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More Federal Legislators Lead to More Resources for Their Constituencies: Evidence from Exogenous Differences in Seat Allocations

Working Paper No. 2019-05

CREMA Südstrasse 11 CH - 8008 Zürich www.crema-research.ch

More Federal Legislators Lead to More Resources for Their Constituencies: Evidence from Exogenous Differences in Seat Allocations*

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October 2019

Abstract

Electoral district magnitude varies across German electoral constituencies and over legislative periods due to Germany's electoral system. The number of seats in parliament per constituency is effectively random. This setting permits us to investigate exogenous variations in district magnitude on federal resource allocation. We analyse the effect of having more than one federal legislator per constituency on federal government resources by exploiting information from 1,375 German constituencies from 1998 to 2017. More federal legislators per constituency lead to statistically significantly more employment of federal civil servants in the respective constituencies. The size of the effect corresponds to about 37 additional federal civil servants (3.4% of average employment) once a constituency is represented by additional legislators from party lists. Numerous robustness tests support our results. Further evidence points to some heterogeneity of the effect. In particular, constituencies represented by additional legislators who are experienced and who are members of larger, competing parties obtain more federal resources.

Keywords: District magnitude, political processes, redistribution mixed-member system
JEL Classification: D72, F50, H41

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* We thank Bill Blomquist, Reiner Eichenberger, Gerhard Glomm, Beate Jochimsen, Stefan Kolev, Nicola Maaser, Stefan Napel, Panu Poutvaara and Gustavo Torrens as well as the participants of the 2019 Annual Meeting of the German Economic Association (University of Leipzig), the Colloquium Series of the Ostrom Workshop (Indiana University), the 2019 Workshop "Insights into Political Economy" (IU and University of Bayreuth), and the Graduate Workshop (University of Bayreuth) for thoughtful comments and suggestions.

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I. INTRODUCTION

When allocating common federal resources, a constituency's share may not only depend on *who* represents it in parliament but also on *how many* legislators represent it. We investigate how electoral district magnitude, i.e. the number of legislators per constituency, affects political representation. In particular, we analyse whether more federal legislators per constituency lead to more federal resources for the respective constituency.

Legislators aim to target their constituencies with public projects to improve their re-election probability.[1] Since these projects are often financed from the common budget, the costs are shared among all constituencies which leads to a common pool problem (Weingast et al. 1981; Velasco 2000). The well-known *law of 1/n* stipulates that a higher number of legislators leads to excessive government spending and an increasing public sector if legislators do not internalize the shared financing costs.

While there is ample evidence that the local electorate profits from more political representation (e.g. Egger and Köthenbürger 2010; Aidt and Shvets 2012; Jennes and Persyn 2015; Fiva and Halse 2016; Maaser and Stratmann 2016; Fritz and Feld 2018; Gehring and Schneider 2019), there is also evidence to the contrary (see e.g. Pettersson-Lidbom 2012; Berry and Fowler 2016). The modern literature tries to account for endogeneity issues when analysing political representation by employing methods of quasi-randomization. However, such approaches do not always fulfil all requirements for identification and institutional details may matter (Eggers et al. 2018).

We contribute to the literature by employing a methodologically innovative strategy to identify the effect of having more legislators per constituency on the federal resources that constituencies receive. The German mixed-member electoral system institutionally assures the exogeneity of the number of legislators per constituency. The *Bundestag* (federal parliament) is comprised of directly elected legislators for each constituency and legislators from state-wide party lists. While every constituency is always represented by one directly elected legislator in the *Bundestag*, the total number of representatives per constituency can be higher as further legislators may enter parliament through state-wide party lists. This is possible since candidates are allowed to run as direct candidates for their constituency and as party list

[1] Analyzing more than 150 studies on distributive politics, Golden and Min (2013) highlight that "[s]tudies overwhelmingly find that incumbent politicians are rewarded by voters for distributive allocations".

candidates simultaneously. Candidates who do not win a plurality in their district race can still profit from their fall-back option and enter parliament through the state-wide party list. District magnitude is effectively random from the point of view of a constituency as it is independent of constituency specific characteristics and unknown prior to election how many legislators from the constituency finally enter parliament through state-wide party lists. Thus, we can analyse the effect of exogenous differences in legislative representation of constituencies.

We employ a dataset of 1,375 German constituencies between 1998 and 2017 to analyse the impact of the number of legislators per constituency on the allocation of federal resources employing fixed effects. Federal resources are captured by the number of federal civil servants who work in a constituency. Additional federal representation by legislators elected through the party lists increases the number of federal civil servants by 0.22 per thousand inhabitants or roughly 37 more civil servants in comparison to constituencies that have only one directly elected legislator. Thereby, having more than one legislator per constituency translates into to a 3.42% increase in federal employment compared to the mean number of federal civil servants. The impact of more legislators is statistically significant and remains robust to the inclusion of a variety of political control variables including committee memberships and belonging to parties in government as well as in diverse subsample estimations. Regarding mechanisms, constituencies particularly profit when they are represented (1) by more experienced legislators, (2) by legislators who also live in the constituency or (3) by legislators who are from the larger parties and who compete to win the direct seat of the constituency.

The remainder of this paper is organized as follows. Section II relates our contribution to the literature. Section III describes the institutional setting, the identification strategy and our data. Estimation results, robustness checks, and mechanisms are presented in Section IV. Section V summarizes our results and concludes.

II. LITERATURE REVIEW

This paper contributes to the literature on the effects of electoral district magnitude and political representation on the distribution of public spending.[2] The pure number of

[2] Generally, legislative bargaining models help to understand public resource distributions arising from representation asymmetries (see e.g., Baron and Ferenjohn 1987, 1989; Snyder et al. 2005, or, more recently Mattozzi and Snowberg 2018; Pecorino 2018; Maskin and Tirole 2019). Golden and Min (2013) provide a magisterial overview on the literature on distributive politics.

representatives may affect the size of the public sector (Weingast et al. 1981; Velasco 2000). Essentially, the argument is that public expenditure in their constituency increases legislators' re-election chances. The costs of providing local public goods are shared by tax payers across *n* constituencies which leads to a common pool problem. Hence, overall spending, debts and inefficiencies increase with the overall number of legislators (Yared 2019) and targeted expenditures in a specific constituency increase with the number of legislators representing it. This result is commonly referred to as the *law of 1/n,* as the cost of one additional unit from the constituency's perspective is *1/n* of the total cost.

The underlying common pool problem of the law of *1/n* is extensively discussed and broadly applied (e.g. Primo and Snyder 2008; Golden and Min 2013; Alesina and Passalaqua 2016; Yared 2019). Empirical evidence highlights its relevance (e.g. Schaltegger and Feld 2009; Egger and Köthenbürger 2010; Gehring and Schneider 2019). More generally, differences in political representation are shown to matter for the allocation of common resources within countries (Atlas et al. 1995; Pitlik et al. 2001, 2006; Lee 1998; Knight 2008; Fink and Stratmann 2011; Jennes and Persyn 2015; Halse 2016). Similar to this literature, we investigate the relevance of district magnitude as a causal factor for legislative representation (Lancaster 1986; Lizzeri and Persico 2001; Portmann et al. 2011).[3]

Political institutions might either aggravate or mitigate the fiscal commons (Baqir 2002; Lee 2015) and some results for the *law of 1/n* suggest that larger legislatures might even induce lower expenditures (e.g. Pettersson-Lidbom 2012; Höhmann 2018).[4] It is noteworthy that increasing the number of representatives from the same constituency makes it more difficult for each of them to be recognized for their personal commitment (e.g. Lancaster 1986; Carey and Shugart 1995; Lizzeri and Persico 2001; Portmann et al. 2011; Carey and Hix 2011). Thus, the *law of 1/n* is more likely to hold when overall electoral district magnitude is small and individual responsibility of legislators more clearly defined (Milesi-Ferretti et al. 2002; Edwards and Thames 2007; Primo and Snyder 2008; Carey and Hix 2013).

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[3] District magnitude usually depends on the electoral system (see Portmann et al. 2011 and Stadelmann et al. 2019 for a discussion). Under majoritarian rule in single member districts, convergence to the median voter is usually predicted (Downs 1957; Cox 1997; Persson and Tabellini 2002, 2005). As district magnitude increases, some form of proportional allocation of seats and diverging political positions usually become the norm (see e.g. Taagepera and Shugart 1989; Carey and Shugart 1995).

[4] Some studies suggest no effects of distinct magnitude (MacDonald 2008; Baskaran 2013; Bel et al. 2018).

The challenge of the empirical literature on the *law of 1/n* consists in identifying a causal link between the number of legislators and resource allocation (e.g. Aidt and Shvets 2012; Pettersson-Lidbom 2012). Discontinuous changes in legislature sizes have been employed in regression discontinuity designs (Egger and Köthenbürger 2010; Pettersson-Lidbom 2012; Höhmann 2017; Lewis 2019). Compound treatment, sorting and small institutional details can make identification challenging even in such settings (Eggers et al. 2018). We add to the empirical literature by leveraging the German mixed-member electoral system where district magnitudes differ both between constituencies and within constituencies over legislative periods. Moreover, overall district magnitude is small, i.e. one legislator per district is guaranteed in our setting and usually only a second or a third legislator are added due to the electoral system.[5] Related to our contribution, Maaser and Stratmann (2016) analyse the impact of differences in political representation on resource allocation by exploiting a mixed electoral system within three German states. They find a positive link of legislators residing in a district and the share of government transfers.

III. INSTITUTIONAL BACKGROUND, IDENTIFICATION STRATEGY AND DATA

Germany's federal electoral system

Elections for the German Federal Parliament (the *Bundestag*) are held every four years. There are many institutional subtleties characterizing the electoral system but the main mechanism for the allocation of seats to constituencies is relatively simple: German voters cast two ballots simultaneously. The two ballots are referred to as the "first vote" and the "second vote". The first vote is for a direct candidate of a constituency, who must achieve a plurality in his/her constituency to be elected. There are currently 299 constituencies in Germany of roughly similar population size. The second vote allows voters to vote for a closed party list in each of the 16 German states. Party lists are proposed by the states' party associations in a secret ballot prior to federal elections. The *Bundestag* comprises exactly one direct legislator

[5] In our setting, the number of legislators per constituency isbelow the electoral sweet spot referred to by Carey and Hix (2011, 2013) and Portmann et al. (2013) such that our results should not depend on it. Hence, we avoid issues linked to non-linearities of district magnitude discussed in the literature.

from each constituency and the remaining half of the seats is allocated to candidates from the closed state party lists at to achieve proportionality at the state level based on the second vote.[6] Representation is *not* proportional at the level of constituencies.

It is common that direct candidates are also party list candidates simultaneously, i.e. they run for the direct mandate of their constituency and on a party list at the same time. Their list position is seen as the fallback option if they do not win the direct mandate in their constituency. Hence, direct candidates who lose the district race may still obtain a seat in the *Bundestag* through the party list. Direct candidates who win a direct mandate, on the other hand, have to accept it and are then skipped on the party list when allocating the remaining seats. 39.7% of candidates in our sample have achieved a plurality in their constituency and were simultaneously on a party list. These candidates entered the *Bundestag* as direct candidates. 47.8% of candidates in our sample did not achieve a plurality in their constituency but they still entered the *Bundestag* through the party list. Our data includes candidates who achieved a plurality in their constituency but who have not been on a party list at the same time (about 6.8% of the sample). 5.7% of candidates in our sample were only on a party list and entered the *Bundestag* but they did not run as direct candidates for a constituency.

The total number of direct mandates a party wins is subtracted from its total amount of seats it is entitled in each state to have in the *Bundestag* according to its second vote share. Candidates from the closed state party list ranked highest fill the remaining seats.[7] Thereby, first vote (constituency level) and second vote (state level) jointly determine who is finally elected from state-wide party lists. Overall, district magnitude is rather small. In our sample district magnitude has a mean of 1.94 and a median of 2.

Identification strategy

While every constituency is represented by exactly one directly elected legislator, the actual number of legislators representing it may increase due to additional legislators who lost

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[6] There are subtleties at the federal level: Parties need to achieve at least five percent of second votes to participate in the allocation of seats by proportional rule. Alternatively, three direct candidates of a party must win. Moreover, usually more seats than half need to be filled through the party list to achieve proportionality (overhang seats).

[7] There is another subtlety at the state level: It is possible that the number of direct mandates that a party wins exceeds the number of seats it is entitled by proportional rule. From 1998 to 2009, the respective parties kept so called overhang mandates as a bonus. From 2013 on, other parties are compensated with leveling seats to restore overall proportionality.

the direct election in the constituency. These additional legislators may enter the *Bundestag* through their respective party list.

The ranking of candidates on closed state party lists is traditionally determined by representative assemblies at the state level in advance of the election (Wessels 1997). Delegates from the party decide on the ranking of candidates position by position in secret ballots. Representation of constituencies plays a minor role, if any in these ballots (Korte 2009), as geographical representation is assured by the direct candidates from the point of view of parties. Instead, popular and well-known politicians tend to seize the first positions on the list. Often direct candidates are rewarded with high ranks for the efforts in their campaigns (Gschwend et al. 2009). The ranking is also shaped by interest groups within the parties such as trade unions or the youth wing that claim positions for their members. Gender considerations play a role too as parties imposed quotas on themselves[8] or try to achieve a certain number of female candidates on their state-wide lists.

The second vote result in the state determines each party's total number of seats. Whether a candidate who lost a direct race in a constituency is finally elected to the *Bundestag* depends on his/her position on the closed state party list, first vote results in other constituencies as well as second vote results.[9] As party lists are closed and elected at the state level, voters are not able to strategically influence this second stage allocation of candidates from the party lists in favor of their constituency in the election.[10] Thus, differences in the number of legislators per constituency exclusively stem from the allocation of legislators from the party list who *lost*

[8] On the party lists of The Greens, for example, every odd rank (including the leading position) is supposed to be allocated to a woman.

[9] E.g., the electoral results in Bavaria in 2017 serve as a neat illustration that first and second vote results from the whole state jointly determine who gets elected from the closed state party list. Joachim Herrmann from the Christian Social Union (CSU) was on the first position of the party list but he did not run as a direct candidate. All direct mandates were won by the CSU with a plurality in each constituency. Thereby, the party exceeded the number of legislators it is actually entitled to due to its second vote share which ensures proportionality. The CSU was allowed to keep its overhang mandates (i.e. all direct candidates are in the *Bundestag*), but no further candidates from the party list were elected. Hence, even the leading candidate of the dominant party in a big German state was not elected. Due to interplay of first and second vote results it is barely predictable whether more than one legislator per constituency gets elected.

[10] This holds even if voters were able to strategically organize at the level of the constituency.

their district race (Appendix A1 and Figure A1 for an illustration and Figure A2 for a typical ballot paper).

All legislators who compete for a direct seat in their constituencies (about 94.3%) have incentives to cater for their constituency's interest regardless of being directly elected or finally entering parliament through the party list. Having reelection prospects in mind, the provision of local public goods can enhance their local visibility and their chance to win the next direct election in their constituency (Maaser and Stratmann 2016). Candidates who ran for direct election but did not win, have often made promises to gain the support of their local electorate. Despite their defeat, they need to keep political credibility within their constituency (Gagliarducci et al. 2011). Poor performance for the constituency in the *Bundestag* can also be punished by neglecting the politician in the nomination as a district candidate or allocating a low rank on the party list in the next election.[11] Finally, politicians may have ties to their geographic constituency for personal or professional reasons and they often have offices in their constituency (Gschwend et al. 2009; Maaser and Stratmann 2016). Conversely, if legislators had no incentives to cater for their constituency after election, we should not find any effect of the number or representatives per constituency such that our setting serves as conservative test for the *law of 1/n*.

To summarize, every constituency is certainly represented by exactly one directly elected legislator. Candidates from the state-wide party lists who lost the direct election possibly supervene. The allocation of candidates from the state party lists over constituencies is independent of constituency-specific characteristics and voter preferences though and is hence neither uniform nor can it be predicted reliably for all constituencies in advance. Thus, from the perspective of a constituency it is externally given whether it receives additional legislators from the state-wide party lists. This leads to exogenous differences in district magnitudes between constituencies, i.e. additional legislators in a constituency next to the directly elected legislator can be viewed as a treatment variable.

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[11] Anecdotal evidence for this is abound: Representative Marieluise Beck ran for election as direct candidate and led The Green party list in Bremen. She was elected from the state party list. However, she was said to have neglected her geographic constituency. After having lost her party association's support she abstained from another candidacy (see https://www.welt.de/politik/deutschland/article157645892/Marieluise-Beck-weicht-dem-gruenen-Zwergenaufstand.html, accessed November 07. 2018).

Data and estimation equation

Our institutional setting allows us to identify the effects of additional legislators per constituency elected through the state-wide party list on the provision of federal resources at the level of constituencies. We compile data for five legislative periods between 1998 and 2017 obtaining 1,375 observations.[12] Our unit of observation is constituency-legislative period specific. We employ the following model and use OLS fixed effects to estimate

$$Federal\ civil\ servants\ per\ 1{,}000\ capita_{it} = \beta_0 + \beta_1 Additional\ Legislator_{it} + X_{it}\gamma + \lambda_i + \mu_t + \varepsilon_{it}$$

Our main dependent variable is the number of *Federal civil servants per 1,000 capita* in constituency i in legislative period t which serves as a measure for the allocation of federal resources to the constituency. Federal civil servants include employees of the political administration, federal defense administration and armed forces, federal police force, financial administration, research institutes, meteorological service, etc.), and they are frequently used as a relevant indicator for the allocation of common resources (Carsey and Rundquist 1999; Baqir 2002; Besley and Preston 2007; Golden and Min 2013).[13] Federal civil servants are comprised of *federal officials* (tenured and constitutionally protected from dismissal) and *federal employees* (no special protection from dismissal). Being subordinated to federal authorities, location and personal decisions are prone to the discretionary influence of legislators. Indeed, numerous examples of discretionary influence to gain additional civil servants exist.[14] Constituencies have a mean total amount of federal civil servants of 1080 (4.88 per thousand inhabitants), of which 761 are federal officials and judges.

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[12] We consider the universe of legislators who were in parliament for at least half a legislative period (96% of all legislators).

[13] An alternative measure of federal resources would be funds for the construction of federal roads. Renewal, maintenance and other federal infrastructure spending are not included in federal infrastructure reports such that this measure is not reliable. Legislators' incentives to campaign for federal road construction are not as clear as in the case of employment as road construction cannot be realized quickly and it is not unequivocally supported by the population in the constituency.

[14] To give just two examples: In 2017 the mayor of Freyung in Bavaria thanked the federal representative Bartholomäus Kalb for his commitment to bring 20 additional jobs of the federal police to the city (see https://www.freyung.de/blog/20-neue-arbeitsplaetze-bei-der-bundespolizei-mdb-kalb-erreicht-staerkung-des-standortes-freyung.html, accessed 09 August 2019). Representative Silke Launert achieved 56 new tenured positions for in the federal police department in her constituency (see https://www.silke-launert.de/aktuelles/archiv/bundespolizei-standort-ist-sicher accessed 09 August 2019).

To measure the effect of additional political representation on federal resource allocation (the *law of 1/n*), we include the binary variable *Additional Legislator*. It takes a value of one if a constituency i in period t is represented by two or more legislators. To obtain the variable *Additional Legislator*, we link eventually elected legislators to the constituency in which they ran for direct election and count the total number of representatives per constituency. Note that the variable *Additional Legislator* precisely maps the German electoral system which grants exactly one directly elected legislator to each constituency and additional representatives who lost the direct election and may enter the *Bundestag* through the party lists. The archive of the *Bundestag* provides information on all legislators running for direct election and on whether they were actually directly elected (with a plurality) or through the party list.[15] We expect the coefficient of interest β_1 to be positive and statistically significant, i.e. additional legislators increase the resource allocation to their constituency. Overall, 27.9% of the constituencies do not receive additional legislators from the state-wide party list, 49.5% have one, 18.6% two and 3.7% three additional legislators from the closed state party list. Less than 0.3% have the maximum number of four additional representatives. Thus, in most cases we are moving from a single legislator per constituency to two legislators, i.e. the number of representatives doubles. In all cases the total number of legislators representing a constituency remains at most five, i.e. below any potential "sweet spot" (Carey and Hix 2011).

The matrix $X_{i,t}$ includes time-variant constituency and political characteristics. The *Federal Statistical Office* provides controls at district level including measures for population density, gross domestic product and the number of unemployed persons.[16] We complement these controls with constituency-specific political variables from the manual *'Kürschners Volkshandbuch'* on personal and political biographies of all members of the *Bundestag*. These characteristics include age, gender, seniority, vote margin in first vote results, residence, education, committee membership, party posts, offices, party affiliation, birthplace and political experience at the local level. Closed party list ranks are supplemented from Bergmann

[15] 5.7% of legislators in the Bundestag presented themselves only on the party list and did not run for direct election. We assign these legislators according to their residency to a constituency in a separate specification test below. We assign a value of zero for *Additional Legislator* to eight observations of constituencies in which the directly elected legislator dropped out early in the first half of the legislative period and no more legislators from the party lists are present (there are no replacement elections).

[16] Districts according to the *Federal Statistical Office* do not always coincide with (electoral) constituencies' boundaries and constituencies may change their boundaries due to changes in population size and dissolution. We combine districts to constituencies of which they are part of (see Appendix B).

et al. (2018). Short descriptions and summary statistics of all our variables can be found in Table A2 in the Appendix.

We include *constituency fixed effects* λ_i to account for unobserved constituency heterogeneity that is constant over time such as prevailing political culture or historically determined locations of federal authorities. In addition, we include *legislative period fixed effects* μ_t to account for common developments or shifts in political agenda like federal reforms that entail the reduction or increase of federal civil servants. $\varepsilon_{i,t}$ constitutes the error term. Standard error estimates are clustered at the constituency level.

IV. EMPIRICAL EVIDENCE FOR THE LAW OF 1/N

Main results

Figure 1 provides descriptive evidence that the number of federal civil servants per 1,000 inhabitants is 14.0% higher (corresponding to an additional 0.62 civil servants per 1,000 inhabitants) in constituencies that have been allocated more than one legislator in the *Bundestag* due to the electoral system.

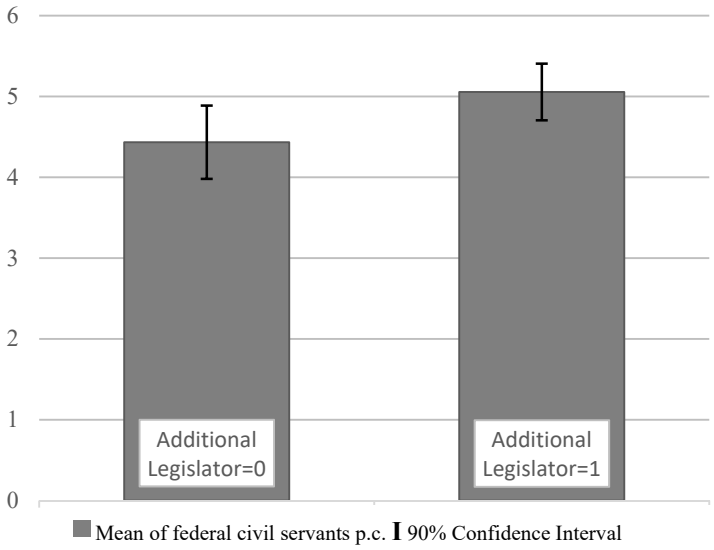

Figure 1: Mean of federal civil servants per 1,000 capita according whether constituencies have additional legislators in the *Bundestag* or not

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Federal civil servants			Federal officials		Federal employees	
	p.c.	p.c	total	p.c.	total	p.c.	total
Additional Legislator (treatment)	0.220**	0.227*	36.98*	0.182	31.95*	0.072**	12.79**
	(0.108)	(0.117)	(18.97)	(0.116)	(18.03)	(0.036)	(4.997)
District time variant controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Political controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constituency Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.11	0.13	0.11	0.05	0.04	0.22	0.22
# Observations	1,375	1,375	1,375	1,375	1,375	1,375	1,375
# Constituencies	478	478	478	478	478	478	478

Notes: District time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Political controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority Avg*) and Residence (*Residence*). Robust standard error estimates are clustered at the constituency level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1: The effect of additional legislators per constituency on the allocation of federal civil servants, federal officials and federal employees

Table 1 provides econometric evidence for the *law of 1/n*. Specification (1) employs the number of federal civil servants per 1,000 capita as a dependent variable and includes time and constituency fixed effects. The variable *Additional Legislator* is positive and statistically significant. Specification (2) includes a set of constituency-specific and political control variables. The effect of having an additional legislator representing the constituency apart from only the directly elected one remains positive, statistically significant and similar in size to specification (1).

In column (3), we analyze the effect of *Additional Legislator* on the total number of civil servants in a constituency. This is sensible since constituencies are required to be of roughly similar population size according to German constitution. Once again, a positive and statistically significant effect emerges. In terms of magnitudes our results suggest that constituencies with more additional legislators from the state-wide party list profit from an increase of 0.22 federal civil servants per thousand capita or 37 in absolute numbers respectively which corresponds to 3.4% of the mean number of federal civil servants in the sample. It is noteworthy that the magnitude of the effect closely corresponds to anecdotal evidence provided by legislators themselves when advertising their achievements for the constituency.

Specifications (4) to (7) present separate estimations with federal officials (4 and 5) and federal employees (6 and 7) as dependent variables. Point estimates of *Additional Legislator* are positive in all specifications. Statistically significant results at conventional significance levels emerge for both specifications using federal employees as dependent variable. The results suggest that federal employees tend to be used more systematically to target funds for constituencies, which is consistent with the view that discretionary scope of legislators is higher for federal employees than in the case of federal officials.

The results of Table 1 support the view that larger district magnitude translates into a higher provision of federal resources for the respective constituency. The institutionally driven variation in the number of legislators per constituency allows us to identify the relevance of the *law of 1/n*.

Robustness checks

We provide a large array of robustness checks in Tables 2 to 4. All our results and interpretations regarding the effect of more legislators per constituency remain unchanged.

	Test	Description	(1) Federal Civil Servants p.c.	(2) Federal Employees p.c.
(1)	Education	Baseline regression controlling for education (*Doctorate*)	*0.243** (0.112)* **Confirmed**	*0.083** (0.037)* **Confirmed**
(2)	Committee membership	Baseline regression controlling for committee membership in the committees for defense, interior, agriculture and infrastructure.	*0.192* (0.112)* **Confirmed**	*0.063 (0.040)* **Marginally confirmed**
(3)	Electoral incentives	Baseline regression controlling for representatives that only run for election as district candidates (*Only direct candidate*) and representatives listed on the first three state list places (*Rank 3*).	*0.232** (0.118)* **Confirmed**	*0.071* (0.036)* **Confirmed**
(4)	Party offices	Baseline regression controlling for actual party offices held at the local (*Local Party*), state (*State Party*) and national level (*Nation Party*) and engagement in youth organization (*Youth Orga*).	*0.257* (0.144)* **Confirmed**	*0.103** (0.046)* **Confirmed**
(5)	Offices	Baseline regression controlling for offices held at the national level (*Minister*) and past offices at the state (*State Office*) and national level (*Nation Office*).	*0.208* (0.119)* **Confirmed**	*0.073* (0.038)* **Confirmed**
(6)	Local politicians	Baseline regression controlling for offices held at the local level (*Actual Local Exp)* and past offices at the local level (*Past Local Exp*).	*0.185 (0.113)* **Marginally confirmed**	*0.069** (0.030)* **Confirmed**

Table continues on next page.

	Test	Description	(1) Federal Civil Servants p.c.	(2) Federal Employees p.c.
(7)	Local Ties	Baseline regression controlling for representatives' birthplace (*Birth*) and place where graduated from school (*School*).	*0.169 (0.126)* **Marginally confirmed**	*0.075* (0.039)* **Confirmed**
(8)	Party affiliation	Baseline regression controlling for representatives' party affiliation (*Right*) and their belonging to a party in government (*Party in Government*)	*0.282* (0.117)* **Confirmed**	*0.093** (0.039)* **Confirmed**
(9)	All	Include all control variables from this table	*0.175 (0.128)* **Marginally confirmed**	*0.104** (0.047)* **Confirmed**

Notes: The regressions estimate the baseline model including district time variant controls and personal characteristics. District time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Political controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority_Avg*) and place of residence (*Residence*). In all regressions we employ constituency and time fixed effects. Column (1) shows the results for the dependent variable Federal civil servants, p.c. and column (2) for Federal employees, p.c. The remark "Confirmed" below the point estimates indicates whether the main results remain robust in comparison to the baseline results. All regressions include the full sample of 1,375 observations. Standard error estimates are clustered at the constituency level and reported in parentheses. Significance levels are indicated by *p<0.1; **p<0.05; ***p<0.01.

Table 2: Robustness checks for the effect of additional legislators on federal resource allocation using data from self-reported personal and political biographies of the legislators

a. Political control variables

Table 2 effectively summarizes different robustness tests including control variables from personal and political biographies. Every specification is presented in a separate row and a short description of each test is given. In particular, we take account of education, committee membership, electoral incentives, party offices, positions at the federal and state level, political presence at the local level, local ties, party affiliation and the belonging to parties in government, all of which have been shown to be of relevance for the allocation of federal resources in the literature (e.g. Maaser and Stratmann 2018). We always include the control variables of the most stringent setting of Table 1. We report the regression coefficient for our main independent variable *Additional Legislator* employing the number of federal civil servants per 1,000 population (specification 1) and federal employees per 1,000 population (specification 2) as dependent variables.[17]

In all regressions, the point estimates of the *Additional Legislator* variable are positive and usually statistically significant. Regarding the magnitude of the coefficient estimates, they are within a range of less than 0.5 standard errors of the point estimates presented in Table 1, i.e. the results of Table 2 closely mirror those of Table 1. Higher district magnitude due to additional legislators entering the Bundestag for their constituency through the state-wide party lists always lead to an increase in the number of federal civil servants.

b. Subsets and list-only legislators

In Table 3, we investigate different subsets of our dataset.

Larger cities might be places where federal civil servants work. (Some) Politicians might prefer to run for election in cities with a larger variety of cultural offers (Lancaster and Patterson 1990 or Maaser and Stratmann 2016). Our main results and interpretations are not affected when we drop Bonn and Berlin-Mitte, i.e. constituencies where the seat of government is located (row 1). Furthermore, we drop district-free cities (row 2) and gradually exclude constituencies that are cities or include cities with more than 200,000 or 150,000 inhabitants (rows 3 and 4). Throughout all specifications our results remain robust and even of similar magnitude in comparison to earlier specifications.

[17] When employing federal officials as a dependent variable, respective coefficients remain positive and tend to be statistically insignificant similar to our baseline results.

	Test	Description	#Obs	(1) Federal Civil Servants p.c.	(2) Federal Employees p.c.
(1)	Drop seats of government	Drop the constituencies Bonn and Berlin-Mitte as seats of government	1,366	*0.221* (0.117)* **Confirmed**	*0.075** (0.037)* **Confirmed**
(2)	Drop district free cities	Baseline regression for a subsample that only includes constituencies without district free cities	813	*0.249* (0.133)* **Confirmed**	*0.049 (0.034)* **Marginally confirmed**
(3)	Drop cities with more than 200,000 inhabitants	Baseline regression for a subsample that only includes constituencies that consist of or contain a city with more than 200,000 inhabitants	1,032	*0.261* (0.144)* **Confirmed**	*0.083* (0.046)* **Confirmed**
(4)	Drop cities with more than 150,000 inhabitants	Baseline regression for a subsample that only includes constituencies that consist of or contain a city with more than 150,000 inhabitants	969	*0.282* (0.148)* **Confirmed**	*0.085* (0.047)* **Confirmed**
(5)	Drop cities with more than one constituency	Baseline regression for a subsample that drops constituencies from statistical districts with several constituencies within its boundaries	1,140	*0.262* (0.147)* **Confirmed**	*0.086* (0.044)* **Confirmed**
(6)	Constituencies correspond to statistical districts	Baseline regression for a subsample that only includes constituencies corresponding to their statistical districts	445	*0.382* (0.201)* **Confirmed**	*0.162** (0.071)* **Confirmed**

Table continues on next page.

	Test	Description	#Obs	(1) Federal Civil Servants p.c.	(2) Federal Employees p.c.
(7)	Constituency in all 5 periods	Baseline regression for a subsample that only includes constituencies that existed for 5 periods	490	*0.386*** (0.174)* **Confirmed**	*0.070*** (0.032)* **Confirmed**
(8)	5.7% of legislators entering through the party list	We consider legislator who are only on the party list and do not present themselves as direct candidates. We link them to constituencies according to the reported place of residence.	1,375	*-0.068 (0.165)* **Different independent variable**	*0.035 (0.037)* **Different independent variable**

Notes: The regressions estimate the baseline model including district time variant controls and personal characteristics. District time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Political controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority_Avg*) and place of residence (*Residence*). In all regressions we employ constituency and time fixed effects. Column (1) shows the results for the dependent variable Federal civil servants, p.c., column (2) for Federal employees, p.c. The remark "Confirmed" below the point estimates indicates whether the main results remain robust to the respective changes. Standard error estimates are clustered at the constituency level and reported in parentheses. Significance levels are indicated by *p<0.1; **p<0.05; ***p<0.01.

Table 3: Robustness checks for the effect of additional legislators on federal resource allocation using different subsamples and list-only legislators

As constituencies do not always correspond to statistical districts, we drop statistical districts and cities that consist of several constituencies in row (5). The results correspond to the baseline estimates in Table 1 and the coefficients are of similar magnitude.

When exploring constituencies whose boundaries correspond exactly to statistical districts in row (6) and constituencies that remain unchanged for all five legislative periods in row (7), we again find that additional legislators have a positive and statistically significant effect on the number of federal civil servants. Again, it is noteworthy that the quantitative results are similar to our main results and, if anything, even slightly larger in magnitude.

About 5.7% of German legislators enter the *Bundestag* through the party list *without* running as direct candidates in a constituency. So far, our estimations employed directly elected candidates and legislators from the state party lists who simultaneously ran for direct election but lost it. We now assign legislators who were not running as direct candidates to constituencies according to their reported place of residence and rerun our main estimation counting only them as the additional legislators in the constituency. Legislators who do not run as direct candidates should be less connected, if at all, to geographical constituencies (Manow 2012). Constituencies do not profit in terms of federal resources from legislators who only run for election on state-wide party lists and report their place of residence in its respective boundaries as shown in row (8). This strengthens our interpretations as the results suggest that only additional legislators who present themselves as direct candidates for their constituency lead to more federal resources.

c. Selection on unobservables

Our baseline results remain robust to the inclusion of control variables from legislators' biographies and in different subsets. To investigate whether unobserved variables are likely to drive our findings, we perform a robustness test following Oster (2017). This test aims to reveal potential endogeneity problems that arise from unobserved variables. The basic idea of the test is to confront changes in the coefficient of interest and the explanatory power of the model captured by the R^2 when control variables are included to a model without any controls. A relatively constant point estimate and an important rise of the R^2 when adding further observable controls, is suggestive that unobservables are unlikely to affect the relationship under the assumption that the included controls are the most relevant ones (see Oster 2017 for further explanations or Arnold et al. 2016 for an application). Table A3 in the appendix

provides the corresponding tests. We find that potential endogeneity problems arising from unobservables are unlikely in our setting. In fact, selection on unobservables would have to be at least 3.13 times stronger than selection on observables to make the effect of additional legislators on federal resources irrelevant. Indeed, the controlled and uncontrolled coefficients for the variable *Additional Legislator* are quantitatively highly similar throughout all our specifications. As the institutional setting determines district magnitude, these tests make us confident that the effect of additional legislators on federal resources is well identified.

d. Placebo tests for civil servants at state and municipal level

A positive effect of the number of legislators per constituency on the distribution of public resources should only be found when federal legislators are able to influence its allocation. There should be *no* relationship between more federal legislators in a constituency and resources that are *not* subject to federal authority. Table 4 shows that this is indeed the case.

	(1)	(2)	(3)	(4)	(5)	(6)
	State civil servants p.c.	State officials p.c	State employees p.c	Municipal civil servants p.c.	Municipal officials p.c.	Municipal employees p.c.
Additional Legislator	-0.064	-0.020	-0.046	-0.036	-0.004	-0.049
	(0.134)	(0.067)	(0.082)	(0.082)	(0.010)	(0.067)
Constituency time variant controls	Yes	Yes	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Constituency Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.20	0.16	0.06	0.42	0.30	0.52
#Observations	1,272	1,272	1,272	1,272	1,272	1,272
# Constituencies	435	435	435	435	435	435

Notes: The regressions estimate the baseline model including district time variant controls and personal characteristics and employing civil servants, officials and employees at the state and municipal level as dependent variables. District time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Political controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority_Avg*) and place of residence (Residence). In all regressions we employ constituency and time fixed effects. Standard error estimates are clustered at the constituency level and reported in parentheses. Significance levels are indicated by *p<0.1; **p<0.05; ***p<0.01.

Table 4: Placebo test – No influence of additional federal legislators on resources decided at the state and the municipal level

We investigate the number of civil servants, officials and employees working in a constituency who are employed by states or municipalities as a placebo test in Table 4. Federal

legislators have no discretionary power over state or municipal funds. The results show that there is *no* effect of additional federal legislators on either state or municipal civil servants, officials, and employees. The coefficient estimates for the variable *Additional Legislator* is always statistically insignificant and point estimates are close to zero.

Mechanism and effect heterogeneity

To explore the potential heterogeneity of the effect of more legislators, we divide constituencies into subgroups with regard to different characteristics and recode the variable *Additional Legislators* to reflect the subgroups. Results are reported in Table 5.

We start by exploring the relevance of seniority vs. being new to parliament. The relevance of time spent in parliament is commonly acknowledged (e.g. Kotakorpi et al. 2017). Conditional on being represented by additional legislators, one subgroup comprises constituencies with legislators who are new to parliament (binary variable *Additional Legislator (New to parliament=1)*). The second subgroup consists of constituencies represented by legislators with an average seniority that is larger than one legislative period (binary variable *Additional Legislator (New to parliament=0)*). We include the two variables in the regression. Constituencies with only one legislator form the reference category, as before. In columns (1) and (2) of Table 5, the point estimates of the coefficient referring to the group of constituencies with additional legislators who are new to parliament is not statistically different from zero and its magnitude is close to zero. In contrast, positive effects from additional legislators emerge in constituencies with more experienced legislators. Similar results are obtained when employing two indicators to construct subgroups by age of legislators (not reported). These findings suggest that constituencies' advantages of additional representation stem from additional legislators with more experience in the *Bundestag*.

In columns (3) and (4), we concentrate on the legislators' place of residence (e.g. Maaser and Stratmann 2016). The results suggest that legislators who also live in constituency where they were elected (*Additional Legislator (Residence=1)*) are more engaged in securing federal resources in comparison to constituencies which have legislators who ran there as candidates but do not live there (*Additional Legislator (Residence=0)*). Birthplace as a proxy for local ties yields similar results (not reported). This is consistent with the view that legislators who also live in the constituency where they run for direct election are tied more closely to the constituency for personal reasons (Gschwend et al 2009; Maaser and Stratmann 2016; Önder et al. 2018).

	(1) Federal Civil Servants p.c.	(2) Federal Employees p.c	(3) Federal Civil Servants p.c	(4) Federal Employees p.c.	(5) Federal Civil Servants p.c.	(6) Federal Employees p.c.	(7) Federal Civil Servants p.c.	(8) Federal Employees p.c.	(9) Federal Civil Servants p.c.	(10) Federal Employees p.c.
Additional Legislator (New to parliament=1)	0.016	0.015								
	(0.195)	(0.054)								
Additional Legislator (New to parliament=0)	0.242**	0.076**								
	(0.117)	(0.037)								
Additional Legislator (Residence=0)			0.008	0.010						
			(0.138)	(0.041)						
Additional Legislator (Residence=1)			0.254*	0.080**						
			(0.132)	(0.040)						
Additional Legislator (Party in government=0)					0.238*	0.051				
					(0.139)	(0.042)				
Additional Legislator (Party in government=1)					0.213*	0.098***				
					(0.106)	(0.037)				
Additional Legislator (Vote margin<=2.5%)							0.084	0.137**		
							(0.164)	(0.069)		
Additional Legislator (Vote margin>2.5%)							0.246*	0.063		
							(0.129)	(0.041)		
Additional Legislator (Represented by both legislators from CDU/CSU and SPD)									0.295**	0.092**
									(0.143)	(0.043)
Additional Legislator (Not represented by both legislators from CDU/CSU and SPD)									0.052	0.021
									(0.110)	(0.039)
District time variant controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Personal characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constituency Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.13	0.22	0.13	0.22	0.13	0.22	0.13	0.22	0.13	0.22
#Observations	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375	1,375
# Constituencies	478	478	478	478	478	478	478	478	478	478

Notes: Notes: The regressions estimate the baseline model including district time variant controls and personal characteristics and recoding the variable *Additional Legislator* to reflect the subgroups according to several characteristics. District time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Political controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority_Avg*) and place of residence (*Residence*). In all regressions we employ constituency and time fixed effects. Standard error estimates are clustered at the constituency level and reported in parentheses. Significance levels are indicated by *p<0.1; **p<0.05; ***p<0.01

Table 5: Exploring mechanisms and the heterogeneity of the effect of additional legislators

Results from column (5) and (6) show no unequivocal results when considering whether constituencies are represented by additional legislators from parties in government. Both constituencies with additional legislators from parties in government (*Additional Legislator (Party in government=1)*) and constituencies with additional legislators from the opposition (*Additional Legislator (Party in government=0)*) see more federal funds allocated to them. This suggests that geographical representation incentives of legislators from opposition parties in view of the next election are relevant.

Narrow direct elections might incentivize legislators to focus more on their constituency to improve future election prospects. Empirically, there are no substantial differences between constituencies with additional legislators and a narrow margin (*Additional Legislator (Vote margin<=2.5%)*) and those who won with a wider margin (*Additional Legislator (Vote margin>2.5%)*) according to specification (7) and (8). However, a more apt measure for competition in the German institutional setting is actually the simultaneous representation of a constituency by legislators from the Christian conservative parties (CDU/CSU) and the social democrats (SPD) who both usually had the most chances of winning pluralities in a constituency in the past (see Frank and Stadelmann 2019). Thus, it may pay off for candidates from these parties to target their constituencies. Indeed, results from columns (9) and (10) show point estimates significantly different from zero for additional legislators for constituencies from the treatment group represented by both CDU/CSU and SPD legislators. In contrast, there is no effect for constituencies that obtained additional legislators from smaller parties in comparison to constituencies with only one directly elected legislator.

V. CONCLUSIONS

We analyze differences in political representation of constituencies arising from the German mixed-member electoral system and investigate their impact on the allocation of federal resources. We argue that the allocation of additional legislators to constituencies from the closed party lists is exogenous to the constituencies. This allows us to identify the effect of an increase in the number of legislators per constituency on the allocation of federal resources, i.e. we provide a test for the original *law of 1/n*. In our sample of 1,375 constituencies from 1998 and 2017, we find that more federal civil servants are employed in constituencies with more than one legislator in the *Bundestag*. Quantitatively, having more than one legislator per constituency leads to an increase of 0.22 civil servants per thousand inhabitants or roughly 37

civil servants in absolute numbers. The magnitude of the effect corresponds closely to anecdotal evidence from German federal politicians who advertise their success in targeting federal funds in newspapers and on their websites.

Our result highlights the relevance of political representation for the allocation of public resources and the fiscal commons (Jennes and Persyn 2015; Maaser and Stratmann 2016). It is fully consistent with the *law of 1/n*, i.e. that public expenditures increase in legislature size (Weingast et. al 1981; Schaltegger and Feld 2009; Egger and Köthenbürger 2010). This empirical result is robust to numerous sensitivity checks. Placebo tests reveal that additional federal legislators cannot affect expenditures outside of their power. Moreover, experienced legislators as well as legislators from larger parties that compete for a direct seat in the constituency are likely to gain more federal resources for their constituency.

Our analysis points to many research avenues. Mixed-member electoral systems exist around the world. Depending on the institutional framework, legislators that enter parliament through party lists often have incentives to cater for their constituency. Thus, our identification strategy might be applied in other countries. Furthermore, our setting suggests that usually cumbersome contamination effects (Herron and Nishikawa 2001; Ferrera et al. 2005) of mixed-member electoral systems may be advantageously leveraged for alternative research questions. Since additional legislators who enter parliament through the party lists are elected by proportional rule, we should only find a positive result if they cater for their constituency similarly to legislators elected by plurality rule. Alternatively, the directly elected legislators might have even more incentives to cater for their constituency when facing competition of elected legislators from the same constituency. As mixed-member electoral systems can be frequently found in practice, applications of theoretical predictions which suggest differences between (pure) majoritarian and proportional systems need to be contrasted to the actual electoral system in place and complex incentives to be taken into account. All this provides numerous interesting opportunities for future research.

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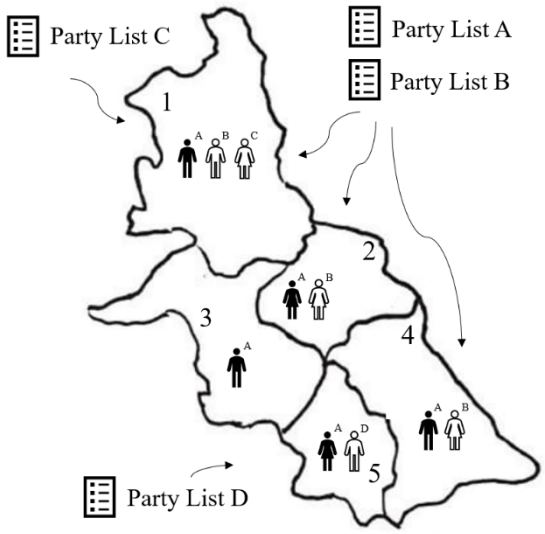
APPENDIX – SUPPLEMENTARY INFORMATION
(Intended for online publication only)

Appendix A: Illustration of the allocation legislators to constituencies

Figure A1 shows a fictive German state that consists of five constituencies. Party A is the most successful party in the state. Suppose it obtained 50% of the second vote shares and it also wins all district races, i.e. all district direct candidates were elected with a plurality. As overall representation in the state needs to be proportional according to the German electoral system, the number of seats in parliament that party A obtains only corresponds to its five district winners. Hence, party A neither sends additional legislators from the party list to parliament nor does it profits from excess seats. All other parties do *not* win a direct constituency seat. However, their share of second votes (30% for Party B; 10% for Party C and D) allows them to send candidates from their respective lists to the *Bundestag*. In our example, all concerned candidates lost their district race but receive a seat through a high rank on their party lists. Since parties are permitted to nominate just one candidate for direct election, there can only be one additional representative per district and party. Party B is the second most successful party according to the share of second votes. The first three positions on its list are occupied by its district race losers from the constituency 1, 2, and 4. Constituency 1 receives another legislator from party C, whereas the candidate of party D ran in constituency 5 and got elected through the party list. This illustrates a possible allocation of candidates leading to representation asymmetries. While four constituencies are treated with additional legislators next to their directly elected candidates, one district is left only with the direct candidate.



	Vote Shares	Direct Mandates	List Mandates
Party A	50%		
Party B	30%		
Party C	10%		
Party D	10%		

Figure A1: Illustration of the allocation legislators to constituencies

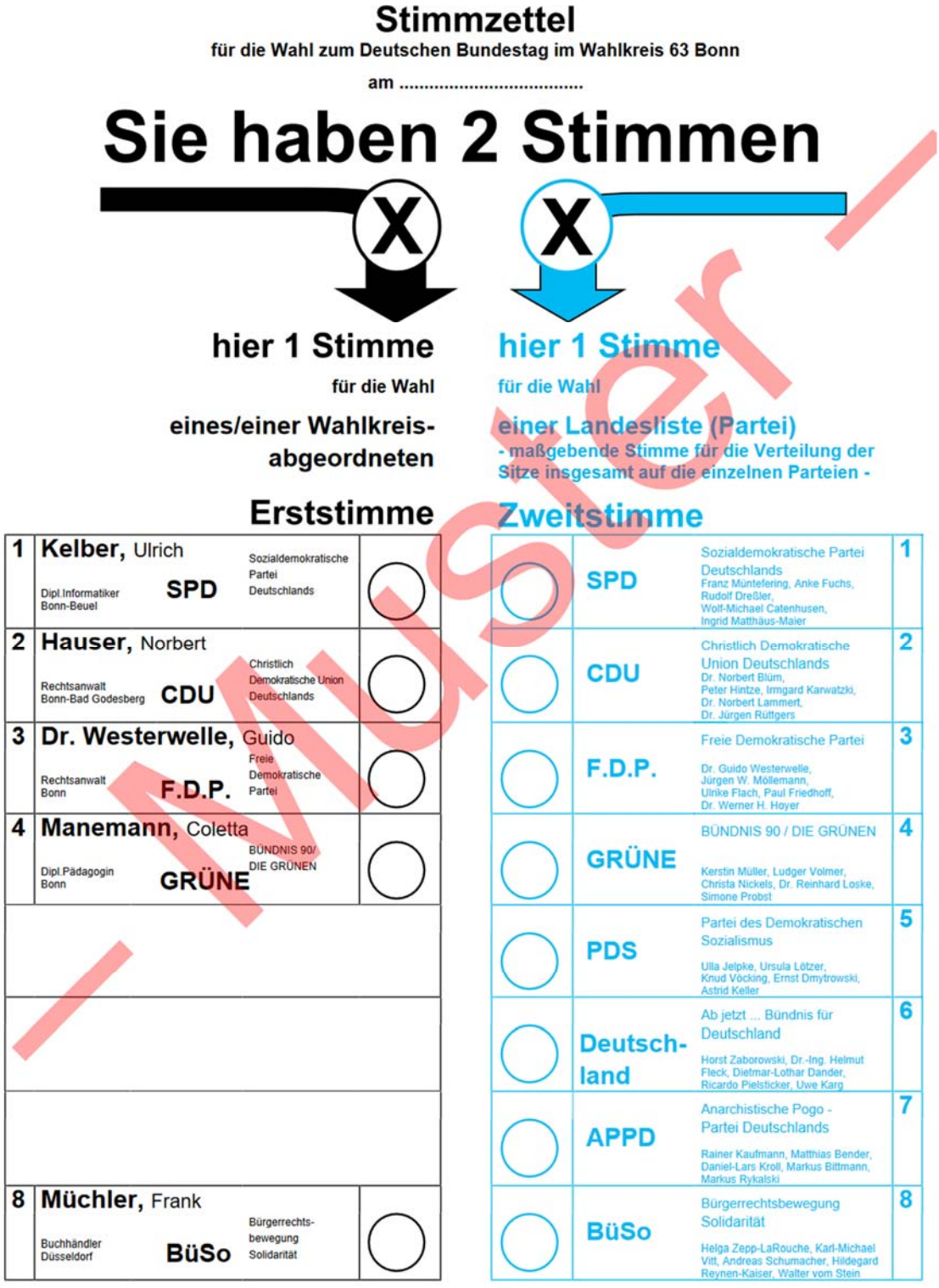


Figure A2: Typical ballot paper for a federal election from the *Bundeswahlordnung, Anhang 26*. In the first column, voters give their "first vote" ("Erststimme") for a direct candidate in their constituency. In the second column, voters give their "second vote" ("Zweitstimme") for the closed party list at the state level.

Appendix B: Merging statistical districts to electoral constituencies

Subsequent to the German reunification, the number of constituencies was reduced from 326 constituencies to 299 in 2002. The number of constituencies in each state is linked to its population size and a single constituency is not legally allowed to differ more than 25 percent from the average constituency's population size (see § 3 Absatz 1 Satz 1 Nummern 2, 3 und 5 BWG). Demographic developments lead to changes in the number of constituencies (e.g. Thuringia lost one constituency to Bavaria in 2005. In 2009, Lower Saxony and Baden-Wuerttemberg each received one constituency from Saxony and Saxony-Anhalt. Mecklenburg-Western Pomerania transferred one constituency to Hesse in 2013).

Constituencies do not always coincide with the boundaries of underlying statistical districts. Consequently, the following constituency forms can be observed:

1. The constituency exactly contains one whole statistical district and boundaries coincide.
2. The constituency contains more than one whole statistical districts and boundaries coincide.
3. The constituency contains at least one whole statistical and at least one statistical district that is split between more constituencies. Hence boundaries do not fully coincide.
4. The constituency contains at least one statistical district that is split between more constituencies. Hence boundaries do not fully coincide.

All our control variables are finally expressed in terms of population (per thousand). When merging statistical districts to constituencies, we add all statistical districts that are completely and partly within the constituency and divide it by the number of statistical districts. Thereby, we get an average value of all statistical districts that are included in the constituency. Some constituency information is missing due to lacks in regional data in some eastern German states prior to their respective district reforms.

Large district-free cities such as Berlin are divided into several constituencies. The corresponding district data from the *Federal Statistical Office* is provided for these cities as whole units. We divide data from these statistical districts by the number of constituencies they consist of and check for robustness to show that their exclusion does not affect our main results.

We run robustness tests where we only include constituencies where boundaries coincide.

Variable	Description	Source	N	Mean	SD	Min	Max
Additional Legislator (treatment)	=1 if constituency is represented by at least two legislators; =0 otherwise	Bundestag website	1,375	0.72	0.45	0	1
Act Local Experience	=1 if more than 50% of constituency's legislator is mayor or currently holds a post in a local subdistrict or district council; =0 otherwise	Kürschners Volkshandbuch. own calculations	1,375	0.18	0.39	0	1
Age	Average age of the constituency's legislators	Kürschners Volkshandbuch. own calculations	1,375	49.78	7.30	26	69
Birth	=1 if more than 50% of constituency's representatives are born in the constituency; 0 otherwise	Kürschners Volkshandbuch. own calculations	1,375	0.26	0.44	0	1
City	=1 if electoral constituency is or contains at least one district-free city; =0 otherwise	Kürschners Volkshandbuch. own calculations	1,375	0.48	0.50	0	1
Committee_*Topic*	=1 if constituency is represented by at least one parliamentarian in a committee including the topics defense, interior, agriculture and infrastructure; =0 otherwise	Bundestag website					
Density	Population per square kilometer	Regional Statistics, own calculations	1,375	718.38	1098.73	17.31	4660.58
Doctorate	=1 if more than 50% of constituency's representatives have a doctoral degree; =0 otherwise	Kürschners Volkshandbuch. own calculations	1,375	0.08	0.27	0	1

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Variable	Description	Source	N	Mean	SD	Min	Max
Federal Civil Servants	Federal civil servants	Regional Statistics	1,375	1,079.84	1,624.94	0	21350
Federal Employees	Federal employees	Regional Statistics	1,375	258.16	524.45	0	8007.50
Federal Officials	Federal officials and judges	Regional Statistics	1,375	761.05	1,081.99	0	13025.75
Female	=1 more than 50% of all legislators from one constituency are female; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.17	0.37	0	1
GDPPC	Gross domestic product per capita (output side) deflated to 2010 Euros	Regional Statistics, own calculations	1,375	31,770	12076	15591	92053
Local Party	=1 more than 50% of constituency's legislators hold a party position at the local level (i.e. chairman or vice chairman of the local, city, regional, subconstituency or constituency group); =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.43	0.50	0	1
Margin	=1 if the difference of the direct vote share of the two first-placed candidates in a constituency is less than 2.5 percentage points; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.12	0.32	0	1
Nation Office	=1 if at least one legislator of all legislators in one constituency collected political experience at the federal level in previous legislative periods (junior minister; minister, chancellor); =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.10	0.31	0	1
Only district candidate	=1 if constituency winner didn't run for election via state list; 0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.15	0.35	0	1

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Variable	Description	Source	N	Mean	SD	Min	Max
Minister	=1 if constituency is represented by at least one legislator who is actual member of government	Kürschners Volkshandbuch, own calculations	1,375	0.04	0.26	0	1
Municipal Civil Servants	Municipal civil servants	Regional Statistics	1,272	2,575.13	1,738.28	530	18585
Municipal Employees	Municipal Employees	Regional Statistics	1,272	1,837.11	1,208.44	225.44	11,262.75
Municipal Officials	Municipal Officials	Regional Statistics	1,272	501.77	456.64	48.33	2909.5
Nation Party	=1 if more than 50% of constituency's legislators hold a party position at the national level (i.e. chairman or vice chairman of the party, board member, presidium member, secretary general); =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.04	0.19	0	1
Party in Government	=1 if more than 50% of all legislators from one constituency are from a party in government; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.47	0.50	0	1
Past Local Experience	=1 if more than 50% of constituency's legislators was mayor or held a post in a local subconstituency or constituency council in the past; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.54	0.49	0	1
Rank 3	=1 if more than 50% of constituency's legislators are positioned among the first three places on the state list; =0 otherwise	Bergmann et al. (2018), own calculations	1,375	0.12	0.32	0	1
Residence	=1 if more than 50% of all legislators from one constituency state their main residence to be located in the constituency; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.84	0.36	0	1
Right	=1 if more than 50% of all legislators from one constituency are member of conservative-liberal parties (CDU, CSU, FDP); =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.27	0.44	0	1

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Variable	Description	Source	N	Mean	SD	Min	Max
School	=1 if more than 50% of the constituency's legislators graduated from school in the respective constituency	Kürschners Volkshandbuch, own calculations	1,375	0.51	0.50	0	1
Seniority	Average seniority of the constituency's parliamentarians	Kürschners Volkshandbuch, own calculations	1,375	2.94	1.44	1	9
State Civil Servants	State civil servants	Regional Statistics	1,272	3,728.19	3,261.29	525.17	32712
State Employees	State employees	Regional Statistics	1,272	1,035.25	1,437.51	51.13	14,218.33
State Office	=1 if at least one of the constituency's legislators has political experience from a state parliament or held a post as chancellor or minister in past legislative periods at the state level; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.10	0.31	0	1
State Officials	State Officials	Regional Statistics	1,272	2,614.03	1,908.37	356.58	18,025.75
State Party	=1 if more than 50% of constituency's legislators hold a party position at the state level (i.e. chairman or vice chairman of the state group, board member, presidium member, secretary general); =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.10	0.31	0	1
UnemplPC	Unemployed persons per 1000 people	Regional Statistics	1,375	40.43	17.27	11.95	123.14
Youth Organization	=1 if more than 50% of constituency's legislators were or are active in the respective party's youth organization; =0 otherwise	Kürschners Volkshandbuch, own calculations	1,375	0.25	0.44	0	1

Table A2: Description of data, sources and summary statistics

Proportional selection assumption	$\tilde{\delta} = 0.5$	$\tilde{\delta} = 0.75$	$\tilde{\delta} = 1$
	District fixed effects included in baseline		
Uncontrolled $\dot{\beta}_1$	0.237	0.237	0.237
Controlled $\tilde{\beta}_1$	0.227	0.227	0.227
Uncontrolled $\dot{R}^2$	0.01	0.01	0.01
Controlled $\tilde{R}^2$	0.13	0.13	0.13
Time fixed effects	No	No	No
Identified set [$\beta_1^{*\prime}, \tilde{\beta}_1$]	[0.191, 0.227]	[0.173, 0.227]	[0.155, 0.227]
Zero excluded from identified set?	Yes	Yes	Yes

Notes: We analyze changes in the coefficient of the *Additional Legislator* variable when adding constituency time variant controls and personal characteristics control to two baseline specifications, including district fixed effects, and district fixed effects as well as time fixed effects, respectively. The respective point estimates and R^2 can be found in Table A4 in the Appendix. The uncontrolled $\dot{\beta}_1$ and $\dot{R}^2$ are shown in row (1) and (2). row (3) provide the controlled $\tilde{\beta}_1$ and $\dot{R}^2$. The bias-adjusted $\beta_1^{*\prime}$ is the lower bound of the identified set and is calculated by solving $\beta_1^{*\prime} = \tilde{\beta}_1 - \tilde{\delta}\frac{(\dot{\beta}_1 - \tilde{\beta}_1)(R_{max} - \tilde{R})}{(\tilde{R} - \dot{R})}$. We use three different degrees of selection on unobservables $\tilde{\delta} = \{0.5, 0.75, 1\}$ a consistently assume $R_{max} = 1$. The identified set never includes zero which suggests robustness of the results with regard to endogeneity problems from omitted variables.

Table A3: Test for selection on unobservables regarding the effect of additional legislators on federal resources

	(1) Federal civil servants p.c.	(2) Federal civil servants p.c.	(3) Federal civil servants p.c.
Additional Legislator (treatment)	0.237** (0.111)	0.220** (0.108)	0.227* (0.116)
Constituency time variant controls	No	No	Yes
Personal characteristics controls	No	No	Yes
Time Fixed Effects	No	Yes	Yes
Constituency Fixed Effects	Yes	Yes	Yes
R-squared	0.01	0.11	0.13
#Observations	1,375	1,375	1,375
# Constituencies	478	478	478

Notes: The dependent variables and constituency time variant controls in per 1,000 people values. Constituency time variant controls include gross domestic product per capita (*GDPPC*), population density (*Density*) and the number of unemployed per capita (*UnemplPC*). Personal characteristics controls include gender (*Female*), age (*Age*), vote margin (*Margin*), Seniority (*Seniority_Avg*) and Residence (*Residence*). Standard error estimates are clustered at the constituency level and reported in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Estimations yielding coefficients and R^2 for robustness tests following Oster (2017) in Table A3