Local governments receive various types of transfers from states. On average two fifths of transfers are largely committed for administrative costs, debt service, and education. Formula-based transfers account for roughly an additional third of all transfers. One sixth of transfers are investment transfers which are granted for purposes and projects set out in the state budget plan. Investment transfers are discretionary transfers.

The impact of representation on the allocation of funds is likely to be largest with discretionary rather than formulaic transfers. Investment transfers offer the greatest potential as they can be targeted to specific locations and executive agencies have greater discretion, for example, via project grants. For this reason investment transfers are our preferred dependent variable in the empirical analysis.

However, other categories of transfers are also subject to decision-making in the state legislature. For example, the formulas which govern the distribution of automatic transfers are determined by state laws. And these formulas, which provide funds for municipalities, are usually revised along with adoption of a new annual or bi-annual budget. Since it is possible that legislators make use of such broader, more subtle, channels of influence, we also study total state transfers.[16] Moreover, by also using total transfers our results are more comparable to the previous research on the topic, which has largely used this measure.

We estimate the regression model

$$g_{lkt} = \beta_0 + \beta_1 D_{lkt} + \boldsymbol{\beta} \mathbf{X}_{lkt} + \gamma_l Z_l + \delta_t T_t + \varepsilon_{lkt}. \qquad (11)$$

The dependent variable g_{lkt} are transfers to district *k*, in Land *l*, in year *t*, and Z_l and T_t are state and year fixed effects.

The variable D_{lkt} denotes the number of legislators residing in the electoral district *k* in state *l* in a given year. We assign legislators to districts based on the address listed in the

[16] However, it should be possible in principle to explain the observed pattern of *formula transfers* using the relevant set of demographics alone. Adding a representation variable would then have no additional explanatory value, even if political power played a role in negotiating the formula. As formulaic transfers are the largest single component of total transfers, the effect of representation tends to be blurred.

official handbooks of their state legislature. This address is the location of either their home or their office where citizens may contact them personally.[17]

In most cases an electoral district contains several municipalities; in some cases, however, a municipality consists of more than one electoral district. This is the case for the largest cities, and it requires some modification to our unit of analysis. We propose two ways to address this issue: First, following the existing literature, we measure representation and transfer spending in *per capita* terms, and treat cities that consist of several electoral districts as one single observation. Alternatively, we consider the share of the transfer budget located in district *k* in a given year and regress it on the share of *k*-representatives in the state legislature. For example, if a municipality consists of *x* electoral districts, we create *x* separate observations and ascribe to each of these a *share* of *1/x* of the transfers received by the municipality, of representatives, of income etc. This procedure is somewhat contrived; yet, it takes the notion of an electoral district more literally than the per capita approach. Further, using this approach, in the presence of spill-overs between the electoral districts within a large city, we will underestimate the impact of political representation. In the following we refer to these two approaches as the per capita model and the share model.

Because populations and legislatures vary in size across states, we convert all variables to a common metric. In the per capita regressions, we measure representation as the number of representatives residing in an electoral district relative to the average number of representatives per capita in the state, i.e. total number of representatives in a state divided by its population size (see David and Eisenberg 1961; Ansolabehere et al. 2002). Analogously, we measure annual per capita transfers to an electoral district relative to the annual average per capita transfers in the state. In our regressions using shares, we measure representation as the percentage share of the state legislature residing in district *k*. Likewise; we calculate investment transfers and total transfers to district *k* as the percentage of the respective annual state budget.

The **X** vector in our regression equation (11) includes a number of other variables that might influence the geographic distribution of transfer spending. We control for income and the unemployment rate to allow for the possibility that more transfers are allocated to low income regions. Additionally, we include the percentage of the population that is older than 65, because elderly persons are often recipients of assistance, like meals on wheels, home medical care, etc. to which German municipalities make financial contributions. The **X** vector

[17] By far most legislators, that is, more than ninety percent of all legislators, give the location of their home in the official handbook and many have an office in the vicinity. – All plurality-rule candidates in our sample lived in the district where they ran for election.

also includes population size and the land area of districts.[18] These variables allow for diseconomies of scale in geographically large or sparsely populated districts, which might demand more resources than more compact districts to achieve the same level of services. However, population concentration might also be associated with higher per capita spending due to increased crowding in the consumption of public services. Finally, we include an indicator variable for the state capital. This accounts for the possibility that districts in the capital might receive greater transfers due to infrastructure spending related to the presence of the state legislature, and offer a larger number of public services jobs than rural areas, as for example in museums or to run subways.[19]

A potential concern with the cross-section analysis is that the level of representation is not the source of increased transfers, but that some common unobserved factor might have led a district to have both more representatives in the legislature and a large share of the state's transfers. For example, a location with many cultural offerings might attract legislators to live there, while at the same time the lobbying for funds by, say, museums and artists, is associated with a district inflow of state transfers. To alleviate these concerns we present additional instrumental variables estimations that take advantage of an intricate institutional feature of Germany's electoral system.

Which candidates obtain a seat in the state legislature depends on a number of factors: The most obvious are the party's overall performance, and how many of its direct candidates win the plurality of the vote share. By ranking candidates on more or less promising positions on its list, the party has limited control on which candidates get a mandate. Yet, even candidates ranked in a relatively low position sometimes become legislators, and this happens when their party is entitled to 'proportionality seats' (*Ausgleichsmandate*). These are additional seats in the legislature, which are allocated when another party won more seats from the first vote than it is entitled to on the basis of its state-wide vote share.[20] These additional seats restore proportionality. Since it is hardly predictable before the election

[18] Alternatively, we also ran regressions including population *density*. In the context of fiscal equalization schemes in Germany the idea that higher density necessitates higher public expenditures per capita is referred to as "Brecht law".

[19] We also considered other political factors, in addition to representation, which may affect the distribution of state money, namely district voter turnout and partisanship, but found no significant effects.

[20] In the states and years we consider, a sufficiently great number of compensatory seats existed in North Rhine-Westphalia in the legislative periods between 1990 and 2005 and in Lower Saxony between 2003 and 2009. We take the number of representatives with 'proportionality seats' for each electoral district in states and periods where 'proportionality seats' occurred, and calculated a relative measure of per capita representation exactly as in the case of all representatives. Because the number of proportionality seats in a district often equals zero, in our instrumental variable analysis we do not transform these variables to logs.

whether 'proportionality seats' will be created and for whom, we suggest using this special sub-group of representatives as an instrument for the representation variable.

In our regression analysis we transform all transfer and income variables into real 2005 euros, and generally measure all variables in natural logarithms, therefore all parameters are elasticities.[21] Summary statistics for the full set of variables included in our analysis are presented in Table 1. For example, Representation per capita is the number of representatives residing in a given electoral district divided by district population relative to the total number of representatives per capita in the state. A value of this index > 1 reflects that the number of legislators affiliated to the district is greater than (state) average. If the distribution of legislators across districts were uniform, the mean would be 1 and the standard deviation would be 0. Similarly, we construct Transfers per capita as the amount of transfers per capita that an electoral district obtains relative to the average amount of per capita transfers in the state. This is analogous to the definition of the representation index. In view of the share model regressions, Representation share gives the number of legislators residing in district *k* as percentage of the total legislature, and Total transfers and Investment transfers are the percentage of the respective annual state budget flowing into district *k*. Note that the number of observations in the share model is greater because several identical electoral districts are created which all together amount to the large city which constitutes one single observation in the per capita model.

V. Results

5.1 Basic Results

We present results from our per capita specifications in Table 2.[22] The first three columns show estimates for total state transfers. The last three columns show estimates for investment transfers. For each of these two dependent variables, the first specification includes only the representation variable (Table 2, columns 1 and 4), the second specification adds income, unemployment, and share of elderly (Table 2, columns 2 and 5), and the third specification

[21] Very few district-year observations were dropped (17 all together, corresponding to 0.3 percent of our dataset) because the representation variable was equal to zero, implying that its log would be undefined. This problem arose only when a district was represented by a single legislator who, for example, moved to political office at the federal level or left the legislature for health reasons shortly after state elections, and his or her replacement had no ties to that district. We alternatively added +1 to the variables before taking the logarithm with virtually identical results.

[22] Data used in this analysis are available from the authors on request. All regression analyses in this paper were performed using the statistical package STATA. The two-stage least-squares regressions use the STATA function ivreg2.

adds namely population size and area of the district relative to the state as well as a dummy for the state capital (Table 2, columns 3 and 4). All specifications include year and state indicators.

In all specifications, the point estimates on the representation variable are positive and statistically significant, showing that a larger number of legislators in a district lead to higher state per capita transfers to that district. The point estimates imply that a change in relative per capita representation in a district from 1 to 1.5 (or by 50 percent), corresponding to one additional representative compared to average per capita representation, results in a two percent increase in total transfers, and a 3.5 percent increase in investment transfers. This translates into additional annual funds per district amounting to € 0.8 million and € 0.3 million, respectively, in 2005 Euros.

Table 2 shows that per capita income is negatively related to transfer spending in districts, implying that transfer spending is somewhat redistributive to lower incomes. The coefficient for unemployment is statistically significant in the total transfers regressions, but not in the investment transfers regressions. This can be attributed to the fact that the formulaic component of total transfers allots more money to municipalities whose tax capacity is low, which is often the case when unemployment is high. Further, relative size of the elderly population cannot explain state transfers.

Population size has a positive and statistically significant effect on total transfers per capita (Table 2). This is presumably due to the fact that total transfers are dominated by their formulaic component. The formulas compare a municipality's fiscal capacity to its fiscal 'need', which is, in effect, an allowed per-capita level of spending multiplied by the number of residents. This level is set to be higher in large cities (so-called *Einwohnerveredelung*), so that more citizens do not only lead to higher formula transfers in absolute terms, but also in per capita terms. Urban districts tend to be small in terms of square miles; the just mentioned provisions in the formula thus probably account for the negative and significant impact of district area on total transfers.[23] Considering investment transfers, the effect of population size is also positive and statistically significant, but smaller than on total transfers. The positive point estimate is likely due to the fact that some projects financed by investment transfers tend to be located in big cities.[24] Further, we find positive and statistically significant point

[23] We also ran regressions where (the logarithm of) population density relative to the state average was included as control rather than population size and area. Density is positively and highly significantly related to total transfers, and negatively and significantly related to investment transfers.

[24] Indeed, if we re-estimate our model (Table 2, column 6) excluding all cities that consist of more than one electoral district, population size is not significant any more. Other point estimates remain basically unchanged; yet, state capitals drop out of the sample.

estimates on the variables measuring the district's area and whether the district is located in the state capital.

Table 3 provides results for our share model specifications, replacing cities consisting of *x* electoral districts by *x* separate observations which are each credited with *1/x* of the city's transfers, representatives, income, population, and area (as well as with the city's unemployment rate and its share of elderly in the population). Again, the first three columns contain results for districts' shares of total transfers, and the last three columns report results for the districts' shares of investment transfers. Estimates on the representation variable in Table 3 are quite similar in magnitude to those in Table 2. For example (Table 3, model 6), a fifty-percent increase in the average district's share of representatives, which is about one additional representative, increases the district's share of investment transfers by roughly four percent or about € 0.4 million, ceteris paribus. Estimation results for the economic and demographic variables again point to a strong public policy drive behind the regional allocations of transfers within German states. To summarize, our baseline results are robust to using this different approach.

We also obtain similar results when estimating our per capita and share models *without* transforming the variables to logs (Appendix, Tables A.1 and A.2) and when using averages for each four or five year legislative period rather than yearly data (Appendix, Table A.3).

5.2 Extensions

To address concerns about omitted variable bias or simultaneous causality bias, we present additional estimations that use as an instrument those representatives who received a seat in the legislature because the electoral system compensates excess seats.

Table 4a shows the results of the first-stage regressions of the endogenous variable "Representation per capita" on the instrumental variable "Proportionality seats per capita" and included exogenous variables. The signs of the coefficients on the instrumental variable are positive and statistically significant. The first stages of our analysis show that, as expected, representation by 'proportionality seats' is positively associated with general representation and statistically significant at the 0.1%-level. Moreover, F-statistics range between 350 (Table 4a, models 2 and 3) and 420 (Table 4a, model 1), which suggests that the 'proportionality seats' variable is a reliable instrument.

In Table 4b we report the second results of the two-stage least-squares estimation, where the dependent variable are per capita transfers expressed in logarithms. Considering total transfers (Table 4b, models 1-3), we do not find any significant effect of representation. By

contrast, the effect of representation on investment transfers is throughout positive and significant (Table 4b, models 46). For example, the point estimate of 0.212 with a standard error of 0.073 (model 6) implies that a fifty-percent increase in relative per capita representation, corresponding to roughly one additional representative from the district in the legislature, leads to a 10.6 percent increase in investment transfers, ceteris paribus. This translates into approximately 0.9 million more investment funds per district per year, which is about three times the corresponding prediction from the OLS estimations. As can be seen from comparing Tables 2 and 4b, results for investment transfers are qualitatively and even quantitatively robust to the use of a different estimation technique.

One interesting issue is *which* representatives predominantly account for the positive link between representation and fiscal transfers. Our theoretical model assumes that the legislative leaders who are members of the executive will use their discretion over funds to assemble legislative coalitions to pass preferred proposals. In the model, the independent legislators in the model are by definition indifferent on ideological grounds. Still, there are reasons to hypothesize that members of the government party have a higher probability to be included in the coalition formed by the government on some issue: First, the government knows the preferences of its own legislators better than it knows those of opposition party members. Second, persuading legislators to support the measure may only be secondary to coordinating and mobilizing the government's parliamentary majority. Then, funds would be expected to flow primarily to senior figures in the governing coalition as payment for services in agenda-setting and asserting party discipline. Third, the government could have a distaste or extra cost for purchasing the votes of members of the opposition party.

To investigate this issue empirically, we develop measures of the per capita representation associated with the government and opposition parties, respectively. For each state and year, we calculate government representation as the number of representatives from governing parties residing in a district divided by district population relative to the average number of governing party representatives. We compute opposition representation analogously.

Table 5 reports the results from our regressions of total transfers (columns 1-3) and investment transfers (columns 4-6) on our decomposed representation measures. Coefficients in the first three columns of Table 5 show a positive relationship between the number of opposition representatives and the total transfers that a district receives per capita. Yet, urban areas are disproportionately represented by politicians from the Green and the Liberal party who are more often in the opposition, at the same time the formulaic component of total

transfers are biased towards urban areas – this biases the results towards finding an effect of opposition representatives on state total transfers

As shown in the last three columns of Table 5, estimates for investment transfers are more consistent with our hypothesis. Coefficients demonstrate that a positive relationship exists between the amount of representation by legislators from governing parties and discretionary funds which is statistically significant in all specifications (Table 5, model 4-6). While coefficients on the government variable are throughout about twice as large as those on the opposition variable, the difference is not big enough to be statistically significant. For example, the coefficients 0.0519 and 0.0206 for the two representation variables in the full specification (Table 5, model 6) imply that, other things equal, one additional representative (roughly a 100 percent increase) from the governing (opposition) party adds approximately five percent (two percent) to a district's annual investment funds per capita.

VI. Conclusion

In this paper we establish the finding that the geographical location of a legislator, while not necessarily being a representative of any geographic constituency, is one factor in determining the distribution of central government transfers. We present a theoretical model which predicts that a district will receive a larger share of state transfers the more members of the legislature are affiliated to it. Our model suggests that the causal mechanism behind that prediction is legislative targeting by leaders in the legislature.

Our empirical results validate the key prediction of our formal analysis. The empirical work in this paper offers two advantages in comparison to earlier studies. First, electoral districts in German states operate under relatively homogenous socio-economic and political conditions. Second, variation in the number of representatives across districts is quasi-accidental, allowing better identification of the effect of representation on state transfers. We show evidence clearly supporting the hypothesis that areas to which more legislators have ties are favored in the allocation of state funds. As predicted, the effect is more pronounced with investment transfers than with total transfers and with legislators from the state's governing party or coalition than with opposition members.

In proportional parliamentary systems parties have the incentive not to just win in a specific district, but to win as large a proportion of the nationwide vote as possible to maximize their parliamentary representation. This has led scholars to primarily focus on the consequences of national level policies rather than on the allocation of local public goods.

One of the contributions of this study is that it calls into question the notion that geographically concentrated spending belongs to the realm of specific institutional environments, as for example the U.S. electoral system: Public policy decisions also reflect geographical differences in representation in systems where we would least expect it.

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Table 1: Variable definitions and descriptive statistics

Variable name	Definition	Mean	Std.dev.
	Panel A. Per capita model		
Total transfers per capita[a]	Total transfers per capita that an electoral district obtains relative to the average total transfers per capita in the state	.910	.389
Investment transfers per capita[a]	Investment transfers per capita that an electoral district obtains relative to the average investment transfers per capita in the state	.988	.410
Representation per capita [b]	Number of representatives per capita for a given electoral district relative to the total number of representatives per capita in the state	.999	.419
Proportionality seats per capita[b]	Instrument for Representation per capita. Number of representatives with 'proportionality seats' per capita for a given electoral district relative to the total number of compensatory seats per capita in the state	1.01	2.742
	Panel B. Share model		
Total transfers[a]	%(share of the respective state's total transfers that an electoral district received)	.876	.480
Investment transfers[a]	%(share of the respective state's investment transfer spending that an electoral district received)	.876	.416
Representation share[b]	% (number of representatives of an electoral district relative to the total number of representatives in the state assembly)	.876	.380
	Panel C. Control Variables		
Income per capita[c]	Per capita income in an electoral district relative to the state average	.980	.155
Income share[c]	Percentage of the electoral district's income in total real income in the state	.876	.278
Unemployment[d]	Unemployment rate in an electoral district relative to the average unemployment rate in the state	.964	.234
Age 65 and older[e]	Fraction of the electoral district's population that is aged 65 or older relative to the average	.996	.115
Population[e]	Percentage of an electoral district's population in the total population of the state	1.13	.877
Area[e]	Percentage of an electoral district's area in the total area of the state	1.13	.702
Capital District	Indicator variable that takes the value 1 if the electoral district is the state capital, and zero otherwise.	.010	.100
Gov representation per capita[b]	Number of representatives from governing parties in an electoral district divided by district population relative to the average number of government representatives per capita in the state	1.01	0.569
Opp representation per capita[b]	Number of representatives from opposition parties in an electoral district divided by district population relative to the average number of opposition representatives per capita in the state	.981	.866

Notes. 1) Footnotes refer to data source: [a] Municipal financial statements (*Kommunale Haushalts-rechnungsstatistik*) provided by state statistical offices; [b] Handbooks of states' legislatures (*Volkshandbücher*), various years; [c] Income tax statistic provided by state statistical offices; [d] Federal employment agency; [e] data provided by state statistical offices. 2) Transfer and income variables were deflated by the respective states' CPI, obtained from the Federal Statistical Office of Germany. 3) As unemployment data at the municipality-level exist only since 2002, we construct an electoral district's unemployment rate by first associating every municipality with the unemployment rate of the *Kreis* it belongs to, and then calculate a population weighted mean of unemployment rates of all municipalities which belong to the same electoral district.

Table 2: Per capita representation and distribution of per capita transfers

	Total transfers per capita			Investment transfers per capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation per capita	0.119***	0.0471*	0.0406*	0.0766*	0.0629**	0.0709**
	(0.0301)	(0.0216)	(0.0199)	(0.0311)	(0.0240)	(0.0229)
Income per capita		-0.851***	-1.481***		-1.480***	-1.371***
		(0.0920)	(0.0936)		(0.111)	(0.110)
Unemployment		0.727***	0.298***		-0.0480	-0.00155
		(0.0529)	(0.0536)		(0.0577)	(0.0616)
Age 65 and older		-0.00316	0.0418		0.0377	0.133
		(0.101)	(0.0924)		(0.0961)	(0.0963)
Population			0.332***			0.0745*
			(0.0274)			(0.0315)
Area			-0.136***			0.0789***
			(0.0200)			(0.0218)
Capital District			-0.183			0.337**
			(0.177)			(0.129)
R^2	0.032	0.438	0.545	0.010	0.251	0.279
N	5268	5268	5268	5268	5268	5268

Notes. Robust standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variable is log(Total transfers per capita) in columns 1-3 and log(Investment transfers per capita) in columns 4-6, measuring the (log of the) per capita amount of transfers that an electoral district obtains relative to the average respective transfers per capita in the state. Except for the indicator capital district, we log all independent variables.

Table 3: Districts' shares of representatives and districts' shares of transfers

	Total transfers			Investment transfers		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation share	0.130**	0.0761*	0.0239	0.107**	0.108**	0.0752**
	(0.0436)	(0.0353)	(0.0243)	(0.0335)	(0.0341)	(0.0275)
Income share		0.252**	-1.606***		-0.0410	-1.128***
		(0.0907)	(0.128)		(0.0808)	(0.144)
Unemployment		1.027***	0.244***		0.281***	0.0967
		(0.0587)	(0.0692)		(0.0649)	(0.0712)
Age 65 and older		-0.203	0.0222		-0.497**	-0.0142
		(0.195)	(0.114)		(0.164)	(0.136)
Population			2.919***			2.003***
			(0.182)			(0.167)
Area			-0.245***			0.0106
			(0.0223)			(0.0225)
Capital District			0.00976			0.404**
			(0.157)			(0.126)
R^2	0.165	0.394	0.635	0.156	0.177	0.344
N	6835	6835	6835	6835	6835	6835

Notes. Robust standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variable is log(Total transfers) in columns 1-3 and log(Investment transfers) in columns 4-6, measuring the (log of the) percentage share of the respective state budget that flows into an electoral district. Except for the indicator capital district, we log all independent variables.

Table 4a: Instrumental variable analysis, first stage

	Representation per capita		
	(1)	(2)	(3)
Proportionality seats per capita	0.0428***	0.0387***	0.0382***
	(0.0021)	(0.0020)	(0.0726)
Income per capita		0.190**	-0.0485
		(0.0660)	(0.0693)
Unemployment		0.284***	0.140*
		(0.0438)	(0.0558)
Age 65 and older		0.720***	0.630***
		(0.0850)	(0.0874)
Population			-0.0046
			(0.0170)
Area			-0.0699***
			(0.0129)
Capital District			0.356***
			(0.0452)
R^2	0.095	0.183	0.202
N	2023	2023	2023

Notes. Robust standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variable is log(Representation per capita), measured as (the log of) the number of representatives per capita in an electoral district relative to the average number of representatives per capita in the state. The main independent variable, Proportionality seats per capita, is measured as the number of representatives with a proportionality seat in a district divided by district population relative to the total number of proportionality seats divided by state population. We log all other independent variables except for the indicator capital district.

Table 4b: Instrumental variable analysis, second stage

	Total transfers per capita			Investment transfers per capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation per capita	-0.0317	-0.0286	-0.0410	0.121^{+}	0.199**	0.212**
	(0.0741)	(0.0577)	(0.0502)	(0.0703)	(0.0720)	(0.0730)
Income per capita		-1.323***	-1.691***		-1.438***	-1.426***
		(0.0661)	(0.0718)		(0.0972)	(0.108)
Unemployment		0.817***	0.380***		-0.138*	-0.217**
		(0.0460)	(0.0513)		(0.0600)	(0.0731)
Age 65 and older		-0.0151	0.00574		-0.0746	0.0739
		(0.0937)	(0.0875)		(0.103)	(0.102)
Population			0.284***			0.131***
			(0.0173)			(0.0219)
Area			-0.104***			0.0591***
			(0.0128)			(0.0155)
Capital District			-0.448***			0.107
			(0.0618)			(0.126)
R^2	-0.006	0.493	0.562	0.006	0.189	0.217
N	2023	2023	2023	2023	2023	2023

Notes. Robust standard errors in parentheses: $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variables are log(Total transfers per capita) in columns 1-3 and log(Investment transfers per capita) in columns 4-6, measured as the (log of the) per capita amount of transfers that an electoral district obtains relative to the average respective transfers per capita in the state. Except for the indicator capital district, we log all independent variables.

Table 5: The impact of governing party and opposition party representatives on the distribution of per capita transfers

	Total transfers per capita			Investment transfers per capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Gov representation per capita	0.0328	-0.0180	-0.0171	0.0450*	0.0339*	0.0458**
	(0.0220)	(0.0151)	(0.0138)	(0.0205)	(0.0165)	(0.0160)
Opp representation per capita	0.0521***	0.0334**	0.0311***	0.0206	0.0213^{+}	0.0231*
	(0.0142)	(0.0103)	(0.00892)	(0.0149)	(0.0112)	(0.0106)
Income per capita		-0.855***	-1.491***		-1.476***	-1.366***
		(0.0904)	(0.0929)		(0.110)	(0.110)
Unemployment		0.723***	0.291***		-0.0457	0.00135
		(0.0527)	(0.0536)		(0.0576)	(0.0613)
Age 65 or older		0.0570	0.0885		0.0403	0.129
		(0.102)	(0.0922)		(0.0967)	(0.0963)
Population			0.327***			0.0765*
			(0.0271)			(0.0315)
Area			-0.140***			0.0797***
			(0.0197)			(0.0220)
Capital District			-0.164			0.333**
			(0.173)			(0.129)
R^2	0.029	0.443	0.550	0.009	0.250	0.278
N	5285	5285	5285	5285	5285	5285

Notes. Robust standard errors in parentheses: $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variable is log(Total transfers per capita) in columns 1-3 and log(Investment transfers per capita) in columns 4-6, measuring the (log of the) per capita amount of transfers that an electoral district obtains relative to the average respective transfers per capita in the state. Except for the indicator capital district, we log all independent variables. As in some observations our measures of a district's representation by the government and the opposition, respectively, equal zero, we added +1 to the variables before taking the logarithm.

Appendix – Robustness checks

Table A.1: Per capita representation and distribution of per capita transfers, levels

	Total transfers per capita			Investment transfers per capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation per capita	0.105***	0.0503*	0.0516**	0.0695*	0.0562*	0.0682**
	(0.0278)	(0.0214)	(0.0195)	(0.0288)	(0.0235)	(0.0222)
Income per capita		-0.498***	-0.900***		-1.085***	-0.938***
		(0.0746)	(0.0845)		(0.0902)	(0.0878)
Unemployment		0.845***	0.559***		0.0717	0.136*
		(0.0630)	(0.0540)		(0.0543)	(0.0582)
Age 65 and older		-0.0656	-0.0394		-0.0391	0.0465
		(0.108)	(0.0993)		(0.102)	(0.0979)
Population			0.158***			0.0304
			(0.0279)			(0.0158)
Area			-0.0779***			0.0928***
			(0.0178)			(0.0190)
Capital District			-0.459*			0.198
			(0.232)			(0.148)
R^2	0.016	0.373	0.457	0.010	0.187	0.215
N	5290	5290	5290	5290	5290	5290

Notes. Robust standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variables are Total transfers per capita in columns 1-3 and Investment transfers per capita in columns 4-6, measured as the per capita amount of transfers that an electoral district obtains relative to the average respective transfers per capita in the state.

Table A.2: Districts' shares of representatives and districts' shares of transfers, levels

	Total transfers			Investment transfers		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation share	0.140***	0.111**	0.0707*	0.0712*	0.0732*	0.0476+
	(0.0416)	(0.0348)	(0.0306)	(0.0309)	(0.0306)	(0.0256)
Income share		0.365***	-0.621***		-0.0123	-0.594***
		(0.0893)	(0.176)		(0.0796)	(0.170)
Unemployment		0.971***	0.691***		0.231***	0.261***
		(0.0998)	(0.104)		(0.0565)	(0.0708)
Age 65 and older		-0.0781	0.0593		-0.475**	-0.0579
		(0.213)	(0.142)		(0.156)	(0.114)
Population			1.681***			1.367***
			(0.228)			(0.176)
Area			-0.134***			0.0937***
			(0.0291)			(0.0179)
Capital District			0.301			0.283**
			(0.220)			(0.0989)
R^2	0.124	0.327	0.403	0.156	0.175	0.321
N	6852	6852	6852	6852	6852	6852

Notes. Robust standard errors in parentheses: $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and year effects not reported. The dependent variable is Total transfers in columns 1-3 and Investment transfers in columns 4-6, measuring the percentage share of the respective state budget that flows into an electoral district.

Table A.3: Per capita representation and distribution of per capita transfers, averages over legislative periods

	Total transfers per capita			Investment transfers per capita		
	(1)	(2)	(3)	(4)	(5)	(6)
Representation per capita	0.219***	0.0939*	0.0856*	0.132*	0.108*	0.123**
	(0.0553)	(0.0403)	(0.0358)	(0.0582)	(0.0451)	(0.0439)
Income per capita		-0.770***	-1.443***		-1.440***	-1.356***
		(0.0910)	(0.0949)		(0.1112)	(0.1109)
Unemployment		0.753***	0.305***		-0.0408	-0.0069
		(0.0575)	(0.0549)		(0.0579)	(0.0472)
Age 65 and older		-0.0362	0.0440		0.0270	0.108
		(0.0969)	(0.0873)		(0.0971)	(0.0987)
Population			0.343***			0.0793*
			(0.0286)			(0.0329)
Area			-0.142***			0.0668**
			(0.0200)			(0.0230)
Capital District			-0.209			0.292
			(0.182)			(0.1492)
R^2	0.027	0.477	0.599	0.001	0.323	0.352
N	1302	1302	1302	1302	1302	1302

Notes. Robust standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, constant as well as coefficients for fixed state and legislative period effects not reported. The dependent variable is log(Total transfers per capita) in columns 1-3 and log(Investment transfers per capita) in columns 4-6, measuring the (log of the) per capita amount of transfers that an electoral district obtains relative to the average respective transfers per capita in the state. Except for the indicator capital district, we log all independent variables. All variables are averaged over legislative four-or-five-year periods.