Party selectors, voters, and the choice of productive representatives under different types of list proportional representation

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Party selectors, voters, and the choice of productive representatives under different types of list proportional representation[*]

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Abstract

Do party selectors or voters choose more productive politicians? Selectors may promote quality candidates and have an informational advantage over voters, but quality need not be the key criterion for nominations, and voters may be sufficiently informed to correct inferior decisions. We empirically examine whether the type of principal responsible for the selection affects individual parliamentary work (attendance, bills, amendments, questions, speeches). Flexible-list proportional representation systems are both interesting and analytically useful in this context, since seats within parties are first allocated to candidates reaching a certain number of personal votes, while any remaining seats are awarded based on the pre-electoral list rank. This allows us to compare three types of elected candidates: selector-chosen, voter-chosen, and doubly-chosen representatives. Analysing data from the Czech Republic in the period between 2002 and 2021, we find that voters have a stronger preference for candidates with high formal education than selectors. We do not find differences in parliamentary behaviour between selector-chosen and voter-chosen types. The results speak against a potential trade-off between giving voters more influence on within-party seat allocation and the quality of chosen representatives.

Keywords: list proportional representation, political selection, ballot structure, preference voting, candidate selection, flexible-list system, parliamentary behaviour

1   Introduction

A key function of elections is the choice of political personnel. From a principal–agent perspective, citizens delegate decision-making to representatives by means of voting. It is, therefore, important to ask to what extent elections succeed in selecting good types of politicians ex ante and in incentivising them to do good work ex post (Fearon, 1999; Besley, 2007; Dal Bó and Finan, 2018; Carroll and Nalepa, 2020). An obvious follow-up question is whether the specific rules for conducting such elections influence the occurrence of adverse selection and moral hazard problems (Braendle, 2016). It is well-known that electoral systems decide on the relative influence of party selectors and voters in choosing representatives (Carey, 2007; Buisseret and Prato, 2022; Däubler, 2022). As documented by Renwick and Pilet (2016), citizens' influence on the within-party allocation of seats has considerably increased in European political systems in recent decades. This raises the question whether the gain in choice and voice for voters could be offset by negative effects on parliamentary work by the representatives they select. This would be the case, for example, if party actors with incentives to promote good candidates lose their influence to voters who are poorly informed or prefer candidates with features that are not conducive to parliamentary work.

Most of the existing literature addressing electoral system effects on political selection either focuses on the difference between majoritarian elections with single-seat districts and elections held under proportional representation (PR) (e.g., Galasso and Nannicini, 2011; Becher and Menéndez González, 2019), or studies key trade-offs within a certain type of list PR (e.g., Galasso and Nannicini, 2015; Buisseret et al., 2022). How different forms of ballot structure affect political selection in list PR has received little attention. Papagni et al. (2023) compare closed-list PR (where only the pre-electoral party ranking matters) to fully-open-list PR (where citizens' preference votes alone decide). Our interest is similar, but we focus on the intermediary class of flexible-list PR, which is common throughout Europe.[1] In this system, parties present ranked lists of candidates and voters can express preferences for individual

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[1] For example, in the 2014 European Parliament election, nine out of 29 polities used such a system: Austria, Belgium, Bulgaria, Croatia, Czech Republic, Netherlands, Slovakia, Slovenia, and Sweden (Däubler et al., 2022: 359).

candidates. Candidates with a certain number of preference votes are moved to the top of the list and may win a seat instead of competitors who were preferred by the selectors. In practice, some MPs are selected by the party, some by the voters, and others by both groups. This allows us to examine political selection effects within the same legislative period empirically.

Existing research on the effects of electoral systems on the quality of selected politicians mostly relies on personal characteristics like education or occupation (e.g., Papagni et al., 2023 on ballot structure; for more general overviews see Braendle, 2016; Dal Bó and Finan, 2018). While we describe the distribution of such background variables in a first step of our analyses, we are mainly interested in the link between the selecting principal and the eventual parliamentary output. In this context, personal characteristics play a role as input factors in the production function.

The empirical analysis examines the selection of MPs and its effect on parliamentary productivity in the Czech Republic and proceeds in three steps. First, introducing a new and more nuanced classification of MPs elected in flexible-list systems, we tally and compare four types of candidates from the national parliamentary elections between 2002 and 2021: MPs chosen by both party selectors and voters (accounting for 68% of MPs); MPs chosen by selectors only (19%); MPs chosen by voters only (13%), plus the de-selected candidates losing out to the previous group. We find that, in comparison with selectors, voters prefer politicians with higher formal education and are less supportive of businesspeople. Second, we use regression models to estimate how observed characteristics and any unobserved factors shared among types affect the parliamentary work (attendance, bills, amendments, questions, speeches) of the three types of actually elected MPs (for the 2010–13 and 2013–17 parliaments). This analysis suggests that there are no differences between MPs chosen by selectors only and those chosen by voters only. Third, starting from the observed election results, we identify the set of MPs who would have been elected under alternative electoral rules using closed or fully-open (ranked) lists and use a regression-based simulation to predict the output for the resulting counterfactual parliaments (Eggers and Lauderdale, 2016). We conclude that the output profiles would hardly change if the types of list used were different.

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This paper contributes to the broader debate about how electoral systems affect political selection. In line with Papagni et al. (2023), we find that voters choose more highly educated candidates than selectors, but in terms of the eventual scope of parliamentary output there are no differences. We believe there is a more general lesson to be drawn from these patterns. Not only is the quality of representatives a difficult and multi-dimensional concept (Braendle, 2016; Dal Bó et al., 2017). Preferences of selectors and voters can differ with regard to many candidate characteristics, and these may combine very differently in the production of final outputs. Finally, with regard to the practical consequences of giving voters more influence on within-party seat allocation, our results are good news. As it stands, we cannot find any evidence that this process comes at the expense of electing less educated or less productive MPs.

The remainder of this paper is organised as follows. Section 2 briefly reviews related literature, before Section 3 outlines the theoretical arguments. The institutional context is described in Section 4, the data and methodology in Section 5. Section 6 presents the empirical results and Section 7 concludes.

2   Related literature: Electoral systems and political selection

The topic of political selection has recently received much interest (for reviews see Braendle, 2016; Dal Bó and Finan, 2018). A large part of the work addressing the role of electoral systems therein focuses on the difference between majoritarian elections with single-seat districts and elections held under PR.[2] For example, the theoretical model by Galasso and Nannicini (2017) shows that majoritarian systems perform better at selecting good quality politicians than PR systems if their share of competitive districts is sufficiently (but not excessively) high. Empirically, the same authors provide evidence that Italian parties nominate better candidates in more competitive single-seat districts (Galasso and Nannicini, 2011; see also Gagliarducci et al., 2011; Gavoille and Verschelde, 2017). Similarly, Becher and

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[2] Another branch of work studies key trade-offs that characterise a certain type of list PR. For example, Galasso and Nannicini (2015) study party leaders' decisions about where to rank loyal candidates versus 'expert' candidates (who are popular with voters) on closed lists (see also Buisseret et al., 2022).

Menéndez González (2019) show that majoritarian systems select better politicians albeit at the expense of policy representation.[3]

In contrast, this paper focuses on the consequences of different types of list-based PR. The ballot structure has a direct impact on the nature of political selection. If lists are closed, the post-electoral allocation of seats within parties is based on list ranks assigned by party selectors before the election. When lists are fully open, citizens' preference votes decide on which candidates from a party will take seats. Flexible lists are a hybrid form that specify list ranks as the default order for intra-party seat allocation, but candidates with a certain number of preference votes can 'jump the queue' (Renwick and Pilet, 2016: 26–28). From the perspective of a competing principals framework (Hix, 2002; Carey, 2007; Sieberer and Ohmura, 2021), the list type shapes the relative influence of party selectors and voters (Buisseret and Prato, 2022; Däubler, 2022).

Independently, but similar to us, Papagni et al. (2023) argue that the effect of ballot structure on the quality of politicians is theoretically ambiguous. Their empirical evidence from electoral system change in Italy suggests that a switch from open to closed lists caused the election of politicians with lower educational attainment. The authors attribute this to voters' rather than selectors' behaviour, but can only indirectly test this, since they lack data on the background of unsuccessful candidates. Hangartner et al. (2019) emphasise the supply side, showing that Colombian parties, which can choose between fielding open or closed lists, can use the former to attract better candidates who run for them.

Our focus is on flexible-list systems, in which parties present ranked lists, but voters can express preferences for individual candidates. If candidates garner enough preference votes (rules often specify a threshold as a percentage of the total list vote), they by-pass competitors who were preferred by the selectors. Hence, candidates can be elected 'out of order', although their list rank would not have been sufficient given the number of seats the party has won (Renwick and Pilet, 2016; Däubler et al., 2022;

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[3] Crutzen and Sahuguet (2023) examine the interplay of the competitiveness of the candidate selection process and these two types of electoral systems for candidates' campaign effort.

Smrek, 2023). This phenomenon of 'jumping the queue' given by list positions has received some attention in the political science literature, but these studies are either descriptive or have a focus different than ours. Its prevalence is documented by Renwick and Pilet (2016: 240–47) for national elections in western and eastern European countries and by Däubler et al. (2022: 13) for European Parliament elections. Obtaining a seat exclusively due to preference votes is not the typical outcome, but rates above 10% in many elections and values around 40% typical for recent European Parliament elections in Italy are not negligible.[4] Similar to our paper, Smrek (2023) examines the parliamentary behaviour of 'ballot jumpers' in the Czech Chamber of Deputies, albeit with a different focus.[5] That study is mainly interested in whether MPs whose election is due to preference votes show behaviour that is independent of their party, e.g., by voting differently from its majority, and it concludes that they do not.[6] What our study adds to the literature on flexible-list systems in particular is the argument that instead of contrasting 'ballot jumpers' with other MPs, we should distinguish *three* types of actually elected MPs: those chosen by the party selectors only, those chosen by the voters only, and those chosen by both. And, if we want to assess the impact of the list type by means of political selection, we should use the correct counterfactuals about which of these three types would be elected under different rules.

Studying how political selection affects the quality of elected representatives raises the challenging question of how to define and measure the outcome. Many existing studies use what may be considered proxy measures of ex ante quality, such as "education, previous income, occupational background, and previous political experience" (Braendle, 2016: 206), but it may be more appropriate to consider quality as multi-dimensional (Dal Bó et al., 2017). We consider observed ex ante quality measures, too, but we are particularly interested in how these factors combine in the production of parliamentary output.

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[4] Similar analyses are also possible if lists are fully open but nevertheless ranked; see Gendźwiłł and Marcinkiewicz (2019) on subnational elections in Poland.

[5] Dvořák (2023) compares the actual composition of the Czech parliament to the one that would have been obtained under a closed-list system on a large number of variables.

[6] Two models in Smrek (2023) also consider legislative activities. Ballot jumpers initiate or sponsor more bills than other MPs, while there is no difference when it comes to asking parliamentary questions.

3   Theoretical arguments: Selectors, voters and MPs' parliamentary productivity

Our interest lies in whether the principal who selected an MP makes a difference for the agent's subsequent parliamentary behaviour. The latter is approached from an output-oriented perspective, considering the attendance record and how many activities MPs engage in.[7] The question then becomes whether MPs who owe their election exclusively to preference votes are more or less productive than those who are chosen on the basis of their list position only, with those who are chosen by both party selectors and voters as a third category.

In line with the wider literature on political selection, we understand parliamentary activities as products that result from competence and motivation (Caselli and Morelli, 2004; Besley, 2007; Gavoille and Verschelde, 2017).[8] Observable skills (e.g., formal education, a certain professional background, prior experience as an MP) may in some cases be substituted and in others complemented by motivation. There are multiple forms of parliamentary output, and the production function differs across activities. For example, different inputs are likely required for drafting a bill than for asking a question to a minister.[9] The two principals – selectors and voters – may differ with regard to two aspects. First, they can have different preferences, both over MPs' characteristics (the input factors) and over the eventual outputs. Second, the two principals may differ in the amount of information they have, both about whether politicians possess these input factors and about how inputs map to outputs.

Starting from these considerations, we suggest that there are two stylised theoretical perspectives on how the influence of the two principals affects parliamentary output. From the first theoretical perspective, whose basic notion centres on *quality-promoting selectorates*, we would expect that MPs chosen by party selectors (only) are more productive than MPs chosen by voters (only). First, between-

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[7] From a slightly different angle, this could also be seen as an examination of whether the nature of selection affects 'leisure shirking' by MPs (e.g., Gagliarducci et al., 2011, Bernecker, 2014; Frank and Stadelmann, 2017).

[8] There could also be additional input factors like access to information and networks.

[9] This is, for example, reflected in the findings by Pemstein et al. (2015: 1426–27), who show that Members of the European Parliament with prior experience in this legislature author more reports and motions but ask fewer questions and give fewer speeches than their first-term colleagues.

party competition creates incentives to run candidates who are popular or able to garner votes. As long as features that facilitate parliamentary activity are either directly attractive to voters or correlate with other characteristics that voters like, this should contribute to the nomination of productive candidates to promising list positions. Second, independent of such electoral incentives, parties may have a general interest in nominating candidates who will be active in parliament if elected from the top list positions. If MPs' parliamentary work helps parties achieve electoral or policy-related goals, party selectors have an interest to promote candidates who will work hard in parliament (Louwerse and van Vonno, 2022). This applies both to parties that can expect to hold executive positions and to others (Buisseret et al., 2022). It is also compatible with the notion that high-quality high-ranked candidates exert campaign effort in exchange for promotion to governmental office (Cox et al., 2021). An additional requirement should also be fulfilled: party selectors should possess sufficient information to judge which skills are relevant and which politicians have proven to be motivated.

If party selectors can be expected to promote quality candidates, one may be sceptical about voters interfering with the party-decided ranking, for two reasons. First, it is possible that voters in principle equally value MPs who are productive or who possess characteristics conducive to producing output, but in comparison with party selectors suffer an informational disadvantage (André et al., 2014: 240–43). Citizens may have more difficulties assessing which skills are relevant for being a good MP, whether candidates indeed possess these, or which politicians are more motivated than others. Second, citizens may have different preferences altogether. For example, they could favour MPs who engage in constituency service or bring home material benefits to those politicians who do arduous work in parliamentary committees. Candidates who are good campaigners and can attract votes, e.g., through personal contact or communication on social media, need not be those who will eventually work hard in parliament (Bowler et al., 2020). In practice, citizens also often rely on cues such as the reputation of a candidate's occupation (Mechtel, 2014) or characteristics that they share with a candidate, like gender or place of residence (e.g., Van Erkel, 2019; Coufalová et al., 2023). **Overall, the *quality-promoting parties perspective* thus suggests that MPs chosen by party selectors only will be more productive MPs than those favoured by voters only.**

In contrast, the *inferiority-correcting voters perspective* starts from the notion that parties may often have incentives not to promote the best candidates, while voters know (and care) enough to take remedial action. A first reason why party selectors may not assign the best list positions to high-performing candidates is current insiders' fear of replacement (Besley et al., 2017; Becher and Menéndez González, 2019). A second reason lies in trade-offs with other candidate features that party selectors value, such as loyalty (Galasso and Nannicini, 2015, 2017), ideological congruence (Serra, 2011), local ties (Latner and McGann, 2005; Shugart et al., 2005), or a certain gender (Verge and Wiesehomeier, 2019). Parties may also adhere to norms of incumbent renomination or seniority progression, regardless of the quality of candidates (Cirone et al., 2021). In addition, when deciding on list nominations, party selectors may have an eye on the aggregate balance, for example in terms of gender or the geographical distribution of candidates within the district (Latner and McGann, 2005). A third reason has to do with who actually makes up the group of party selectors. If it is the national party leadership, it is plausible that the expected performance of MPs plays a role. If the party selectorate is decentralised or more inclusive (Rahat and Hazan, 2001), preferences may differ, and, e.g., local concerns may trump future parliamentary performance. A decentralised nomination process may also exacerbate the first mechanism from above, since high-quality MPs may pose a within-party threat to *local* party leaders.

This second view implies that party selectors assign candidates of inferior quality to promising list ranks, but it is conceivable that voters counteract these nominations by giving preference votes to candidates who will be productive MPs. Citizens may either indirectly value candidate characteristics (observable skills) that are factors in producing parliamentary output, or – in the case of re-running incumbents – may have observed their past behaviour as MPs.[10] While some formal skills or the motivation may be less well observable to voters, it is possible that voters are overall in a good enough position to choose productive MPs. Empirical evidence from Italy suggests that a switch from open to closed lists indeed caused the election of politicians with lower educational attainment (Papagni et al., 2023). **Overall, the**

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[10] This can be facilitated by the website of the parliament or online portals that provide overviews of politicians' records (like nasipolitici.cz in the Czech Republic).

inferiority-correcting voters perspective **therefore implies that MPs chosen by voters only will be more productive than those favoured by selectors only.**

We believe that both perspectives are plausible, and it is not straightforward to specify the conditions under which one of them would prevail over the other.[11] For example, the argument that more intense between-party competition incentivises parties to promote quality candidates (e.g., Galasso and Nannicini, 2011; Becher and Menéndez González, 2019) has been challenged on theoretical and empirical grounds (Buisseret et al., 2022). While examining scope conditions for either perspective is an important avenue for further research, our aim in this paper is more modest. In the empirical section we will examine the recent Czech experience to see whether the evidence favours one of the two perspectives *overall*.

4   Institutional context: Parliamentary elections and behaviour in the Czech Republic

Elections to the lower chamber of the Czech parliament are conducted using a flexible-list PR system with 200 MPs elected in 14 districts. The average district magnitude is 14 but with quite large variation. Typically, five to nine parties clear the nationwide 5% threshold, which implies that there are party lists with no more than one or two elected candidates, but also some (big parties in large districts like the capital Prague) that earn more than ten seats. Voluntary preferential voting with multiple preference votes was introduced in 1990, but the specific rules guiding matters such as the number of preferential votes and the threshold necessary for candidates to defy the order of list positions have changed several times (see Däubler et al., 2018). Since 2010, voters are allowed to cast a maximum of four preference votes and candidates' preference votes need to reach at least 5% of the number of ballots cast for their list to be moved to the top of the post-electoral ranking.

In a flexible-list system like the one used in the Czech Republic we can distinguish three types of actually elected MPs according to the principal who selected them:

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[11] In principle, it is possible that neither selectors nor voters value quality in candidates. In this case, the empirically observed degree of divergence in their choices would have to result from preferences for different features that are unrelated to parliamentary work or to selectors' misjudged anticipations of candidate popularity.

- voter-chosen MPs (who would not have been elected under a closed-list rule; with a list position lower than the first S ranks, where S is the number of seats the party has won, post-hoc);

- selector-chosen MPs (who would not have been elected under an open-list rule; with a list position within the first S ranks, but a preference vote rank below S); and

- doubly-chosen MPs (who would have been elected under both a closed-list and an open-list allocation rule).

Table 1 provides an example of intra-party seat allocation. The list received a total of 124,445 ballots, awarding it six seats in the allocation between parties. To be moved to the top of the list, a candidate needs to obtain a number of preference votes that equals 5% of the number of ballots, here 6,223 votes. There are three candidates above this threshold, but two of them are already at the top of the list anyway, making the candidate on list rank seven (H. Válková) with 5.84% the only one to jump the queue. Since H. Válková was listed below rank six on the list, she is a voter-selected MP. The three remaining seats are awarded on the basis of the list ranks to the candidates on list positions three to five (V. Adámková, P. Nacher, and R. Králíček). In a ranking purely based on preference votes, V. Adámková and P. Nacher, like M. Stropnický and R. Pelikán, are among the first six candidates, making them doubly-chosen MPs. In contrast, R. Králíček on list position five received only the 12th highest preference vote result and therefore is a selector-chosen MP. Finally, even though the party received six seats, the candidate number on list position six (M. Červíčková) was de-selected as a consequence of being overtaken by H. Válková. The fact that she received more preference votes than R. Králíček does not affect the allocation process, since her personal vote is below the threshold.

Table 1: Example of intra-party seat allocation and types of MPs (2017, Prague district, ANO party)
Number of ballots cast for list: 124,445; number of seats won: 6

List rank	Name	Personal votes		Vote rank	Post-electoral rank (5% threshold)	Elected	Type of MP or candidate
		N	In % of ballots				
1	Stropnický, Martin	18449	14.82	1	1	Yes	doubly-chosen
2	Pelikán, Robert	14699	11.81	2	2	Yes	doubly-chosen
3	Adámková, Věra	5064	4.06	4	4	Yes	doubly-chosen
4	Nacher, Patrik	4147	3.33	5	5	Yes	doubly-chosen
5	Králíček, Robert	1035	0.83	12	6	Yes	selector-chosen
6	Červíčková, Monika	1478	1.18	6	7	No	de-selected
7	Válková, Helena	7276	5.84	3	3	Yes	voter-chosen
8	Venhoda, Petr	754	0.60	14	8	No	
9–36	...	297 – 1376	0.23 – 1.10	7–36	9–36	No	

Source: Czech Statistical Office, www.volby.cz.

The rank of the candidates on the ballots is determined by the parties. There are significant differences in the candidate selection process among Czech major parties, with traditional parties (founded in the 1990s) on the one side and new parties on the other. Traditional parties usually have a four-layer structure with local, county, regional, and national organisations. All of these are involved in candidate selection: the local and county levels have a say in proposing candidates, the regional level decides upon the ranking of candidates, and the national level may overrule the choices for the positions on top of the list (Outlý and Prouza, 2009). More recently founded parties are heterogeneous, including when it comes to candidate selection. Some of them (like Greens and Pirates) have roots in civil society, are quite decentralised and allow all party members to be involved in the candidate selection process. Others (like ANO, SPD) were created by political entrepreneurs, are very centralised, and the party leader has a strong influence in candidate nomination and ordering (Hloušek et al., 2020).

The law requires candidate lists to be submitted to electoral authorities more than two months before elections. Parties usually finish the whole process around half a year before election, then post the lists on their websites, and present candidates in media and public events. Candidate lists are distributed in print to every eligible voter to their home address. Voters receive ballots at least three days, but usually

one or two weeks, before the election. In addition to the name, the ballot papers provide information on academic title(s), age, occupation, place of residence, and party membership (see Appendix A.1 for an example). This means that voters easily know already quite a lot about each candidate, and – in principle – also have the time to look for more information if they wish to do so.

Previous research on the electoral performance of individual candidates in Czech elections provides insights into the preferences of voters. High-ranked candidates, incumbent MPs, ministers, regional and local politicians, and university-educated candidates obtain more preference votes (Marcinkiewicz and Stegmaier, 2015; Coufalová and Mikula, 2023). In addition, female candidates receive more preferential votes than male candidates; however, if a woman occupies the first position, she receives fewer preferential votes than male candidates (Marcinkiewicz and Stegmaier, 2015: 80–83). In effect, female candidates have to rely more strongly on preference votes than on their list position (Stegmaier et al., 2014). Research focusing on Czech municipal election results (Svitáková and Šoltés, 2023) further shows that selectors and voters have divergent preferences when it comes to gender and occupation: parties prefer men and candidates with a law background, while voters prefer women and medical doctors (for similar results, see Jurajda and Münich, 2015). Candidate choice is also driven by social homophily effects, in the sense that voters choose candidates who resemble them in terms of socio-demographic characteristics (Coufalová et al., 2023).

The Czech lower chamber provides MPs with considerable leeway for pursuing individual activities. They have the right to sponsor bills, propose amendments, ask questions to government members and speak on the floor (Syllová et al., 2021). These personal activities constitute an important part of parliamentary work. MPs sponsor between 30 and 50% of all bills, and amendment activity at the committee stage is in the hands of individual MPs. Not that much is known about what explains variation in MPs' degree of activity. Hájek (2019) reports that women speak less frequently on the floor, while MPs with more parliamentary experience and a university education speak more often. Attendance at votes goes down with experience. Smrek (2023) finds that women and MPs with a college degree ask more parliamentary questions. Also, MPs elected from further down on the list are less active in terms

of bill initiation/sponsorship and parliamentary questions. Given the large number of factors influencing parliamentary work, it is important to take into account a wide range of MP characteristics when predicting the output of parliaments that would be elected under different rules.

5 Data and methodology

5.1 Data

The descriptive analysis of candidate features is based on results from the elections held between 2010 and 2021, while the analysis of parliamentary behaviour draws on data collected for two legislative periods (2010–13 and 2013–17). We consider exclusively the period after the preference vote reform that took effect in 2010, since it is possible that the reform not only changed the occurrence of MP types but also their characteristics. Data on election results and on candidate demographics come from the Czech Statistical Office. Information on parliamentary activities is provided on the website of the Chamber of Deputies.[12]

In terms of observable skills, we consider the following characteristics: prior experience in the national parliament (no experience, one term, two or more terms); higher education (none, BA or MA degree, doctorate); professional background (medical, law, business, politics, public sector, other);[13] current membership in sub-national parliament (regional assembly, municipal council). We also include the personal characteristics of gender as well as age (in decades, linear and squared). While we are mainly interested in the selection aspect of the principal–agent relationship, we need to adjust for variation in incentives. These are captured by a simulation-based probability that the party will lose the MP's seat to other parties (see Appendix A.3) and an indicator variable for being the only MP from a party in a district. Finally, we include a measure of the relative position of the candidate within the list, calculated as *1 – (list_position –1)/(list_length –1)*, which has a range between 0 for the lowest-ranked candidate

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[12] When modelling parliamentary behaviour, we consider MPs who were not cabinet members at the start of the legislative period and remained MPs for at least half of it. MPs who join the cabinet later or switch parties are considered up to the point when this happens. The count data regression models include an offset to adjust for varying mandate lengths.

[13] The professional background variable is coded on the basis of information provided on the ballot for the current and earlier elections. This also implies that the categories are not exclusive; e.g., an MP may have experience in both the medical sector and the political sector.

and 1 for the first-ranked candidate. Since we also adjust for electoral safety, this is meant to capture unobserved aspects of candidate quality if party selectors rank accordingly.

To measure the parliamentary output of individual MPs, we tally the following activities: legislative bills (single-authored bills and multi-author bills as first-named author); amendments to legislation (bills amended during their second reading); oral interpellations of ministers; speeches (oral contributions during debates of legislation); and participation in parliamentary voting (attended roll-call votes).[14]

5.2   Methodology

Our empirical analysis consists of three parts. We start by describing the prevalence of the different types of MPs (selector-chosen, voter-chosen and doubly-chosen) in recent Czech elections and how these groups vary with regard to observable characteristics. In the second part, we estimate the production functions that map MPs' observed skills (and unobserved factors shared by the different MP types) to parliamentary activities, using generalised linear regression models. We observe i politicians who (during their mandate as MP in legislature l of length m_{il}) engage in four parliamentary activities j (bills, amendments, oral interpellations, and speeches) and decide whether to participate in V_{il} votes. The outcome variables are counts of activities or the number of votes an MP participated in. We model the systematic part as

$$\eta_{ilj} = alpha_j + \beta_{1j} voterchosen_{il} + \beta_{2j}\, doublychosen_{il} + \psi_{plj} + \delta_{dj} + \mathbf{Z}\boldsymbol{\gamma}_j,$$

where, for each activity j, α_j is a constant, the parameters ψ_{plj} and δ_{dj} are fixed effects for party group p in legislature l and electoral districts d respectively, and (in the second specification presented below) the vector $\mathbf{Z}$ represents additional control variables. The parameters β_{1j} and β_{2j} reflect differences in productivity among types of MPs depending on which principals chose them. We mainly focus on the comparison between the pure types of selector-chosen and voter-chosen MPs: the quality-promoting parties perspective implies a negative value of β_{1j}, whereas the inferiority-correcting voters perspective

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[14] Most of the information is provided as part of the Open Data section on the website of the Chamber of Deputies https://www.psp.cz/sqw/hp.sqw?k=1300. The data on spoken contributions was scraped from the website. For parliamentary voting, we consider only those votes as missed for which the MP did not excuse their absence. To measure amending activity, we used additional documents kindly provided by Václav Sklenář.

suggests a positive value of this parameter. In addition, the parameter β_{2j} tells us how the selectors' favourites who are 'endorsed' by voters differ from those who are not.

To allow for overdispersion in the data relative to the baseline distribution, we rely on negative binomial regressions for the counts (adjusting for varying mandate lengths) and a beta-binomial model (with logit link) for the vote attendance rate:

$$y_{ilj} \sim NegativeBinomial(\mu_{ilj}, \alpha_j)$$

$$\log(\mu_{ilj}) = \eta_{ilj} + \log(m_{il})$$

$$y_{il5} \sim BetaBinomial(V_{il}, \pi_{il}, \sigma)$$

$$\log\left(\frac{\pi\_il}{1 - \pi\_il}\right) = \eta_{il5}$$

The models are estimated using maximum likelihood, with standard errors clustered for persons (some MPs served in both legislative terms).[15] To facilitate interpretation of these nonlinear models, where effects depend on the baseline rate/probability, the discussion refers to both relative changes (derived from exponentiated coefficients, i.e., incidence rate ratios and odds ratios) and absolute changes (based on the implied difference in the mean prediction for the group of selector-chosen MPs if they were selected by voters instead).

In the third part of the empirical analysis, we simulate parliamentary output under alternative electoral rules, following the counterfactual representation approach introduced by Eggers and Lauderdale (2016). We observe the parliamentary behaviour of the actually elected MPs under the flexible list electoral system, and a regression (as used in the second step) can model the relationship between the characteristics of these MPs and their individual parliamentary output. In addition, we know the observed characteristics of the candidates who would have been elected under a closed list or a fully-open (ranked) list rather than the actual flexible-list system (assuming that the nominations and the election results for parties and candidates would be the same).[16] If we are also willing to make the

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[15] Models are estimated with STATA 18. The implementation of the beta-binomial model is due to Hardin and Hilbe (2014).
[16] The only exception is the type variable. In the closed-list case, we set it to 'selector-chosen', since these politicians may not be popular with voters; in the open-list case we consider candidates with list positions greater than the party magnitude as 'voter-chosen' and the others as 'doubly-chosen'.

fundamental assumption "that the relationship between legislator characteristics and legislator behaviour would remain the same even as the distribution of characteristics changes" (Eggers and Lauderdale, 2016: 283), we can combine these two sources of information to simulate the activity profile of the counterfactual parliaments. We draw a set of coefficients from the regression results, calculate the linear predictor using the covariates for the alternative set of MPs, simulate an outcome from the underlying distribution, and then average across the MPs to characterise the typical output of this parliament. Note that, in the context of this simulation, we need to make predictions for politicians that are not part of the analysis sample. Therefore, it makes sense to use an alternative specification of the regressions that includes person-level random effects. The model for this part of the analysis is implemented in a Bayesian framework, whose details are described in Appendix A.5.

6   Empirical results

6.1   *Descriptive statistics: Types of MPs and their observed skills*

Table 2 summarises the relative frequency of different types of actually elected MPs in recent Czech parliamentary elections. To begin with, it happens with moderate frequency that MPs 'jump the queue', i.e., that they are chosen exclusively by the voters. The overall rate is 13.3%, with some variation across elections. As expected, the phenomenon has occurred more frequently since 2010, when the number of preference votes was increased and the preference vote threshold decreased. It is interesting to see that the opposite trend is visible for MPs who are chosen by the selectors only. Across all elections, their share is 18.5%, and it has gone down in recent years. This pattern suggests that parties are now more strongly anticipating who will be popular when ranking candidates on the lists. Finally, approximately two out of three MPs (with some variation across elections) are doubly chosen and would also have been elected under closed or fully-open lists.

The next question is whether selectors and voters choose different types of MPs, in terms of their background and observed skills. To answer this, it is useful to complement the three types of actual MPs with a fourth group, the candidates who were most preferred by the selectors but failed to be elected

because voters promoted candidates from further down the list. For each voter-chosen MP who was elected 'out of order', there is such a 'de-selected' candidate.

Table 2: Types of actually elected MPs under the flexible list system (%; N=200 in each parliament)

	Voter-chosen MPs (not elected under counterfactual closed list)	Selector-chosen MPs (not elected under counterfactual open list)	Doubly-chosen MPs (elected under counterfactual closed and open lists)
2002	6.0	27.5	66.5
2006	3.5	23.0	73.5
2010	23.5	20.5	56.0
2013	14.5	11.0	74.5
2017	14.0	14.5	71.5
2021	18.0	14.5	67.5
ALL ELECTIONS	13.3	18.5	68.3

Figure 1 summarises the characteristics of these four groups of politicians, focusing on the four elections between 2010 and 2021. Formal education and professional background are shown near the top, followed by further candidate characteristics. We start by comparing the eventual MPs only chosen by voters (green ▲) to the selectors' favourites who were de-selected (red **x**). Voters are considerably more sympathetic than selectors towards candidates with doctoral titles, whereas for candidates with BA/MA degrees it is the other way around. The share of candidates without third-level education is slightly lower in the voter-chosen than in the de-selected group, but this difference is not as large. Voters quite clearly dislike businesspeople. The share of candidates with a political background is also slightly lower, while it is somewhat higher for politicians with legal, medical, and public sector experience. Looking at the other variables further shows that preference voting is used to promote non-incumbents at the expense of incumbents, women at the expense of men, and regional assembly members.

These patterns are largely mirrored and typically even more pronounced when comparing the voter-chosen MPs (green ▲) to the selector-chosen MPs (yellow ▼). This is intuitive, since the latter group owes their election to list ranks near the top of the list that reflect support by the selectors and secured election despite limited popularity with voters. More fine-grained analyses that differentiate by election year are summarised in Appendix A.2. The pattern that the selector-chosen MPs have the lowest

proportion of doctors, the highest share of candidates without university education, and the most businesspeople is present in each election.

Figure 1: Comparing the three types of elected MPs and candidates de-selected by voters, pooled across four elections (2010–21)
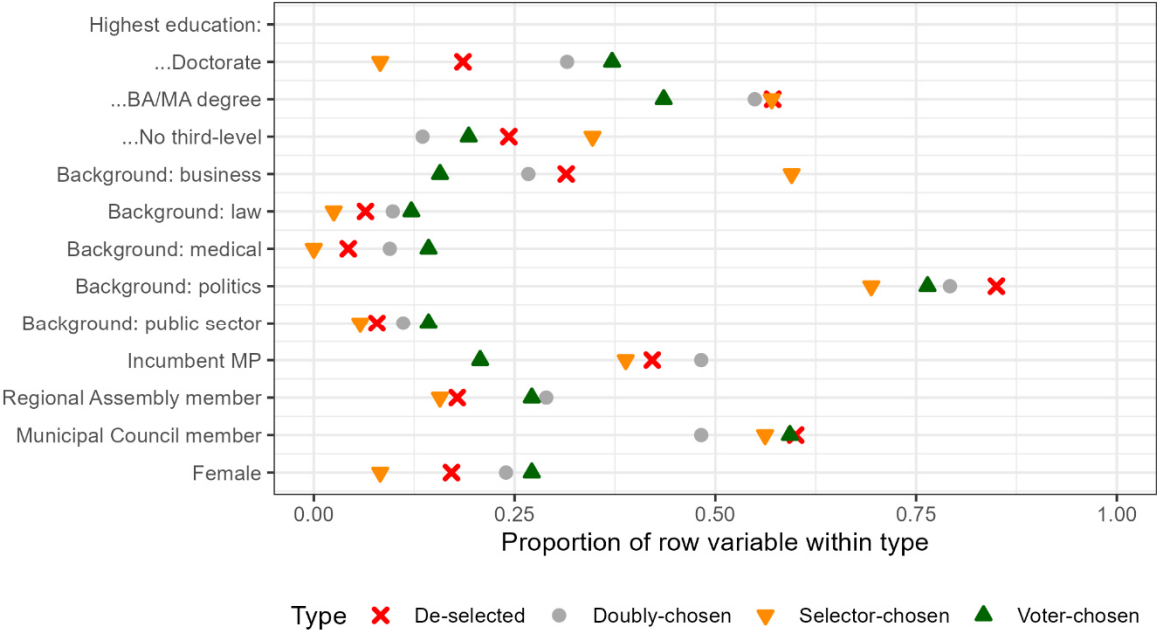
Note: Doubly-chosen N = 539, Selector-chosen N = 121, De-selected and Voter-chosen N = 140 each. The categories of the Background variable are not exclusive. The continuous age variable is not included here, but its distribution is similar across types.

Taken together, if one is willing to interpret formal education as ex ante quality, these patterns provide some evidence for the voter-correction perspective.[17] In addition, it is also clear that preferences differ with regard to other characteristics, such as a business background or gender. If we are interested in what MPs ultimately 'produce', we should consider how all these inputs combine to create parliamentary outputs.

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[17] These patterns could underestimate differences in the 'true' and sincere preferences between the two principals, for example if selectors' rankings anticipate what type of candidate voters like, or if high ballot positions *cause* voter support (rather than just correlate with it due to candidate quality). This is a downside of our approach, and we do not think there is a simple solution for addressing this problem. On the positive side, it is an advantage that we can observe the rankings of the same set of candidates by selectors and by voters in a real-world election. In addition, empirically even the first list position does not guarantee strong voter support. Pooled over the 2010–21 elections, list leaders of the 311 seat-winning lists were doubly-chosen in 82% of the cases, but not that rarely selector-chosen (4%) or de-selected (14%).

6.2   Regression models for the production functions

To examine how these various personal-level factors contribute to the production of parliamentary output, we use regression modelling. We begin with a basic comparison of the MP types in terms of their activity tallies and the attendance at roll-call votes, controlling only for party-legislature and district dummy variables. Clear-cut support for one of the two perspectives would imply that either selector-chosen MPs are more productive than voter-chosen MPs (or the other way around), across all activities. As Panel A of Table 3 shows, there is no evidence for such a pattern. We cannot detect any statistically significant differences between these two groups. In addition, for three of the activities, the point estimates are close to zero, implying very small relative differences (voter-chosen MPs table 5% more amendments [95% CI: –17%, +52%], speak 7% less often [–38%, +39%] and their odds of participating in a vote are 4% smaller [–19%, +33%] when compared to selector-chosen MPs). There are two activities for which the point estimates are larger. Voter-chosen MPs initiate 25% more bills [–29%, +123%] and are 26% more frequently [–32%, +133%] engaged in oral interpellations than their colleagues chosen by selectors only. In absolute terms, the mean predicted activity rate in the group of selector-chosen MPs would increase from 0.57 bills to 0.72 bills and from 10.2 to 12.8 interpellations if they were voter-chosen instead.

The models in Panel B of Table 3 include the other control variables;[18] hence, we are examining to what extent productivity is influenced by any shared unobserved factors (including motivation) among the types defined by the selecting principal rather than any differences in MPs' observed skills or background characteristics. When including the observed covariates, all differences between the voter-chosen and selector-chosen group remain statistically insignificant at the 5% level. For vote participation, the difference is also substantively small (the odds of attending are 6% lower [–30%, +27%] for the voter-chosen than for the selector-chosen group).

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[18] The full regression results can be found in Table A.4.1 in the Appendix (columns without shading). As an aside, statistically significant differences (at the 5% level) for the formal education variables can only be found for speeches (more highly educated MPs speak more), but not for the other activities.

Table 3: **Regression models of activities by MP type, with and without control variables**

	Bills (I)	Amendments (II)	Oral interpellations (III)	Speeches (IV)	Vote participation (V)
Panel A: without controls (beyond party-legislature and district FE)					
Selection *(reference category: selector-chosen, N=57)*					
Voter-chosen (N=70)	0.227	0.050	0.229	–0.077	0.037
	(0.293)	(0.189)	(0.315)	(0.208)	(0.127)
Doubly-chosen (N=220)	0.746***	–0.094	0.059	0.470***	–0.203*
	(0.238)	(0.137)	(0.223)	(0.180)	(0.106)
ln(alpha)	–0.017	–0.408***	0.749***	–0.107	
	(0.193)	(0.127)	(0.095)	(0.078)	
ln(sigma)					–3.169***
					(0.081)
Controls	No	No	No	No	No
Party-legislature FE	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes
McFadden's Pseudo R2	0.076	0.040	0.089	0.033	0.026
Observations	347	347	347	347	347
Panel B: with additional controls					
Selection *(reference category: selector-chosen, N=57)*					
Voter-chosen (N=70)	–0.162	0.377*	0.244	0.221	–0.060
	(0.364)	(0.227)	(0.457)	(0.191)	(0.154)
Doubly-chosen (N=220)	0.374	–0.070	–0.176	0.409***	–0.114
	(0.260)	(0.165)	(0.239)	(0.155)	(0.110)
ln(alpha)	–0.777***	–0.517***	0.619***	–0.362***	
	(0.288)	(0.134)	(0.094)	(0.075)	
ln(sigma)					–3.319***
					(0.079)
Controls	Yes	Yes	Yes	Yes	Yes
Party-legislature FE	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes
McFadden's Pseudo R2	0.144	0.054	0.106	0.060	0.036
Observations	347	347	347	347	347

Coefficients from negative-binomial (columns I–IV) and beta-binomial regression (column V) models. Robust standard errors adjusted for clustering by person in parentheses. Dummy variables for party-legislature combinations and electoral districts are included in all models. In addition, the models in Panel B control for the following variables: highest education, professional background, relative list position, electoral safety, seniority, elected to regional assembly, elected to municipal council, sole representative, female, age and age squared. * p<0.10; ** p<0.05; *** p<0.01.

For the other activities, the point estimates suggest somewhat larger differences. Controlling for several observed skills, voter-chosen MPs table 46% more [–7%, +128%] amendments, engage in 28% more [–48%, +213%] interpellations and speak 25% more often [–14%, +81%] than their selector-chosen colleagues. For the latter group, the mean activity rates are predicted to change from 3.8 to 5.5 amendments, from 10.7 to 13.6 interpellations, and from 54 to 68 speeches if these MPs were chosen by voters instead. In contrast, once we adjust for observed personal characteristics, voter-chosen MPs

draft 15% fewer [–58%, +74%] bills than selector-chosen MPs (suggesting a decrease from 0.59 to 0.51 bills for the latter group if their selection type changed).[19]

We can gain some additional insights by comparing the group of MPs who were chosen by both principals to those chosen by selectors only. Here, the differences are more pronounced and some of them are statistically significant. Doubly-chosen MPs initiate 111% more [+32%, +236%] bills and speak 60% more often [+12%, +128%], while their odds of vote participation are 18% lower [–34%, +1%] than those of their selector-chosen colleagues. In absolute terms, the mean predicted activity rate in the group of selector-chosen MPs would increase from 0.57 bills to 1.21 bills and from 59 to 94 speeches if they were doubly chosen instead, while the vote participation rate would decrease from .88 to .86. It is also interesting to see that these differences shrink when controlling for observed characteristics in the case of bill initiation (+45% [–13%, +142%]) and vote attendance (–11% [–28%, +11%]), but they remain at a similar level for speech contributions (+51% [+11%, +104%]). It could be the case that the doubly-chosen group includes politicians who are more prominent or better communicators than those who are chosen by selectors but then fail to become 'endorsed' by voters.

Taken together, these analyses of parliamentary productivity do not provide strong evidence for either the quality-promoting parties or the inferiority-correcting voters perspective. There are no clear and consistent differences when comparing the 'pure' types of selector-chosen and voter-chosen MPs. While the overall patterns remain somewhat inconclusive, there is one clear insight: MPs who owe their election exclusively to voters do not underperform. If anything, there is a tendency that they are *more* productive than those chosen by selectors only.

In addition, we note that the estimated production functions mapping observed characteristics to parliamentary outputs differ considerably between the activities (see Table A.4.1 in the Appendix). In combination with the earlier result (from Section 6.1) that selectors and voters differ in terms of their

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[19] The results do not change much when not including the relative list position as a control variable (see Table A.4.1 in the Appendix, columns shaded in grey). The coefficient for the voter-chosen group becomes smaller and is no longer statistically significant at 10%.

preferences over candidates' observable skills and background characteristics, this implies an alternative, indirect route between the principal responsible for selection and the eventual outputs. Therefore, to further examine the broader question of whether different types of list PR make a difference for parliamentary behaviour, the next section uses regression-based estimates of the production functions to predict the output profile of counterfactual parliaments elected under 'pure' alternative electoral rules.

6.3 Simulated counterfactual parliaments

We use a regression model to predict the parliamentary activities for MPs who would have been elected if lists had been closed or fully open (assuming that nominations and election results had been the same). The set of predictors is the same as in the model in Section 6.2, but the simulation also includes correlated random effects at the person level because out-of-sample predictions are involved (see Appendix A.5 for further details and the regression results). Figure 2 displays the average activity level (the mean across the 200 MPs) in these parliaments elected under alternative rules, showing the median and the middle 50% of the distribution of this mean across 2,000 simulated parliaments.

In the aggregate, the predicted output is very similar across parliaments elected under different rules. The clearest differences appear for some activities in the 2010–13 parliament, when the average MP would have spoken less but participated in more votes if elected under fully-open rather than closed-list rules. However, the substantive size of these differences is small, reflecting only a small fraction of a standard deviation of these variables in the analysis sample of actual MPs.[20] Taken together, the simulations do not suggest that the typical parliamentary output would be much different under alternative electoral rules. To some extent, this may have to do with the uncertainty in inferring the underlying production functions, but we believe a more general conclusion can be drawn. Formal education, observed skills, and unobserved factors shared by each of the three MP types combine in

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[20] The 1% difference in voting equals approximately 9% of a standard deviation in the analysis sample, and the difference of six speeches corresponds to 6% of a standard deviation.

Figure 2: Simulating counterfactual parliaments under three different electoral systems: flexible list (actual rules), closed list and open list
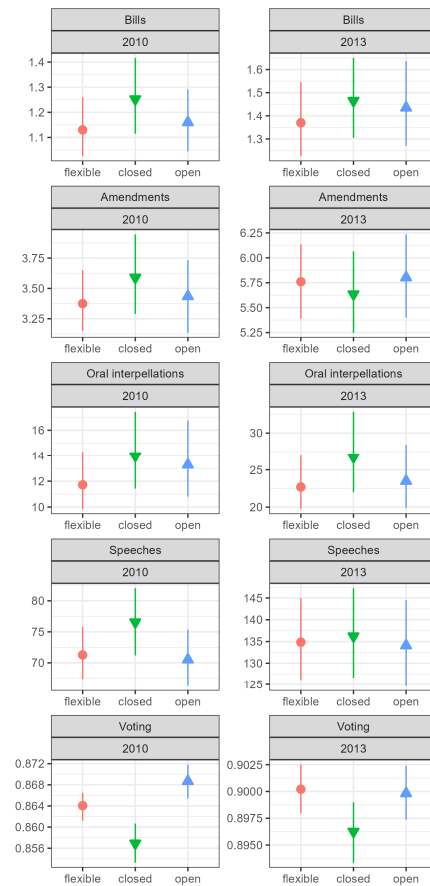
Note: Based on 2,000 draws from the posterior predictive distribution from the model shown in Table A.5.1 in Appendix A.5. For each draw, the mean of the activity across MPs is calculated. Shown is the median and the middle 50% of the distribution.

complex ways in creating various types of parliamentary output. As a consequence, it seems unlikely that different types of list PR would lead to parliaments that differ strongly in terms of productivity.

7   Conclusion

This study has examined whether party selectors and voters as the two main principals choose candidates with different characteristics as MPs, and how that eventually affects parliamentary work. Our starting point was the theoretical ambiguity of whether parties promote quality candidates (and voters might tinker with that selection) or whether voters rather correct inferior choices by party selectors. Studying the Czech case in the period between 2002 and 2021, we found that approximately two out of three MPs

were chosen by both principals, one out of five by selectors only, and one out of eight by voters only. Comparing these three types of elected MPs (plus the candidates de-selected by voters) in terms of personal characteristics to some extent favours the inferiority correction argument, since voters more readily choose candidates with higher formal education. This result concurs with the conclusions by Papagni et al. (2023), who rely on a completely different case and research design (electoral reform in Italy). We did not find any differences in parliamentary productivity between selector-chosen and voter-chosen types, and the simulations of counterfactual parliaments do not suggest that their output would look much different if composed of MPs elected under a closed-list, the actual flexible-list, or a fully-open (while ranked) list system. The input factors combine in complex ways in the production of output, and that works against finding simple relationships between the formal rules for political selection and final outcomes. However, we admit that our analysis of parliamentary activity is limited by studying its quantity rather than its quality (Bouteca et al., 2019; Schobess, 2022), and we encourage further research that addresses this shortcoming.

It may also be asked if the specific results depend on features that are unique to the Czech case. On the one hand, Czech voters do not appear to be different from voters in other countries when it comes to the allocation of preference votes. Support of educated candidates, incumbents, or candidates with local ties is typical in systems with open- and flexible-list systems (Wauters et al., 2020; Söderlund et al., 2021). On the other hand, the Czech Chamber of Deputies has certain peculiarities. It resembles a working parliament with strong committees (Koß, 2018), but agenda control by the cabinet is weak and MPs have ample rights to pursue individual activities. While government parties take advantage of the fact that participation in roll-call votes also reflects partisan deals on balancing the government–opposition numbers by means of pairing (compare Fazekas and Hansen, 2022), the opposition may use privileged access of office holders (like the Chamber leadership, party or group leaders) to the parliamentary floor to obstruct proceedings. Hence, activities of individual MPs may be influenced not only by skills and competence but also by other factors, especially those of a partisan nature.

Electoral systems have become more 'personalised' in many European countries in recent decades (Renwick and Pilet, 2016). The wider consequences of what is essentially shifting influence (upon choosing MPs) from selectors to voters (Buisseret and Prato, 2022; Däubler, 2022) are not particularly well understood. Our results, based on the recent experience in the Czech Republic, do not suggest that the principal who does the choosing has a dramatic effect on the parliamentary behaviour of MPs. We consider this lack of evidence that voters select less productive candidates than selectors as good news. Our results suggest that there is no unwelcome trade-off between giving voters more opportunities to affect the process of within-party seat allocation and the quality of representation on the output side. It seems possible that differences in MP characteristics due to the identity of the choosing principal may be more relevant when we think about descriptive representation as such (Stegmaier et al., 2014), and how the latter affects policy representation by individual MPs, for example in terms of issue attention (e.g., Bäck et al., 2014) or position-taking (e.g., Ramstetter and Habersack, 2020). Voters implicitly create a parliament that is less representative of the population in terms of educational background (and by implication also in terms of income). We believe that examining the causes and consequences of these choices is a particularly worthwhile avenue for further research (compare Carnes and Lupu, 2023).

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A Appendix:
‘ Party selectors, voters, and the choice of productive representatives under different types of list proportional representation ’

A.1 Example of ballot paper

Figure A.1: Ballot paper for ANO party, 2021, Karlovarský district

Note: For each candidate, the ballot paper displays the list rank, the full name with title(s) (if any), the age in years, the profession, the place of residence, and the party membership status. A preference vote is expressed by circling the candidate number. Source: `https://www.mvcr.cz/volby/clanek/vzory-hlasovacich-listku-2021.aspx`
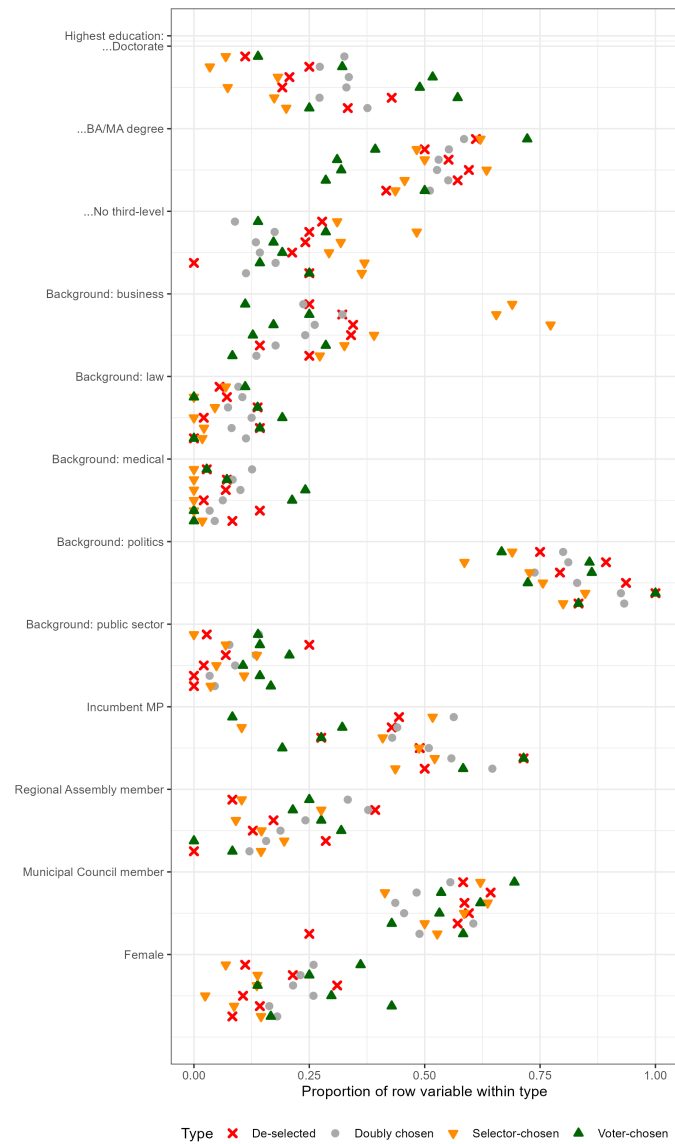
A.2   Candidate types by election

Figure A.2: Candidate types by election

Note: Elections are shown in descending chronological order for each variable: 2021 (top), 2017, 2013, 2010, 2006, 2002 (bottom).

A.3   Simulating the safety of seats using a bootstrap election approach

The bootstrap elections method (Freier and Odendahl 2015, Kotakorpi et al. 2017) simulates seat allocation outcomes by first resampling votes from a vote distribution and then allocating seats based on the votes drawn. For any seat won by a party in the actual election, we can look at the share of bootstrap samples in which a party/candidate also won that seat.

For the purposes of this paper, the aim is to capture how forward-looking MPs may assess the safety of their seat. Hence, the approach simulates the consequences of vote swings for seat allocation.

Let

- $\mathrm{corr}(\mathbf{S})$ be a correlation matrix of parties' vote swings between the previous election and the one before that (based on data for the 14 districts)[1]

- $\mathbf{V_p}$ be a diagonal matrix, where the non-zero entries represent standard deviations set to $2 * (.1 * \text{vote proportion} + .01)$, as in Folke and Rickne (2016: 43).

- $\mathbf{\Sigma_p}$ be the variance-covariance matrix calculated from $\mathbf{V_p}$ and $\mathrm{corr}(\mathbf{S})$.

- $\mathbf{V_d}$ be a diagonal matrix, where the non-zero entries represent the cross-district standard deviations of each party's vote swings between the previous election and the one before that[2]

- $\mathbf{\Sigma_d}$ be the variance-covariance matrix calculated from $\mathbf{V_d}$ and $\mathrm{corr}(\mathbf{S})$.

Given the number of parties P, the steps are as follows:

1. Draw one vector of length $P - 1$ with national-level swing values from a multivariate normal distribution $s_p \sim \mathcal{N}_{P-1}(\mathbf{0}, \mathbf{\Sigma_p})$

2. Draw 14 vectors of length $P - 1$ with district-level party votes from a multivariate normal distribution $s_d \sim \mathcal{N}_{P-1}(\mathbf{0}, \mathbf{\Sigma_d})$

3. Calculate the implied swing for the Pth party and add all the drawn swing values to the observed past vote shares.

4. Allocate the seats based on the actual rules (14 independent district-level allocations based on d'Hondt, to any parties (coalitions) that win at least 5% (10%) nationally).

The simulation is based on 1000 draws.

Table A.1 shows the main inputs and results at the party level.

References

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[1] The results from the 1998 election were disaggregated to the 14 districts in place as of the 2002 elections. If parties did not contest the previous national election (TOP09 and VV in 2006 for 2010; ANO and Usvit in 2010 for 2013), the correlation of their vote swing with that of other parties is set to 0.

[2] If parties did not contest the previous national election (TOP09 and VV in 2006 for 2010; ANO and Usvit in 2010 for 2013), the standard deviation is set to 0.1.

Table A.1: Summary of the simulation settings and results

| | Observed: | | Assumed sd: | | Simulation result: | | |
| | | | | | Seats (if in parl., %) | | |
	Votes (%)	Seats (%)	Votes (%)	Pr(in parl)	5%	med	95%
2002							
CSSD	34.5	35.0	8.9	1.00	19.0	35.5	52.5
KDUCSLUSDEU	16.3	15.5	5.3	0.98	7.0	15.0	25.0
KSCM	21.2	20.5	6.2	0.99	9.5	20.5	32.5
ODS	28.0	29.0	7.6	1.00	19.0	28.5	38.0
2006							
CSSD	34.4	37.0	8.9	1.00	20.0	37.5	54.5
KDUCSL	7.7	6.5	3.5	0.75	3.5	6.5	13.5
KSCM	13.6	13.0	4.7	0.96	4.5	12.5	21.0
ODS	37.6	40.5	9.5	1.00	23.0	40.5	58.0
SZ	6.7	3.0	3.3	0.62	2.5	7.0	14.0
2010							
CSSD	27.2	28.0	7.4	1.00	14.5	28.5	39.5
KSCM	13.9	13.0	4.8	0.94	6.0	13.0	20.5
ODS	24.9	26.5	7.0	1.00	12.5	26.0	36.5
TOP09	20.6	20.5	6.1	0.99	9.5	20.0	30.5
VV	13.4	12.0	4.7	0.69	5.5	19.0	45.4
2013							
ANO	21.3	23.5	6.3	1.00	11.0	23.2	35.0
CSSD	23.4	25.0	6.7	0.99	12.5	25.0	37.0
KDUCSL	7.8	7.0	3.6	0.71	4.0	7.5	13.2
KSCM	17.1	16.5	5.4	0.98	6.6	17.5	28.5
ODS	8.8	8.0	3.8	0.77	4.0	8.5	15.5
TOP09	13.7	13.0	4.7	0.96	6.0	13.5	22.5
Usvit	7.9	7.0	3.6	0.58	5.0	13.5	30.6

A.4 Regression results of models with control variables

Table A.4.1:   Regression models of activities by MP type with control variables (specifications with and without relative list position variable)

	Bills (I)		Amendments (II)		Oral interpellations (III)		Speeches (IV)		Vote participation (V)	
	Full	Full w/o rel. list pos.	Full	Full w/o rel. list pos.	Full	Full w/o rel. list pos.	Full	Full w/o rel. list pos.	Full	Full w/o rel. list pos.
Selection *(reference category: selector-chosen, N=57)*										
Voter-chosen (N=70)	-0.162	-0.222	0.377*	0.234	0.244	0.166	0.221	0.082	-0.060	0.119
	(0.364)	(0.297)	(0.227)	(0.197)	(0.457)	(0.352)	(0.191)	(0.172)	(0.154)	(0.139)
Doubly chosen (N=220)	0.374	0.377	-0.070	-0.069	-0.176	-0.174	0.409***	0.415***	-0.114	-0.115
	(0.260)	(0.260)	(0.165)	(0.166)	(0.239)	(0.240)	(0.155)	(0.156)	(0.110)	(0.111)
Highest education *(ref.: no college degree)*										
BA/MA degree	-0.334	-0.329	0.300	0.303	0.416*	0.422*	0.447***	0.448**	0.115	0.099
	(0.220)	(0.220)	(0.192)	(0.194)	(0.252)	(0.251)	(0.153)	(0.153)	(0.097)	(0.101)
Doctorate	0.240	0.246	0.099	0.104	0.514*	0.508*	0.676***	0.674***	0.105	0.086
	(0.249)	(0.249)	(0.215)	(0.217)	(0.282)	(0.282)	(0.206)	(0.206)	(0.134)	(0.136)
Background *(non-exclusive categories)*										
Business	-0.144	-0.145	0.147	0.140	-0.364*	-0.377*	0.166	0.154	-0.136	-0.123
	(0.196)	(0.197)	(0.135)	(0.136)	(0.218)	(0.210)	(0.142)	(0.141)	(0.098)	(0.099)
Law	0.865***	0.867***	0.198	0.192	-0.288	-0.298	0.606***	0.600***	-0.306**	-0.311**
	(0.272)	(0.271)	(0.243)	(0.241)	(0.372)	(0.367)	(0.230)	(0.228)	(0.142)	(0.144)
Medical	-1.232***	-1.237***	-0.014	-0.025	-0.716*	-0.716*	-0.782***	-0.788***	-0.156	-0.155
	(0.374)	(0.374)	(0.222)	(0.221)	(0.388)	(0.388)	(0.213)	(0.214)	(0.148)	(0.148)
Politics	0.343	0.356	0.060	0.094	0.131	0.157	0.129	0.161	-0.140	-0.162
	(0.242)	(0.248)	(0.197)	(0.197)	(0.325)	(0.315)	(0.194)	(0.191)	(0.122)	(0.124)
Public sector	-0.571**	-0.581**	0.110	0.090	0.101	0.091	-0.225	-0.251	0.066	0.076
	(0.285)	(0.285)	(0.162)	(0.161)	(0.332)	(0.331)	(0.177)	(0.175)	(0.108)	(0.109)
Relative list position	0.224		0.535		0.296		0.520		-0.616**	
	(0.860)		(0.400)		(0.877)		(0.327)		(0.295)	
Electoral safety	1.940***	1.964***	-0.306	-0.248	0.060	0.121	0.681**	0.742**	-0.544**	-0.619**
	(0.648)	(0.637)	(0.421)	(0.424)	(0.671)	(0.603)	(0.343)	(0.342)	(0.269)	(0.265)
Seniority *(ref.: no experience)*										
1 term	-0.214	-0.213	0.292**	0.299**	0.011	0.019	0.315***	0.321***	-0.065	-0.081
	(0.224)	(0.225)	(0.142)	(0.143)	(0.246)	(0.245)	(0.120)	(0.120)	(0.105)	(0.107)
2+ terms	-0.190	-0.192	0.353*	0.350*	-0.256	-0.253	0.556***	0.551***	-0.270**	-0.282**
	(0.262)	(0.263)	(0.186)	(0.187)	(0.318)	(0.319)	(0.184)	(0.182)	(0.121)	(0.124)
Elected to Regional Assembly	-0.288	-0.290	-0.155	-0.156	0.319	0.324	-0.040	-0.040	0.054	0.052
	(0.211)	(0.211)	(0.155)	(0.155)	(0.264)	(0.263)	(0.148)	(0.149)	(0.102)	(0.103)
Elected to Municipal Council	0.085	0.081	-0.038	-0.052	0.175	0.172	-0.350***	-0.358***	0.104	0.112
	(0.170)	(0.171)	(0.132)	(0.133)	(0.224)	(0.224)	(0.129)	(0.128)	(0.083)	(0.085)
Sole representative	0.317	0.324	0.067	0.075	0.339	0.346	0.551***	0.555***	-0.006	-0.043
	(0.277)	(0.279)	(0.184)	(0.184)	(0.307)	(0.310)	(0.187)	(0.187)	(0.133)	(0.131)
Female	0.330*	0.330*	0.245*	0.248*	0.710***	0.712***	-0.227	-0.225	0.119	0.111
	(0.176)	(0.176)	(0.146)	(0.145)	(0.211)	(0.210)	(0.144)	(0.144)	(0.089)	(0.090)
Age (in decades)	1.892***	1.917***	0.451	0.528	2.654***	2.695***	1.181***	1.256***	0.104	0.031
	(0.619)	(0.622)	(0.407)	(0.402)	(0.536)	(0.517)	(0.397)	(0.392)	(0.261)	(0.257)
Age squared	-0.209***	-0.211***	-0.059	-0.066	-0.283***	-0.287***	-0.131***	-0.138***	-0.009	-0.002

	(0.064)	(0.064)	(0.041)	(0.040)	(0.057)	(0.056)	(0.040)	(0.040)	(0.026)	(0.026)
Constant	-6.056***	-5.939***	-0.836	-0.590	-5.410***	-5.297***	-0.072	0.167	2.774***	2.470***
	(1.677)	(1.552)	(1.065)	(1.055)	(1.350)	(1.349)	(0.997)	(1.001)	(0.662)	(0.670)
ln(alpha)	-0.777***	-0.775***	-0.517***	-0.511***	0.619***	0.619***	-0.362***	-0.359***		
	(0.288)	(0.287)	(0.134)	(0.132)	(0.094)	(0.095)	(0.075)	(0.075)		
ln(sigma)									-3.319***	-3.303***
									(0.079)	(0.080)
Party-legislature FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
McFadden's Pseudo R2	0.076	0.144	0.040	0.053	0.089	0.106	0.033	0.059	0.026	0.035
Observations	347	347	347	347	347	347	347	347	347	347

Coefficients from negative-binomial (columns I-IV) and beta-binomial regression (column V) models. Robust standard errors adjusted for clustering by person in parentheses. Dummy variables for party-legislature combinations and electoral districts are included, but coefficients not reported. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

A.5 Bayesian multivariate model with correlated MP random effects

There are i politicians who (during their mandate as MP in legislature l of length $d_{il} \geq 0$) engage in four parliamentary activities j (bills, amendments, oral interpellations, and speeches) and decide whether to participate in V_{il} votes.[3] That means we have four count variables y_{ilj} with $j = 1, 2, 3, 4$ and a proportion of attended votes y_{il5}.

$$y_{ilj} \sim NegativeBinomial(\mu_{ilj}, \phi_j)$$
$$\theta_{il} \sim Beta(\pi_{il} * \kappa, (1 - \pi_{il}) * \kappa)$$
$$y_{il5} \sim Binomial(V_{il}, \theta_{il})$$
$$z_{ij} \sim \mathcal{N}_5(0, \Sigma)$$
$$log(\mu_{ilj}) = \mathbf{x_{ilj}}\beta_{\mathbf{j}} + log(d_{il}) + z_{ij}$$
$$log(\pi_{il}/(1 - \pi_{il})) = \mathbf{x_{il}}\beta_{\mathbf{5}} + z_{i5}$$

The prior distributions are:

$$\beta_{\mathbf{j}} \sim Normal(0, 10)$$
$$1/\phi_j \sim Half - Cauchy(0, 5)$$
$$\kappa \sim Pareto(1, 1.5)$$

The choice of the prior for κ follows Carpenter (2016). The prior distribution for the random effects z_{ij} is a multivariate normal, parameterized as discussed in STAN (2021: 36-41); please see the code below for details. We run two Markov chains, with 2,000 iterations (after a warmup of 1,000) and a thinning factor of two, which in total gives us 2,000 draws from the posterior distribution.

Simulating counterfactual parliaments

The analysis sample consists of $N = 347$ politician-legislature combinations (we do not consider MPs who were cabinet members at the beginning of the session or whose spell was shorter than half the legislative period). The counterfactual parliaments consist of $N = 200$ MPs, selected from the candidate pool on the basis of closed list, flexible list, or fully open (while ranked) list rules according to the actual election results. This means that the counterfactual parliaments include some politicians who are not part of the analysis sample, because they were never actually elected or never observed in parliament (as non-cabinet members and with long enough spells). For those politicians, a random effect is drawn from $\mathcal{N}_5(0, \Sigma)$; for those who were observed it is drawn from the posterior distribution of their personal z_{ij}. Combining the observed characteristics x_{ilj} and simulated model parameters $\beta_{\mathbf{j}}, \phi_j, \kappa$, we can then draw from a Beta, a Binomial and a Negative-Binomial distribution to predict outcomes. The mean across the 200 MPs characterizes the typical output of the simulated parliament.

References

Carpenter, B. (2016). Hierarchical Partial Pooling for Repeated Binary Trials. Available at: https://mc-stan.org/users/documentation/case-studies/pool-binary-trials.html

STAN (2021). Stan User's Guide. Version 2.27. https://mc-stan.org/users/documentation/

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[3]An excused absence is counted in the same way as an attended vote.

STAN code

```
functions {
// auxiliary functions preventing problems in the random number generators with too small or large values
 int my_neg_binomial_2_log_rng(real eta, real phi) {
    real gamma_rate = gamma_rng(phi, phi / exp(eta));
    if (gamma_rate > exp(20)) gamma_rate = exp(20);
    return poisson_rng(gamma_rate);
 }
   real my_beta_rng(real alpha, real beta) {
    real mya = alpha;
    real myb = beta;
    if (mya == 0) mya = exp(-20);
    if (myb == 0) myb = exp(-20);
    return beta_rng(mya, myb);
  }
}
data {
int<lower=1> A; // number of activities (with vote attendance)
int<lower=1> Mevo; // number of unique MPs ever observed
int<lower=1> Mnevo; // number of unique MPs never observed
int<lower=1> K; // number of covariates for act
int<lower=1> Nmt; // number of (observed) mp-year cobminations
int<lower=1> idevomt[Nmt]; // id index for person (ever observed), for each mp-year cobmination
matrix[Nmt, K] xact; // covariates for actually observed MPs in sample
matrix[400, K] xactfl; // covariates for flexible list
matrix[400, K] xactcl; // covariates for closed list
matrix[400, K] xactol; // covariates for  open list
int<lower=1> trialsl[400]; //  total N of votes  for sim parls
int<lower=1> idfl[400]; //
int<lower=1> idcl[400]; //
int<lower=1> idol[400]; //
real offset[Nmt]; // log duration of mandate
int<lower=0> y[(A-1)*Nmt]; // counts as one long vector
int<lower=0> yrc[Nmt]; // number of non-missed votes
int<lower=1> trials[Nmt]; //  total N of votes
}


parameters {
matrix[A, K] betaact;
matrix[A, Mevo] z; // MP effect for cases ever observed
cholesky_factor_corr[A] L_Omega;
vector<lower=0,upper=pi()/2>[A] tau_unif;
real<lower=1> kappa;
vector<lower=0>[A-1] phi_inv;
vector<lower=0, upper=1>[Nmt] theta;
}

transformed parameters {
vector[(A-1)*Nmt] logmu;
vector[(A-1)*Nmt] phil;
vector<lower=0, upper=1>[Nmt] p;
vector<lower=0>[A] tau;
matrix[A, Mevo] zc;

tau = 2.5 * tan(tau_unif);
zc =  diag_pre_multiply(tau, L_Omega) * z;

for(nmt in 1:Nmt){
  for(a in 1:(A-1)){
```

```
      logmu[(a-1)*Nmt + nmt] = xact[nmt] * betaact[a]' + offset[nmt] +
                  zc[a, idevomt[nmt]];
      phil[(a-1)*Nmt + nmt] = 1/phi_inv[a];
      }
   p[nmt] = inv_logit(xact[nmt] * betaact[A]' + zc[A, idevomt[nmt]]);
   }
}

model {
// priors
to_vector(z) ~ std_normal();
to_vector(betaact) ~ normal(0,10);
L_Omega ~ lkj_corr_cholesky(2);
kappa ~ pareto(1, 1.5);
phi_inv ~ cauchy(0,5);

// likelihood
y ~ neg_binomial_2_log(logmu, phil);
theta ~ beta(p * kappa, (1 - p) * kappa);
yrc ~ binomial(trials, theta);
}

generated quantities {
matrix[A, Mnevo] zadd;
matrix[A, Mnevo] zcadd;
matrix[A, Mevo + Mnevo] zcall;

vector[400] yhrcfl;
vector[400] yhrccl;
vector[400] yhrcol;
vector[400] pfl;
vector[400] pcl;
vector[400] pol;
vector[400] thetafl;
vector[400] thetacl;
vector[400] thetaol;
vector[400*(A-1)] yhfl;
vector[400*(A-1)] yhcl;
vector[400*(A-1)] yhol;
matrix[2, A] meanfl;
matrix[2, A] meancl;
matrix[2, A] meanol;
corr_matrix[A] Omega;

Omega = multiply_lower_tri_self_transpose(L_Omega);

zadd = to_matrix(normal_rng(rep_row_vector(0,A*Mnevo),1), A, Mnevo);
zcadd =  diag_pre_multiply(tau, L_Omega) * zadd;
zcall = append_col(zc,zcadd);


for(i in 1:400){

pfl[i] = inv_logit(xactfl[i] * betaact[A]' + zcall[A, idfl[i]]);
pcl[i] = inv_logit(xactcl[i] * betaact[A]' + zcall[A, idcl[i]]);
pol[i] = inv_logit(xactol[i] * betaact[A]' + zcall[A, idol[i]]);

thetafl[i] = my_beta_rng(pfl[i] * kappa, (1-pfl[i])*kappa);
thetacl[i] = my_beta_rng(pcl[i] * kappa, (1-pcl[i])*kappa);
thetaol[i] = my_beta_rng(pol[i] * kappa, (1-pol[i])*kappa);
```

```
yhrcfl[i] = binomial_rng(trialsl[i], thetafl[i]) * inv(trialsl[i]);
yhrccl[i] = binomial_rng(trialsl[i], thetacl[i]) * inv(trialsl[i]);
yhrcol[i] = binomial_rng(trialsl[i], thetaol[i]) * inv(trialsl[i]);

  for(a in 1:(A-1)){
  yhfl[i + (a-1)*400] =  my_neg_binomial_2_log_rng(xactfl[i] * betaact[a]' + zcall[a, idfl[i]], 1/phi_inv[a]);
  yhcl[i + (a-1)*400] =  my_neg_binomial_2_log_rng(xactcl[i] * betaact[a]' + zcall[a, idcl[i]], 1/phi_inv[a]);
  yhol[i + (a-1)*400] =  my_neg_binomial_2_log_rng(xactol[i] * betaact[a]' + zcall[a, idol[i]], 1/phi_inv[a]);
  }
}


for(t in 1:2){
meanfl[t,5] = mean(yhrcfl[(1 + (t-1)*200):(t*200)]);
meancl[t,5] = mean(yhrccl[(1 + (t-1)*200):(t*200)]);
meanol[t,5] = mean(yhrcol[(1 + (t-1)*200):(t*200)]);
    for(a in 1:(A-1)){
    meanfl[t,a] = mean(yhfl[(1 + (a-1)*400 + (t-1)*200):((a-1)*400 + t*200)]);
    meancl[t,a] = mean(yhcl[(1 + (a-1)*400 + (t-1)*200):((a-1)*400 + t*200)]);
    meanol[t,a] = mean(yhol[(1 + (a-1)*400 + (t-1)*200):((a-1)*400 + t*200)]);
    }
  }
}
```

Table A.5.1: Results from multivariate regression model with correlated MP random effects

	Bills (I)			Amendments (II)			Oral interpellations (III)			Speeches (IV)			Vote participation (V)		
	2.5%	*Mean*	*97.5%*	*2.5%*	*Mean*	*97.5%*	*2.5%*	*Mean*	*97.5%*	*2.5%*	*Mean*	*97.5%*	*2.5%*	*Mean*	*97.5%*
Selection *(ref.: selector-chosen)*															
Voter-chosen	-1.20	-0.32	0.57	-0.38	0.13	0.64	-1.15	-0.20	0.72	-0.39	0.07	0.51	-0.22	0.08	0.38
Doubly-chosen	-0.35	0.23	0.80	-0.52	-0.16	0.19	-1.11	-0.47	0.21	-0.06	0.26	0.59	-0.24	-0.01	0.23
Highest education *(ref.: no college degree)*															
BA/MA degree	-0.92	-0.38	0.24	-0.09	0.29	0.68	-0.67	0.00	0.70	-0.01	0.32	0.67	-0.20	0.04	0.27
Doctorate	-0.21	0.47	1.18	-0.23	0.25	0.72	-0.58	0.24	1.14	0.18	0.59	1.01	-0.32	-0.01	0.28
Background *(non-exclusive categories)*															
Business	-0.69	-0.22	0.28	-0.15	0.16	0.48	-0.68	-0.06	0.55	-0.12	0.15	0.44	-0.28	-0.09	0.11
Law	0.14	0.81	1.53	-0.47	0.09	0.60	-1.62	-0.62	0.37	0.17	0.62	1.11	-0.60	-0.27	0.07
Medical	-2.41	-1.50	-0.6	-0.56	-0.05	0.48	-1.24	-0.28	0.72	-0.97	-0.54	-0.09	-0.29	0.05	0.37
Politics	-0.20	0.46	1.15	-0.31	0.12	0.57	-0.59	0.22	1.01	-0.12	0.21	0.54	-0.32	-0.10	0.13
Public sector	-1.44	-0.76	-0.05	-0.31	0.10	0.54	-0.31	0.45	1.21	-0.64	-0.23	0.15	-0.13	0.13	0.41
Relative list position	-1.37	0.14	1.78	-0.58	0.37	1.33	-1.14	0.66	2.42	-0.45	0.31	1.03	-0.67	-0.20	0.31
Electoral safety	0.76	2.25	3.68	-0.94	-0.08	0.84	-1.73	-0.07	1.49	0.02	0.77	1.52	-1.06	-0.56	-0.06
Seniority *(ref.: no experience)*															
1 term	-0.68	-0.17	0.33	-0.10	0.24	0.58	-0.77	-0.23	0.37	0.00	0.25	0.51	-0.41	-0.24	-0.07
2+ terms	-0.94	-0.25	0.38	-0.23	0.19	0.62	-1.20	-0.47	0.29	0.06	0.42	0.78	-0.57	-0.32	-0.07
Elected to Regional Assembly	-0.96	-0.44	0.08	-0.68	-0.35	-0.03	-0.65	-0.07	0.56	-0.43	-0.16	0.11	-0.22	-0.04	0.13
Elected to Municipal Council	-0.33	0.12	0.59	-0.28	0.02	0.32	-0.75	-0.20	0.34	-0.48	-0.23	0.01	-0.10	0.08	0.24
Sole representative	-0.35	0.33	0.97	-0.50	-0.05	0.39	-0.74	0.05	0.84	0.03	0.38	0.76	-0.36	-0.11	0.14
Female	0.00	0.47	0.96	-0.07	0.27	0.61	0.28	0.89	1.52	-0.44	-0.14	0.17	-0.15	0.05	0.25
Age (in decades)	0.33	1.94	3.47	-0.65	0.38	1.44	0.42	2.19	3.98	0.13	0.98	1.96	-0.58	0.02	0.65
Age squared	-0.37	-0.21	-0.05	-0.16	-0.05	0.06	-0.43	-0.25	-0.06	-0.02	-0.10	-0.02	-0.06	0.00	0.06
Constant	-10.78	-6.74	-2.90	-3.69	-0.93	1.73	-8.56	-4.07	0.69	-2.10	0.26	2.49	1.20	2.78	4.28
$1/\varphi$ *(Negative binomial)*	0.01	0.14	0.42	0.13	0.27	0.43	0.38	0.74	1.28	0.16	0.23	0.32			
κ *(Beta-binomial)*													78.2	121.7	176.7
τ *(Scale of RE)*	0.73	0.97	1.23	0.61	0.77	0.93	1.11	1.46	1.78	0.74	0.85	0.97	0.53	0.61	0.70
RE corr. with amendments	0.66	0.83	0.94												
RE corr. with oral interpell.	0.00	0.26	0.49	0.25	0.45	0.65									
RE corr. with speeches	0.63	0.79	0.91	0.63	0.77	0.90	0.16	0.36	0.53						
RE corr. with vote attendance	-0.43	-0.21	0.01	-0.13	0.06	0.24	0.17	0.35	0.52	-0.23	-0.06	0.10			
N							347								

Note: The table describes the posterior distribution of the parameters. Means of coefficients and correlations are shaded in grey if the middle 95% of the posterior distribution does not cover zero.