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Coalition government or federalism? The relationship between policy distance and institutional design

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Abstract. This study theorises the political system after the introduction of democracy through one mechanism: federalism and coalition government. This study shows that if a stable ruling party can be constituted by a coalition government without a federal system, then either the coalition government is maintained or a single party runs the state government as the ruling party, without devolving as much power to the regions as in a federal system. However, if there is a strong opposition party and the ruling party cannot be expected to have sufficient policy effectiveness, and if the opposition is strong enough in some regions to be the opposition party in the national government but the ruling party in the regions if federalism is introduced, then both the ruling party and the opposition party will benefit from federalism. Incentives then arise for both the ruling party and the opposition to reduce the powers of the state as a state and increase the powers of local government. Institutional designers choose whether to introduce federalism or to constitute a coalition government as a way of optimising investment for policy by the parties as well as the balance between policy distance between parties and the size of the parties.
Keywords. Coalition governments; Federalism, Policy distance, Relation-specific investment.
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1. Introduction

This study provides a theoretical demonstration of the mechanisms by which political institutions are determined in a democracy. Political systems can be broadly divided into centralised and decentralised systems in terms of the relationship between the centre and the regions, but within the decentralised system, the federal system is a political system in which power is devolved to the regions in particular. The government of a state with a federal system often makes decisions only in limited areas, such as education, foreign affairs, military affairs and social security, while other areas are decided by the regions that make up the federal system. On the other hand, many democratic states have introduced multi-party systems. A multi-party system has several parties with diverse policy priorities to reflect the policy needs of diverse citizens. Where multiple parties exist, the ruling

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party may create a coalition government in which more than one party is the ruling party to increase the feasibility of its policies; where there are three or more large parties, or where the ruling party with the most parliamentary seats has less than half the seats, opposition parties seek policy compromises from the ruling party, resulting in the ruling party's policies Sometimes they are implemented under smaller budgets than originally planned. Continued policy compromise tends to lead to the formation of institutions that are not fully effective, e.g. whereas the ruling party wants to pass a law banning an act, the opposition party's proposal may result in only half-hearted legislation with loopholes in the law, or a smaller budget and less policy effectiveness. Opposition parties not only want to cut the budgets of the ruling party's policies to realise the opposition party's policies but also have incentives to reduce the policy effects of the ruling party, discredit citizens' trust in the ruling party, increase the size of the opposition party as a result of the election and become the ruling party in the next election. Rather than negotiating with a strong opposition party whose policies differ significantly from those of the ruling party and compromising on policies, the ruling party can make smaller compromises by forming a coalition government with an opposition party whose policies are closer to those of the ruling party and compromising within the coalition government. Furthermore, if a coalition government can win more than half of the seats in Parliament, decisions made within the coalition government will be implemented as policy. It does not require compromise with the opposition. In other words, the ruling party has an incentive to create a coalition government when a strong opposition exists.

This study differs from previous studies in that it presents the federal system and coalition government through one mechanism. If a stable ruling party can be constituted by a coalition government without federalism, this study maintains that a coalition government or a single party runs the state government as the ruling party without devolving as much power to the regions as in a federal system. However, if there is a strong opposition party and the ruling party cannot be expected to have sufficient policy effectiveness, and if the opposition is strong enough in some regions to be the opposition party in the national government but the ruling party in the regions if federalism is introduced, then there are advantages to introducing federalism for both the ruling and opposition parties. Incentives then arise for both the ruling party and the opposition to reduce the powers of the state as a state and increase the powers of local government.

The first half of this study will show whether a federal system can be introduced or whether it can be handled by a coalition government, in terms of the policy distance between the ruling party and the opposition. The second half considers coalition government and federalism from the financial perspective of political parties.

It is shown that the more relationship-specific investment between parties, the stronger the coalition government from a financial point of view and the less need for federalism to be introduced. Relation-specific investments are investments in human and material resources that enable a party, especially the opposition party, to realise policies, investments that increase the effectiveness of the policies the ruling party wants to realise. For example, the money and opportunity costs incurred by an opposition party in the run-up to the legislation of law can be considered a relationship-specific investment if it can only realise the legislation if it becomes the ruling party by forming a coalition government with another party. For example, if the opposition party has created many sunk costs based on creating a coalition government, it will need the help of other parties to recover the investment costs. In addition, since profits are shared in a coalition government, parties in a coalition government that are not the largest party will be underinvested. The second part of this study analyses the design of coalition and federal political institutions from a financial perspective.

Several previous studies exist on models in which political regimes are theoretically determined in terms of the extent to which democracy is introduced, such as authoritarian states, authoritarian states with elections and democratic states. This study is novel in that it theoretically presents a political system after the introduction of democracy. It clarifies whether, under a political system with a multi-party system, the ruling party or the opposition party will introduce a federal system or try to form a coalition government under a non-federal system. It is novel in that there is no previous research in terms of comparing coalition government and federalism when choosing a political system.

2. Previous research

2.1. Coalition governments

An analysis using game theory focusing on party distribution is Riker's (1962) Least Winning Coalition. Other studies that focus on game-theoretic aspects of government formation include Pelog (1981) and Van Deemen (1989); Kirchsteiger & Puppe (1997) maximise the relative weight of each party in the coalition government based on the behaviour of each party seeking office The model was analysed using a distance measure on the policy space. The distance measure on the policy space is also used in this study.

In the context of aggregate choice, which aggregates individual preferences, there are two approaches. The first is the legislative bargaining model (e.g. Baron & Ferejohn, 1989, Calvert & Dietz, 1996, Jackson & Boaz, 2002). It deals with negotiations between players as well as between political parties. The second is an analysis of power struggles in committees (Shapley & Shubik, 1954 and Aumann & Kurz, 1977). It focuses on the Shapley value of the bargaining game.

Concerning coalition governments, many theories and models of coalition building have been presented and modelled (Austen-Smith & Banks, 1988; Axelrod, 1970; Baron, 1993; Deemen, 1991,1997; Grofman, 1982; Kahan & Rapoport, 1984; Kirchsteiger & Puppe, 1997, Laver & Shepsle, 1996;

McKelvey Ordeshook & Winer, 1978; Peleg; 1980, 1981; Schofield, 1993a, 1993b; Swaan, 1973; Vries, 1999).

Since Riker (1962), theoretical studies of the coalition government have been advanced, often focusing on the formation and termination of coalition governments (Laver & Schofield, 1998). Citizens who support the democratic government are supposed to focus on the link between citizens' preferences and government policies (Dahl, 1971; Powell, 2000). Citizens' interest in the formation and termination of coalitions suggests that the parties that make up the coalition government value this link (Laever & Shepsle, 1996). Previous research has also focused on the principal-agent issue of policy-making by the coalition government. There is a need to delegate important policy-making powers to parties or individuals with different preferences on some issues. Some studies suggest that the largest parties manage risk by monitoring the behaviour of such hostile parties and individuals when they form a coalition government and by modifying the behaviour of hostile parties and individuals in some circumstances (Huber & Lupia, 2001). The speed of social change and the diversity of needs has intensified policy specialisation in modern societies, with government bills becoming the focus of legislative activity in parliamentary systems (Andeweg & Nijzink, 1995). Furthermore, as each minister is policy-focused and has a large workload, further devolution of power within the cabinet gives ministers greater freedom in drafting legislation. Even if a coalition government is formed, there is information asymmetry between ministers, which poses important problems for the coalition government. For example, when a ministerial authority implements a policy that differs from the compromise agreed between the parties. Regarding when party leaders ignore this issue, Laver & Shepsle (1996) introduce a portfolio approach. If each minister pursues the ideal policy within his or her jurisdiction, the principal-agent problem is eliminated, but in reality, the Pareto subordination point is realised. That is, coalition government members prefer policy packages created by a compromise between parties, instead of each party pursuing its ideal policies in the issue areas it controls (Thies, 2001). This situation can be remedied through the use of junior ministers who have access to the same information as hostile parties or individuals, or by allowing oversight in the legislative process. The latter, for example, through the standing committee system, provides members with the opportunity to acquire policy expertise and have broad research powers. Others include the right to submit amendments.

2.2. Decentralization (of power)

In Europe, the principle of subsidiarity dictates that functions should be decentralised. Centralisation is considered necessary to have a governance structure that balances regional interests. Decision-making units usually include parliaments made up of representatives. In a centralised system, members of the legislature, which produces the smallest and winning coalition, risk having their interests expropriated, but the parliament can be an insurance policy against this Inman & Rubinfeld (1997a, 1997b) have argued that the budgetary externalities formulated by a centralised system can be exploited by Methods are incorporated into the model of fiscal federalism (fiscal federarism), according to Tiebout (1956) and Oates (1972), who state that achieving the right balance between respect for the different needs of citizens and institutional internalisation is important. In the centralised model, expenditure is financed by general taxation and all districts receive a uniform level of local grants to create public goods. In the decentralised model, local public goods are owned by local authorities. Local taxes create public goods and each district is free to choose the level of public goods. The disadvantage of the decentralised model is that when public goods provide significant benefits, the supply is insufficient. A centralised system may not adequately meet local needs. Decentralisation is preferable when public goods have no spillover effects. Where spillover effects exist, the appropriate level of public goods is determined by the government, comparing the benefits and costs of internalising externalities. In order to be the party that can win on the smallest scale in parliament (e.g. Buchanan & Tullock, 1962; Riker, 1962; Ferejohn, Fiorina & McKelvey, 1987 and Baron & Ferejohn, 1989), representatives Develop reciprocity norms and ensure that all districts receive their share. Models of representative democracy include Osborne & Slivinsky (1996), Besley & Coate (1997) and Coate (1997). The first study on the economics of federalism was Tiebout (1956) and is surveyed in Rubinfeld (1987). It is a centralised form of government, a method of allocating local public goods by focusing on whether competing areas are efficient. Centralised and decentralised forms pose the following positive questions. On the question of when federalism will break down, Bolton & Roland (1997) argue that while centralisation increases efficiency but creates a trade-off between it and the preferences of individual districts, federalism benefits from the ability to tailor policies to the preferences of individual districts As the diversity of individual districts can disappear and homogenisation of districts occurs, federalism collapses, according to Alesina & Spoalare (1997), who created a model that considered the optimal number of districts and the equilibrium number of districts, and found a trade-off between a diversity of needs and economies of scale. Persson & Tabellini (1994) and Ellingsen (1998) considered whether centralised government systems tend to increase the size of government. They modelled policy choices under centralisation when there is a parliament made up of representatives from each district, with a large median electorate choosing a policy. If constituencies are homogeneous and identical, centralisation is attractive because of the cross-district externalities that arise, but the heterogeneity of constituencies weakens the policy effects of centralisation; Persson & Tabellini (1996a, b) note the risk trade-off between centralised and decentralised government and The improved risks of centralisation and increased moral hazard by the regions means that more risks are assumed. They also analysed how regions vary across federal constitutions in the political equilibrium and what constitutional arrangements work well; Lockwood (1998) assumed that centralisation means uniform public spending across districts, and the effects of decentralisation of public works The political economy of the centralised system was analysed. It was shown that spillovers in a broad sense affect the effectiveness of public works. Furthermore, Besley & Coate (2003) and Lockwood (2002) created models that rejected the centralised assumption of uniformity in the provision of public goods; Cremer *et al.*, (1995) and Seabright (1996) combined decentralisation and local democracy to argue that it can play a useful disciplinary role in ameliorating problems such as low accountability.

Sonin (2003) showed that economic decentralisation must be accompanied by political centralisation. On the other hand, Treisman (2007) and Cai & Treisman (2004, 2005) highlighted the benefits of competition between local governments in reducing agency problems, while Besley & Case (1995) argued that as a result of competition between local governments, citizens can see the performance of other local governments as Tommasi & Weinschelbaum (2007) found that the wider the local government, the higher the ratio of principals to officials; Myerson (2014) found that the wider the local government, the weaker the link between pay and performance. It was shown that this becomes the case. The above states that the advantage of a decentralised model is that it provides elections as a sorting device for governance talent.

3. Model

3.1. Policy distance between parties and coalition governments

3.1.1. When not taking into account the proportion of seats held by a given party in Parliament

Consider a model that takes policy preferences into account.

Assume that five policies exist. Each policy is given a numerical value, and each policy is set to 0, 1/4, 1/2, 3/4 and 1, with the five policies equally spaced between 0 and 1. Consider a situation where there are three parties A, B and C, and no party has a majority of members in parliament, so a single government cannot be formed. To form a government, at least two parties need to form a coalition government. Each party has a most-preferred policy. Each party has a different most-preferred policy, for example, Party A prefers Policy 0, Party B prefers Policy 1/2 and Party C prefers Policy 1. A party is considered to be disadvantaged if the policy chosen differs from its own party's most-preferred policy. The magnitude of the disadvantage is assumed to be equal to the distance between the most-preferred policy of the own party and the policy that was implemented. For example, a party that most prefers policy 1/2 will be disadvantaged by 1/4, the distance between policy 1/4 and policy 1/2, if the policy implemented is 1/4. In other words, the benefit from the policy is -1/4. if the policy is 3/4, the benefit from the policy is -1/4 because the distance between the most favoured policy 1/2 is 1/4. on the other hand, if the policy implemented is 0 or 1, the benefit from the policy is -1/2 because the distance between the most favoured policy 1/2 is 1/2. including parties other than party B The benefits gained from each party's policies are summarised in the table.

Table 1. *Benefits of political parties from each policy*

	Policy "0"	Policy "1/4"	Policy "1/2"	Policy "3/4"	Policy "1"
Political party A	0	− 1/4	− 1/2	− 3/4	−1
Political party B	− 1/2	− 1/4	0	− 1/4	− 1/2
Political party C	−1	− 3/4	− 1/2	− 1/4	0

Games are played in the following order.

One of the three parties becomes the cabinet minister. The cabinet minister has the right to encourage parties other than his or her own to form a coalition. The party urged to form a coalition decides whether or not to accept the formation of a coalition. If the party urged to form a coalition accepts the proposal, a new coalition government is formed and new policy decisions are made within the government. If not accepted, a government is formed with a single party as the ruling party and existing policies are implemented. Here, we consider the case where the existing policy is 1/4. We also consider that a party accepts a proposal if the gain is the same whether it accepts or rejects the proposal. If a coalition government is formed, the policy is determined by negotiations between the parties in the coalition. For the sake of simplicity, we assume that, as a result of the negotiations, a policy is chosen that falls in the middle of the policies most favoured by the parties belonging to the coalition. In practice, the outcome of the negotiations may vary depending on the number of seats and power relations between the two parties, but we assume that the two parties have equal numbers of seats and power relations. For example, if parties A and B form a coalition government, policy 1/4, which is halfway between policy 0 and policy 1/2, is chosen. If all parties form a grand coalition, policy 1/2, which is the middle of the whole, is chosen.

Table 2. *The policy chosen by the coalition*

Political partes that make up the coalition	A and B	A and C	B and C	Coalition of all political parties
Policy	1/4	1/2	3/4	1/2

Coalition governments are formed with parties with close policy preferences.

Specifically, they are as follows. First, consider party A as the cabinet minister. The gain from existing policies remains -1/4. If it teams up with party C or forms a grand coalition, party A's gain is -1/2, as policy 1/2 is chosen. Party A, therefore, proposes to form a coalition with Party B and

Party B accepts the proposal because it gets the same gain -1/4 whether it accepts or rejects. Second, suppose party C is put in charge of the cabinet. The gain from the existing policy is -3/4. The gain from working with party B to implement policy 3/4 is -1/4. Party C's gain is -1/2 if it teams up with party A or forms a grand coalition, as its policy is 1/2. Party C, therefore, proposes to form a coalition with Party B, and Party B accepts the proposal because it gets the same gain -1/4 whether it accepts or rejects. Finally, suppose that party B is in charge of the cabinet. If they form a grand coalition, party B can implement the policy it prefers the most, as the policy is 1/2. However, party A refuses to form a grand coalition because existing policy 1/4 is preferable to policy 1/2 for party A. On the other hand, party B gains the same -1/4 if it works with party A to implement policy 1/4 or with party C to implement policy 3/4, so it proposes to form a coalition government with either of them. Whether party A or party C accepts the proposal, the gain of the party approached with the proposal will not fall after the coalition is formed.

Table 3. *Coalition government with only policy gains*

Political party in charge of creating a government	Political partes that make up the coalition	policy to be implemented
Political Party A	A and B	1/4
Political Party B	A and B	1/4
	B and C	3/4
Political Party C	B and C	3/4

The only coalition governments that will be formed will be those of Party A and Party B, or Party B and Party C.

Simply create a coalition government with parties with similar policy preferences.

3.1.2. When considering a party's proportion of seats in Parliament

The difference from the previous section is that the number of seats in both parties affects the negotiations. The largest party has two options: 'no coalition' or 'coalition'. The Senate and the Chamber of Deputies will not be divided into two chambers but will be unicameral. For example, if there are only two parties and Party A has Policy 0 and Party B has Policy 1, then Policy 3/10 is chosen if Party A has 70% of the seats in Parliament. In the previous section, the policy selected was the middle 1/2. In this section, the policy is assumed to be compromised by the proportion of seats held by parties other than the party with the highest number of seats. In the following, it is assumed that there are three parties.

The existing policy remains 1/4. This is a policy close to policy 0 of the largest party A, but is the result of a consultation carried out and a compromise reached with the other parties. It can be approximated to the policy chosen in many countries in reality in the sense that it is close to the policy of the largest party.

As in the previous section, coalition governments are formed with parties with close policy preferences. Specifically, they are as follows.

Party A has a 2/5 seat ratio, Party B has a 3/10 seat ratio and Party C has a 3/10 seat ratio.

As in the previous section, party A has a policy preference of 0, party B has a policy preference of 1/2 and party C has a policy preference of 1. Party A is the largest party and is therefore the cabinet member. Party A and Party B have a seat ratio of 4:3. When teaming up with Party B, {(1/2)-0} x (3/4) = 3/8 policies are chosen. Since the existing policy is 1/4, the existing gain for party A is -1/4 and the gain from coalition with party B is -1/8. Party A chooses 'go into coalition' because its gain rises if it goes into coalition. Party B's existing gain is -1/4 and its gain from coalition is -1/4. In other words, the gain is indiscriminate whether they form a coalition or not. In that case, Party B also chooses to 'form a coalition'. Party A and Party B both choose to 'form a coalition'.

Consider the case where party A chooses to form a coalition with party C. Party C's existing gain is -3/4; if it goes into coalition, it chooses (1-0) x (3/4) = 3/4 policies. Party A's gain is -1/2. Since the gain is less with a coalition than the existing gain of -1/4, the party chooses 'no coalition'. Party C's gain is -1/4. Party C chooses 'go into coalition' because its gain would be higher in a coalition. No coalition is formed because one party chooses 'no coalition'.

3.1.3. In the absence of existing policies, taking into account the ratio of seats in the parliamentary

In the absence of existing policies, each party's gain is simply the multiplication of the ratio of each party's most favoured policy to the number of seats. If party A forms a coalition with party B, as in the previous section, 3/8 of the policies are chosen. Party A's gain is the difference between the gain of the most-preferred policy and the gain of the actual policy. In other words, Party A's gain is -3/8. Party B's gain is -1/8. If party A forms a coalition with party C, 3/4 of the policies are chosen. Party A's gain is -3/4; Party C's gain is -1/4. The largest party A chooses to work with party B because its gain is greater than that of party C. However, assuming no policy compromise as the existing gain, all parties are based on a gain of zero. In that case, no coalition is formed.

3.1.4. Where there is scope for compromise, and where opposition parties are allied

Assume that there is no existing policy, but that a range of compromises can be made to maintain each party. Assume that the negative gain of compromise possible is -1/4. Assume that any coalition that leads to further compromise, i.e. loss of gains, is unacceptable to the parties due to a decrease in supporters, members leaving the party, etc. Based on the analysis in the previous section, when party A enters into a coalition with party B, 3/8 of the policies are realised, -3/8 for party A and -1/8 for party B. In other words, party A chooses 'no coalition' because a coalition with party B would reduce its gain below the compromisable range of -1/4. Party B chooses 'coalition'. In a coalition with Party C, Party A's gain is -3/4 and Party C's gain is -1/4. Party A chooses 'no coalition' and Party C chooses 'coalition'. In other words, party A chooses 'no coalition' with both party B and party C. No coalition government is formed.

However, if the largest party A chooses 'no coalition' with any party, the next stage assumes that parties B and C form a coalition. Party B has policy 1/2 and Party C has policy 1, and as they both have 30% of seats each, the policy to be put forward as a coalition of opposition parties is 3/4 of the middle. In this case, between party BC and party A, which holds 60% of the seats, the sum of the seat ratios of parties B and C, party A Assume they choose to 'compromise' on policy or 'become an opposition party'. Assume that parties B and C form a coalition of opposition parties and either pass a no-confidence motion in the Cabinet or combine the two parties to form one party in the next election. If 'compromise' is chosen, the policy is {(3/4)-0} x (2/3) = 1/2, with a gain of -1/2. In this case, Party A is unable to compromise because it is beyond the range of possible compromises, leaving it with only one option: to 'become an opposition party'. If even the largest party can only achieve very compromised policies, or if it achieves compromised policies but fails to achieve its policy goals as a result and the party becomes smaller, then the option of introducing federalism in the next section arises.

3.2. Policy distance and the federalism demanded by the weak within national parties

This section examines the background to the introduction of federalism under democracy.

Assume that there is an opposition party of a certain size as a national party and that supporters of the policies sought by the opposition party are unevenly distributed regionally. As in the previous section, the ruling party as a national party has to make policy compromises for the opposition. However, with federalism, the policies that the opposition as a national party wants to implement do not necessarily have to be implemented as national policies. As a local party, it can become the ruling party in the regions and implement local policies. In such cases, the need for the ruling national party to compromise on policy is reduced. For citizens, it makes no difference whether the policies they want to see implemented are national government policies or local government policies. There is no longer a need for the ruling party as a national party to implement policies that are lower in priority. Also, as long as policies are implemented in the regions, the size of the party that is the ruling party as a local party and the opposition party as a national party may be reduced. This is because the policies of the opposition as a national party are realised in the regions. This means that for the ruling party as a national party, the benefits of federalism are significant, as there is less need to make policy compromises to be established with the reduced size of the opposition party. On the other hand, for the ruling party as a national party in opposition and as a regional party, can realise its policies in the regions where there are more supporters of its policies. If, as a national opposition party, the likelihood of the ruling party becoming the local ruling party is greater than the likelihood of the opposition party achieving the policies it seeks as a result of seeking policy compromises from the ruling party, then there are advantages for the opposition party as a national party in adopting federalism.

In the discussion up to the previous section, the policy distance between the largest party A and party C is the greatest. However, as a result of party C becoming the ruling party in the regions and party C's policies being realised in some regions, the policies of national party C will come closer to those of the largest party in the country. For example, it could change from 1 to 1/2. In this case, the largest party A will be closer in policy distance to party C. As a result, even if the two opposition parties, Party B and Party C, form a coalition, Party A will still be able to deliver its policies to the extent that a compromise is possible. The largest party A chose to 'be in opposition' in section 3.1.4, but in this section, it can choose to 'form a coalition' by introducing a federal system. Perhaps the weakening of national parties B and C through the introduction of federalism may allow party A to create a government on its own.

If the analysis in the previous section is viewed as a national party and the policy distance between the ruling and opposition parties is very large, the policies implemented are likely to be compromised and inconsistent. With limited budgets, where the ruling and opposition parties have very different constituencies, and where each party has very different policies and priorities that it wants to achieve, both the ruling and opposition parties would benefit from a federal system. In other words, the analysis in the previous section shows that federalism is introduced when the policy distance between the ruling and opposition parties is large and the number of large parties is small. The policy distance between the ruling and opposition parties is within a certain range. In other words, if the policy distance is close, federalism is not introduced and the opposition as a national party is more likely to achieve its policies in a coalition government.

3.3. Discussion of the institutional options for coalition and federalism on minimum-win cooperation

Furthermore, as a result of the large policy distance between the ruling and opposition parties as national parties and the small number of large parties, the policy gap between the ruling and opposition parties of a national party is likely to increase if a federal system is introduced. One reason for this is that the increase in the number of policies realised in the regions means that national parties need only focus on the realisation of policies that are either nationally necessary or have huge costs; secondly, the small number of large parties in national parties means that the policies of a coalition government between large parties are less likely to be This is because supporters of political parties are not looking for compromise. If a coalition government is implemented, both parties' supporters may decline and turn into independents; third, if the ruling party as a state party loses the trust of citizens, for example by making mistakes in the way it delivers its policies and their effectiveness, the opposition party will It is to the opposition's advantage to design policies. To do this, the parties should demonstrate their differences. Also, to demonstrate party differences, it is preferable to have differences in many policies. Citizens have many needs that they would like to see realised as policies, but only far fewer parties exist than the number of needs. In such a case, by presenting the many needs that each citizen has as policies that one of the parties wants to implement, all citizens expect that some needs will be fulfilled by party A and others by party B. If, for some citizens, one need is fulfilled by party A or is implemented but fails as a policy effect, some citizens will seek the fulfilment of another need or support another more viable party. The greater the policy distance between national parties, the more desirable it is for a given citizen to believe that party B is the party that will fulfil another need or that party B is the more viable party.

4. Relation-specific investment

4.1. Relation-specific investment and coalition government

The model is that there are two parties, Party A and Party B, and whether they form a coalition or not is influenced by the human and physical assets they hold. The assets held by the parties are assumed to be the goods owned and available to the party members as assets. The outcomes associated with the policies of political parties are assumed to depend on the investments made by each party. Policy-related outcomes include voting behaviour for one's party and donations to political parties by individuals and companies. The investment includes not only the monetary costs of policy realisation as a political party but also the opportunity costs of policy realisation by party members. The investment decision of political party A is denoted by e_A. e_A = 1 indicates 'invest' and $e_A = 0$ indicates 'do not invest'. Similarly, the investment decision of party B is denoted by e_B. Let outcomes be denoted by $\mathrm{y}(e_A, e_B)$ and assume $\mathrm{y}(1,1) = \mathrm{Y} > 0$, $\mathrm{y}(1,0) = \mathrm{y}(0,1) = \mathrm{y} > 0$ and $\mathrm{y}(0,0) = 0$. Different parties have different policy priorities, but the realisation of many policies involves more than one party. For the 'invest' group, the cost c>0 is borne by each party individually. Consider the decision of whether parties A and B act in concert to realise a certain policy, where q=1 means 'in coalition' and q=0 means 'not in coalition'. The outcome $\mathrm{y}(e_A, e_B)$ represents the benefit in the 'coalition' case and is distributed between the two parties. However, it is assumed that no benefits are generated for either party in the 'not in coalition' case. Assume that the investment decisions of the parties can be observed in each other, but cannot be described in enough detail to be substantiated. Thus, contracts in which each party's share depends on whether an investment has been made and what the outcome of the investment is (e.g. "B pays A p_2 if the outcome is y, p_1 if the outcome is y, and p_0 if the outcome is 0") are naturally not enforceable by the courts.

The following steps are used to implement the coordination process for policy realisation between the parties.

１）Investment decision: each party decides whether to invest or not. It means how much effort or financial payment they are willing to carry out to realise the policies of the other party in the coalition; 2) Realisation of outcomes and renegotiation: both parties observe each party's investments and outcomes before deciding whether to enter into a coalition or not; 3) Transactions and outcomes. Distribution: in accordance with 2), the distribution of outcomes takes place if the two parties are in coalition: the distribution of outcomes between the two parties includes supporting the realisation of policies that are of high priority to another party in the coalition as a compromise on the policies set out in the previous chapter, or that give the other party in the coalition an electoral advantage. It means any activity in general that is designed to make a difference. 4) Renegotiation:.

At the renegotiation stage, assumptions are made about how distribution decisions will be made. At this stage, it is assumed that the two parties both share the same information and make decisions that cannot be changed and that the ex-post benefits generated are maximised. Such a decision is called ex-post efficient. This is because the investment decision has already been made and investment costs are not included in the calculation because they are sunk costs. The investment outcome is either Y,y,0 depending on the investment decision, but as any outcome is more than the profit 0 in the 'no coalition' case, the two parties agree to be in coalition. This means that if the parties do not invest to some extent, they may oppose each other in the budgetary deliberations necessary for the realisation of each policy, whether or not they formally form a coalition. The previous chapter analysed whether to go into coalition by considering the interests at a distance of the policies most favoured by the parties. This chapter assumes that parties can choose whether or not to form a coalition, i.e. whether or not to cooperate, on a policy-by-policy basis, such as obtaining the budget needed to realise a policy, in terms of both benefits and costs. Concerning each party's share, we assume that each party's ex-post benefit depends on (i) the outcome of a coalition, and (ii) the benefit of each party if it fails to form a coalition, which is determined by.

A Post-profit of the $=\alpha+\frac{1}{2}$ y(e_A, e_B)- $\alpha-\beta$

B Post-profit of the $=\beta+\frac{1}{2}$ y(e_A, e_B)- $\alpha-\beta$

α represents A's gain in the absence of a coalition and β represents B's gain. y(e_A, e_B)- $\alpha-\beta$ is the portion of the outcome y(e_A,e_B) from agreeing to a coalition that exceeds the total gain α-β in the absence of coalition. Thus, each party gets half of its own party's profit plus the increase from going into a coalition. However, as stated above, no profit is produced by either party in the 'no coalition' case, i.e. α = β = 0. Substituting this, each group will split the investment outcome y(e_A, e_B) 50-50.

Table 4. *Gain matrix for investment in policies within a coalition government*

		Political party B	
		Invest($e_B = 1$)	Not invest($e_B = 0$)
Political party A	Invest($e_A = 1$)	$\frac{1}{2}Y - c, \frac{1}{2}Y - c$	$\frac{1}{2}y - c, \frac{1}{2}y$
	Not invest($e_A = 0$)	$\frac{1}{2}y, \frac{1}{2}y - c$	$0, 0$

The above assumptions on renegotiation mean that there are no ex-post hold-up problems. This is because ex post efficient decisions are always taken. If each group looks ahead to the outcome of the renegotiation, the net result at the stage of making the investment decision would be ANet interest income of gain: $\frac{1}{2}\,y(e_A, e_B) - ce_A$

BNet profit of: $\frac{1}{2}\,y(e_A, e_B) - ce_B$

Assumption1 (1) $\frac{1}{2}y > \frac{1}{2}Y - c$ (2) $0 > \frac{1}{2}y - c$ (3) $Y - 2c > y$ (4)$Y - 2c > 0$

Since the left-hand side of Assumptions 1(3) and (4) is the total benefit the coalition generates when both choose to 'invest', the right-hand side of (3) is the total benefit when only one 'invests' and the right-hand side of (4) is the total benefit when both choose not to invest, it is ex-ante efficient for both to 'invest'. Under assumption 1, 'not investing' is the dominant strategy for both. Therefore, even though the total benefit of the coalition is maximised when both sides 'invest', both sides choose 'do not invest'. This means that inefficiency of under-investment occurs. This is a hold-up problem. The reason is that, even if an investment is made, only half of the additional gross profit generated by the investment can be obtained. For example, if you choose to 'invest' when your opponent chooses to 'invest', the outcome of the investment is increased by $Y - y$. From (3), this increase in outcome is greater than the additional cost c, so 'invest' increases the total profit. However, since only half of the increase $\frac{1}{2}(Y - y)$ is available to you and the other half is taken by the coalition partner, it is less than the additional cost according to (1). Therefore, 'no investment' is the optimal response.

4.1.1. Cases where only one party invests

In this section, it is assumed that only party A invests. Outcomes can be written as $y(e_A)$, where $y(1) = Y$, and $y(0) = y$. And assume that $Y > y \geq 0$. Furthermore, the difference between the outcomes of $e_A = 1$ and $e_A = 0$ is denoted by Δ. That is, $\Delta = Y - y > 0$. The cost incurred by A when 'investing' is $c > 0$ and the following assumptions hold.

Assumption 2 $\Delta > c > \frac{1}{2}\Delta$

From the first inequality, $Y - c > y$. The left-hand side is the total profit generated by A's investment and the right-hand side is the total profit without investment. Therefore, A's total profit is greatest when A invests; A's investment and coalition is a pre-efficient outcome; is 'investing' optimal for

A; if A chooses to 'invest', A's net profit is $\frac{1}{2}Y - c$; if A chooses not to invest, A's net profit is 1/2 y; if A chooses to 'invest', A's net profit is $\frac{1}{2}y$. Therefore, the condition for A to invest is $\frac{1}{2}Y - \frac{1}{2}y = \frac{1}{2}\Delta \geq$ c. However, due to the inequality in the second half of assumption 2, A chooses 'not to invest', even though the total profit of the coalition is maximised when A invests. In other words, a prior hold-up problem arises.

4.1.2. Relationship-specific investment

If A and B form a coalition, they are both ruling parties. A can also be the ruling party if A absorbs and consolidates B, and B can be the ruling party if A absorbs and consolidates B. The assumption is that if A invests but does not form a coalition with B, the assets generated by the investment will not be realised and the profit will be zero. In other words, A's investment can be interpreted as a relation-specific investment, in the sense that it will only increase the outcome if there is a coalition with B. Many policies can only be realised by the ruling party. Some policies cannot be implemented even if the investment is made by the opposition party. If for a political party it is a prerequisite to be the ruling party to implement a certain policy, we do not see any major problem in regarding the investment in the policy as a relationship-specific investment. To confirm that the fact that the investment is relation-specific is a factor that gives rise to the ex ante hold-up problem, we check what the results of the analysis would be if the investment were general purpose.

Consider the case where the investment is general purpose. If party A enters into a coalition with party B, A's investment increases outcomes from y to $\mathrm{Y} = \mathrm{y} + \Delta$; if A does not enter into a coalition with B, A's profit increases from zero to Δ when A invests; B's profit remains zero. In other words, both the outcome when in coalition with B and the total profit when not in coalition increase by the same amount when A invests. In this sense, investment is interpreted as generic. Then, when A invests, through renegotiation with B, the

$$\text{A Post-profit} = \Delta + \frac{1}{2}(\mathrm{Y} - \Delta) = \frac{1}{2}(\mathrm{Y} + \Delta) = \mathrm{Y} - \frac{1}{2}y$$

$\mathrm{Y} - \Delta$ is the incremental outcome of A choosing to 'invest' and being in coalition with B. On the other hand, if A invests

Since the ex-post profit in the case of no profit is $\frac{1}{2}$, the difference is $\left(\mathrm{Y} - \frac{1}{2}y\right) - \frac{1}{2}y = \varDelta$, and $\varDelta > \mathrm{c} > \frac{1}{2}\varDelta$ under assumption 2.

would exceed the investment cost c. In other words, it is optimal to invest and not underinvest.

Next, consider the case where investment is neither relation-specific nor generic, but has both properties.

If A and B are in a coalition, the outcome is y if A does not invest and $\mathrm{Y} = \mathrm{y} + \varDelta$ if it does. On the other hand, if A does not deal with B, assume that A gets profit a if it does not invest and profit $\mathrm{A} = \mathrm{a} + \varDelta_a$ if it invests. (Both profits of B are assumed to be zero). Here a, A, and $\varDelta_a$ satisfy the following assumptions.

Assumption 3 (1)$\varDelta_a \leq \varDelta$ (2)a $\leq y$

From these assumptions a $\leq y$ and A $\leq Y$, it follows that the joint decision with B is always a posteriori efficient.

When the investment is generic, $\varDelta_a = \varDelta$, and when it is completely relation-specific, $\varDelta_a = 0$. A smaller value of $\varDelta_a$ can be interpreted as the investment being more relation-specific and a larger value of $\varDelta_a$ as more generic.

Generalising the setting in this way, the ex-post profit of A is as follows.

A's ex-post profit (if $e_A = 0$) $= \mathrm{a} + \frac{1}{2}(y - a) = \frac{1}{2}(y + a)$
A's post-profit (if $e_A = 1$) $= \mathrm{A} + \frac{1}{2}(Y - A) = \frac{1}{2}(Y + A)$

If A invests, the net profit is $\frac{1}{2}(Y + A) - c$. Therefore, the condition under which 'invest' is optimal for A is $\frac{1}{2}(Y + A) - \frac{1}{2}(y + a) = \frac{1}{2}(\varDelta + \varDelta_a) \geq c$. If $\varDelta > \mathrm{c} > \frac{1}{2}\varDelta$ in Assumption 2, this condition is not satisfied when $\varDelta_a = 0$ and is satisfied when$\varDelta_a = \varDelta$. Also, since the left-hand side of the condition is an increasing function of $\varDelta_a$, if $\varDelta_a$ is sufficiently small, i.e. the investment is sufficiently relation-specific, the condition is not satisfied and the problem of underinvestment arises. However, if $\varDelta_a$ is sufficiently large, i.e. the investment is sufficiently generic, and the condition is satisfied, the ex-ante hold-up problem is solved.

4.2. Relation-specific investment and federalism

The previous section analysed cooperation between parties in terms of benefits and costs. Specifically, it was shown that underinvestment occurs when the cooperation behaviour, or investment behaviour, of each policy is considered as a relationship-specific investment, whether or not the investment is made for the budget passage and policy realisation of each policy. This means that in the case of opposition parties there are fewer opportunities to realise policies and therefore less investment in policy realisation. It also means that if a party, which is not the largest party, forms a coalition with the largest party and invests in policy realisation, this investment tends to be underinvested. This means that even if a coalition government can become the ruling party and realise policies, it tends to underinvest in policies in proportion to the smaller gains, as the gains associated with policy implementation are shared. The effort and financial costs of parties that are not the largest party are under-invested. In other words, even when in charge of a coalition government, it is sometimes better to be the sole party in charge of policy, as other parties have incentives to underinvest compared to the largest party. However, the solution to this is the introduction of federalism. With federalism, even if a party cannot be the ruling party as a state, if it can be the ruling party in a region, it can deliver its policies in that region. The problem of under-investment can be solved. This is because, in the case of a coalition government, being the ruling party is a prerequisite for realising policies, but the cost-effectiveness is relatively worsened by the distribution of benefits within the ruling coalition government. This is because in a federal system, all the costs have to be paid, but all the benefits can be gained. The benefits include an increase in party control of local councils as they implement policies as the ruling party. It has the potential to become a more stable party. In terms of costs and benefits, parties in a coalition other than the largest party choose to underinvest, which makes the largest party dissatisfied with the other parties in the coalition. Parties other than the largest party will also be dissatisfied because their gains are small. As a result, coalition governments tend to be unstable. A federal system would ensure that even if a party cannot be the ruling party at the national level, it can become the ruling party at the local level, thereby eliminating underinvestment and ensuring that optimal investment is realised at the local level. For the local population, better policies will be realised, leading to a better quality of life.

5. Conclusion

This study theorises about the political system after the introduction of democracy, concerning federalism and coalition government. It showed that under a political system with a multi-party system, the parties, as the system designers, have a choice between introducing a federal system or attempting to form a coalition government under a non-federal system. This is novel in that no previous research exists in terms of comparing coalition and federal regimes when choosing a political system.

This study shows that if a stable ruling party can be constituted by a coalition government without a federal system, then either the coalition government is maintained or a single party runs the state government as the ruling party, without devolving as much power to the regions as in a federal system. However, if there is a strong opposition party and the ruling party cannot be expected to have sufficient policy effectiveness, and if the opposition is strong enough in some regions to be the opposition party in the national government but the ruling party in the regions if federalism is introduced, then both the ruling party and the opposition party will benefit from federalism. It was shown that there would then be an incentive for both the ruling party and the opposition to reduce the powers of the state and increase the powers of the local government.

In the second half of the paper, we discussed coalition government and federalism from the perspective of money and the presence or absence of investment in the policy. It was shown that the more relationship-specific investment between parties, the stronger the coalition government from a financial point of view and the less need for federalism. Relation-specific investments are investments in human and material resources that enable one party, especially the opposition party, to realise its policies, but which also increase the effectiveness of the policies that the ruling party also wants to realise. For parties that are not large enough to be in power, the money and opportunity costs incurred in the process of legislating a certain law cannot be legislated unless they become the ruling party by forming a coalition government with another party. In other words, the investment in policy for a political party can be considered a relationship-specific investment. Each party needs the help of the other parties to recover its investment costs when it has to pay a lot of costs based on creating a coalition government. In addition, since profits are shared in a coalition government, the investment of the party in a coalition government that is not the largest party is less than the optimal investment. Institutional designers indicated that the balance between policy distance between parties and the size of parties, as well as the choice between federalism and the composition of coalition governments is a way to bring the investment for policy by the parties closer to the optimum.

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