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THE POLITICAL ECONOMY OF COALITION IN INDONESIA

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ABSTRACT

Politics as an art of bargaining has gain prominent momentum following the victory of the president-elect Joko Widodo in Indonesia in 2014. This-6paper estimates the value of political parties under uncertainties over two possible coalitions: the Great Indonesia Coalition (Koalisi Indonesia Hebat, KIH) that supports Joko Widodo, and the Red & White Coalition (Koalisi Merah Putih, KMP) that supports Prabowo Subianto, the president candidate from the Gerindra Party. The estimation shows that the Golkar, the second largest earner of seats in the parliament, is more valuable for KMP, making them expensive to be maintained within this coalition. It suggests that the best choice for Golkar is to jump to KIH, unless the KMP provides substantial payoff to lure this party. Nonetheless, the pure strategy Nash equilibrium in a non-cooperative game of political bargaining shows that even though a party has small fair values, but it still has decisive impact in the bargaining table of a coalition.

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Introduction

Modern discussions on public choice instigated by Bergson who, with Paul A. Samuelson, postulate the Bergson-Samuelson social welfare function, which is an aggregate objective function that tried to be maximised by the society given some constraints (Bergson, 1938; Samuelson, 1947; Mueller, 1976). Social welfare function as the aggregation of everyone's preference is controversial and how it is done is subject to debates in the sphere of public choice. The problem on how society aggregates its preference have led to discussions on voting procedures and how they can or cannot be used to aggregate preference. This debate culminates in the challenge by Arrow over the concept of Bergson-Samuelson social welfare function (Arrow, 1963). Arrow argued that there is no perfect social choice function and, consequently, there must be one individual who dictates what would be the aggregate preference of a society.

Moving away from the issue of preference aggregation in public choice, various discussions emerged in the topic of political groups who, in one way or another, represent some frac-

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tions of the society. For example, Hotelling and Downs demonstrated how competition among political parties could have desirable effect to the society as competition among firms may lead to perfect competitive outcome (Hotelling, 1929; Downs, 1957). In this Hotelling-Downs model, political parties tried to win votes by setting their political ideology to be within a certain (one-dimensional) political spectrum. Assuming that voters would vote for a party close to his/her political view, the best outcome for political parties would be to capture the median voters, a ”floating mass” who have not yet decided on which side of political ideology he/she is inclined.

This competition among political parties can be modelled using the ”duopoly” model as in the Hotelling-Downs model or, alternatively, using cooperative game theory where players (political groups) trying to get the highest benefit by forming a coalition. As in most game theoretic setting, rationality is important for players to choose their best strategies. As argued by Bacharach, people are often do things with reasons and pick options based on the expected utility of its payoffs (Bacharach, 2006). With the same spirit as Bacharach, we took the rational approach in explaining people’s behaviour with particular attention is given to the behaviour of political groups trying to win the majority of the parliament.

In order to give exposition to such situation, we use example from the recent development of Indonesian politics. Indonesia, the 16th largest economy in the world, had just undergone a relatively-successful general election (for both presidential and parliamentary) in mid-2014 and the newly-enacted UU MD3 provides an interesting setting for the fight in coalition. Indonesia is a country that uses presidential system, where the president is held responsible directly to the society, and not to the parliament.

The latest presidential election in Indonesia has brought a new phenomenon where the president-elect Joko Widodo (”Jokowi”) from the Indonesian Democratic Party-Struggle (PDI-P) showed a strong position of no political bargaining. In his many speeches, Jokowi always said that his coalition would be ”unconditional”. Some anecdotal evidences show that his political stance stemmed from the experience of the President Susilo Bambang Yudhoyono (”SBY”) where reforms were allegedly held back by SBY’s large coalition which practically includes all political parties except PDI-P. Jokowi’s insistence in unconditional political alliance is interesting because no presidents in the Reformation Era (the era that follows the downfall of the former-President Soeharto in 1998) ever showed such strong political stance before the government is formally established.

Following the Constitutional Court’s decision that reaffirm Jokowi’swinning, much of the debate is now shifts to how Prabowo—the losing presidential candidate—and the losing parties can control the parliament. Political parties are rallying supporters to become either the opposition in the parliament or to be part of the government. The Indonesian constitution does not recognise formal opposition, a fact that could be used as an excuse to allow for myopic political bargaining. Even though the losing parties (the Red & White Coalition, Koalisi Merah Putih, KMP) are now the majority (63 per cent) in the parliament, but some party members gave signals in mass media that they prefer to join Jokowi and to involve in the government and some of the disputes were started far before the official announcement of the presidential election result by the General Election Commission (Asril, 2014; Chairullah, 2014). With PDI-P—along with PKB, Hanura, and NasDem that form Great Indonesia Coalition, Koalisi Indonesia Hebat, KIH—needing for additional support in the parliament, there will be a bargaining between Jokowi’s PDI-P with political parties that might not be loyal to Prabowo’s KMP.

Given such circumstances in the latest Indonesian politics, we construct a model of political bargaining by political groups within a coalition using both cooperative and non- cooperative game theory. The cooperative game is used to elicit fair values of each political group in a coalition, while the non-cooperative game is using results derived from the cooperative game to find the best strategies for political parties involved in the game. We find that Partai Demokrat, who only got 11 per cent of parliamentary seats, is instrumental in coalition formation: once the party remains loyal to Prabowo's KMP, it would be catastrophic for Jokowi's political groups who tried to have control over the parliament. The article proceeds as follow. Section 2 established the general theory. Section 3 discussed the setting for Indonesia, followed by Section 4 that discussed the results. Finally, Section 5 concludes.

Theory

Two separate type of analysis were used: the first is analysing fair values of political parties using cooperative game theory, and; the second is focused on the non-cooperative game theory of political bargaining. Coalition games (cooperative game theory) were used as the main method in doing the analysis. Different from non-cooperative game theory where the units of analysis are individual agents, the coalitional (cooperative) game theory studies the behaviour of groups of agents.

Cooperative Game: The Shapley Value

In order to do the first type of analysis, I estimated the Shapley value of the grand coalition that might emerge (Shapley, 1953b). The cornerstone of the Shapley value is in its focus on the marginal contribution of each member of the grand coalition. This is a straightforward and simple idea: parties having large decisional impact on the margin should be rewarded more. Therefore, before any political bargaining to happen, it is interesting to know the fair value (the Shapley value) of each political party in the coalition. Simply counting the number of seats in the parliament is not sufficient to value the power of the political party because the marginal contribution will be different among political parties and depends on the set of possible coalitions that could emerge.

In order to formally construct this Shapley value let's first define N as a finite number of players, and $v(S)$, where $S \subseteq N$, as a real-valued payoff that can be distributed among the member of the coalition S. The coalitional game G is a tuple (N,v). The game G also assumes superadditivity which means that the value of two coalitions must be at least as great as the sum of individual values:

$$\forall S,T \subset N, \mathit{if}\ S \cap T = \phi, \mathit{then}\ v(S \cup T) \geq v(S) + v(T)$$

In addition, the game must satisfy several axioms. The first is the symmetric axiom where agents i and j are interchangeable if $v(S \cup \{i\}) = v(S \cup \{j\})$ for S that does not contain i nor j. The second axiom is the existence of dummy player, those with zero contribution to the coalition and, consequently, the agent will also receive zero in return. The last axiom is additivity: given that the payoff can be separated into two parts, $v = v_1 + v_2$, then it must be the case that $(v_1 + v_2)(S) = v_1(S) + v_2(S)$ for every coalition S.

Given all of above definitions and axioms, we are now ready to define the formula for the Shapley value:

$$\phi_i(N,v) = \frac{1}{N!} \sum_{S \subseteq N \setminus \{i\}} |S|!\,(|N| - |S| - 1)!\,[v(S \cup \{i\}) - v(S)] \quad (1)$$

The payoff for agent i, ϕ_i, is a fair payoff to the member of the coalition. The value is fair because it averages the marginal contribution of every agent over all different sequence according which the coalition could be made. In fact, the Shapley value is a (risk-neutral) von

Neumann-Morgenstern utility function, which means that it represents the utility of agents within the grand coalition (Roth, 1977). This notion of utility (payoff) will be instrumental in the design of the non-cooperative game that will be described later.

Shapley Value with Subjective Coalitional Weight

The calculation of above Shapley value is based on the symmetric axiom. Most cases, however, are sometimes asymmetric by nature. For example, it would not be "fair" to share the dividend using symmetric Shapley value if there is a player in the coalition that exerts more effort than other players. This situation is well thought by Lloyd Shapley himself and has been extended further by both mathematicians and economists (Shapley, 1953b; Owen, 1968; Owen, 1972; Kalai and Samet, 1985; Dragan, 1989).

However, it is also important for us to assign weight on the likeliness of a coalition to form. In a practical example, some political parties might have bad coalitional history and it is less likely that those parties will again engage in a coalition. In order to accommodate such possibilities we need to (subjectively) assign coalitional weight (ω), which is the likelihood of a coalition to exist. Therefore there is a need to recalculate Shapley value with subjective coalitional weight $\varphi_i(N, v, \omega)$. Given any possible coalitions (including singletons) k, we assign probability that the coalition might occur (ωk). Since the Shapley value is estimated by calculating the marginal contribution of each player in a coalition through any possible sequence, then we need to estimate the joint probability in each of the sequence, rescale its value to lie within the 0-1 range, and use it as the weight for calculating the expected payoff E(v(S)) of the coalition. In the end, after averaging the expected payoffs, we just need to standardise the result such that $\sum{}^{i} \varphi_i(N, v, \omega) = 1$

The Core

The previous method is fair but there is always possibility that some members of the coalition to defect and form a subcoalition that do better for themselves than the grand coalition. Therefore, even if the Shapley value is fair, it ignored stability. This brought us to the Core. By definition, the Core is a set of payment profile that satisfies the following:

$$\forall S \subseteq N, \sum_{i \in S} x_i \geq v(S) \tag{2}$$

The core does not always exist and even if it does, it can be more than one (not unique). Therefore, to guarantee that there will be no defection, the payoffs must be within the Core. Otherwise, agents would do better by forming a subcoalition.

Non-cooperative Game

Once we get the Shapley value of each agents in coalition, the next step is to construct a non-cooperative game where the Shapley values are used as the payoffs. The objective of constructing this non-cooperative game is to find the best strategy for each agents given information about their fair political values. The game will be started by nature deciding the possible environment where the players are situated. More details about the empirical setting of the non-cooperative game can be seen in Section analysis.

Analysis

The Settings

Table 1: Number of Seats in the Parliament of 2014-2019

Members	Number of Seats
KIH (PDI-P, PKB, NasDem, Hanura)	207
Golkar	91
Demokrat	61
PPP	39
KMP (Geriendra, PKS, PAN)	162
Total	560

There are 10 political parties in the 2014 presidential election and two coalitions emerged: the KIH (PDI-P, PKB, NasDem, Hanura) with 207 parliament members and the KMP (Gerindra, PAN, PKS, Golkar, Demokrat, PPP) with 353 parliament members. In total there are 560 seats in the People's Representative Council (DPR). See Table 1 for the distribution of seats in the DPR. The interesting thing is that KIH—that has fewer seats in the parliament—is the one who support the president-elect Jokowi. Knowing that the presidential race result is against the KMP, some party figures from the KMP shows some inclination to be part of the winning coalition. Based on past experiences and comments by political pundits, three members of the KMP—Golkar, Demokrat, PPP—have the potential to jump to the KIH.

In the first setting of the game we exclude the KMP- (Gerindra, PKS, PAN) simply because they are showing strong opposition toward the KIH. Therefore, rather than doing analysis for the whole 10 political parties, we end up with 4 agents that could form what is called the Grand Coalition I:

$$N1 = \{KIH, Golkar, Demokrat, PPP\} \quad (3)$$

In this study the game would be on coalition in the parliament where according to Article 84 of the Law on People's Consultative Assembly, People's Representative Council, Regional Representative Council, and Regional People's Representative Council (short name: UU MD3), the leaders of the parliament could be chosen by means of voting if there is no agreement during the deliberation. Leaders of the parliament include the speaker of the parliament and four deputy speakers which all come from different political parties (each fraction in the parliament propose a person to sit as the leaders of the parliament). In order to simplify the analysis we will only focus on how the coalition tried to win the majority vote of 50 per cent +1 (winning 281 votes). Therefore, to construct the Shapley value and to estimate the Core we need to have:

$$v(S) = \begin{cases} 1 \\ 0 \end{cases} \text{if total number of votes} \geq 281 \text{ otherwise} \quad (4)$$

Given the results from the Legislative Election, the possible coalition that can guarantee a win in leadership of the parliamentary must include the KIH, which gave them the veto power: {KIH, Golkar, Demokrat, PPP}, {KIH, Golkar, Demokrat}, {KIH,Golkar, PPP}, {KIH, Demokrat, PPP}, and {KIH, Golkar}.

With respect to coalitional weight, the following is the procedure to obtain the weights needed to calculate Shapley value with subjective coalitional weight. It is assumed that any coalition between Demokrat and KIH or KMP- is less likely. This is natural because the current President SBY who served as the Chief Counselor of Partai Demokrat said that his party will not be in any coalition and will be the ”balancing power” in the parliament. Therefore, any possible coalition between Demokrat and KIH or KMP- will be given 50% less likelihood.

The coalitional weights can be seen in Table 2.

Table 2: Coalitional Weight

Grand Coalition I				Grand Coalition II			
Coalition(k)	Weight (ωk)	Coalition(k)	Weight (ωk)	Coalition(k)	Weight (ωk)	Coalition(k)	Weight (ωk)
KIH	0.079	G,PPP	0.079	KMP-	0.079	G,PPP	0.079
G	0.079	D,PPP	0.079	G	0.079	D,PPP	0.079
D	0.079	KIH,D,PPP	0.033	D	0.079	KMP-,D,PPP	0.033
PPP	0.079	KIH,G,D	0.033	PPP	0.079	KMP-,G,D	0.033
KIH,D	0.033	KIH,G,PPP	0.079	KMP-,D	0.033	KMP-,G,PPP	0.079
KIH,PPP	0.079	G,D,PPP	0.079	KMP-,PPP	0.079	G,D,PPP	0.079
KIH,G	0.079	KIH,G,D,PPP	0.033	KMP-,G	0.079	KMP-,G,D,PPP	0.033
G,D	0.079	Total	1	G,D	0.079	Total	1

Lastly, the setting for the non-cooperative game is as follow. First, nature decides with probability α and 1−α these two possible subcoalitions/environments: 1) KIH with Demokrat, or; 2) KMP- with Demokrat. Second, the players— Golkar and KIH—observe their strategies and payoffs (which is based on the Shapley values) and choose their best strategy, given expectation of what other rational player would do. To be more specific, Golkar has two strategies: joins the KIH or joins the KMP-. On the other hand, KIH also has two strategies: pick Golkar or PPP as its coalition member. It is assumed that the players are moving simultaneously and having perfect information about the payoffs.

The Results

Fair Values of Political Parties

The Shapley value of the parliamentary game can be summarised succinctly in Table 3 that shows the computed Shapley value side by side with the percentage of seats in the grand coalition. It is interesting to note that while the Shapley value for KIH, Golkar, and PPP are not much different with the share of seats in the grand coalition, but that is not the case for Demokrat. The party's Shapley value is only half of its share in the grand coalition. This could mean that the party overstates its contribution (bargaining power) in the grand coalition and therefore should get a lower (but fair) payoff.

Table 3: Shapley Value and Seats in Parliament of the Grand Coalition

Members	Shapley Value	Share of Seats in the Grand Coalition I
KIH (PDI-P, PKB, NasDem, Hanura)	0.58	0.52
Golkar	0.25	0.23
Demokrat	0.08	0.15
PPP	0.08	0.10

In practical terms, the result shows that while the KIH has enough power to steer the grand coalition (as shown by the > 50% in Shapley value and share of seats in the grand coalition), but they still need other member of the grand coalition to won the actual leadership in the parliament. KIH should also focus its political lobbying to Golkar's politicians rather than PPP's and Demokrat's. These results are not surprising and one only need to glance at the share of the parliamentary seats to come to that conclusion. However, the interesting thing from the Shapley value is that it discounts much (due to the symmetry axiom) of the bargaining power of the Demokrat due to its relatively small marginal contribution to the grand coalition.

Our previous discussion focused on KIH trying to persuade Golkar, Demokrat, and PPP to join their ranks. KMP-, however, would not keep quiet and they will try to avoid KMP from breaking apart. Therefore the question is: how much payoff should be offered to these three parties to remain in the KMP? In order to answer that question we can, again, rely on the Shapley value but now for the Grand Coalition II (N2), which is basically the same as the original KMP:

$$N2 = KMP = \{Gerindra, PKS, PAN, Golkar, Demokrat, PPP\} \quad (5)$$

Table 4 summarises the results, where the most interesting result is how the value of Golkar increased significantly by almost double the value of the share of seats. Compared to the previous result in Table 3, Golkar's fair value is much higher in KMP. It means that Golkar has more bargaining power in KMP than in the KIH. Consequently, the payoff paid to Golkar should be large enough to persuade them to remain in KMP. Knowing that the grand coalition might be unstable, we now move our attention to the Core of this game. The first game shows that the KIH has the veto power and every possible set that enable the coalition to win must include KIH.1Consequently, it makes the remaining three parties has no incentive to deviate and the Core will be unique:$x_{KIH} = 1$, $x_{Golkar} = x_{Demokrat} = x_{PPP} = 0$. While having strong presence in four out of five possible winning sets, Golkar is not large enough to deviate from this coalition. The story is different in the second game where any complete distribution of payoff for both the KMP- and Golkar belongs to the Core. This means that the stability of KMP relies on these two parties belong in the coalition. Once Golkar moved away from KMP, there is no hope for this coalition to win the race for leadership in the parliament.

Above analysis relies heavily on the assumption of equal probability of coalition formation. Real politics, however, are driven by individuals who set the likeliness of a coalition to happen. Using weighted Shapley values we found that the voice of Golkar is now reduced and having a relatively equal worth for both KIH and KMP- (see Table 5).

Table 5: Shapley value with coalitional weight

Members	Grand Coalition I	Grand Coalition II
KIH	0.69	-
Golkar	0.23	0.27
Demokrat	0.05	0.05
PPP	0.02	0.12
KMP-	-	0.55

What is interesting is the fair value of PPP has quadrupled for the KMP- than for the KIH, implying that PPP has increased its significance for this Gerindra-led coalition. It is also worth to note that the weighted Shapley value for both KIH and KMP- are higher than in the (unweighted) Shapley value. This means that the cohesion within these subcoalitions must be maintained to avoid defection by its members.

Game Tree of the Non-cooperative Game

The game tree of the non-cooperative game can be seen in Figure 1.

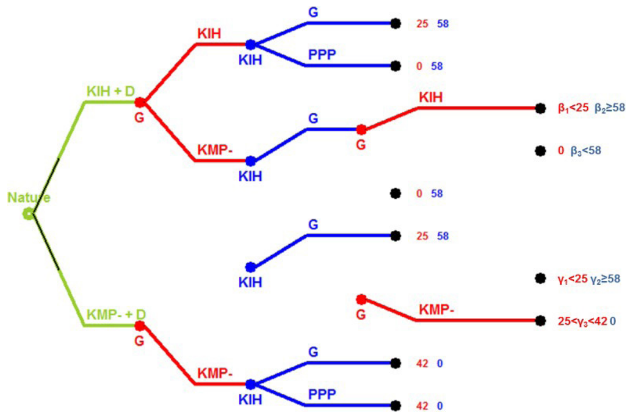

Figure 1: Game Tree of Political Bargaining

Note: G: Golkar; KIH: Indonesia Hebat; KMP-: {Gerindra, PAN, PKS}; D: Demokrat. In order to simplify the presentation, the payoffs are made equal to 100 x Shapley value.

Given the environment, one can quickly observed that the Shapley values obtained from Table 3 and Table 4 fits nicely in the game tree. The problem is when in the first environment (KIH + D) Golkar choose to join KMP- but at the same time KIH wanted to have Golkar in its own coalition. This resulted in a deadlock: KMP- + Golkar have only 253 seats, while KIH has only 268 seats. This makes the voice of PPP became decisive. The same problem when in the second environment (KMP- + D) Golkar pick KIH while the KIH choose PPP instead. With PPP at its side, KIH only has 246 seats, making Golkar's decision to be instrumental.

Table 4: Shapley Value and Seats in Parliament of the KMP

Members	Shapley Value	Share of Seats in the Grand Coalition II
KIH (PDI-P, PKB, NasDem, Hanura)	0.42	0.46
Golkar	0.42	0.26
Demokrat	0.08	0.17
PPP	0.08	0.11

In order to solve the problem, two sub-trees are introduced where Golkar could do two strategies: 1) to remain consistent with its prior chosen strategy, or; 2) to defect.2These strategies resulted in different payoffs as in the Shapley value. For example, in the first situation when Golkar wanted to join KMP- but KIH pick Golkar, it is reasonable to assign a payoff $\beta_1 < 25$ for Golkar because its initial preference with KMP- will not gain anything and it has no other option but to receive less payoff than its fair value. Consequently, the payoff for KIH is now$\geq$ 58 because of the transferred payoff from Golkar, and it is not going to be a strict inequality because there is also possibility that the transferred payoff will be distributed to the other member of the coalition (Demokrat). Given such setting and using backward induction (see Figure 2), the pure strategy Nash equilibrium under the first environment (KIH + D) is for Golkar to choose KMP- but then defect if and only if the KIH wanted to have Golkar in its coalition. This is better than Golkar choose the KIH since the beginning because there is a probability that KIH would pick PPP instead of Golkar (any of these parties will gave enough voting power to win the game). On the other hand, KIH will be better off picking Golkar than PPP.

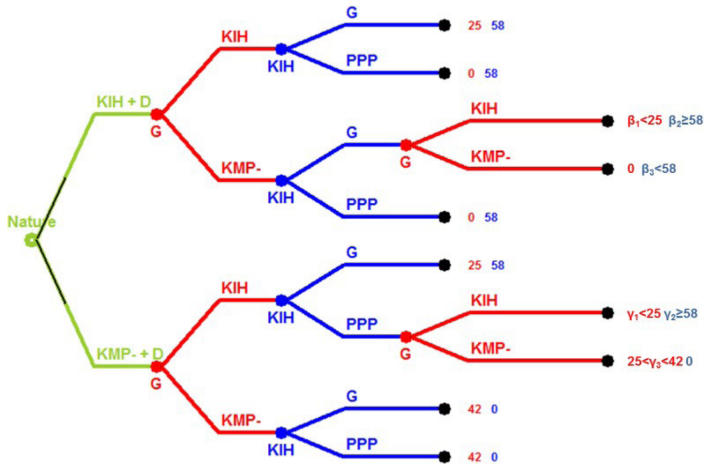

Figure 2: Game Tree of Political Bargaining After Eliminating Dominated Strategies

Note: G: Golkar; KIH: Koalisi Indonesia Hebat; KMP-: {Gerindra, P AN, P K S}; D: Demokrat. In order to simplify the presentation, the payoffs are made equal to 100 x Shapley value.

However, under the second environment (KMP- + D), the situation is becoming much less favourable for the KIH and they cannot avoid defeat in the parliament no matter which political parties they tried to engage because Golkar will always be better off choosing the KMP-. Therefore, even though Demokrat has relatively small Shapley value—whether it is weighted or not—but its voice is significant enough to turn the bargaining table should they choose to remain in the KMP

Conclusion

This paper affirms that KIH does have the veto power for political bargaining, supporting the claim by the president-elect Jokowi that he required that the coalition to be ”unconditional”. The estimation also shows that Golkar’s voice is highly valued for KMP. Analysis of the Core suggests that Golkar has an equal position as the KMP-, suggesting that a substantial payoff is needed to maintain this party to be within the coalition. However, if coalitional weight is assigned, the role of cohesion within the subcoalitions has become increasingly important. Non-cooperative game theory shows that Demokrat still has large strategic power in the parliament. This is rather surprising since Demokrat has relatively small Shapley value. Therefore, we may conclude that small fair values of political parties might still have large impact in bargaining of coalition.

Latest development in Indonesian politics shows that Partai Demokrat is now setting a room for political bargaining through Government Regulation in Lieu of Law (Perpu) No. 1/2014. This Perpu was proposed by President SBY in his last governing days to support direct local government head election, opposing the Law No. 22/2014 on Election of Governor and District Head that supports indirect (via local parliament) local government head election. This move signals a support to KIH’s insistence for direct election, while at the same time showing to KMP that the party is still having some influences over the course of Indonesian politics.

The logical next step in this line of research is to analyse how the coalition/multiparty government may use its power for their own benefit, usually known as the political business cycle, such as that proposed by Hanusch (2012). Another potential theoretical development that departs from this paper is modelling the strategic behaviour of the president given uncertainties in the coalition at the parliament such as in the political bargaining literatures (Staahl, 1972; Rubinstein, 1982; Usher, 2012).

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