



Political Fragmentation and Coalition Alignment effects: Evidence from health Transfers to Italian Regions

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Abstract

Do government parties positively discriminate in favor of swing or aligned sub-national units while allocating public resources? This paper integrates these two strands of the literature and makes a new contribution by incorporating the insightful perspective of the political fragmentation approach. Using a dataset of Italian regions between 2001 and 2011 constructed from primary sources and a new index of fractionalization, based on Golosov (Party Politics 16(2):171–192), we empirically find that it is the fragmentation of the aligned recipient government that affects the final amount of resources, rather than the alignment itself. Quasi-formula-based grants do not remove the arbitrariness that allows for politically motivated targeting.

Keywords Distributive politics · Multi-tier system · Resource sharing formula · Grants · Political processes · Government expenditures and health

JEL Classification D72 · H51 · H77

1 Introduction

A growing literature on fiscal federalism argues that political interests are crucial in the allocation of intergovernmental grants. There is a general concern that opportunistic incumbents at the central level tactically award grants to local governments in order to influence election outcomes. However, the empirical evidence is inconclusive as to which political type, partisan or opportunistic, is relevant and which group of voters, swing, with weak preferences (Lindbeck and Weibull 1987) or aligned (Cox and McCubbins 1986), is favored in designing transfer programs from national to subna-

The data that support the findings of this study are available from the corresponding author upon request.

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tional governments. There are conflicting explanations for this: according to Cox and McCubbins (1986), governments are risk averse and therefore favor their supporters, while according to Lindbeck and Weibull (1987), incumbents support “swing” voters because they respond much more quickly to any stimulus. In a later work, Bracco et al. (2015) find that an incumbent interested in electing his or her local colleagues has an incentive to shift the distribution to aligned jurisdictions with high electoral competition. Political alignment, i.e., whether the local politician belongs to the same party or coalition as the central government, is a central concept in this part of the literature. A drawback of these studies is the assumption that the central government acts as the sole decision maker, while de facto many stakeholders are involved.

Indeed, incumbents have different incentives to negotiate spending policies when their party has a majority than when they need the support of the other parties in the legislature to pass the budget (Roubini and Sachs 1989). The fragmentation of majority and opposition thus also plays a role in explaining the redistribution of resources. Then, we assume that the degree of opposition fragmentation is an important part of the political context that alters the intensity of votes against incumbent parties and makes a significant difference in the pattern of electoral competition.

Moreover, because the central government and subnational governments may be involved in a bargaining game in which the latter may prevent the central government from implementing desired policies or impede central initiatives, we expect that fragmentation at the regional level will also play a role and that politically fragmented regional governments will be favored.¹ In this case, the central government may have to engage in political bargaining and offer benefits to gain the support of defiant subnational units (Tsebelis et al. 2002; Samuels and Mainwaring 2004).

Yet despite the fact that various strands of the literature have provided evidence that either variable-fragmentation or alignment-seems to explain government transfers alone, however, as far as we know, the interaction between fragmentation and partisan alignment at different levels of government has never been studied. This paper brings the above issues together in a single framework by examining whether the effect of political alignment is affected by political fragmentation in a multi-level government. In examining the strategic interaction between the central government and regional governments, our approach extends the empirical evidence of redistributive policies from discretionary government spending to quasi-formula-based intergovernmental grants.² This approach, which emphasises the importance of institutional details, makes single-country analysis a valid alternative to cross-country samples. An important advantage of using subnational data is that budgeting institutions are usually the same for all units considered. These similar institutional structures avoid bias due to omitted variables at the country level and allow the study of larger samples. Italian multilevel governance is an excellent example because intergovernmental health grants on a quasi-formula basis play an important role in funding subnational

¹ Previous studies on fragmented governments have focused mainly on “one level of government” with symmetrically and spatially organized parties.

² In this paper, the words “grant” and “transfer” are used interchangeably to refer to the financial flow of resources from the central government to subnational jurisdictions (not interpersonal). It should be noted that these grants are referred to as rule-based in Italy, but the way they are allocated makes them appear more quasi-rule-based (see Sect. 3).

governments.³ Because both formula and total central government funding are predetermined, the distribution of national funds among regions should be automatic. In practice, a quasi-formula mechanism does not eliminate the arbitrariness that makes politically motivated grant-making possible.

Our work contributes to these strands of literature by showing that the central government allocates more resources to aligned regions, especially those that are more fragmented (*Alignment Fragmented Premium*).

Using a dataset of Italian regions between 2001 and 2011 constructed from primary sources, this study provides an extension of previous analyses and overcomes (in part) the inherent problems of low variability of other fragmentation indices with fixed effects estimators by using an innovative measurement formulation based on Golosov (2010) that better “accounts for the relative sizes of parties” (Golosov 2010, p. 173). Fixed effects estimators and Panel Corrected Standard Errors (hereafter PCSE) developed by Beck and Katz (1995, 1996) are used to construct robust coefficient covariances for panel-corrected residuals.⁴

The rest of the paper is organized as follows. The following section reviews the literature on the political use of intergovernmental transfers and government fragmentation and derives the hypotheses to be tested using Italy as an example. Section 3 provides some background information on the Italian system, such as government and electoral institutions as key determinants of health financing. The data and empirical strategy are described in Sect. 4. Section 5 reports the regression results and discusses their implications. Section 6 provides several robustness checks and Sect. 7 concludes.

2 Literature Review and Theoretical Considerations

Government transfers are one of the most important instruments related to federal systems. According to the classic literature on public finance, transfers are important to finance public expenditures that generate positive externalities that, if financed by local governments alone, might be provided at suboptimal levels (see, for example, Musgrave 1959; Oates 1972; Rosen and Gayer 2014). Another justification is the collection of inefficient local taxes in the absence of a centralized mechanism of taxation and distribution. Finally, the equity argument states that imbalances among local units must be corrected by policies at higher levels of government. Regardless, this part of the literature on government transfers considers normative reasons as the main criterion for allocating these funds. In practice, factors other than normative ones may influence government transfers.

A growing strand of the political economy literature examines how incumbents use intergovernmental transfers for strategic purposes. The central idea of this approach is that political parties and candidates instrumentalize redistributive measures to maximize their electoral outcomes, independent of other normative or efficiency con-

³ In Italy, health spending accounts for about 85% of regional government spending (OECD 2015, p. 110).

⁴ A key advantage of PCSE is that it accounts for the complexity of cross-sectional error processes without requiring the data to be contemporaneously or serially uncorrelated or panel homoskedastic. Therefore, PCSE can be used when the residuals are not spherical. PCSE also has better properties for small samples due to the block diagonal variance-covariance matrix.

siderations. This compelling argument, made in Argentina by Porto and Sanguinetti (2001), has proven equally valid in other contexts, particularly during national electoral campaigns (Alesina et al. 1997).

Interestingly, while any grant can affect the electoral outcome of incumbents, timing matters, as voters seem to reward grants made just before an election more than those made earlier in the election cycle (Veiga and Veiga 2013). To appear more attractive to voters, national governments transfer more funds to districts in election years. These funds are highly productive because they raise awareness of policies (Baleiras and da Silva Costa 2004; Drazen and Eslava 2005). In central election years, however, the returns to purchasing political capital in this way would be offset by the direct political benefits of central spending, so grants should decline (Worthington and Dollery 1998). In this scenario, it is likely that the “strength” of the government (majority or minority, as measured by tenure) plays an important role in determining the budget outcome⁵ and bargaining power of regional governments.

Previous empirical research has shown that it takes time to build networks of relationships and loyalties within the administrative branches of central government responsible for distributing grants. Therefore, it is likely that regional governments that have been in office for a long time lobby more effectively and receive more transfers from the central government. Specific local considerations also play a role. In addition, a government’s policy decisions may also be influenced by the presence of multiple decision makers. Therefore, coalition governments representing multiple parties with different interests can be expected to have difficulty achieving the consensus needed to implement policies. As Perotti and Kontopoulos (2002) note, each member of a coalition has an incentive to increase spending on its constituents because it internalizes only a small portion of the costs. This problem is exacerbated as the number of parties in the coalition increases, so that the share of costs internalized by each group decreases as the number of groups increases (“Law of $1/n$ ”).

It follows that the smaller the number of parties and the greater the bargaining power of the coalition, the easier it is to reach a cooperative solution (Olson 1993). It follows that a coalition has less political power when it is more fragmented.⁶ One can hypothesize that political fragmentation might affect the distribution of grants (Padovano 2012), as more fragmented government majorities would require more central government leniency toward regional governments to “buy” their support.⁷

⁵ Padovano and Venturi (2001) note that most studies misinterpret *ex-post* and *ex-ante* indicators of government longevity, i.e., executive cabinets may use the vote of confidence as a signal of an upcoming election, thus expanding the budget to increase stability.

⁶ In the empirical literature, various concepts of *fragmented governments* are used. For example, Roubini and Sachs (1989) use coalition size, since each party in government tends to represent the interests of a particular interest group. Edin and Ohlsson (1991) argue, however, that the Roubini and Sachs’ cohesion variable captures the effects of minority governments rather than majority governments. According to Harrinvirta and Mattila (2001) and Ricciuti (2004) fragmented governments would behave similarly to politically unstable governments. Another interpretation of fragmented government refers to the number of spending ministers in the government (Kontopoulos and Perotti 1999). We consider the seats held by each party with a new index based on Golosov (2010) (Sect. 4.1.1).

⁷ The idea is that increasing the number of parties makes agreements more difficult, leading to higher spending (i.e. political pork).

Indeed, when there is a large number of opposition parties, their interests may diverge and it may be difficult to coordinate to oppose the government's proposals. As for a fragmented government, it would therefore be difficult for a fragmented opposition to achieve political consensus and political commitment, so government decision-making may not be monitored (Padovano and Venturi 2001; Ricciuti 2004). With a divided opposition, a government can implement a particular policy not only successfully but also without opposition. In short, fragmented opponents favor the central government by reducing the political costs of a policy, while a united opposition poses a greater threat to incumbents that can shorten their tenure.

Since the allocation of grants is the result of a bargaining process between competing interests, whether a national or subnational government is united or fragmented makes a difference to the outcome of the allocation. As plausible as this argument may be, the literature has so far almost completely neglected this side (the opposition) of the bargaining game in grant allocation. Our hypothesis is:

Hypothesis 1: The higher the fragmentation of the majority coalition (opposition), the higher (lower) the level of derived funding.

This hypothesis is tested on the distribution of health care resources among Italian regions, because only health care expenditures, which account for almost two-thirds of regional expenditures, are subject to an equalization mechanism implemented through the National Health Fund.⁸ The Fund de facto allocates resources to the regions on the basis of a quasi-formula based on a negotiation process between the regional governments and their counterparts in the central government (the Ministries of Health and Finance), which takes place within the framework of the Conference of State Regions.

While the above literature shows that government fragmentation plays a role in explaining the redistribution of resources, it does not make clear the mechanism that drives strategic allocation. The literature offers two alternative arguments for how transfers are targeted based on the political characteristics of recipient groups. The first is based on the theoretical (Cox and McCubbins 1986) "core voter model", i.e. supporters with strong party attachment. In this model, risk-averse political candidates favor their supporters "just as risk-averse investors tend to invest in low-risk securities" (Cox and McCubbins 1986, p. 385). The second argument relies on the "swing voter model" of Lindbeck and Weibull (1987) i.e. voters who are more likely to switch their vote because of certain advantages. Then two parties (or two blocs of parties) maximize their vote shares by tactically redistributing grants to constituencies with many swing voters who show no apparent loyalty to either party. Incumbent parties will continue to invest resources in districts until they reach the point where swing voters decide to vote for them. Therefore, the election outcome is assumed to depend on how much a constituency receives from the center.⁹

Multi-level systems of government open up new dimensions in the study of how resources are misallocated to influence election outcomes. Politically aligned levels of

⁸ Several types of grants are provided. Specifically, regions are responsible for providing four categories of basic functions, such as health, education, social assistance and local transportation.

⁹ Empirical studies have accounted a number of countries. For a recent review of the literature, see Glaudić and Vuković (2017).

government can improve the efficiency of distributive practices (Bracco et al. 2015). These mechanisms prompted empirical analyses with mixed findings. Ade and Freier (2013) find no local alignment effects in European and German parliamentary elections. According to Glaurdić and Vuković (2017), parties in power at the national level do not necessarily reward areas where they win, but only those where they gain vote share in each election. In Indonesia, Gonschorek et al. (2018) find that districts with low support for the president received significantly more grants than districts with core support, especially in the year of the national election. “These districts are politically promising investment opportunities. If reelection is no longer an option, this investment motive is absent” (Gonschorek et al. 2018, p. 252).

Instead, there is evidence of alignment effects in Spain (Solé-Ollé and Sorribas-Navarro 2008), Germany (Baskaran and Hessami 2017) and Portugal (Migueis 2013). Research providing evidence of alignment effects includes Banful (2011), who finds that Ghanaian districts receive higher allocations when the vote margin in the last presidential election is smaller; Bracco et al. (2015), who provide empirical evidence that aligned municipalities receive higher grants, especially before elections.¹⁰ Brollo and Nannicini (2012) who show that in Brazil, in close elections, mayors aligned with the president receive more funds than unaligned mayors; Sakurai and Theodoro (2020) who report evidence of co-partisan assistance at the gubernatorial level; Curto-Grau et al. (2018) who find that a mayor belonging to the party of the regional president obtains twice the amount in grants received by an opposition’s mayor; Psycharis et al. (2020) who find as well that mayors politically aligned with the incumbent government receive higher shares of grants; Lara E. and Toro M. (2019), who discover tactical distribution to municipalities in Chile, and Azulai (2018), who shows that political connections between ministers—not the president—and mayors are important in explaining the size of grants transferred.

More recently, Baerlocher and Schneider (2021) provide strong evidence that in Brazil federal officials who are politically aligned with the executive branch transfer their discretionary grants more quickly than their politically unaligned counterparts; Ferreira et al. (2021) find that the alignment between municipal and federal chief executives is crucial to the allocation of grants; Ahmad (2021) find that in India relatively higher per capita transfers flow to states inhabited by large swing voters; Ha and Lee (2022) argues that in Korea, decentralised distribution is significantly affected by the partisan interests of central and local governments; and Jarocinska (2022) finds that regions with more loyal voters to the ruling party receive more grants per capita and that the partisan alignment of regional governments also plays a role. Thus, it emerges that, in Spain, the interaction between the central and subnational levels of government is a crucial variable and that party political alignment may play a central role in the allocation of intergovernmental transfers. We therefore formulate our second hypothesis:

Hypothesis 2: Central grants are higher for regions that are politically aligned with the central government.

¹⁰ In Bracco et al. (2015), grants are signals rather than bribes used by the government to manipulate the public good signal in favour of aligned local incumbents and challengers.

An attempt to move a step further is offered by the political agency model elaborated by Arulampalam et al. (2009). They predict that upper-tier governments allocate more resources to lower-tier governments that are both aligned and relatively more swing (i.e., lower-tier governments in which the upper-tier ruling party faces greater political competition). Our results are consistent with the hypotheses, although not with the results of Arulampalam et al. (2009).

We argue that the alignment effect may be enhanced by the fragmentation of the subnational level of government. If this is the case, there may not be an “alignment premium” per se, but rather it varies with the fragmentation of regional government. National government leaders want to ensure that local leaders are loyal and motivated to achieve the party’s goals. Transferring funds to aligned local governments can increase the gratitude of local leaders and thus increase the incumbent’s chance of reelection. In a multiparty system where control of seats is fragmented, the distribution of specific benefits is an important means of attracting parties into the coalition and keeping them together (Baron and Ferejohn 1989). We then formulate the next hypothesis:

Hypothesis 3: Central government (and thus central grants) is biased in favor of regions that are simultaneously aligned and relatively more fragmented (Aligned fragmented premium).

We found that it is not the practice of partisan alignment itself but is the fragmentation of the aligned recipient government that affects the ultimate level of resources. We call this insight *Aligned Fragmented Premium*.

This literature on discretionary government spending, has mostly focused exclusively on the discretionary parts of the budget. However, Besley and Coate (2003, p. 2628) note that “even when spending is allocated formulaically, it is possible for legislators to manipulate such formulas to favor their own districts.” As Sorribas-Navarro (2011) note, in Spain, for example, regions receive additional grants because the formula that determines these funds can be renegotiated.

Further empirical evidence of politically motivated targeting in formula-based systems is provided by Litschig (2012) in Brazil, Banful (2011) and Fumey and Egwaikhide (2019) in Ghana, Abbott et al. (2017) in Mexico, and Foremny et al. (2017) in Spain. Moreover, the complexity of the formulas appears to increase the risk of political capture of the grant-awarding mechanisms (Banful 2011; Caldeira et al. 2012).

Despite the fact that all these factors may influence the strategic resource allocation of national incumbents, no efforts have been made to integrate the “alignment effect” with the *political fragmentation approach* in the same explanatory model in a quasi-formula-based grant allocation system. Italy provides an ideal case of study, as health grants allocated by the central government to the regions are rule-based but the allocation process involves a high degree of political bargaining.

3 Institutional Setup

The Italian National Health Service, INHS, is funded according to a typical sequential process. The central government determines the amount of funds allocated to the INHS, and the annual funding of each Regional Health Service is the result of a

complex process and lengthy negotiations between the central government and the regional governments. The regions compete with each other, each pushing for the criteria that will benefit it the most in the allocation of available funds.¹¹

Although health care grants are officially described as rules-based, the way they are allocated seems to be rather quasi-discretionary, as much political bargaining is involved, both because the weighted capitation formula changes from year to year after negotiations between the regions and the center, and because the formula itself leaves some room for interpretation (Padovano 2014). To gain insight into the strategic relationship between the central government and the regions in the allocation of health care resources,¹² we summarize relevant background information on the Italian electoral system.

Italy is a unitary republic with a bicameral parliamentary system. Parliament consists of the Chamber of Deputies and the Senate. While the deputies are elected by universal and direct suffrage at the national level, the members of the Senate are elected by universal and direct suffrage at the regional level by voters who have reached the age of twenty-five. Elections are held every 5 years, unless Parliament is dissolved early.¹³ The government of each region consists of three bodies—a council with legislative powers, an executive committee and its President.

The electoral system for regional elections follows a mixed-member logic. The regional council is elected at the same time as the president. Voters can express two votes on the ballot paper: they choose a candidate for the presidency in the majoritarian part, and a list that does not necessarily support that candidate and is running for seats in the legislative regional assembly in the proportional part. Separate voting is permitted. The majoritarian part of the electoral competition is the one that determines the main result of the elections, allocating the leadership of the executive and determining the majority in the legislative assemblies through a majority bonus. This *premium* ensures that the President can always count on a solid majority in the Council.¹⁴

¹¹ Each year, the *State-Regions Conference*, the President of each region and representatives of the central government set the criteria for allocating funds to the regions. In order to promote regional responsibility, the needs are not fully met. The government determines the amount of “topping up to be given to regions as conditional grants” (Bordignon and Turati 2009, p. 307). Due to interregional differences in the tax base, regions that are unable to provide the basic package of health services receive additional funds from the National Solidarity Fund (NSF). These funds are intended to reduce disparities between regions, especially between northern regions (the richest) and southern regions.

¹² The Italian system of public governance has three sub-national levels, regions, provinces, and municipalities.

¹³ During the observed period (2001–2011), Italy held parliamentary elections in 2001, 2006 and 2008 with an electoral system based on proportional representation with a majority bonus at the central level. The regions have an elected parliament called *Consiglio Regionale* (Regional Council) and a government called *Giunta Regionale* (Regional Committee), headed by a governor called President of the regional committee or Regional President.

¹⁴ The regional electoral system is mixed: 4/5 of the members of the regional council are elected by a proportional system, while 1/5 are elected by a majority system from a regional list (called “*listino*”). The dataset takes into account the different methods by which the majority bonus is converted into seats. When the bonus is awarded from a “locked regional list” that is associated with the entire coalition and where party identification is not possible, the majority bonus is not calculated. Since the composition of the bonus seats roughly reflects the proportion of parties that already make up the coalition, no further information is added to the analysis.

Each regional list is headed by a leading member who is the candidate of the coalition for the presidency of the regional council. He is elected directly by the voters. The President chairs the Regional Committee and appoints or dismisses its members, called *Assessori*, who may be elected from outside the Regional Council. When the directly elected president resigns, new elections are called. Regional elections were held in 2000 and 2005, in the years of interest (see Table 1).¹⁵

Both the plurality system for the election of the President and the majority premium for the coalition supporting the winning presidential candidate have allowed a large number of parties to survive and have given a strong push to the bipolarization of the party system.

4 Empirical Strategy

The empirical analysis is based on a new and specifically assembled panel dataset consisting of annual observations of the Italian Ordinary Statute Regions, OSRs,¹⁶ for the period 2001–2011. The variables and the data sources are presented in Table 2. The panel reflects data availability. Excluded from the empirical analysis are the five Regions with special Statute, RSS¹⁷ because of their particular financing structure and spending autonomy, and because they have their own electoral laws.

Despite the differences among the 15 OSRs (in terms of size and number of political parties governing them, extension, density, age structure of the population, and GDP *per capita*, one advantage of restricting our empirical analysis to these regional governments is, that the budgetary institutions and the rules of government are the same for all the units considered, and therefore we avoid to some extent the problem of omitted unobserved variables explaining heterogeneity across different types of governments, and, as highlighted by Ashworth et al. 2005), this is an advantage of using subnational data. It is important to note that the database reflects not only data availability but also the fact that after 2011 it is not possible to capture the colour of the central government because we had only national coalition governments.¹⁸

¹⁵ Only in Molise, due to voting irregularities, an early election was also held a year later, in 2001 and then in 2006. Again later, in Molise, the 2011–2016 legislature was dissolved early in the 2011 regional elections.

¹⁶ The OSRs are Piedmont, Lombardy, Veneto, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Apulia, Basilicata and Calabria. Excluded from the empirical analysis were the 5 Special Statute Regions (Aosta Valley, Friuli-Venezia Giulia, Sardinia, Sicily and Trentino-Alto Adige).

¹⁷ Italy has a three-tier system consisting of the regions, the provinces and the municipalities. It is often referred to as a “regionalized country”. Italy has an asymmetric decentralisation with fifteen regions with ordinary statute (RSO) and the five Regions with special statute (RSS), which enjoy even more legislative and financial autonomy. RSOs are Piedmont, Lombardy, Veneto, Liguria, Emilia-Romagna, Tuscany, Umbria, Marche, Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata and Calabria, while the five RSS, excluded from the empirical analysis, are Valle d’Aosta, Trentino-Alto Adige, Friuli-Venezia Giulia, Sardinia and Sicily.

¹⁸ After 2011, it would be impossible to define some variables. In addition, the decentralisation process has been affected by the change in the structure and organisation of the INHS, in accordance with Legislative Decree N. 229 of 1999 and the introduction of “fiscal federalism” by Legislative Decree No. 56 of 2000. Therefore, we decided not to include the years before 2000 because these reforms significantly changed

Table 1 Number of elections in Italian regions in the years of interest

Region	Area	Number of elections considered	Years
Abruzzo	South	3	2000/2005/2008
Basilicata	South	3	2000/2005/2010
Calabria	South	3	2000/2005/2010
Campania	South	3	2000/2005/2010
Emilia-Romagna	Center	3	2000/2005/2010
Lazio	Center	3	2000/2005/2010
Liguria	North	3	2000/2005/2010
Lombardia	North	3	2000/2005/2010
Marche	Center	3	2000/2005/2010
Molise	South	2	2001/2006
Piemonte	North	3	2000/2005/2010
Puglia	South	3	2000/2005/2010
Toscana	Center	3	2000/2005/2010
Umbria	Center	3	2000/2005/2010
Veneto	North	3	2000/2005/2010

4.1 Model Specification

In our framework, the same parties appear at both the state and the regional levels, and healthcare grants are seen as a strategic tool for central governments seeking reelection. This is true even in a formula-based system, as “it is possible for legislators to manipulate such formulas to favor their own districts” (Besley and Coate 2003, p. 2628). In Italy, for instance, the formula itself leaves some room for interpretation and the weighted capitation rate changes from year to year after negotiations between the regions and the center. Given this framework, our basic empirical model is:

$$\begin{aligned} \log(\text{GRANTSPC}_{it}) = & \beta_0 + \beta_1 \text{Regional ENP}_{Gol}^{Majority}{}_{i(t-1)} + \beta_2 \text{Regional ENP}_{Gol}^{Opposition}{}_{i(t-1)} \\ & + \beta_3 \text{Aligned}_{i(t-1)} + \beta_4 \text{Tenure}_{i(t-1)} + \beta_5 \text{Regional Election}_{i(t-1)} \\ & + \beta_6 \text{Control Variables}_{i(t-1)} + \beta_7 \text{Time Trend}_{i(t-1)} + \alpha_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where the subscript i denotes regions and t is time in years. The dependent variable is the logarithmic transformation of fiscal transfers per region i and year t , in real *per-capita* terms, $\log(\text{GRANTSPC})$. Total transfers include *ex-post* transfers distributed annually by the central government to cover regional healthcare deficits. The variable

Footnote 18 continued

the health care financing system in Italy. The traditional system of forwarding to the regions the funds allocated by Parliament for health care financing was replaced by tax revenues allocated directly to the regions (regional revenue sharing VAT, increase in personal income tax, regional share of gasoline tax). The transition was to be gradual, taking into account historical health expenditures in the first 3 years. For the regions that are in a more difficult situation, the Decree Law provides for a national equalisation fund by 2013, financed from the revenues of VAT, guaranteeing the achievement of a basic level of health care throughout the country.

Table 2 Variables' description

Variable	Explication	Source
Dependent variables		
GRANTS _{PC}	Regional real healthcare cash-basis grants in real <i>per-capita</i> terms	MEF
Independent variables		
Regional ENP ^{Majority} _{Gol}	Effective number of parties in the regional majority, as in Golosov's (2010) formulation in terms of seats detained by each party in a coalition	Own calculation based on electoral data from the website: http://elezionistorico.interno.it/
Regional ENP ^{Opposition} _{Gol}	Effective number of parties outside the majority, formulated as above	Own calculation based on electoral data from the website: http://elezionistorico.interno.it/
National ENP ^{Council} _{Gol}	Effective number of parties supporting the central government at the Senate, formulated as in Golosov (2010)	Electoral data from the website: http://www.senato.it/
Aligned	Dummy variable equals to 1 in regions and years where the coalitions supporting the regional and national governments are the same (0 otherwise). It captures the alignment effect	Electoral data from the website: http://elezionistorico.interno.it/
Tenure	Number of year in office of a regional President	Electoral data from the website: http://elezionistorico.interno.it/
Regional election	Dummy variable equals to 1 if, in a region, there are elections in the second half of year t or in the first half of the year $t + 1$ (zero otherwise)	Electoral data from the website: http://elezionistorico.interno.it/
Political control variables		
Swing	Dummy variable equals to 1 if there was at least one change in the political color of the regional government in the last 15 years (and zero otherwise)	Electoral data from the website: http://elezionistorico.interno.it/
Structural deficit	Cyclically adjusted structural deficit of public administrations at the national level	OECD
Structural control variable		

Table 2 continued

Variable	Explication	Source
Regional GDP per-capita	Regional Gross Domestic Product in real <i>per-capita</i> terms	ISTAT
Regional Health Exp	Regional real public healthcare expenditure <i>per-capita</i> at time <i>t-1</i>	MEF
Regional Unemployment 15+ (%)	Regional percentage of unemployed people older than 15	ISTAT
Population 75+ (%)	Regional percentage of population older than 75	ISTAT
Regional population	Regional population in absolute values	ISTAT

is forwarded one period to tackle the political delay in implementing the negotiated allocation of financial flows. This is consistent with the intuition that transfers to a region may adjust slowly and depend on the values of the previous year. This effect persists when different covariates are taken into account.

4.1.1 Effective Number of Parties: Index Construction

Given the prominent critiques of the Effective Number of Parties as formulated by Laakso and Taagepera, (Goloso 2010; Dunleavy and Boucek 2003; Kline 2009), we introduce a new and improved index based on Goloso (2010), ENP_{Gol} . This index better “account(s) the relative sizes of parties” (Goloso 2010, p. 172) and better reflects the dominance of parties that win overall majorities. It is calculated¹⁹ on the seats each party has within a coalition, using the following formula:

$$ENP_{Gol} = \sum_1^x \frac{s_i}{s_i + (s_1^2) - s_i^2} \quad (2)$$

where s_i is each party’s share of seats (or votes) and s_1^2 is the square of the largest party’s share of seats (or votes). It considers the largest party as 1 and weights all other parties proportionally. Figure 1 illustrates how ENP_{Gol} provides a clearer distinction between more fragmented and concentrated political arenas when confronted with the Laakso and Taagepera index ENP_{LT} . Large values of ENP_{Gol} represent a diffuse political system in which multiple political parties share control of the government and electoral contests are fought by multiple parties; small values characterize a political system with few electoral competitors and a government controlled and run by few political parties. More pronounced polarization increases the variability of this index, clearly

¹⁹ At the regional level, the calculation in terms of seats, both for the majority and the opposition, is done immediately after the election.

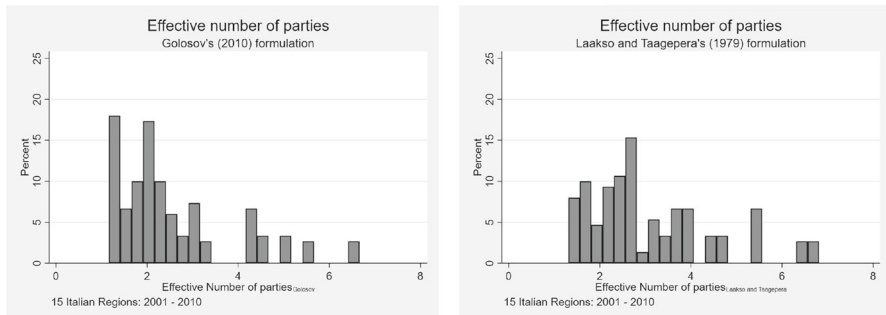


Fig. 1 Frequency distribution of the “Effective Number of Parties” in the regional majorities: Golosov (2010) vs Laakso and Taagepera (1979). *Note:* the *Effective Number of Parties*, calculated as in Golosov (2010), is confronted with the Laakso and Taagepera’s index. The Golosov index offers a clearer distinction between more fragmented and concentrated political arenas

distinguishing between concentrated and highly fragmented coalitions and (partially) overcoming the inherent problems of low variability of fragmentation indices and fixed effects estimators. This property is particularly useful for our analysis because ENP_{Gol} takes into account the effective number of parties in the regional majority coalition, i.e. the degree of fragmentation of a government, **Regional** $ENP_{Gol}^{Majority}$. The same methodology is also used to construct **Regional** $ENP_{Gol}^{Opposition}$, which distinguishes between a united and a divided opposition.²⁰

Our hypothesis is that the more fragmented the majority (opposition) coalition, the higher (lower) the derived health care funding. As expected, the sign of the variable is positive for **Regional** $ENP_{Gol}^{Majority}$ and negative for **Regional** $ENP_{Gol}^{Opposition}$. As pointed out by Mukherjee (2003), as the number of political parties represented increases, so does the number of special interests and voter groups represented. In this case, individual parties have stronger incentives to support spending on subsidies and transfers, as this provides more “pork” to meet the demands of their constituencies (Harrinvirta and Mattila 2001; Perotti and Kontopoulos 2002; Ricciuti 2004).²¹

In our framework, the role of a united opposition holding the government accountable cannot be neglected. Like a fragmented government, a fragmented opposition would have difficulty achieving political consensus and commitment, and would therefore be unable to monitor government decision making (Padovano and Venturi 2001; Ricciuti 2004). Therefore, a government with a divided opposition may not only be able to pursue successful, short-term fiscal policy, but also remain unopposed.

²⁰ The governing coalition includes all parties that form a cabinet, while the opposition includes all parties outside the government that have at least one seat in the regional parliament.

²¹ Some empirical work found evidence to support the prediction that increasing the number of parties represented in a multiparty legislature leads to higher spending on subsidies and transfers at the local government level. Specifically, Pommerehne and Schneider (1978) for Swiss cantons, Poterba (1994) for US states, and Borge and Rattsø (2002) for Norwegian municipalities look at the effects of political fragmentation on budget outcomes.

4.1.2 Political and Control Variables

We include a number of political variables. The variable **Aligned** captures the “alignment effect”. A region is said to be aligned with a higher-level government if the party controlling the government at both levels is the same. In our framework, alignment status is captured by a dummy variable that equals 1 if the region’s president is supported by one of the parties in the coalition government (i.e., the central government). Otherwise, the variable equals zero. Another compelling line of research tests the argument that the ability to negotiate more resources and the intrusion of interest groups into government decisions is an increasing function of time. The variable **Tenure**—the number of years in office of a regional president—is a measure of lobbying processes and personal skills. The longer a (regional) government has been in office, the more effectively it can lobby the central government for higher grants. If a government has been in office for only a short time, it is not held accountable for the results of its policies, so the central government has less incentive to redistribute funds because it is not politically worthwhile. On the other hand, **Tenure** defines personal ability to negotiate more resources. This ability increases with tenure. The corresponding coefficient of this variable is also expected to be positive for **Aligned**.

Most empirical studies have provided evidence that “periodic fluctuations in a government’s fiscal policy are induced by the electoral cycle.” (Alt and Rose 2007). The political budget cycle is expressed by the variable **Regional Election**. It is predicted that incumbent politicians exploit information asymmetries to signal their competence to voters, e.g. by demonstrating their ability to produce public goods without raising taxes.

Transfers are then expected to be higher in election years as national politicians distribute grants to “buy” regional political capital with the aim of maximizing the probability of re-election. This effect is captured by the dummy variable **Regional Election**, which takes the value 1 if a region has elections in the second half of year t or in the first half of year $t + 1$ (zero otherwise).

Another set of control variables considers the impact of public finance, economic, and demographic determinants. The logarithmic transformation of regional GDP *per-capita* **Regional GDP per-capita (log)**—captures macroeconomic performance and conveys an “income effect.” We assume that transfers are negatively correlated with this variable, consistent with the equity-efficiency hypothesis of redistribution of public resources.

Demand effect is expressed by **Population 75+ (%)**, the proportion of people in a region who are 75 years and older. Health transfers are expected to be positively correlated with **Population 75+ (%)** and the unemployment rate (**Regional Unemployment 15+ (%)**). The logarithm of the regional real level of public health spending *per-capita* in the previous year, **Regional Health Exp (log)**, tests for any effect of the previous years’ allocation on the current transfer level. It captures the so-called “spesa storica”, an incremental rule *à la* Wildavski, which is explicitly enshrined in Italian legislation.²² The logarithm of the regional population, **Regional Population (log)**,

²² In 2009 (Law 42/2009), the “spesa storica” was finally abolished and replaced by the standard cost principle in order to take into account structural parameters (i.e. demographic, socio-economic and fiscal indicators) rather than past spending.

accounts for the presence of economies of scale. In addition, this variable accounts for the correlation between the size of the council and the fragmentation of the council itself. Council size correlates with population size, but also affects fragmentation (a 5% party would hardly elect anyone in a sparsely populated region with a small council size, but would certainly elect some representatives in heavily populated areas. In the case of Italy, it is particularly true that fragmentation has an institutional explanation (Chiaramonte 2007). First, electoral thresholds are generally low. More precisely, thresholds are high for parties that run in elections on their own, but less restrictive when small parties are part of large coalitions. The second reason is somewhat more subtle. As we have seen, voters in all regions can cast two votes, one for a presidential candidate (the majoritarian vote), the other for a party (the proportional vote). But they can also choose a single preference for a candidate or a party. If they choose the latter, the vote for the party is automatically transferred to the candidate supported by that party. This explains why coalitions have a strong incentive to field as many lists as possible, especially in close races. As it is particularly evident in populous regions, even small parties that have no hope of representation can muster the few votes that can be decisive for victory or defeat in a majority election.

A linear trend is also considered to model technological changes over time. We create region-specific trends (**Time Trend**), that imply that technological progress occurs at a steady pace specific to each region and correlates with regional GDP deflator growth.

Finally, the structurally adjusted deficit, **Structural deficit**, proxies the fiscal limits of the European Union. It traces any external constraint on the dynamics of the “common pool” in healthcare financing. For a qualitative description of each variable, see Table 2.

4.2 Methodology

To test whether the data have any problem, heteroskedasticity, serial autocorrelation and cross-sectional dependence are tested. Unfortunately, for panel data of this length, the tests developed by Wooldridge (2002), Pesaran (2004b), and Breusch and Pagan (1980) cannot be considered reliable for panel data of this length.²³

Cross-sectional dependence may occur due to omitted common effects or spatial dependence in regional data, typically observed in regional panel data (Pesaran 2015). It may be the result of local spill-over effects between countries or regions (Eberhardt and Teal 2011). Ignoring cross-sectional dependence can lead to misleading conclusions and inconsistencies (Pesaran 2015). From a purely economic perspective, however, it would be difficult to argue that there is no cross-sectional dependence and autocorrelation of the error when it is a bargained allocation of public funds. In particular, Italy is constrained by (international) financial boundaries at the EU level, and the central government is responsible for ensuring the general objectives and basic

²³ According to Pesaran (2004b), the statistical power of the test is unacceptably low for such a panel size. Since the test of Wooldridge may also be unreliable for small panels for the reasons given by Drukker (2003), the test of Bhargava et al. (1982) and the test given in Devereux et al. (2008) are also conducted, confirming the presence of autocorrelation of the error.

principles of the INHS, as well as for allocating national resources to the regions. It follows that each region receives an amount of resources that is influenced by the amount of funds received elsewhere, i.e. from all other regions. There is thus a (negative) cross-sectional dependency. For all these reasons, we apply to the estimated model the CD test, developed in Pesaran (2004a) and Pesaran (2015), as well as those Frees (1995) and Frees et al. (2004), which are tests for cross-sectional independence. When N is large, this test, which takes into account the extent of dependence, may be more appropriate than the Breusch–Pagan LM test, which tests the extreme null hypothesis of independence. Moreover, the CD test proves to be powerful for both static and dynamic panels. The test rejects the null hypothesis of cross-sectional independence in favor of cross-sectional dependence, as can be seen in Table 5.²⁴

For all these reasons, we opt for the Panel Corrected Standard Errors, PCSE (Beck and Katz 1995), which are robust to the general form of heteroskedasticity, cross-sectional dependence, and autoregressive structure of the error.²⁵ Specifically, Monte-Carlo simulations show that this estimator performs well for small panel data (Beck and Katz 1995, p. 642).

Moreover, when it comes to constructing accurate confidence intervals with balanced panel data, that are characterized by Parks-style heteroskedasticity, serial correlation,²⁶ and cross-sectional dependence, Reed and Ye (2011) suggested either the Beck and Katz's Panel Corrected Standard Errors, PCSE estimator, or Pooled-OLS (with heteroskedasticity and cross-sectional dependence robust standard error).

5 Estimation Results

5.1 Fixed Effect Estimates

The results of the preliminary fixed effects regressions can be found in Table 3. In this specification, we first analyse the effects of overall council fragmentation. To account for possible endogeneity bias due to omitted variables, we test whether regional-level fragmentation (which is not fully invariant in the time domain) is robust to a fixed effects specification, given the importance of controlling for unobserved region-specific effects that could simultaneously affect public resource redistribution and government fragmentation (Baskaran 2013, p. 357). In column (1) and column (2), we estimate a model without a control variable. Regional $ENP_{Gol}^{Council}$ is relevant in magnitude and highly significant, as is the **Tenure** variable, and, to some extent,

²⁴ Another useful solution would be the Breusch–Pagan LM test (Breusch and Pagan 1980), which is simply based on the average of the squared pairwise correlation of the residuals. This test has good power when N is relatively small (Pesaran 2015), and our sample of only 10 regions might be a case for this application. However, when N is of similar size to T , the LM test may be subject to a large bias, which is particularly relevant when T is small.

²⁵ In this case, the general White method (Arellano 1987) produces consistent standard errors when the residuals are correlated within clusters but uncorrelated between clusters. On the other hand, the feasible generalized least squares (FGLS) method is not feasible when the time dimension of the panel, T , is smaller than its cross-sectional dimension, N (Hoechle 2007).

²⁶ As recommended by Reed and Ye (2011), the value of the AR (1) parameter in the error term—i.e. in the presence of serial correlation—should not exceed 0.30.

Table 3 Fixed-effect regressions with XTPCSE standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
Regional ENP ^{Council} _{Gol}	0.008***	0.008***	0.005**	0.006**	0.005**	0.006**
	0.003	0.003	0.002	0.002	0.002	0.002
Aligned	0.017	0.016	0.018	0.012	0.018	0.012
	0.014	0.013	0.013	0.013	0.013	0.013
Regional election	0.030**		0.026**		0.026**	
	0.014		0.010		0.010	
Tenure	0.004**	0.007***	0.004*	0.005***	0.004*	0.005***
	0.002	0.002	0.002	0.002	0.002	0.002
Regional unemployment 15+ (%)			0.004*	0.008***	0.004*	0.008***
			0.002	0.002	0.002	0.002
Regional GDP per-capita (log)			0.241	0.738**	0.241	0.738**
			0.202	0.355	0.202	0.355
Population 75+ (%)			- 0.012	- 0.042	- 0.012	- 0.042
			0.031	0.048	0.031	0.048
Regional health exp (log)			0.001	- 0.170	0.001	- 0.170
			0.150	0.196	0.150	0.196
Regional population (log)			1.294*	0.942	1.294*	0.942
			0.761	0.871	0.761	0.871
Structural deficit (%)			- 0.016**	- 0.001	- 0.016**	- 0.001
			0.007	0.010	0.007	0.010
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
Region-specific trend	Yes	No	Yes	No	Yes	No
Year dummies	No	Yes	No	Yes	No	Yes
Autoregressive AR(1) ρ	0.31	-	0.26	-	0.26	-
R-Square	0.99	0.96	0.99	0.97	0.99	0.97
No. of cases	150	150	150	150	150	150

The estimation method is fixed effects with panel corrected standard errors reported in brackets. All time variant controls are lagged 1 year. Asterisks indicate significance level at the 10(*), 5(**), 1(***) percent level

the effect of the political cycle captured by the **Regional Election**. No significant effect of the alignment effect is found. Adding year dummies (and assuming that the error term is not autocorrelated) as in column (2) does not seem to have a negative impact on the parameters, either in terms of magnitude or statistical significance. Because of possible collinearity with time-dependent dummies, the variable **Regional Election** is not included in column (2). Control variables are introduced in columns

(3) and (4) and the same results are confirmed. As expected, the introduction of region-specific intercepts leads to a slight loss of statistical significance for the most serially correlated variables, such as Regional ENP_{Gol}^{Council}. However, the magnitude of the coefficients does not appear to be noticeably affected. As for the coefficients of the control variables, only **Regional GDP per-capita** and **Regional Unemployment 15+ (%)** show a positive and statistically significant impact on the dependent variable.

Table 4 shows the estimation results of several model specifications with time and region effects that break down council fragmentation into both ENP_{Gol}^{Majority} and ENP_{Gol}^{Opposition}. If no time dummies are included, a common autoregressive structure of the error is assumed.²⁷ A region-specific trend is added to avoid collinearity and to proxy steady increase in *per-capita financing* due to technological change.²⁸ PCSE are chosen to handle cross-sectional dependence, heteroschedasticity, and autocorrelation in the error term. As expected, the introduction of region-specific intercepts results in a loss of statistical significance for the most serially correlated variables, such as those capturing fragmentation (**Regional ENP_{Gol}^{Majority}**) and the “alignment effect” (**Aligned**), and to a lesser extent the healthcare and economic variables.²⁹

In column (1) and column (2), we again estimate a model without control variables, allowing for fixed time effects only in the first column. While other parameters do not appear to be affected, the fragmentation effect of the Majority, which is driven by the variable—**Regional ENP_{Gol}^{Majority}**—has a positive and statistically significant effect on transfer flows. Moreover, the effect is larger than when considering total council fragmentation. The Model in column (2) shows a weak negative effect on transfer flows of the Opposition’s ENP **Regional ENP_{Gol}^{Opposition}**. The effect is marginally significant and corresponds to a slight decrease in the statistical significance of the coefficient of the ENP of the majority.

As with the other political controls, the effect of the political cycle—via the dummy variable **Regional Election**—explains the 2.8% of the redistribution of health care grants. This result accounts for the possibility that strategic resource allocation could occur when electoral concerns are stronger (e.g., in the years leading up to elections). This result is consistent with the literature on political business cycles (Baleiras and da Silva Costa 2004; Drazen and Eslava 2005)

In the columns from (3) to (6) in Table 4, structural controls are added. As in model (3) and (4) in Table 3, the introduction of region-specific intercepts results in a slight loss of statistical significance for the highly serially correlated variables. As expected, the variable **Structural deficit**—which is time-variant but cross-sectionally invariant—is always negative and statistically significant.³⁰ This is evidence of

²⁷ A common autoregressive parameter is preferred over the panel-specific autoregressive one because the standard errors are larger in small panels. Common autoregressive coefficients are reported in each estimate.

²⁸ A linear combination of the regional GDP deflator is considered a cross-section-specific time trend.

²⁹ When Model 1 and Model 3 in Table 4 are compared with the POLS regressions in the robustness checks (Sect. 6) in Table 8, the estimated parameters in a Pooled OLS model increase while the standard errors remain the same. This is due to the extremely low intertemporal variability resulting from the introduction of the FE-estimator, which causes a reduction in the coefficients and thus erases much of the heterogeneity.

³⁰ In Model 4 in Table 4, the joint inclusion of time dummies, fixed effects, and variables that change only in the cross-section domain leads to some computational problems with the estimated parameter of

Table 4 Fixed-effects regressions with XTPCSE standard errors

Logarithm of <i>per-capita</i> level of derived financing	(1)	(2)	(3)	(4)	(5)	(6)
Regional ENP ^{Majority} _{Gol}	0.013*** (0.004)	0.011** (0.005)	0.007** (0.003)	0.006* (0.004)	0.006* (0.003)	0.004 (0.004)
Regional ENP ^{Opposition} _{Gol}	0.001 (0.015)	- 0.022* (0.013)			- 0.012 (0.012)	- 0.028*** (0.009)
Aligned	0.017 (0.014)	0.019 (0.013)	0.018 (0.013)	0.010 (0.013)	0.018 (0.013)	0.014 (0.013)
Regional election	0.029** (0.014)		0.026** (0.010)		0.028** (0.011)	
Tenure	0.004* (0.002)	0.008*** (0.002)	0.004** (0.002)	0.006*** (0.002)	0.005** (0.002)	0.007*** (0.002)
Regional unemployment 15+ (%)			0.004** (0.002)	0.008*** (0.002)	0.005** (0.002)	0.010*** (0.002)
Regional GDP per-capita (log)			0.246 (0.203)	0.703** (0.358)	0.300 (0.209)	0.790** (0.346)
Population 75+ (%)			- 0.012 (0.031)	- 0.039 (0.049)	- 0.007 (0.032)	- 0.027 (0.048)
Regional health exp (log)			0.003 (0.147)	- 0.157 (0.188)	0.001 (0.145)	- 0.157 (0.158)
Regional population (log)			1.263 (0.776)	0.941 (0.882)	1.308* (0.783)	0.970 (0.888)
Structural deficit (%)			- 0.016** (0.007)	- 0.003 (0.010)	- 0.017** (0.007)	- 0.023** (0.011)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
Region-specific trend	Yes	No	Yes	No	Yes	No
Year dummies	No	Yes	No	Yes	No	Yes
Autoregressive AR(1) ρ	0.31	-	0.26	-	0.26	
R-Square	0.99	0.96	0.99	0.97	0.99	0.97
No. of cases	150	150	150	150	150	150

The estimation method is fixed effects with panel corrected standard errors reported in brackets. All time variant controls are lagged 1 year. Asterisks indicate significance level at the 10(*), 5(**), 1(***) percent level

Table 5 Cross-sectional dependence of residuals test results

CD test	Absolute value	p value
Pesaran	4.159	0.00*
Frees	1.103	0.00*

*Refers to the rejection of the null hypothesis of cross-sectional independence in Fixed Effects panel data models

Table 6 Fixed-effect regressions with interaction terms

Logarithm of <i>per-capita</i> level of derived financing	(1)	(2)	(3)	(4)	(5)
Regional ENP ^{Majority} _{Gol}	- 0.000	0.003	0.002	0.004	0.017
	(0.005)	(0.004)	(0.004)	(0.004)	(0.012)
Aligned	- 0.015	- 0.002	- 0.020	- 0.002	0.138***
	(0.022)	(0.021)	(0.025)	(0.022)	(0.047)
National ENP ^{Council} _{Gol}					0.034
					(0.024)
Regional ENP ^{Majority} _{Gol} × Aligned	0.012**	0.008	0.012**	0.008	- 0.017
	(0.005)	(0.005)	(0.006)	(0.006)	(0.015)
National ENP ^{Council} _{Gol} × Aligned					- 0.072***
					(0.025)
Regional ENP ^{Majority} _{Gol} × National ENP ^{Council} _{Gol}					- 0.004
					(0.005)
Regional ENP ^{Majority} _{Gol} × National ENP ^{Council} _{Gol} × Aligned					0.013
					(0.008)
Regional ENP ^{Opposition} _{Gol}	- 0.028***	- 0.012			
	(0.009)	(0.012)			
Tenure	0.007***	0.005**	0.006***	0.004**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Regional election		0.028***		0.027***	0.039***
		(0.011)		(0.010)	(0.015)
Regional dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	No	Yes	No	No
Control variables	Yes	Yes	Yes	Yes	Yes
Region-specific trend	No	Yes	No	Yes	Yes
Autoregressive AR(1) ρ	-	0.27	-	0.29	0.32
R-Square	0.97	0.99	0.97	0.99	0.99
No. of cases	150	150	150	150	150

The estimation method is fixed effects with panel corrected standard errors reported in brackets. All time variant controls are lagged 1 year. Asterisks indicate significance level at the 10(*), 5(**), 1(***) percent level

Table 7 Marginal effects on the derived *per-capita* financing on changes in the Effective number of parties conditioned on the “alignment effect”

Model	\hat{ME}	(St. Err.)	p-value	95% confidence interval	
(1)					
(Aligned = 0)	− 0.000	(0.005)	0.97	− 0.009	0.009
(Aligned = 1)	0.012***	(0.004)	0.00	0.004	0.019
(2)					
(Aligned = 0)	0.004	(0.004)	0.35	− 0.004	0.011
(Aligned = 1)	0.011**	(0.005)	0.01	0.002	0.020
(3)					
(Aligned = 0)	0.002	(0.005)	0.72	− 0.007	0.010
(Aligned = 1)	0.014***	(0.004)	0.00	0.006	0.022
(4)					
(Aligned = 0)	0.004	(0.004)	0.25	− 0.003	0.011
(Aligned = 1)	0.012***	(0.005)	0.01	0.002	0.021

MEs refer to Models presented in Table 6. All time variant controls are lagged 1 year. Asterisks indicate significance level at the 10(*), 5(**), 1(***) percent level

the strong effect of the external budget constraint in containing the redistributive dynamics of the “common pool” consistent with Bordignon and Turati (2009). Conversely, the effective number of opposition parties—**Regional ENP_{Gol}^{Opposition}**—does not perform very well except in Model 6 (Table 4), which includes fixed effects, time dummies, and control variables. We expect the final level of grants to be affected by the bargaining power of the opposition. It appears that the central government can impose its preferences when the opposition is fragmented (i.e., weaker). Our results only partially confirm our hypothesis.

When control variables such as the unemployment rate and GDP *per-capita* are added, some additional distortionary effects in the distribution of transfers become apparent. The positive coefficient on the unemployment rate—**Regional Unemployment 15+ (%)**, a general proxy for the state of the economy—suggests the consequence of a countercyclical use of regional redistribution.³¹ Contrary to expectations, the coefficient on GDP *per-capita* in Model 4 and Model 6 in Table 4 is positive and significant, suggesting that as regional GDP *per-capita* increases, grants to a region also increase. However, the reported results are consistent with the assumption that political influence is positively correlated with GDP *per capita*. These results reflect the greater influence that regions with high GDP exerted on the design of the grant distribution formula.

The alternative statistical significance of ENP in the majority and in opposition, particularly evident in column (6), is due to the interaction of two variables with

Structural deficit. Replication of the estimate with the standard error of Driscoll and Kraay yields results consistent with the Model in column 1 and column 2 of Table 4.

³¹ This result is consistent with Plümper et al. (2005). They found that unemployment tends to exert upward pressure on public budgets.

Table 8 Robustness checks

Logarithm of <i>per-capita</i> level of derived financing	(1)	(2)	(3)	(4)
Regional ENP ^{Majority} _{Gol}	0.013*** (0.004)	0.014*** (0.005)	0.007* (0.004)	0.015*** (0.005)
Regional ENP ^{Opposition} _{Gol}		0.016* 0.010		
Aligned	0.033** (0.015)	0.026* (0.015)	0.014 (0.012)	0.031** (0.014)
Regional election				0.018 (0.017)
Tenure	0.001 (0.003)	0.001 (0.003)	0.007*** (0.002)	0.002 (0.002)
Swing			0.126*** (0.015)	0.083*** (0.030)
Regional unemployment 15+ (%)	0.016*** (0.002)	0.015*** (0.002)	0.015*** (0.002)	0.010*** (0.002)
Regional GDP per-capita (log)	- 1.022*** (0.066)	- 1.007*** (0.061)	- 1.070*** (0.064)	- 0.942*** (0.118)
Population 75+ (%)	0.077*** (0.007)	0.077*** (0.007)	0.094*** (0.007)	0.075*** (0.013)
Regional health exp (log)	0.180 (0.135)	0.115 (0.146)	- 0.064 (0.129)	0.081 (0.138)
Regional population (log)	- 0.034*** (0.007)	- 0.034*** (0.007)	- 0.026*** (0.007)	- 0.042*** (0.013)
Structural deficit	- 0.022*** (0.005)	- 0.010 (0.008)	- 0.014*** (0.003)	- 0.008 (0.012)
Macro-area dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No
Region-specific trend	No	No	No	Yes
R-Square	0.94	0.94	0.95	0.99
No. of cases	150	150	150	150

Pooled-OLS regressions. The estimation method is fixed effects with panel corrected standard errors reported in brackets. All time variant controls are lagged by 1 year. Asterisks indicate significance level at 10(*), 5(**), 1(***) percent level

low intertemporal variability and fixed time effect. The empirical analysis shows that majority fragmentation has a leading effect on the dependent variable that is larger in magnitude than the ENP at the council level. All in all, the results confirm that transfers to maximize returns in the form of votes are not targeted to areas where political support is concentrated (Cox and McCubbins 1986), but to areas where majorities tend to be fragmented. This finding adds a new and interesting result to the empirical literature. A previously neglected variable, the effective number of parties in the regional majority, is likely to be an important factor in explaining grant flows.

5.2 The Combined Effect of Alignment and Fragmentation

To further test whether the central government is biased in favor of the aligned regions and, among them, in favor of the relatively more fragmented regions, we used an interaction model to estimate what we call “the alignment fragmented premium” in Tables 6 and 7.

We consider the marginal effect of the continuous variable **Regional ENP**^{Majority_{Gol}} conditioned on the binary variable **Aligned**. The marginal effect, ME, of the ENP is calculated as follows:

$$\widehat{ME}_{\text{Regional ENP}^{Majority}_{Gol}} = \frac{\partial \log(F)}{\partial \text{Regional ENP}^{Majority}_{Gol}} = \begin{cases} \widehat{\beta}_{\text{Regional ENP}^{Majority}_{Gol}} & \text{for Aligned} = 0 \\ \widehat{\beta}_{\text{Regional ENP}^{Majority}_{Gol}} + \widehat{\beta}_{\text{Interaction}} & \text{for Aligned} = 1 \end{cases} \quad (3)$$

The standard errors of the MEs, calculated as in Brambor et al. (2006), are corrected for the presence of cross-sectional dependence.

The structure of Table 6 is the same as that of Table 4, with structural control variables included in each model specification and two different interaction effects added. The conditioned MEs of **Regional ENP**^{Majority_{Gol}} are given in Table 7 to account for the magnitude of the confidence interval, which is shown in Fig. 3 from column (1) to (4). The ME is positive and statistically different from zero only when the regional government is aligned with the central government. In particular, an additional party increases the level of *per-capita* funding on average from +1% to +2%, *ceteris paribus*. Moreover, the presence of a political cycle confirms an additional financial premium of 2.8%. The positive effect of an additional year in office is confirmed, although it is still small in magnitude. The ME of the interaction in Model 1 (Table 6) is shown in Fig. 2. When the government are aligned, the estimated ME of an additional ENP (the punctual estimate is 1.4%) is very close to the results of the Pooled-OLS specification (1.5%) in the robustness checks in Sect. 6 (Table 8). It follows that central government (and hence central grants) is biased in favor of regions that are simultaneously aligned and relatively more fragmented. We call this *Aligned Fragmented Premium* (AFP). It turns out that despite the quasi-formula, the central incumbent changes the distribution of grants in favor of aligned regional arenas with unstable coalitions, given the uncertainty of a coalition. The additional funding is pure patronage politics as the central government seeks the loyalty and motivation of regional parties. These varia-

Fig. 2 Impact of the effective number of parties on changes in health care grants conditioned on the alignment of regional government. *Note:* The axis on the left indicates the magnitude of the marginal effect (the interaction in Model 1, Table 6)

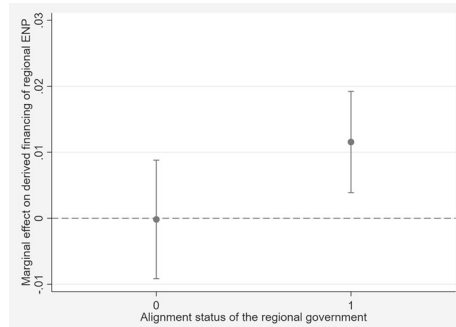
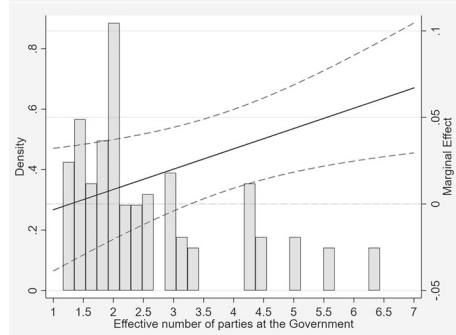


Fig. 3 Impact of the alignment premium on changes in health care grants conditioned on the effective number of parties at the regional level. *Note:* The axis on the right indicates the magnitude of the marginal effect (the interaction in Model 1, Table 6). The vertical axis on the left is for the histogram, which depicts the absolute frequencies of the effective number of parties depicted on the horizontal axis



tions within regions reflect the multiple options available to politicians to change grant levels to extend the life of government, even in a formula-based framework. Table 6 provides the estimation results for the interaction.

Conversely, to examine the marginal effect of the variable **Aligned** on the level of funding, the ME is conditioned by **Regional ENP^{Majority}_{Gol}**. Thus, the marginal effect of the variable **Aligned** is:

$$\widehat{ME}_{\text{Aligned}} = \frac{\partial \log(F)}{\partial \text{Aligned}} = \widehat{\beta}_{\text{Aligned}} + \widehat{\beta}_{\text{Interaction}} \times \text{Regional ENP}_{\text{Gol}}^{\text{Majority}} \quad (4)$$

In this case, the conditional variable is continuous. MEs and meaningful standard errors are calculated for each value of the conditional variable. Figure 3 shows the ME of **Aligned** conditioned by **Regional ENP^{Majority}_{Gol}** calculated from Model 1 in Table 6. The solid line in Fig. 3 illustrates the entire ME from Equation 4, while the dashed lines trace the 95% confidence interval. The distribution of the conditional variable is represented by the gray shaded histogram.

The central government is willing to allocate financial resources to the regions if their president belongs to the same party (or coalition). The “alignment premium” increases if the political arena is populated by more than 3.5 parties (otherwise the effect is not statistically different from zero). In this case, the AFP ranges on average from 3 to 6%.³² There is no “alignment premium” per se, but it varies with regional gov-

³² This finding resolves conflicts between seemingly contradictory previous studies, especially in the Italian case (Padovano 2014; Bordignon and Turati 2009).

ernment fragmentation. In short, regions that are aligned with the central government are likely to receive higher transfers the more fragmented the regional governments are. Transferring funds to aligned local governments can increase the gratitude of local leaders, which increases the incumbent’s chances of reelection. Success in local elections can also contribute to success in national elections. In addition, a national government may want to increase the likelihood of reelection of aligned local leaders if winning local elections gives the party a boost in national elections. In a multiparty system where seat control is fragmented, the distribution of particularistic benefits is an important means of attracting parties into the coalition and keeping them together (Baron and Ferejohn 1989).

Despite the key role that government fragmentation and alignment play in much of the theoretical literature, it seems that fragmentation or alignment alone cannot capture the full complexity of intergovernmental relations. To our knowledge, only Arulampalam et al. (2009) considered another variable, swing, in addition to alignment in their analysis of discretionary transfers. They found that a state that is both aligned and swing in the last election is estimated to receive higher transfers than a state that is neither aligned nor swing. Thus, it appears that previous research has never considered the interaction between partisan alignment of levels of government and fragmentation to determine whether this scenario may lead to a different magnitude of intergovernmental transfers. In a context with multiple levels of government, AFP then reveals a new mechanism affecting intergovernmental grant policy and offers an original contribution to the existing literature on tactical redistribution of resources to subnational governments as well as to the literature on fragmentation.

5.3 Does Fragmentation at the Central Level Affect Grants’ Flows?

To determine whether political fragmentation at the central level strengthens the AFP at the central level, we test a new formulation with two multiplicative terms and **National ENP^{Council}_{Gol}**, i.e., the effective number of parties supporting the central government.³³ This variable measures the fragmentation of the government and captures the strength of decision makers at the central level. It takes into account the effective number of parties in the upper house of the bicameral Parliament, the Senate, and is thus representative of the political balances that directly influence the government.³⁴ We expect politically motivated targeting to increase with fragmentation.

Again, **National ENP^{Council}_{Gol}**, computed as in Golosov (2010) is the new conditioning variable.³⁵ The new ME of an additional effective party is redefined as:

$$\widehat{ME}_{Reg\ ENP_{Gol}^{Maj}} = \frac{\partial \log(F)}{\partial Regional\ ENP_{Gol}^{Maj}}$$

³³ The *ENP_{Gol}* index takes into account, at the national level, the composition of parliamentary parties in November–December of each year, when the Parliament has special duties—“*sessione di bilancio*”—as the annual budget law is debated and passed.

³⁴ The Chamber of Deputies and the Senate have a different electoral system where only the Chamber of Deputies has a majority, with an electoral bonus on a national basis.

³⁵ The variable changes only in the time domain.

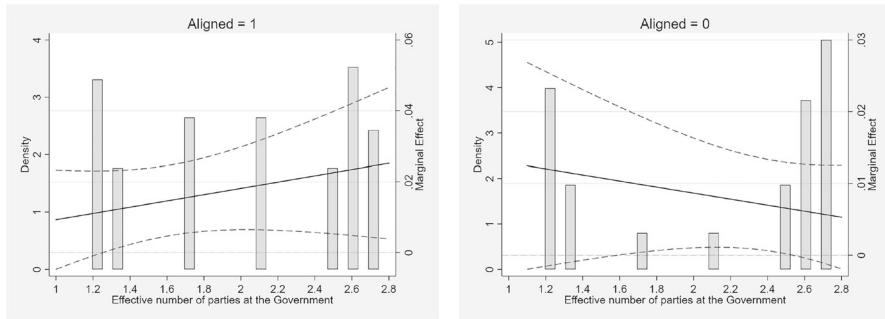


Fig. 4 Impact of the effective number of parties in office on changes in health care grants conditional on the central government fragmentation and the alignment effect. *Note:* Aligned = 1, when regional and national governments are supported by the same coalition (and zero otherwise). The solid line illustrates the overall conditional marginal effect (the interaction in Model 5, Table 6), whereas the dashed lines trace out the 95% confidence interval. Axes on the left are for the histogram, which depicts the relative frequencies of the effective number of parties depicted on the horizontal axis

$$= \begin{cases} \hat{\beta}_{Reg ENP_{Gol}^{Maj}} + \hat{\beta}_{Nat ENP_{Gol}^{Council}} \times Reg ENP_{Gol}^{Maj} \times Nat ENP_{Gol}^{Council} & \text{for Aligned} = 0 \\ \hat{\beta}_{Reg ENP_{Gol}^{Maj}} + (\hat{\beta}_{Nat ENP_{Gol}^{Council}} \times Reg ENP_{Gol}^{Maj} + \hat{\beta}_{Interaction}) \times Nat ENP_{Gol}^{Council} & \text{for Aligned} = 1 \end{cases} \quad (5)$$

The ME of **Regional ENP_{Gol}^{Majority}** at the regional level, conditioned by the **National ENP_{Gol}^{Council}** and by the alignment between the two levels of government, **Aligned**, are derived from Column (5) of Table 6 and presented in Fig. 4.

The results show that the more fragmented the central government, the higher the AFP (the fragmentation premium at the regional level) when the two coalitions are aligned. In this case, the premium averages between 1.5 and 2.5%, depending on how many parties support the central government. On the other hand, if the regional government is not aligned with the central government, the AFP premium (if statistically different from zero) decreases as fragmentation increases. This last result is evidence that there is no “alignment premium” per se.

6 Robustness Checks

6.1 Different Specifications and Other Intervening Factors

In this section, we investigate the sensitivity of our estimates by performing robustness checks, reporting the estimates reported in Tables 8 and 9. We find that our results are robust to substitution of a state-specific trend for the region-specific trends and to exclusion of time fixed effects.

Moreover, we investigate the sensitivity of our results by excluding some regions, starting with Campania, followed by Molise and Abruzzo. Campania was selected due to its highest fragmentation (on average) in the observed period. Due to a political

Table 9 Robustness checks

Model	$\hat{M}E$	(St. Err.)	p-value	95% confidence interval	
R1					
(Aligned = 0)	- 0.001	(0.005)	0.88	- 0.010	0.009
(Aligned = 1)	0.014**	(0.006)	0.01	0.003	0.025
R2					
(Aligned = 0)	0.004	(0.004)	0.32	- 0.004	0.011
(Aligned = 1)	0.013**	(0.006)	0.02	0.002	0.024
R3					
(Aligned = 0)	0.001	(0.005)	0.90	- 0.009	0.010
(Aligned = 1)	0.018***	(0.006)	0.00	0.006	0.029
R4					
(Aligned = 0)	0.005	(0.004)	0.21	- 0.003	0.012
(Aligned = 1)	0.014**	(0.006)	0.02	0.003	0.025
R5					
(Aligned = 0)	0.004	(0.006)	0.48	- 0.007	0.015
(Aligned = 1)	0.019***	(0.005)	0.00	0.009	0.029
R6					
(Aligned = 0)	0.005	(0.004)	0.21	- 0.003	0.014
(Aligned = 1)	0.014**	(0.006)	0.03	0.002	0.026
R7					
(Aligned = 0)	0.006	(0.006)	0.27	- 0.005	0.017
(Aligned = 1)	0.020***	(0.005)	0.00	0.009	0.030
R8					
(Aligned = 0)	0.006	(0.004)	0.13	- 0.002	0.015
(Aligned = 1)	0.014**	(0.006)	0.03	0.001	0.027
R9					
(Aligned = 0)	0.001	(0.004)	0.83	- 0.007	0.009
(Aligned = 1)	0.011**	(0.005)	0.02	0.002	0.020
R10					
(Aligned = 0)	0.002	(0.004)	0.72	- 0.007	0.010
(Aligned = 1)	0.014***	(0.004)	0.00	0.006	0.022
R11					
(Aligned = 0)	0.002	(0.004)	0.64	- 0.006	0.009
(Aligned = 1)	0.011**	(0.005)	0.02	0.002	0.020
R12					
(Aligned = 0)	0.001	(0.004)	0.83	- 0.007	0.009
(Aligned = 1)	0.011**	(0.005)	0.02	0.002	0.020

Marginal effects of the effective number of parties (Regional $ENP_{Gol}^{Majority}$) conditioned on the “Alignment Effect” (Aligned). MEs refer to different sample specifications of the baseline model. Models from R1 to R4 exclude Campania from sample. Models from R5 to R8 exclude Basilicata and Abruzzo. All time variant controls are lagged by 1 year. Models from R10 to R12 include a national trend instead of regional specific ones. Asterisks indicate significance level at the 10(*), 5(**), 1(***) percent level

Table 10 Robustness check: fixed-effect regressions with XTPCSE standard errors

Logarithm of <i>per-capita</i> level of derived financing	(1)	(2)	(3)	(4)	(5)
Regional ENP ^{Majority} _{Gol}	0.002	0.004	0.004	0.004	0.003
	0.006	0.003	0.003	0.003	0.003
Regional ENP ^{Opposition} _{Gol}	– 0.078***				– 0.021**
	0.018				0.009
Aligned	0.019	0.014	0.011	0.014	0.014
	0.021	0.013	0.012	0.013	0.012
Tenure	0.025***	0.003	0.006***	0.003	0.008***
	0.004	0.002	0.002	0.002	0.002
Repayment Plan	0.071***	– 0.043**	– 0.059**	– 0.043**	– 0.050**
	0.024	0.021	0.026	0.021	0.023
Regional Election		0.021**		0.021**	
		0.010		0.010	
Regional Unemployment 15+ (%)		0.007***	0.005**	0.007***	0.006***
		0.002	0.002	0.002	0.002
Regional GDP per-capita (log)		0.353	0.067	0.353	0.159
		0.231	0.231	0.231	0.241
Population 75+ (%)		– 0.049	0.087***	– 0.049	0.084***
		0.062	0.019	0.062	0.019
Regional Health Exp (log)		– 0.027	0.015	– 0.027	0.027
		0.132	0.175	0.132	0.161
Regional Population (log)		1.161	2.478***	1.161	2.409***
		0.997	0.393	0.997	0.411
Structural deficit (%)		– 0.014**	– 0.008	– 0.014**	– 0.011
		0.007	0.008	0.007	0.008
Region-specific trend	No	Yes	No	Yes	No
Year dummies	No	No	No	No	No
Regional dummies	Yes	Yes	Yes	Yes	Yes
R-Square	0.90	0.99	0.97	0.99	0.97
No. of cases	150	150	150	150	150

The estimation method is fixed effects with panel corrected standard errors reported in brackets. All time variant controls are lagged by 1 year. Asterisks indicate significance level at 10(*), 5(**), 1(***) percent level

scandal that led to earlier elections in Molise, we treated this region as an outlier and excluded it from the sample. Abruzzo held its regional election in 2008 due to the early resignation of the President following his indictment for alleged corruption (see Table 1). All results seem to be confirmed in terms of both magnitude and statistical significance. As an additional check, we consider the “repayment plans” (known as “*Piani di Rientro*”). These plans are a tool used by the central government to monitor and penalise regions with health care deficits. The plans are enforced through contractual agreements between the national and regional governments and are imposed whenever the regional health care deficit reaches or exceeds 7% of the previous year’s deficit (Ministero della Salute 2006). In this case, a region must submit to the central government a credible plan to restructure its health care system, including a list of measures and the corresponding regional taxes to cover these costs. In return, the central government allows them to access additional funds to improve health care. It is noteworthy that despite the fact that they were introduced by the National Budget Law of 2006 (Law 266/2005), it is only since 2013 that additional funds have been provided to support regional development³⁶ and the quota is equivalent to only 0.25 percent of the ordinary funds of the NHS.³⁷ When the variable “repayment plans” is included in the regression (see Table 10), the other coefficients are not affected.

To further check the robustness of our results, we included a swing measure in the regression. **Swing** is a time-invariant dummy variable that tracks financing dynamics consistent with the “swing voters” model (Dixit and Londregan 1996). Thus, we tested the idea of tactical investments focused on “swing” regions (Lindbeck and Weibull 1987) that are more likely to switch votes because of particularistic benefits, (rather than the hypothesis that politicians reward preexisting supporters (Cox and McCubbins 1986)). **Swing** takes the value 1 if there has been at least one change in the political color of the regional government in the last 15 years (and zero otherwise). Slightly more than half of the regions—homogeneously distributed over a north-south geographic span—are “swing” by this definition (Table 11).

Since this is a time-invariant variable, we ran Pooled-OLS regressions with PCSE. The results are presented in Table 8. To mitigate the potential endogeneity bias due to omitted variables that vary over time but are constant across regions, we use geographic dummies instead of regional fixed effects. We grouped the 15 Italian regions into three geographic macro-areas—North, Center and South—that are homogeneous in terms of economic characteristics. In some specifications, we also included time dummies. The effect seems to be remarkable as the estimated marginal response is about 10%. **Swing** alone doesn’t fully explain the tactical redistribution dynamics and does not change the magnitude or significance level of **Regional ENP**^{Majority}_{Gov}.

6.2 Endogeneity and Interpretation Issues

A potential concern with the preceding analysis is that the *Effective Number of Parties* could be endogenous, since the “causality” could run from grants to fragmentation, rather than the other way around. If this is the case, the dissatisfied local politicians

³⁶ Article 2, paragraph 67-bis of Law 191/2009.

³⁷ As established in Article 15, paragraph 23 of Legislative Decree 95/2012.

Table 11 Descriptive statistics

Variable	Mean	Std. dev.	Min	Max	Observations
GRANTSPC					
Overall	6.886	0.288	5.975	7.318	N = 150
Between		0.274	6.285	7.232	n = 15
Within		0.111	6.576	7.183	T = 10
Regional ENP^{Majority}_{Gol}					
Overall	2.589	1.299	1.161	6.432	N = 150
Between		1.056	1.259	4.981	n = 15
Within		0.800	- 0.234	5.179	T = 10
Regional ENP^{Opposition}_{Gol}					
Overall	2.570	0.772	1.274	4.558	N = 150
Between		0.669	1.539	3.910	n = 15
Within		0.420	0.671	3.354	T = 10
National ENP^{Council}_{Gol}					
Overall	2.072	0.619	1.196	2.745	N = 150
Between		0	2.072	2.072	n = 15
Within		0.619	1.196	2.745	T = 10
Aligned					
Overall	0.547	0.499	0.000	1.000	N = 150
Between		0.229	0.300	0.800	n = 15
Within		0.447	- 0.253	1.247	T = 10
Regional election					
Overall	0.193	0.396	0.000	1.000	N = 150
Between		0.026	0.100	0.200	n = 15
Within		0.395	- 0.007	1.093	T = 10
Tenure					
Overall	5.120	3.407	1.000	15.000	N = 150
Between		2.597	2.400	10.500	n = 15
Within		2.296	0.620	9.620	T = 10
Regional unemployment 15+ (%)					
Overall	8.152	4.750	2.860	25.670	N = 150
Between		4.420	3.758	16.186	n = 15
Within		2.052	3.206	17.636	T = 10
Population 75+ (%)					
Overall	9.927	1.752	5.756	13.922	N = 150
Between		1.694	6.822	13.128	n = 15
Within		0.611	8.464	11.316	T = 10
Regional health exp					
Overall	1611	142.83	1304.43	2035.96	N = 150
Between		106.71	1477.23	1792.05	n = 15
Within		98.50	1345.24	1867.19	T = 10

Table 11 continued

Variable	Mean	Std. dev.	Min	Max	Observations
Structural deficit					
Overall	0.821	0.723	- 0.607	1.702	N = 150
Between		0.000	0.821	0.821	n = 15
Within		0.723	- 0.607	1.702	T = 10
Regional GDP per-capita					
Overall	23,242	5454	14,839	31,848	N = 150
Between		5583	15,467	31,204	n = 15
Within		679	20,935	24,479	T = 10
Regional population					
Overall	3,316,739	2,414,552	320,005	9,871,928	N = 150
Between		2,488,350	320,863	9,447,490	n = 15
Within		110,383	2,888,091	3,741,176	T = 10

could change party affiliation or form a new regional party. As a result, fragmentation could be influenced by grantmaking, rather than the other way around. One way to rule out reverse causality would be to use a regression discontinuity design. However, this approach is not applicable given the small sample sizes of our within-country analyses. The most widely used approach is the instrumental variable, but this would be challenging in our study due to the lack of time-varying exogenous instruments. As a first feasible solution, the response variable is forwarded 1 year to better capture the lag in the grant-making mechanism and the time gap between policy decision and policy implementation. In addition, we do not capture party switching during a legislative session (which could be caused, for example, by unsatisfactory tactical allocation). Fragmentation indices are calculated using data from election results.³⁸ Therefore, the effective number of parties is stable on average over a 3/4 year period. These indices reflect the preferences of voters—expressed during elections—who are largely unaware of the actual redistribution of healthcare grants. This rules out the possibility of reverse causality between grants and policy choices. Although this erases a remarkable amount of variability, changes in the distribution of grants are directly linked to changes in voter preferences

An additional argument could be that aligned and fragmented regions are targeted for a higher distribution pattern due to purely economic considerations. However, concerns about the results are somewhat mitigated by the panel nature of the data and the control for regional GDP and unemployment. The FE coefficients estimate the impact of within-region variation on the outcome as political characteristics change, while controlling for fixed, unmeasured regional characteristics even if they are correlated with the political variables of interest. In addition, the FE model specification controls for time-invariant omitted variables that differ by region (i.e., political variables)

³⁸ The fragmentation indices are calculated with data from election results, rather than from the composition of parliamentary groups, which takes into account changes in party composition from time to time.

and accounts for unobserved and correlated time-invariant country heterogeneity by explicitly estimating country fixed effects.

Finally, one could argue that unmeasured regional characteristics are not fixed and could be correlated with changes in voter preferences. However, it is unlikely that unmeasured regional characteristics changed significantly during the 10-year period studied.

7 Conclusions

This paper empirically investigates whether political motives determine the allocation of (quasi-discretionary) health grants to 15 Italian regions over the period 2001–2011. The main estimates use a geographic fixed effects and time fixed effects approach augmented by the use of panel-corrected standard errors to deal with autocorrelation.

The empirical analysis considers the strategic interaction between the center and regional governments and provides evidence of the influence of political factors in the allocation of intergovernmental grants in the Italian regional framework, where healthcare is the area where fiscal federalism rules are in force. Moreover, healthcare financing is an important issue in Italian electoral campaigns and key decisions on the regional allocation of resources take place in a political economy context where national legislators are elected from regional constituencies and political negotiations within the legislature determine the outcomes. As far as we know, subnational-level studies have mostly been conducted with data from relatively low levels of government, which casts doubt on the generalizability of the results. In contrast to cross-national studies, this paper uses variations from the relatively homogeneous Italian regions of ordinary status (OSR). In contrast to studies of subnational governments, this work is concerned with the middle level of Italian government, the regions, a politically powerful and fiscally relevant level.

Using interaction terms to capture the political environment in which the grant allocation takes place, we find that party alignment between the central government coalition and the coalition of regional governments matters for central government grantmaking only when fragmentation (i.e., the effective number of parties in the government and opposition coalitions after Golosov 2010) is taken into account. We call this finding *aligned fragmented premium*. The novelty of the present analysis is that it combines two aspects of government behavior that seem to belong together but have not previously been considered in the same model. It also shows that the introduction of allocation formulas as such does not help to curb political influence on grant allocation.

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Data availability All data used in this manuscript are freely accessible online and are available from the corresponding author upon request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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