Distributive Politics in Malaysia
Maintaining Authoritarian Party Dominance

Hidekuni Washida

7 Manufacturing legislative dominance
Gerrymandering and malapportionment

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

7 Manufacturing legislative dominance

Gerrymandering and malapportionment

Introduction

The preceding chapters explain how the *Barisan Nasional* (BN, formerly the Alliance) has cultivated electoral support by impartial cost compensation for affiliated states and providing career incentives for efficient mobilizers. This chapter explores how it had manufactured legislative dominance by magnifying the limited pool of votes. As discussed in chapter 1, the BN had survived multiparty elections with smaller margins of victory than other dominant parties have enjoyed. Therefore, the BN had needed to transform its modest level of electoral support into a two-thirds majority. Although the single-member district, plurality electoral rule (or the first-past-the-post, FPTP) had contributed to the large gap between vote and seat shares, it cannot fully explain the continuous legislative dominance under changing political and socioeconomic conditions. This chapter reveals that the BN had effectively manufactured legislative dominance by the efficient distribution of seats, i.e., by gerrymandering and malapportionment.

From a comparative perspective, Malaysia is a notoriously gerrymandered and malapportioned case. Various anecdotes have suggested that these tactics have contributed to the BN's enduring dominance. According to the expert survey conducted by the Electoral Integrity Project, which covers 54 democratic or quasi-democratic regimes, the Malaysian gerrymandering score is the second highest after the United States (Martínez i Coma and Lago 2016). The malapportionment index (MAL) (Samuels and Snyder 2001) of Malaysia also marks a higher rank in the global samples (Ong, Kasuya and Mori 2017).[1] By focusing on incentives and constraints, Ong *et al.* (2017) reveal that the malapportionment tends to be more serious in competitive autocracies, such as Malaysia and Singapore (also see Tan 2011), than established democracies or closed autocracies. The manipulation of political representation is a useful means to weaken (typically democracy-oriented) opposition parties without relying on massive electoral fraud (Higashijima and Kasuya 2016; also see Roberts 2015; Wong 2017).

Various Malaysia studies have repeatedly mentioned these issues. Recently, thanks to the activities of *Bersih* (Coalition for Clean and Fair Elections or Clean), which means clean, the Malaysian people became more concerned about

the fairness of elections (also see chapter 8). In particular, the 2013 election contributed to renewed attention to malapportionment, because the BN retained 60% of seats with fewer votes than those of the opposition coalition (Ostwald 2013). However, there have been few systematic analyses, despite continuous allegations of manipulation.

More generally, an investigation is needed into how ruling parties in authoritarian regimes manipulate electoral representation and manufacture legislative dominance. Although these tactics have long been listed on the "menu of manipulation" of competitive authoritarianism (Schedler 2002), there have been insufficient studies about strategic redistricting and apportionment. Even in the literature about comparative democracies, the empirical scope is limited mainly to the United States.

However, the findings of the American studies cannot be directly applied to an authoritarian context. Leaders of authoritarian regimes enjoy much wider discretion than leaders in democratic countries. They can easily remove institutional constraints, such as an impartial election commission or judiciary, the formal restriction on a maximum range of population disparity among constituencies, or a rule that requires respecting administrative or community boundaries. Thus, political intentions are expected to emerge more clearly in authoritarian regimes.

In addition, strategies for gerrymandering and malapportionment are more coordinated in such regimes. In the United States and other democracies, redistricting, and reapportionment take place in a two-step procedure in which the automatic, census-based reapportionment among states precedes the within-state redistricting by relevant actors of respective states. In contrast, authoritarian leaders often exert top-down, full-fledged discretion over the simultaneous process of redistricting and reapportionment. Therefore, they can elaborate a more comprehensive strategy for redistricting and reapportionment. For example, they can draw lines without being constrained by the one-person-one-vote principle.

Through the systematic analyses of an originally constructed Geographic Information System (GIS) database, this chapter reveals that "crack/inflate supporting bases and diffuse/disturb opposition bases" is the optimal mapmaking strategy under authoritarian party dominance. This database covers four redistricting exercises in peninsular Malaysia (1974, 1984, 1994, and 2003).[2] By using this database, this chapter explores how the BN had relocated supporting and opposing voters into new boundaries. Before moving to the analyses, this chapter begins with a theoretical discussion about gerrymandering and malapportionment and then extends the scope to the context of authoritarian party dominance.

Theoretical discussion and extension

The conventional wisdom of gerrymandering argues that the optimal strategy is to "crack and pack" (Owen and Grofman 1988), i.e., to divide highly supportive constituencies in order to "export" surplus votes to neighboring

constituencies (cracking) and to enclose as many opposition supporters as possible into a smaller number of constituencies (packing). However, such an argument assumes a balanced (symmetric), two-party system as in the United States. This section extends the theoretical scope to a dominant party regime and argues that political leaders will crack without packing. Because of the larger pool of supportive votes than are in democracies, a dominant party can diffuse opposition votes without packing into seats that are sure to be lost. It can also disturb opposition bases by redistricting.

Moreover, leaders in such regimes are less constrained by the principle of one-person-one-vote rule. Therefore, they can selectively overrepresent the cracked pieces of supporters to efficiently manufacture legislative dominance (and coalitional advantages). To consider the optimal mapmaking strategies under authoritarian party dominance, the following sections review existing theories of gerrymandering and malapportionment.

The theory of gerrymandering

The theory of crack and pack elaborates an optimal strategy in a competing two-party system in which one party has discretionary control over redistricting under the FPTP rule. The basic intuition is that a mapmaking party aims to win as many seats as possible with a given number of supportive votes by reducing wasted votes.[3] Because a candidate can win a seat by getting slightly more votes than the majority, a mapmaking (ruling) party can increase the wasted votes for the rival (opposition) party by concentrating the rival's supporters into a smaller number of seats. In a similar vein, it can reduce its wasted votes by cracking highly supportive constituencies to spread wasted supporters for neighboring constituencies. However, exporting too many supporters can jeopardize the electoral prospects of cracked seats. A strategic decision thus depends on the party's preference for the maximization of either the expected number of seats or the probability of sustaining incumbency status.

There have been insufficient empirical analyses to examine this intuition. This is partly because actual redistricting faces various constraints, including geographic constraints, lack of political discretion in redistricting, political influence of individual legislators who seek to avoid geographic changes, and varying power balances between competing parties or between mapmakers and the independent judiciary.

American studies exploit the opportunity of interstate comparisons to explore the determinants of redistricting patterns (e.g., Cox and Katz 2002). The cross-state comparative analysis by Winburn (2008) reveals that a partisan crack and pack becomes salient when a party has discretion in redrawing plans and faces fewer institutional constraints, as in the cases of Georgia and Texas. However, whether these findings still hold beyond the American context remains uncertain.

An additional issue relates to the difficulty of capturing changes in electoral boundaries. Pioneering studies have relied on indirect approaches, such as

analyzing seat-vote functional relationships (e.g., Gelman and King 1994) or the geometric shape of constituencies such as compactness (e.g., Polsby and Popper 1991). Since the seminal work by Crespin (2005), however, American studies have increasingly employed a GIS-based approach. By using GIS, researchers can directly capture how electoral boundaries are redrawn. However, the availability of GIS-based database is severely restricted. Constructing a GIS database is time-consuming; therefore there have been a limited number of GIS-based studies.

The GIS technique has expanded the theoretical scope. For example, Yoshinaka and Murphy (2009) push forward the idea of personal votes (e.g., Ansolabehere, Snyder and Stewart 2000; Desposato and Petrocik 2003) and reveal that mapmakers not only pack opposing voters into areas represented by rival incumbencies but also create population instability in the opposition constituencies by breaking the intimacy between incumbents and their supporters.[4] Creating population instability is a specific type of swapping or kidnapping (Grofman and Brunell 2010: 656).[5] Although recent studies have demonstrated the effectiveness of the GIS-based approach, whether such patterns become salient in other contexts is still uncertain.

There have been scant empirical analyses in the literature about authoritarian regimes, although the problem of gerrymandering should be more serious in competitive authoritarian regimes. An exceptional case study by Wong (2017) reveals that, in Hong Kong, constituencies represented by opposition incumbents are more likely to be the target of redelineation. This, in turn, reduces their chances of reelection due to the increased population instability.

Malesky (2009), another notable exception in the literature about authoritarian regimes, analyzes the case of a Vietnamese single-party regime and reveals that reformist leaders divided administrative units (provinces) dominated by large, state-owned enterprises to increase the number of reformist members in the central committee. In a similar vein, African studies also demonstrate that splitting administrative units is frequently employed as a means to provide patronage (Green 2010; Kasara 2010) or to divide and co-opt opposition groups (Kraxberger 2004; Kasara 2010; Albaugh 2011; Grossman and Lewis 2014).

However, increasing the number of administrative units by geographic splitting constitutes only a specific type of gerrymandering. Multiparty, competitive authoritarian regimes require the use of more complex strategies of electioneering than the case of less competitive regimes. In most countries, including Malaysia, administrative units do not correspond to electoral constituencies and the numbers of units rarely change. Therefore, it is necessary to explore the strategic manipulation of electoral rather than administrative boundaries in such regimes.

In particular, multiparty regimes ruled by dominant parties provide a useful analytical field, because leaders in such regimes face fewer constraints. Therefore, they are capable of reflecting their strategic concerns more directly and systematically than are leaders of democracies. In addition, they are more induced to manipulate the electoral market than are leaders in less competitive regimes.

How do mapmaking strategies under single-party dominance diverge from the conventional wisdom? As reviewed earlier, the theory of crack and pack assumes a competing two-party system. In contrast, under single-party dominance, a mapmaker cracks supporting bases but plausibly avoids packing opposition supporters into seats that are sure to be lost. Because of the larger pool of supporters, a dominant party can afford to pack opposition supporters into surely losing seats. Instead, it can crack its strongholds and export redundant supporters into neighboring competitive areas, thus diluting opposition votes in these areas.

To illustrate the intuition, Figure 7.1 compares two hypothetical strategic settings, in which the partisan balance between a mapmaker (ruling) party and a rival (opposition) party differs. Supporters are colored in black and opponents are in white. The upper panel represents a symmetric competition between two parties, in which the number of supporters balances (50:50). In contrast, the lower panel is an asymmetric situation, in which a mapmaker leads by 20 votes (60:40). What strategy does a mapmaker follow in such a situation? Let me start by supposing the constraint of equal electorate size, although relaxing this assumption expands the leeway for a mapmaker.

In the upper panel, a mapmaker can increase the number of winnable seats by cracking highly supportive "*a*" and packing opposition supporters into "*f*" so as to create easily winnable "*d*" and "*e*" at the expense of surely losing "*f*."
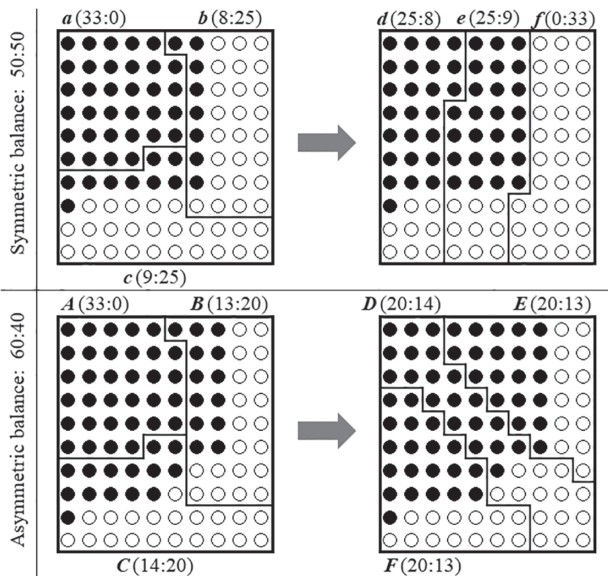

Figure 7.1 Delineation strategies under different partisan balances

Note: Numbers in parentheses represent the numbers of voters supporting the black party (a mapmaker) and the white party respectively.

In contrast, in the lower panel, a mapmaker can win all seats by splitting highly supportive "*A*" to dilute opposition votes in adjoining constituencies ("*E*" and "*F*"). This example shows that an extra pool of supporters exempts a mapmaker from packing rival supporters.

More generally, the preferable extent of cracking depends on the partisan balance between competing parties in the area of concerned and neighboring constituencies. As seen from the figure, a mapmaker splits supporting bases more aggressively in the lower panel than in the upper panel. In contrast, when the partisan balance is not advantageous for a mapmaker, he/she may avoid cracking the supporting areas. For example, if the balance is 40:60 and a mapmaker has only seven supporters outside of "*a*" in the upper-left panel boundaries, a mapmaker is expected to refrain from splitting even though the number of supporters in "*a*" is fixed. Instead, it may change the boundaries of oppositional strongholds to create population instability for rival candidates, which consequently imposes an intraparty coordination problem.

In sum, because of the asymmetric partisan balance, a dominant party is expected to crack its strongholds to export supporters and dilute opposition voters without packing oppositional supporters into seats (Hypothesis 6a). Yet the optimality of cracking is expected to depend on partisan balance including neighboring constituencies. Specifically, a mapmaker will crack its strongholds under more supportive partisan balances, whereas he/she may split oppositional strongholds under disadvantaged partisan balances to disturb opposition bases by creating population instability (Hypothesis 6b). Moreover, as discussed in the next section, relaxing the assumption of equal population size allows a mapmaker to flexibly carve out any supportive, overrepresented constituency.

The theory of malapportionment

When examining the strategies for apportionment,[6] previous literature has mainly investigated the cross-national determinants of malapportionment. A seminal work by Samuels and Snyder (2001) proposed an index of malapportionment (MAL) and found that MAL is higher under the FPTP electoral system, although this point is contested (Ong *et al.* 2017).

In addition, a formal apportionment rule also affects whether malapportionment or gerrymandering becomes more salient. For example, rules that require preserving existing administrative or community boundaries increase the reliance on malapportionment as in the case of Japan, whereas political manipulation tends to emerge as gerrymandering under the institutionalized rule of one-person-one-vote, as in the United States (Christensen 2004).

Moreover, Horiuchi (2004) attributes impartial apportionment to the income inequality between rural and urban areas, which induces population movement from the former to the latter at a faster pace than reapportionment cycles. The LDP had an incentive to delay reapportionment, because rural areas have been its supporting bases. By rewarding overrepresented rural areas, the LDP succeeded in retaining cost-efficient seats (Horiuchi and Saito 2003; Scheiner 2006).

In recent studies, there has been a growing agreement that ruling elites over-represent their supporting bases to protect their political power and vested interests.[7] For example, Ardanaz and Scartascini (2013) argue that ruling elites in a highly unequal society try to block democratization and redistribution by overrepresenting their supporting bases. A comparative, cross-national/within-country analysis of eight FPTP African countries by Boone and Wahman (2015) also demonstrates that elites of authoritarian regimes overrepresent rural sup-porting bases to preserve their vested interests even after democratization. Such overrepresented interests produce conservative bias (Samuels and Snyder 2001; Snyder and Samuels 2004) or subnational authoritarian enclaves (Gibson 2012) even after democratization.

It is expected that the BN had overrepresented constituencies with higher levels of electoral support (Hypothesis 7a). Yet strategies for redistricting and reapportionment may differ, although they are interrelated. For example, a mapmaker may target oppositional strongholds in redistricting, but he/she has no incentive to overrepresent oppositional strongholds. Because new seats are plausibly apportioned to the affiliated states under the federal structure, opposition states will be systematically underrepresented (Hypothesis 7b).

In addition, as the aforementioned studies imply, political elites may consider not only short-term electoral results but also long-term consequences when they make a decision about reapportionment, because providing additional seats creates vested interests. Redistricting may be aimed at electioneering, e.g., indirectly increasing the partisan balance in neighboring districts, whereas reap-portionment is related to long-term concerns because it exerts more long-lasting impact on the power balances among parties or within a ruling party. In par-ticular, the UMNO leaders supposedly took a more cautious stance toward giving additional seats to non-Malay-dominant areas, which could negatively affect the UMNO's dominance within the BN. Therefore, overrepresenting Malay-dominant areas would be a preferable strategy for them (Hypothesis 7c).

As previous literature indicates, an analytical approach that focuses on within-country variance is an effective means to systematically explore a leader's reap-portionment strategy. Like Boone and Wahman (2015), this study directly examines the within-country variance of over/underrepresentation in an authori-tarian regime with the FPTP rule. The GIS database also allows an analysis of the redistricting and reapportionment strategies from a unified framework as mapmakers do.

The Malaysian context

As discussed, vote shares of the Malaysian ruling coalition had been much lower than in other dominant parties. To transform the limited pool of votes into a stable majority, political leaders had been strongly induced to improve the effi-ciency of vote-seat transformation. Actually, they succeeded in transforming the moderate vote shares, which have hovered around 60%, into a two-thirds major-ity, except for in the 1969 and recent elections.

The wide gap between vote and seat shares can be attributed not solely to the FPTP rule but also to the efficient distribution of political representation. Wider discretion in redistricting and apportionment has enabled the political leaders to respond flexibly to changes in the electoral and socioeconomic environment. By leveraging their legislative dominance, political leaders had extended their influence with frequent, constitutional amendments. Although the BN had lost its two-third majority since 2008 and consequently the power to unilaterally change the number of seats among states,[8] it retained the power to redraw boundaries (a simple majority) until 2018. Actually, the 2018 election was conducted under new boundaries. The following section explains the process of removing institutional constraints and then reviews the preliminary evidence.

Removing institutional constraints

Rachagan (1992) describes in detail the process of politicization of redistricting and apportionment. The British colonial authority created an independent Election Commission (EC) at the time of independence. However, as seen in chapter 3, the ruling coalition has experienced tough competition since the first election in 1959, because it failed to elicit support from newly enfranchised non-Malay electorates. After the EC drafted a new delineation plan to reduce rural weighting in the next election, the UMNO amended the constitution in 1962 and deprived the EC of its power to redistrict. It left the EC only the role of recommendation of a redistricting plan to the prime minister before presenting it to the legislature for approval.[9]

This amendment empowered the prime minister to alter the recommendation before submitting to the lower house, in which one-half of the members of the lower house can approve the redistricting plan without requiring senate approval. In addition, the maximum deviation of the size of the electorate, formerly in the band of ±15% from the mean, was expanded, and rural constituencies were subsequently permitted to be half of urban constituencies (Rachagan 1992: 385–7). The 1973 amendment abolished the restriction on the electoral size of constituencies (Rachagan 1992: 391), thereby liberating the ruling party from the issue of malapportionment. Moreover, a 1983 amendment removed the decennial requirement to review boundaries. Although the restriction for prohibiting changes at least for 8 years was preserved, it enabled the government to redraw any constituencies at any time when the number of apportioned seats changes (p. 392).

When drawing electoral boundaries, political leaders have not been constrained by administrative boundaries at district and village levels. The major geographic constraints still remaining are: (1) electoral boundaries should be nested within-state boundaries, and (2) state legislative constituencies should be nested within parliamentary constituencies.[10]

In addition, the ability to collect local information is beneficial for partisan gerrymandering. The BN had utilized the extensive local knowledge collected

through the politico-bureaucratic network at the grassroots level (Scott 1985; Shamsul 1986). Since the 1990 election, the BN changed the rule of vote counting units from the constituency level to the polling station level, each of which consisted of approximately 700 electorates. This change further enhanced the ability to collect detailed information (Lim 2002: 126).[11]

Gerrymandering in Malaysia

Existing Malaysia studies have pointed out various cases of gerrymandering. A well-known example of oppositional packing is the creation of the Federal Territory of Kuala Lumpur in February 1974. In the 1969 election, the ruling coalition and mainly non-Malay-based opposition parties won the same number of seats in the Selangor state assembly.[12] Federalization was intended to remove opposition-leaning, mainly non-Malay votes from Selangor in subsequent elections and entrench them in underrepresented constituencies (Rachagan 1992: 393–4).[13]

Rachagan (1992) also points out the strategy of creating overrepresented, small constituencies in areas inhabited mainly by supportive Malay voters. Through a case study of Johore, he shows that the BN carved out a less popu-lated Malay-dominant seat, for which the UMNO's vice president ran unopposed.

A GIS-based case study of Kedah by Ong and Welsh (2005) compares the electoral and demographic cartographies and descriptive statistics before and after the redelineation in 2003. The authors demonstrate that the BN exported non-Malay voters to vulnerable seats contested by the PAS (a Malay-based opposition party). Given the vote-pooling effect (Horowitz 1985: 396–7, 425–6), such exported voters were plausibly induced them to vote for the BN rather than the Malay-centric PAS.

Although these studies are insightful,[14] their coverage has been limited to specific areas and periods and therefore insufficient to systematically explore the strategies of mapmaking. Including Ong and Welsh (2005), existing studies have relied on the visual comparison of maps and descriptive statistics to derive implications when referring to the conventional framework of crack and pack. This chapter tries to fill this gap.

Malapportionment in Malaysia

As discussed above, the ruling party had removed the institutional constraints on malapportionment with constitutional amendments. There are three factors to understand the context of malapportionment in Malaysia: electoral support, ethnicity, and federalism.

As comparative and Malaysia-focused studies point out, there are substantial reasons to expect that the BN has over/underrepresented supportive/opponent areas. As Rachagan (1992) demonstrates, the BN carved out less-populated seats in highly supportive areas, while it packed opposing voters into under-represented federal seats in Kuala Lumpur.

These cases also imply that political leaders, those of the UMNO in particular, considered not only electoral results but also the ethnic composition of constituencies. The ethnic composition of each constituency affects which party runs for a seat. Overrepresenting Malays at the cost of underrepresenting non-Malays contributes to the UMNO's dominance within the coalition.

Yet we are still uncertain about, for instance, how the leaders had balanced electoral and ethnic concerns when the Malay votes became increasingly divided by intra-UMNO factional struggles and the UMNO-PAS rivalry. In addition, as Rachagan implies, the attributes of individual politicians of respective constituencies may affect the mapmaking strategy. We thus need a more systematic analysis that considers various factors including geographic conditions.

The third factor of federalism relates to the second point. Malaysia originally consisted of the 11 peninsular states of former Malaya, which attained independence in 1957. Singapore and the two Borneo states of Sabah and Sarawak joined the federation in 1963, although the former left in 1965. Singapore, a strategically and economically important region, was inhabited mainly by Chinese. To counterbalance its Chinese population, the Borneo states were invited into the federation. The native groups were categorized as a broader Malay group of *bumiputera* (sons of the soil). To persuade Sabah and Sarawak, the peninsular government provided them with bonus seats (see chapters 3 and 4). Thereby, these two states have been systematically overrepresented.

The following two figures illustrate the trends of MAL. Figure 7.2 illustrates the trend by decomposing the Malay-belt states (Perlis, Kedah, Kelantan, and Terengganu), other peninsular states, the federal territories in peninsular Malaysia (Kuala Lumpur and Putrajaya), and the two Borneo states, including the federal territory of Labuan. It shows that the two Borneo states explain approximately one-third of malapportionment.

To examine the degree of over/underrepresentation, Figure 7.3 decomposes the plus and minus values of MAL, which is originally defined as an absolute scale. This figure demonstrates, as expected, that the Borneo states have been
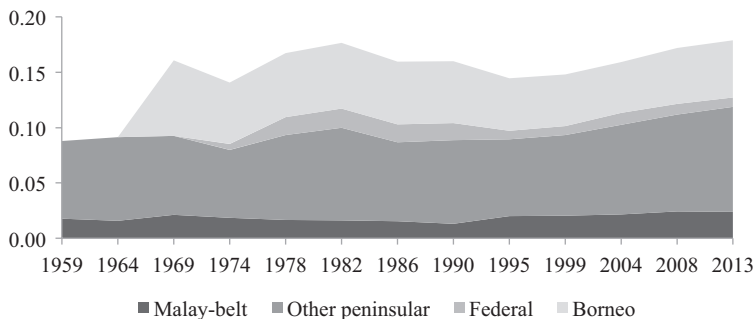

Figure 7.2 MAL by major clusters of states, 1959–2013

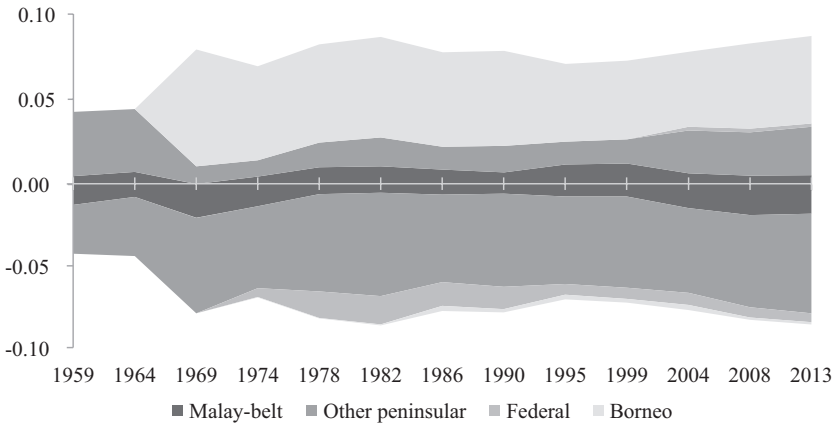Note: Based on parliamentary seats. For data sources, see Appendix 7.1.

Figure 7.3 Decomposed MAL (plus/minus) by major clusters of states, 1959–2013

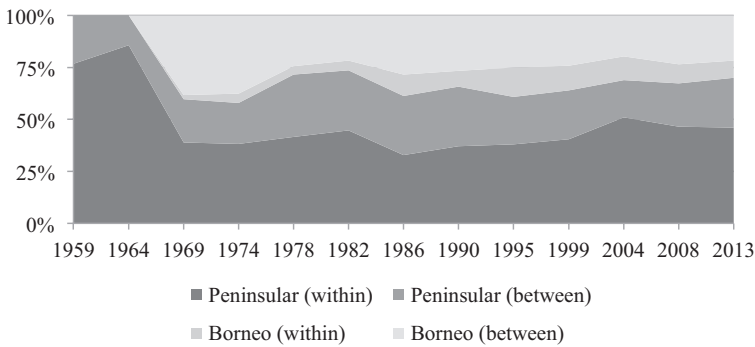Note: Based on parliamentary seats. For data sources, see Appendix 7.1.

Figure 7.4 Within/between variances of electorate population by peninsula/Borneo, 1959–2013

Note: Based on parliamentary seats. For data sources, see Appendix 7.1.

overrepresented at the cost of the peninsular areas other than the Malay-belt. Figure 7.4 differentiates the parliamentary-constituency level variance of electorate numbers into between-state and within-state components.[15] This figure reveals that the higher weight for the Borneo states can be attributed to between rather than within components (approximately 6:3), whereas the variances in the peninsular areas result from within rather than between components (approximately 6:3). In other words, the overrepresentation of the Borneo states stems mainly from the systematic and historical bonuses for these states, whereas intrastate redistricting matters for the gaps in peninsular Malaysia. The following analysis focuses exclusively on the peninsular states.

GIS-based analyses

The GIS database permits the identification of geographic changes in electoral boundaries and therefore helps examine the underlying strategy of redistricting and reapportionment. This study constructed an original GIS database that covers all of the redistricting exercises of parliamentary and state legislative constituencies in peninsular Malaysia except for the latest exercise. Before the latest exercise, the government renewed parliamentary and state legislative boundaries in 1974,[16] 1984, 1994, and 2003, which necessitates five sets of shapefiles tied to corresponding electoral and demographic data. This study created polygon-based shapefiles based on scanned images of electoral and administrative boundaries (for detail, see Appendix 7.1).

The basic units of analysis are state legislative boundaries. Given the nested structure of parliamentary and state legislative constituencies and the high correlation of vote shares in the following samples between two tiers ($r = 0.84$, excluding the federal territories), focusing on the lower tier helps us to understand the nuanced strategies of manipulation.[17]

This section conducts two analyses: (1) geographic splitting and overrepresentation and (2) a comparison of the distributions of electoral support before and after redelineation. The first analysis helps reveal which constituencies have been targeted for cracking and overrepresentation, and the second is useful to explore how the BN has reorganized cracked pieces into new boundaries.

Splitting and overrepresentation

The theoretical section argues that a dominant party is expected to crack and overrepresent its strongholds without packing opposition votes. In addition, a leader is likely to consider long-term political consequences, especially in reapportionment. To examine this argument, this section uses the GIS-based dataset. The dataset covers four sets of state legislative constituencies in the final elections of each delineation cycle: i.e., the electoral boundaries after the 1969, 1982, 1990, and 1999 elections.[18] Because federal territories have no state legislative constituencies, this study uses the parliamentary constituencies for the federal territories in Kuala Lumpur and Putrajaya.[19]

The first dependent variable is the ordinal degree of "crackedness" in five scales, which is calculated as follows.[20] The first step is to calculate the maximum ratio of cracked areas. For example, when a constituency is divided into two pieces by a new electoral boundary and the relative ratio of these areas is 6:4, then the maximum ratio is 0.6. Because the distribution of this ratio is highly skewed, this study inversely ranks the maximum ratio from lower to higher values to create a five-scale variable. A higher scale implies that a constituency is cracked more drastically.[21]

The second dependent variable is the Relative Representative Index (RRI) (e.g., Ansolabehere, Gerber and Snyder 2002; Boone and Wahman 2015), that is, seat shares divided by voter shares in ln (see chapter 5). Because the basic

unit of analysis is state legislative seats, this study modifies the index by the number of state constituencies in each parliamentary constituency. The (current) weighted RRI (WRRI) of state legislative constituency i is defined as follows:

$$\text{WRRI}_i = \ln\left(\frac{\text{weighted seat share}_i}{\text{voter share}_i}\right) = \ln\left(\frac{s_j / n_j}{e_i}\right),$$

where n_j represents the number of state legislative constituencies in parliamentary constituency j, s_j is the parliamentary seat share, which is calculated as $1/N$, where N is the total number of parliamentary seats in peninsula, and e_i is the electorate share within the total number of electorates of state legislative constituencies and federal territories in peninsula.[22] However, the post-redelineated WRRI$_i$ (post-WRRI$_i$) cannot be directly obtained from the pre-delineated electoral data. Thus, this study identifies the post-redelineated constituencies, to which respective cracked pieces belong, by overlaying the prior and posterior electoral boundaries on GIS. Then it calculates the post-WRRI$_i$ based on the post-redelinated boundaries by using the weights of area shares of respective pieces of pre-redelineated constituencies.

Figure 7.5 displays the boxplot of current WRRI$_i$ by partisanship of state legislative constituencies at each election. Except for the 1994 exercise, the gap between the BN and opposition seats expanded just after redistricting and then declined until the next delineation reversed this trend.[23] This trend implies that the BN had inflated the electoral weight of supporters by redistricting.
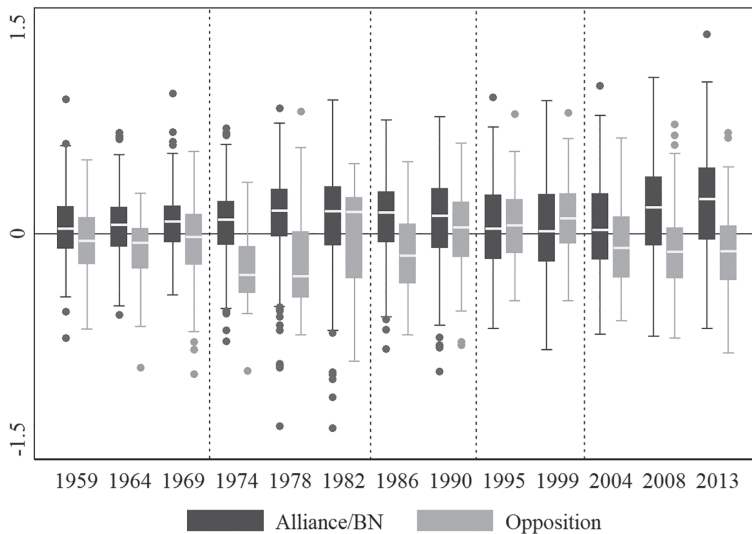

Figure 7.5 Boxplot of current WRRI by partisanship, 1959–2013

Note: Vertical dashed lines represent the redelineation years. Constituencies with WRRI larger than two do not appear on the figure. For data sources, see Appendix 7.1.

To explore the determinant of gerrymandering and malapportionment, this study uses the following independent variables. The main independent variable is the electoral support, which will positively affect the decision of cracking and overrepresentation. Because a cracking decision is constrained by the partisan balance of the main constituency and its neighboring constituencies, it is measured as the mean vote shares of the concerned and adjoining constituencies at the final elections of each delineation cycle.[24] The coefficient of this variable is expected to be positive in the estimation of both dependent variables.[25]

Next, as Gopoian and West (1984) imply, party leaders prioritize partisan rationality, whereas incumbent politicians want to escape boundary changes. Their interest may not always be contradictory because encouraging the effort to cultivate personal votes helps consolidate electoral support. Taming career-seeking incumbents may also stabilize intraparty politics. To examine whether leaders pay specific concern to the intraparty members, this study includes a dummy variable of seats represented by the UMNO members.[26]

Regarding demographic variables, this study examines the share of Malay voters[27] and the voter density in ln, and the growth rate of voter population. The Malay voters are expected to be overrepresented, but we have no specific expectation about the effect of ethnic composition for cracking. In addition, this study uses the number of adjoining constituencies within a state in the cracking model, because a larger number increases the latent neighboring pair for manipulation. This study controls the lagged five-scale cracking variable[28] and lagged (pre-redelineation) WRRI for respective dependent variables. Finally, state and temporal dummies are added. Figure 7.6 illustrates the maps of weighted vote shares in the 1999 election, cracking index, and post-WRRI (and its change) at the time of 2003 delineation.

Because strategies for gerrymandering and malapportionment are interrelated, this study employs a Seemingly Unrelated Regression (SUR) model. The results appear in Table 7.1. In addition, Figures 7.7 and 7.8 respectively illustrate the estimated values of cracking and overrepresentation indices at different levels of electoral support and at their means by partisan affiliation of state governments with other variables being controlled. As expected, the BN had cracked and overrepresented supporting bases.[29] The results also imply that the BN often split opposition states. In contrast, the latter figure confirms that the opposition states had been systematically underrepresented.

The degree of malapportionment depends greatly on the share of Malays, as Figure 7.9 illustrates.[30] As discussed earlier, in contrast to short-term election-eering, reapportionment affects the interparty power balances in the long-term. The results show that the UMNO leaders had selectively overrepresented Malay-dominant areas. By doing so, they had increased the baseline for "proportional" allocation of ministerial portfolios (see chapter 6).

In contrast, ethnic composition was not a key factor in redistricting because short-term electioneering was supposedly more important in cracking decisions. In cracking, the UMNO leaders cracked supporting bases but sometimes avoided changing the electoral boundaries of the constituencies represented by

Weighted vote share in 1999 · Cracking index at 2003 delineation

Post-WRRI at 2003 delineation · Changes of WRRI at 2003 delineation
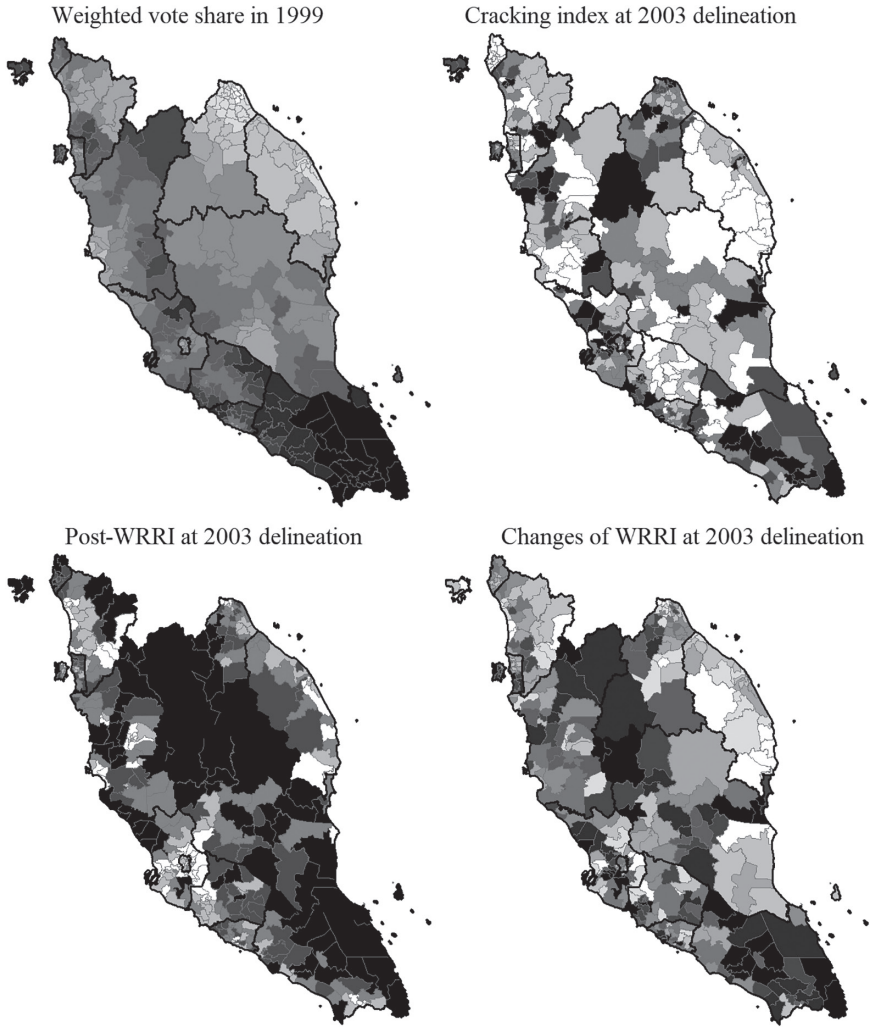
Figure 7.6 Cartographies of weighted vote shares, cracking index, and post-WRRI
in 2003

Note: Darker colors represent higher values. For the GIS database, see Appendix 7.1.

the UMNO members to stabilize intraparty politics. Demographic variables
indicate that populated urban areas (and increasingly populated areas) are more
likely to be split, but the voting weight of populated areas has been lower than
rural areas. The table also shows that the number of adjoining constituencies
extended the strategic flexibility.

Table 7.1 Analysis of cracking and overrepresentation, all delineations

	Cracking	Post-WRRI
Electoral support	2.340***	0.329***
	(0.577)	(0.079)
Opposition states	0.368*	−0.106***
	(0.205)	(0.028)
UMNO members	−0.202**	0.015
	(0.097)	(0.013)
Share of Malays	0.053	0.162***
	(0.242)	(0.034)
ln density	0.240***	−0.056***
	(0.031)	(0.005)
Increase of voters	2.303***	−0.021
	(0.345)	(0.053)
N of adjoining seats	0.135***	
	(0.022)	
Lagged cracking	0.083**	
	(0.036)	
Lagged WRRI		0.336***
		(0.022)
Constant	−0.759	0.073
	(0.489)	(0.064)
Correl. of residuals	0.231	
Breusch-Pagan (χ^2)	72.297***	

Note: N = 1361. State and year dummies are omitted from the table. For data sources and basic statistics, see Appendices 5.1, 8.1, and 8.2.
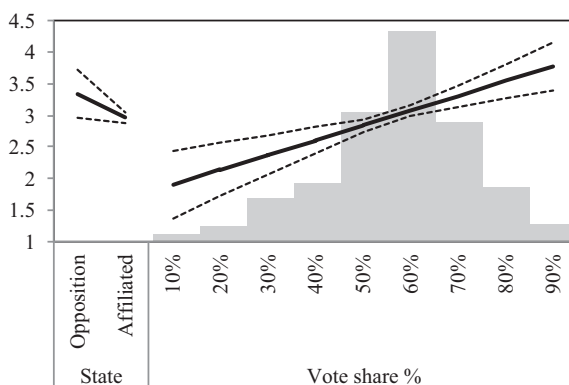
*$p < .10$; **$p < .05$; ***$p < .01$.

Figure 7.7 Estimated cracking index by electoral support

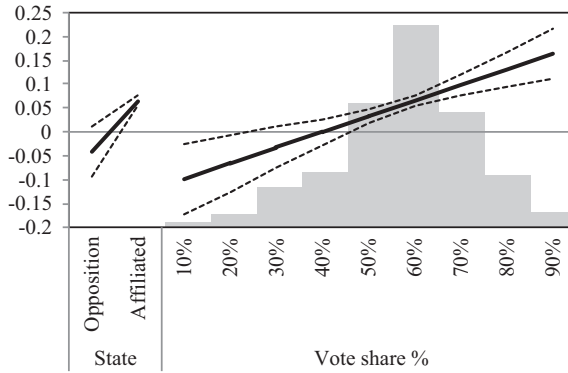Note: Dashed lines represent 95% confidence intervals.

Figure 7.8 Estimated post-WRRI by electoral support

Note: Dashed lines represent 95% confidence intervals.
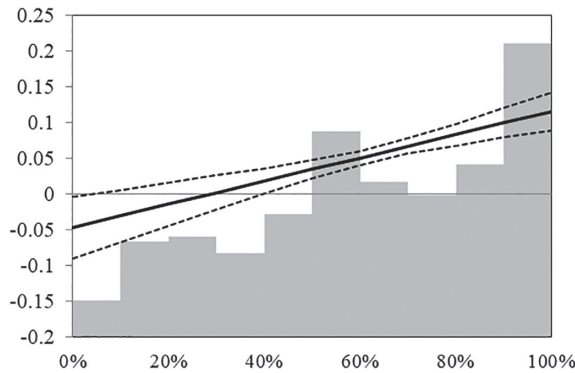
Figure 7.9 Estimated post-WRRI by Malays' share (%)

Note: Dashed lines represent 95% confidence intervals.

The Breusch-Pagan test implies that cracking and overrepresentation are positively associated. To elaborate this point, Figure 7.10 draws the kernel densities of changes in $WRRI_i$ by partisanship and five-scale cracking degrees. This figure shows that when the BN constituencies were cracked into smaller pieces, these pieces were more likely to be the core parts of overrepresented, supportive constituencies. In contrast, when the opposition seats were split into pieces, cracking often diluted the voting weights of opposition voters.

To examine the difference between redelineation cycles, Table 7.2 shows the year-by-year SUR results.[31] The coefficients of the electoral support variable are

Figure 7.10 Kernel densities of WRRI changes by partisanship and cracking degrees

Table 7.2 Analysis of cracking and overrepresentation, respective delineation

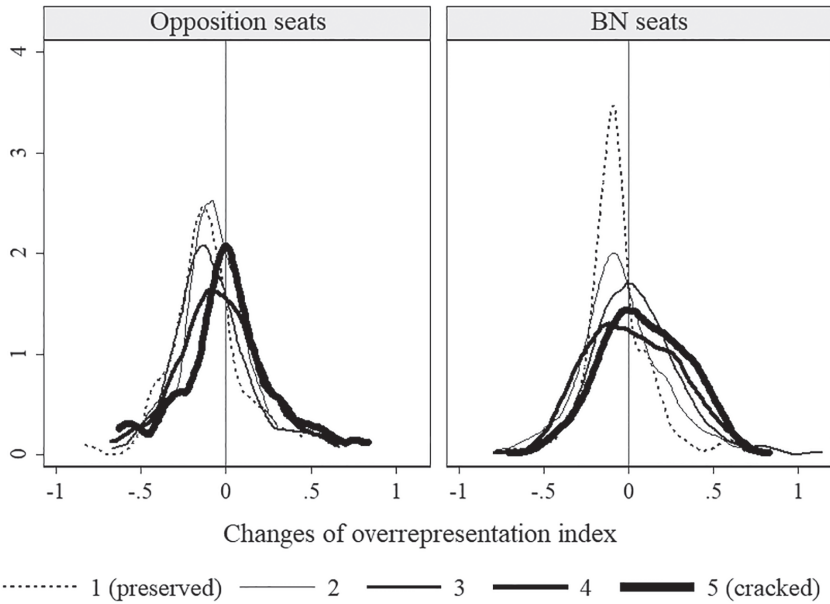|	1974		1984	
	Cracking	*Post-WRRI*	*Cracking*	*Post-WRRI*
Electoral support	3.021**	0.559***	1.556	0.664***
	(1.381)	(0.166)	(1.581)	(0.206)
UMNO members	–0.361	–0.028	–0.537***	–0.011
	(0.195)	(0.024)	(0.185)	(0.025)
Share of Malays	0.227	0.220***	0.930*	0.247***
	(0.521)	(0.064)	(0.515)	(0.069)
ln density	0.172**	–0.066***	0.263***	–0.037***
	(0.069)	(0.009)	(0.062)	(0.010)
Increase of voters	1.290*	–0.019	2.490***	–0.024
	(0.755)	(0.104)	(0.536)	(0.082)
N of adjoining seats	0.217		0.136***	
	(0.048)		(0.041)	
Lagged cracking	n.a.		0.086	
			(0.065)	
Lagged WRRI		0.067		0.355***
		(0.043)		(0.041)
Constant	–0.567	–0.133	–0.006	–0.405***
	(1.085)	(0.128)	(1.198)	(0.153)
Correl. of residuals	0.232		0.357	
Breusch-Pagan (χ^2)	15.135***		40.418***	
N	282		317	

	1994		2003	
	Cracking	*Post-WRRI*	*Cracking*	*Post-WRRI*
Electoral support	0.501	0.150	5.594***	0.477*
	(1.244)	(0.144)	(1.559)	(0.245)
Opposition states	0.478	−0.280***	1.587***	−0.160**
	(0.617)	(0.072)	(0.444)	(0.072)
UMNO members	0.061	−0.005	−0.162	0.043*
	(0.217)	(0.025)	(0.161)	(0.026)
Share of Malays	−0.485	0.230***	0.305	−0.023
	(0.525)	(0.063)	(0.395)	(0.065)
ln density	0.226***	−0.044***	0.289***	−0.042***
	(0.059)	(0.008)	(0.059)	(0.010)
Increase of voters	2.733***	0.007	1.637	0.172
	(0.645)	(0.089)	(1.099)	(0.191)
N of adjoining seats	0.159***		0.075**	
	(0.040)		(0.036)	
Lagged cracking	0.195***		0.148**	
	(0.064)		(0.059)	
Lagged WRRI		0.383***		0.601***
		(0.040)		(0.052)
Constant	−0.048	0.336***	−4.568***	−0.004
	(1.044)	(0.117)	(1.234)	(0.193)
Correl. of residuals	0.192		0.205	
Breusch-Pagan (χ^2)	13.140		16.935***	
N	358		404	

Note: There was no opposition state in 1974 and 1984. State dummies are omitted from the table. For data sources and basic statistics, see Appendices 5.1, 8.1, and 8.2.

*$p < .10$; **$p < .05$; ***$p < .01$.

statistically significant for the cracking decision in 1974 and 2003. In 2003, the BN not only cracked its strongholds to export supportive votes but also split opposition states to create population instability and to curve out winnable seats. Before the 1990s, especially in the first redelineation exercise of the Mahathir administration (1984), the redistricting preserved the constituencies of the UMNO members plausibly for consolidating his leadership after winning the first election. In contrast, after consolidating the leadership position, Mahathir did not hesitate to split the UMNO's seats.

The BN had systematically overrepresented the Malay-dominant constituencies. However, this did not stand in 2003. This partly reflects the fact that the Malay voters became deeply divided after the late 1990s.[32] Because overrepresenting Malay votes became risky, the BN focused primarily on electoral rationality.

In sum, Malaysian mapmakers had focused on short-term electoral rationality in splitting electoral boundaries, but they are also concerned with the intra-coalition power balance in determining which parts of the cracked areas should be overrepresented. Cracking supporting bases entails the risk of increasing the vulnerability to an unexpected electoral swing. At least before 2008, ethnic and regional cleavages and the vote-pooling effect had successfully reduced the risk associated with cracking. This point will be discussed later (and in the next chapter).

Distribution of electoral support before and after redistricting

Thus far, we have examined the cracking and overrepresentation strategies. The next question is how the BN had reorganized cracked pieces into new boundaries. To answer this question, this study compares the distributions of BN vote shares of state legislative constituencies before and after redistricting. Although the results of the final elections in delineation cycles represent the before-redistricting distribution, the results under new boundaries cannot be directly known from these elections. The results of the next election cannot be a proxy for the post-redelineation results because of the various changes during the electoral term (or the direct impact of redistricting).

This study estimates post-redelineation distributions by the overlaid intersections of electoral boundaries. Because there are no data about the voting behavior at the polling station level, it aggregates the number of partisan supporters based on the cracked pieces of areas by assuming that the respective supporters are evenly scattered within a constituency. For example, when a constituency composed of 60 BN supporters and 40 opposition supporters is split into two parts with the area ratio being 3:2, the former part is assumed to contain 36 supporters and 24 opponents, and the remaining voters go to the latter part. Then these clusters of people are aggregated based on new boundaries to calculate the relative vote shares of respective parties.[33] Based on this proxy, Figure 7.11 demonstrates the kernel densities of the BN and opposition parties before and after redelineation exercises.

According to the figure, the BN had created more competitive constituencies with smaller margins: approximately from 50% to 60% of vote shares. It has cracked seats with higher margins of victory to export supporters to neighboring constituencies. Curtailing the winning margins improves the efficiency of vote-seat transformation to sustain a stable majority.

The lower panel indicates that the BN has also diluted oppositional strongholds to increase the probability of winning back opposition seats without packing into oppositional strongholds. Redelineation exercises significantly reduced the number of constituencies in which opposition parties fared well. The findings here clearly contradict the prediction of the packing theory. If a mapmaker packs opposition voters, the distributions of opposition vote shares should move rightward, but they actually shifted leftward. Because of the larger

BN

| 1969 | 1982 |

| 1990 | 1999 |

.1   .3   .5   .7   .9 .1   .3   .5   .7   .9

Vote %

Major opposition parties

| 1969 | 1982 |

| 1990 | 1999 |

.1   .3   .5   .7   .9 .1   .3   .5   .7   .9

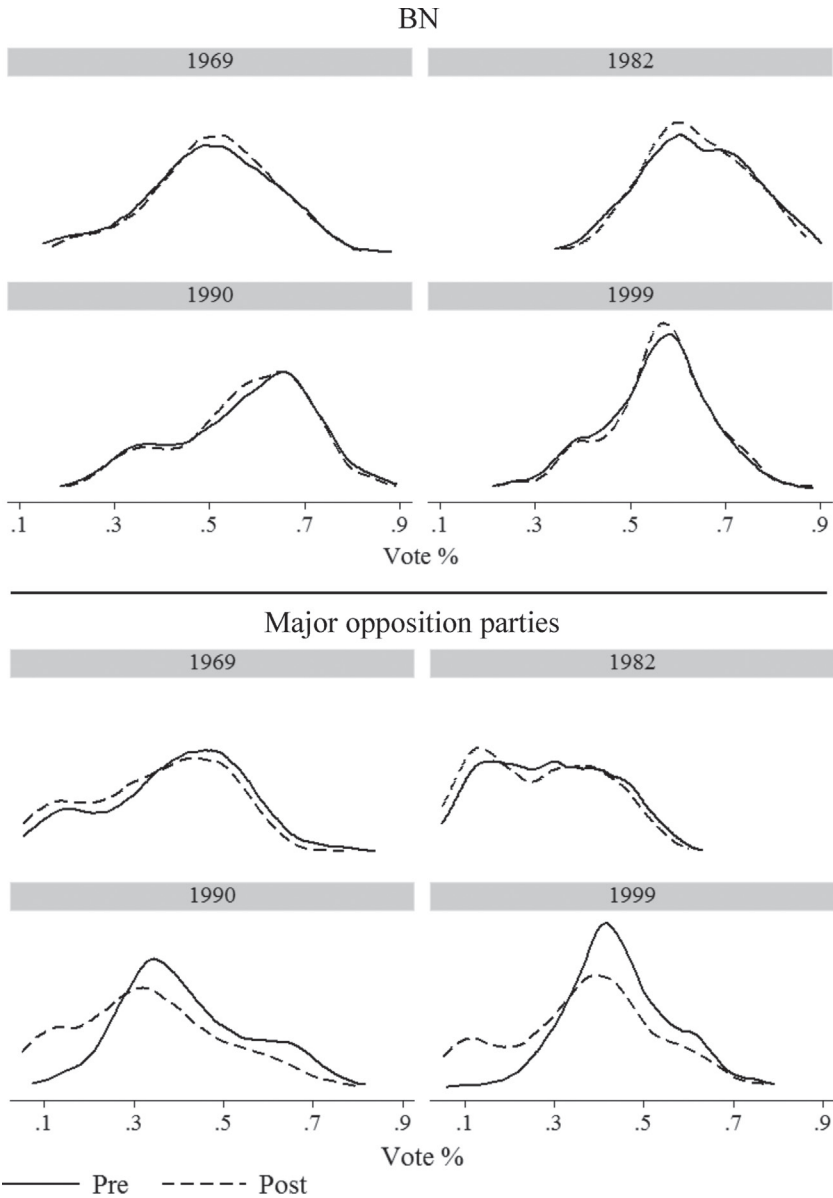Vote %

——— Pre   - - - - - Post

Figure 7.11 Kernel densities of electoral support before and after delineations by partisanship

Note: The lower panel excludes the cases lower than 5% of vote shares. Major opposition parties include: PAS, DAP, Semangat 46, and Keadilan. For data sources, see Appendix 7.1. Values after redistricting are estimated by using the GIS.

pool of voters, a dominant party can dilute opposition votes without packing into seats.

Unintended consequences of gerrymandering

Before concluding this chapter, it is useful to discuss the effect of redistricting on a regime. Specifically, the analyses of electioneering techniques help understand the unexpected, sudden setback of the BN in the 2008 election. In 2008, the BN lost a stable majority for the first time (since 1969 if the Alliance period is included). This was mainly because of the non-Malays' massive swing for opposition parties (see chapter 8). As demonstrated in this chapter, the BN has transformed a limited advantage in vote shares into a stable majority. For that purpose, the BN had strategically cracked its supporting bases to improve the vote-seat efficiency.

However, cracking supporting bases entails the risk of increasing the vulnerability to an unexpected electoral swing. By doing so, the BN might have ironically made its vote structure more vulnerable to the changing behavior of electorates. At least until the recent elections, ethnic and geographic cleavages had successfully reduced the risk associated with cracking. For example, the non-Malay-based opposition party, DAP, performed better in urban constituencies, but such constituencies have been surrounded by suburban BN-leaning constituencies. The BN had exploited ethnic and regional divides to effectively diffuse oppositional votes.

As the comparative distributions (Figure 7.11) show, however, the kurtosis of the BN's vote share was increased by redistricting exercises and thereby made more vulnerable to an electoral swing. In particular, voting structure became vulnerable to the non-Malays' swing by the 2003 redelineation. In the 1999 election, the Malay electorates became deeply divided into the BN and opposition sides. The 2003 redelineation was intended to reduce the vulnerability to the Malays' swing. According to Figure 7.12, which illustrates the differences of Malay and Chinese voter shares in 1999 and 2004 (based on the data of parliamentary constituencies), the BN promoted ethnic mixture in the 2003 redelineation exercise. Increased ethnic mixture plausibly aimed to protect the UMNO by a vote-pooling effect, but it ironically increased the vulnerability to the non-Malays' swing in 2008.[34]

Although the opposition coalition succeeded in exceeding the vote shares in the 2013 election, the BN sustained incumbency status with 60% of the seats, thanks to the highly overrepresented rural, Malay-dominant constituencies. To withstand the declining dominance, the BN changed electoral boundaries just before the 2018 election. As illustrated in Figure 7.13, the BN reversed its strategy and decreased ethnic mixture in 2018 redelineation exercise. The figure implies that the latest redistricting created more Malay-dominant seats (and Chinese-dominant seats) to secure remaining supporting bases. However, gerrymandering and malapportionment are less effective when a limited pool of electoral support increasingly dries up.
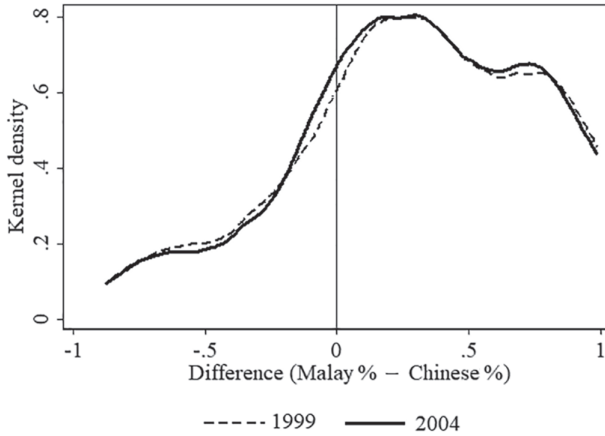
Figure 7.12 Ethnic composition (Malay %–Chinese %) in 1999 and 2004

Note: For data sources, see Appendix 7.1.

Figure 7.13 Ethnic composition (Malay %–Chinese %) in 2013 and 2018

Note: For data sources, see Appendix 7.1.

Conclusion

This chapter aimed to extend the empirical and theoretical scope of gerryman-dering studies to a dominant party system. Specifically, it challenged the con-ventional wisdom of oppositional packing, which subsumes a competing two-party system. Because of the larger pool of supporters (and wider discretion),

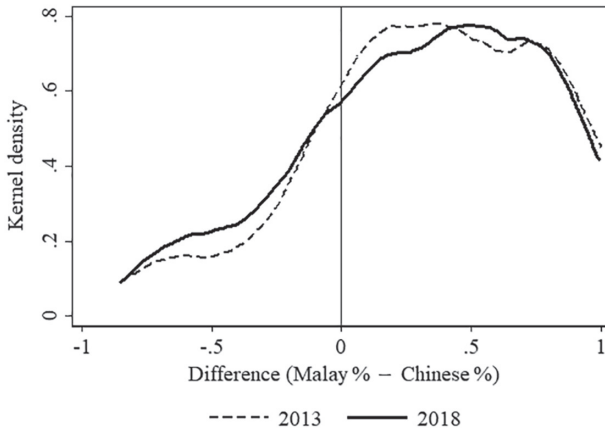a mapmaker cracks (and inflate) its supporting bases without packing opposition votes into seats. By using an originally constructed GIS database, this chapter examined the degrees of cracking and malapportionment and compared distributions before and after redistricting. The approach developed here would be useful for further comparative analyses.

In addition to the effect of partisan balances, an exploration of the effects of institutional constraints would be a promising research field. In Malaysia, political leaders had removed institutional constraints with frequent constitutional amendments. They removed the autonomy of the EC and expanded its flexibility regarding the size, timing, and location of lines. The Malaysian case indicates that authoritarian traits are crucial for mapmaking strategy. In authoritarian regimes, mapmakers enjoy tremendous discretion in redistricting and apportioning. Such discretion allows a party to choose electorates instead of being chosen by electorates. As the final section implies, the impact of map manipulation on regime dynamics would also extend our understanding of regime changes.

Given the limited constraints, political leaders of authoritarian regimes can select various tools in the menu of manipulation. As demonstrated in previous chapters, mapmaking strategies have been well-coordinated with distributive strategies of other resources. The BN has strategically created competitive constituencies to maximize the efficiency of vote-seat transformation; at the same time, it has also backed up the electoral campaign by the prospective, impartial development allocation and career incentives to induce efficient mobilization effort in affiliated states (chapters 5 and 6). An exploration of the strategic coordination of various tools of political manipulation would be another promising research field. The next chapter will explore the structural causes of the sudden electoral setback in 2008.

Appendix 7.1
Data sources

Geographic Information System (GIS) data: Because of the lack of a GIS database of electoral boundaries, this study constructed an original GIS database. Although it is not an idealistic database, it helps capture approximate geographic changes in the limited availability of precise geographic data. This study uses ArcGIS 10.3 and constructed the database by taking the following steps. First, it created polygons of sub-district (mukim) level administrative units of peninsular Malaysia in the 1970s, 1980s, 1990s, 2000s, and 2010s, by splitting district (daerah) polygons by hand with georeferencing with scanned images of the maps. The district polygons are extracted from the GADM database (www.gadm.org), version 2.8. Scanned images of sub-district administrative maps appear in the censuses and reports of the Department of Statistics. It then created polygons of electoral constituencies in the first (1959–1969), the second (1974–1982), the fifth (2004–2013) boundaries, and thereafter the third (1986–1990) and fourth (1995–1999) boundaries, by georeferencing with boundaries of administrative and the scanned images of pre/post-redelineation, electoral boundaries. Although the government can cross administrative boundaries except for state boundaries, there are substantial overlaps between electoral and administrative boundaries. Such overlaps are useful in georeferencing. The map of the first and the second boundaries appear in Election Commission (EC)'s reports. The map of the fifth boundaries appears on the EC's website in addition to other secondary sources, including news coverage (e.g., *the Star*, *the New Straits Times*) and Information Malaysia (Berita Publishing), various issues. The maps of the third and the fourth boundaries rely on these secondary sources, but the georeferencing with administrative and electoral boundaries helps identify geographic changes. To measure the cracking index, it calculates overlapped areas by creating the intersections of multiple layers of polygons of administrative and electoral boundaries.

Note: For other data, see Appendices 5.1 and 6.1.

Appendix 7.2

Descriptive statistics

		N	Mean	St. Dev.	Min	Max
Table 7.1	Cracking index	1361	2.999	1.415	1.000	5.000
	Post-WRRI	1361	0.055	0.282	−0.716	1.023
	Electoral support	1361	0.569	0.114	0.176	0.854
	Opposition states	1361	0.084	0.277	0.000	1.000
	UMNO members	1361	0.525	0.500	0.000	1.000
	Share of Malays	1361	0.627	0.270	0.011	1.000
	ln density	1361	4.641	1.721	−0.113	10.001
	Increase of voters	1361	0.140	0.124	−0.405	1.468
	N of adjoining seats	1361	4.403	1.678	0.000	11.000
	Lagged cracking	1361	3.812	1.178	1.000	5.000
	Lagged WRRI	1361	0.062	0.317	−1.416	1.022
Table 7.2	Cracking index (1974)	282	3.220	1.432	1.000	5.000
	Post-WRRI (1974)	282	0.028	0.244	−0.709	0.709
	Electoral support (1974)	282	0.501	0.110	0.176	0.730
	Opposition states (1974)	282	0.000	0.000	0.000	0.000
	UMNO members (1974)	282	0.475	0.500	0.000	1.000
	Share of Malays (1974)	282	0.598	0.276	0.115	0.998
	ln density (1974)	282	4.220	1.734	−0.113	10.001
	Increase of voters (1974)	282	0.192	0.117	−0.123	0.663
	N of adjoining seats (1974)	282	4.277	1.671	1.000	9.000
	Lagged cracking (1974)	282	5.000	0.000	5.000	5.000
	Lagged WRRI (1974)	282	0.033	0.273	−1.022	1.022
	Cracking index (1984)	317	3.139	1.362	1.000	5.000
	Post-WRRI (1984)	317	0.089	0.277	−0.686	0.735
	Electoral support (1984)	317	0.642	0.087	0.430	0.849
	Opposition states (1984)	317	0.000	0.000	0.000	0.000
	UMNO members (1984)	317	0.637	0.482	0.000	1.000
	Share of Malays (1984)	317	0.635	0.254	0.140	0.995
	ln density (1984)	317	4.447	1.676	0.583	9.911

	N	Mean	St. Dev.	Min	Max
Increase of voters (1984)	317	0.207	0.139	−0.405	1.468
N of adjoining seats (1984)	317	4.319	1.668	0.000	10.000
Lagged cracking (1984)	317	3.625	1.106	1.000	5.000
Lagged WRRI (1984)	317	0.094	0.357	−1.416	0.973
Cracking index (1994)	358	2.916	1.420	1.000	5.000
Post-WRRI (1994)	358	0.060	0.269	−0.562	0.897
Electoral support (1994)	358	0.575	0.118	0.238	0.854
Opposition states (1994)	358	0.109	0.312	0.000	1.000
UMNO members (1994)	358	0.564	0.497	0.000	1.000
Share of Malays (1994)	358	0.632	0.274	0.028	1.000
ln density (1994)	358	4.775	1.700	0.645	9.652
Increase of voters (1994)	358	0.135	0.112	−0.083	0.726
N of adjoining seats (1994)	358	4.464	1.688	0.000	10.000
Lagged cracking (1994)	358	3.550	1.113	1.000	5.000
Lagged WRRI (1994)	358	0.069	0.320	−1.005	0.854
Cracking index (2003)	404	2.807	1.413	1.000	5.000
Post-WRRI (2003)	404	0.043	0.317	−0.716	1.023
Electoral support (2003)	404	0.553	0.099	0.251	0.826
Opposition states (2003)	404	0.186	0.389	0.000	1.000
UMNO members (2003)	404	0.438	0.497	0.000	1.000
Share of Malays (2003)	404	0.638	0.272	0.011	0.999
ln density (2003)	404	4.967	1.693	0.569	9.863
Increase of voters (2003)	404	0.056	0.059	−0.315	0.315
N of adjoining seats (2003)	404	4.505	1.678	0.000	11.000
Lagged cracking (2003)	404	3.361	1.159	1.000	5.000
Lagged WRRI (2003)	404	0.052	0.310	−0.845	0.970

Notes

1 This index is based on the Loosemore-Hanby index and defined as follows: $\mathrm{MAL} = \left(\sum |s_j - e_j| \right) / 2$, where s_j and e_j respectively represent the seat and electorate share of each constituency. The sample of Samuels and Snyder (2001) includes seventy-eight countries in the 1990s, of which the mean value was 0.07. The mean value of 160 countries (Ong *et al.* 2017) is 0.09. The Malaysian score in the 2013 election was 0.17.

2 This chapter focuses on peninsular Malaysia partly because of the limited coverage of the GIS database. However, it is less problematic, because the Malaysian political scene has been dominated by peninsular-based parties at least before the Borneo partners have increased their presence since the 2008 election. The number of peninsular seats has always been larger than in the Borneo states. In addition, the party systems and ethnic compositions as well as the timing of redistricting differ in the peninsular and Borneo states. In addition to the analysis of the latest redelineation, an extension to the Borneo states is among my future projects.

3 In contrast, Friedman and Holden (2008) highlight the uncertainty of voting behaviors and suggest an alternative strategy, namely, a combination of matched sliced clusters of highly supportive and opposing voters. However, this strategy seems to be difficult under positive spatial autocorrelation.

4 McKee (2008) finds that voters swapped into seats represented by other incumbent legislators become less likely to recognize their names.

5 Kelly (2012) unveils a sophisticated technique of kidnapping. By focusing on prisoners who are prohibited from voting but counted as residents of incarcerated geographic units, he reveals that mapmaking can import such prisoners into safe constituencies in order to export supportive voters to neighboring constituencies. Kirkland (2012) also demonstrates that a majority party strategically changes boundaries to import latent campaign donors (higher income groups).

6 Comparative studies of malapportionment have focused more on its consequences than causes. As reviewed in chapter 3, the amount of budgetary resources tends to be larger for overrepresented areas in various countries. Malapportionment also affects the composition of income tax (Ardanaz and Scartascini 2013).

7 Malapportionment does not necessarily aim at blocking reform or democratization (Gibson and Calvo 2000; Malesky 2009).

8 The number of seats for respective states is stipulated in the constitution (article 46). Apportioning parliamentary seats requires a constitutional amendment, and thus the two-thirds majority of lower house, whereas redelineation requires only a majority of seats.

9 The first delineation drawn in 1958 was supposed to be transitional, but this amendment sustained the map for subsequent elections in 1964 and 1969.

10 For the regulations of redistricting, also see Part VIII (especially the Articles from 113 to 117 and inserted amendments) and the Thirteenth Schedule of the constitution.

11 Lim (2002: 125) even implies that the identification numbers printed on each ballot and counterfoil technically allow the BN to monitor voting behavior of individual voters.

12 Political uncertainty and communal fear of Malays resulted in the ethnic riot. This provided an opportunity for the UMNO's radical elites to take over the party leadership, to suspend the legislature before amending the constitution in an authoritarian direction, and to establish the UMNO's dominance within the ruling coalition. See chapter 3.

13 Federalization, however, is an exceptional tool of electoral manipulation. The government federalized Labuan (an island of Sabah) in 1984 and Putrajaya (an administrative city in Selangor constructed) in 2003. Federalizing Putrajaya is a means to create a highly overrepresented (more than 20 times) and supposedly pro-BN constituency (because most electorates are public servants).

14 For the case studies of Borneo states, see Francis Loh (2003) and Lim (2005).

15 Specifically, as in ANOVA (analysis of variance), the between-state variance is defined as $n_k \left(\bar{e}_k - \bar{e} \right)^2$, where n_k is the total number of seats in state k, $\bar{e}_k$ is the mean number of electorates in state k, $\bar{e}$ is the mean number of electorates of all constituencies. The within-state variance is calculated as: $\sum_j \left(e_{jk} - \bar{e}_k \right)^2$, where e_{jk} represents the number of electorates in parliamentary constituency j of state k. The figure aggregates the variances by area categories. For the more sophisticated measurement of decomposed malapportionment, see Wada and Kamahara (2018).

16 The 1974 redelineation took effect before the 1974 election.

17 The analysis of parliamentary electoral boundaries leads to similar conclusion about strategic gerrymandering (Washida 2017).

18 Because electoral boundaries change by redelineation, the data structure is not the panel data.

19 Removing federal territories produces similar results.

20 Using the 10-scale variable produces similar results.

21 Using the effective number of pieces produces similar results.

22 The index here uses the number of voters instead of that of population partly because we have no access to the population data of each constituency. A mapmaker plausibly focuses on the number of voters in drawing electoral boundaries.

23 It is worth noting that the gap has continuously expended during the 2000s because of the growing divide between rural and urban electorates as well as between Malays and non-Malays. This point will be discussed in the next chapter.

24 Using the values of parliamentary seats or the mean values of parliamentary and state legislative seats produces similar results.

25 As alternative measures, this study also examines vote shares or raw electoral margins of each state legislative constituency. The coefficients of these variables in the model I for cracking become insignificant but those for overrepresentation remain significant. This implies that, as expected, cracking decision is more constrained by neighboring degrees of electoral support.

26 This study also examined the seniority variable, but its coefficient was statistically insignificant.

27 The ethnic composition of state legislative constituencies before the 1986 election is not publicized (cf. that of parliamentary constituencies before the 1974 is available); this study estimated them based on village-level demographic compositions in the closest census data. Specifically, it calculated the values by creating the overlaid intersections of electoral and village boundaries on the GIS database by assuming that Malay and non-Malay voters were evenly distributed within a village. A more sophisticated interpolation remains for a future task.

28 Because the redelineation in 1974 was the first exercise, this variable is set to 5 (using 1 affects only the coefficient of the constant term). This scale is the weighted sum of cracking ratio based on post-redelineated boundaries by using the GIS database (also see the explanation in the next section). Using raw values (one subtracted by maximum cracking ratio) produces similar results.

29 Using the changes of WRRI as a dependent variable also indicates that supporting bases had been systematically overrepresented.

30 This study also examined the interaction between weighted vote shares and Malay shares. The significantly positive coefficient (in particular, in the analysis of the 1994 redistricting) implies their interactive effect on malapportionment.

31 There were no opposition states during the 1974 and 1984 delineation cycles.

32 The correlations between the BN vote shares and Malays' shares of respective state legislative constituencies are: +0.42 in 1969, +0.03 in 1982, and +0.18 in 1990. The correlations were statistically significant at the 1% level in 1969 and 1990. In contrast, the correlation in 1999 was significantly negative (-0.37).

33 More realistically, respective partisan supporters may be concentrated in specific areas within a constituency. Yet this issue is less problematic because errors associated with this approach may inversely affect the argument of this paper, because the BN has more nuanced information. Although geographic interpolation can provide more nuanced information about within-constituency distribution of supporters, estimation here would provide useful information about the BN's redistricting strategy.

34 For the unexpected result of redistricting in a different context of Mexico, see Meng and Palmer-Rubin (2017).

References

Albaugh, E. A., 2011. An Autocrat's Toolkit: Adaptation and Manipulation in 'Democratic' Cameroon. *Democratization* 18 (2): 388–414.

Ansolabehere, S., Gerber, A., and Snyder, J., 2002. Equal Votes, Equal Money: Count-Ordered Redistricting and Public Expenditures in the American States. *American Political Science Review* 96 (4): 767–77.

———, Snyder, J. M., and Stewart, C., 2000. Old Voters, New Voters, and the Personal Vote: Using Redistricting to Measure the Incumbency Advantage. *American Journal of Political Science* 44 (1): 17–34.

Ardanaz, M. and Scartascini, C., 2013. Inequality and Personal Income Taxation: The Origins and Effects of Legislative Malapportionment. *Comparative Political Studies* 46 (12): 1636–63.

Boone, C. and Wahman, M., 2015. Rural Bias in African Electoral Systems: Legacies of Unequal Representation in African Democracies. *Electoral Studies* 40: 335–46.

Christensen, R., 2004. Redistricting in Japan: Lessons for the United States. *Japanese Journal of Political Science* 5 (2): 259–85.

Cox, G. W. and Katz, J. N., 2002. *Elbridge Gerry's Salamander: The Electoral Consequences of the Reapportionment Revolution*, Cambridge: Cambridge University Press.

Crespin, M. H., 2005. Using Geographic Information Systems to Measure District Change, 2000–2002. *Political Analysis* 13: 253–60.

Desposato, S. W. and Petrocik, J. P., 2003. The Variable Incumbency Advantage: New Voters, Redistricting, and the Personal Vote. *American Journal of Political Science* 47 (1): 18–32.

Francis Loh, K. W., 2003. Electoral Politics in Sabah, 1999: Gerrymandering, 'Phantoms,' and the 3Ms. In K. W. Francis Loh and J. Saravanamuttu, eds., *New Politics in Malaysia*, pp. 228–52, Singapore: ISEAS.

Friedman, J. N. and Holden, R. T., 2008. Optimal Gerrymandering: Sometimes Pack, But Never Crack. *American Economic Review* 98 (1): 113–44.

Gelman, A. and King, G., 1994. A Unified Method of Evaluating Electoral Systems and Redistricting Plans. *American Journal of Political Science* 38 (2): 514–54.

Gibson, E. L., 2012. *Boundary Control: Subnational Authoritarianism in Federal Democracies*, Cambridge: Cambridge University Press.

——— and Calvo, E., 2000. Federalism and Low-Maintenance Constituencies: Territorial Dimensions of Economic Reform in Argentina. *Studies in Comparative International Development* 35 (3): 32–55.

Gopoian, J. D. and West, D. W., 1984. Trading Security for Seats: Strategic Considerations in the Redistricting Process. *The Journal of Politics* 46: 1080–96.

Green, E., 2010. Patronage, District Creation, and Reform in Uganda. *Studies in Comparative International Development* 45: 83–103.

Grofman, B. and Brunell, T. L., 2010. Redistricting. In J. E. Leighley, ed., *The Oxford Handbook of American Elections and Political Behavior*, pp. 649–66, Oxford: Oxford University Press.

Grossman, G. and Lewis, J., 2014. Administrative Unit Proliferation. *American Political Science Review* 108 (1): 196–216.

Higashijima, M. and Kasuya, Y., 2016. The Peril of Parliamentarism? Executive-Legislative Relations and the Transition to Democracy from Electoral Authoritarian Rule. *EUI Working Papers* MWP 2016/01.

Horiuchi, Y., 2004. Malapportionment and Income Inequality: A Cross-National Analysis. *British Journal of Political Science* 34: 179–82.

Horiuchi, Y., and Saito, J., 2003. Reapportionment and Redistribution: Consequences of Electoral Reform in Japan. *American Journal of Political Science* 47 (4): 669–82.

Horowitz, D. L., 1985. *Ethnic Groups in Conflict*, Berkeley and Los Angeles: University of California Press.

Kasara, K., 2010. *Ethnic Beachheads and Vote Buying: The Creation of New Administrative Districts in Kenya, 1963–2001.* A paper delivered at the Annual Meeting of the American Political Science Association, Philadelphia.

Kelly, J. P., 2012. The Strategic Use of Prisons in Partisan Gerrymandering. *Legislative Studies Quarterly* 37 (1): 117–34.

Kirkland, J. H., 2012. Wallet-Based Redistricting: Evidence for the Concentration of Wealth in Majority Party Districts. *State Politics & Policy Quarterly* 13 (1): 49–69.

Kraxberger, B., 2004. The Geography of Regime Survival: Abacha's Nigeria. *African Affairs* 103: 413–30.

Lim, H. H., 2002. Electoral Politics in Malaysia: Managing Elections in a Plural Society. In A. Croissant, G. Bruns and M. John, eds., *Electoral Politics in Southeast and East Asia*, pp. 101–48, Singapore: Friedrich Ebert Stiftung.

———, 2005. Making the System Work: The Election Commission. In M. Puthucheary and O. Norani, eds., *Elections and Democracy in Malaysia*, pp. 249–91, Bangi: UKM Press.

Malesky, E., 2009. Gerrymandering-Vietnamese Style: Escaping the Partial Reform Equilibrium in a Nondemocratic Regime. *The Journal of Politics* 71 (1): 132–59.

Martínez i Coma, F. and Lago, I., 2016. Gerrymandering in Comparative Perspective. *Party Politics* April: 1–6.

McKee, S. C., 2008. Redistricting and Familiarity with U.S. House Candidates. *American Politics Research* 36 (6): 962–79.

Meng, A. and Palmer-Rubin, B., 2017. Gerrymandering Opposition: Minority-Concentrated Districts and Electoral Competition in Mexico. *Studies in Comparative International Development* 52: 64–86.

Ong, K. M., Kasuya, Y., and Mori, K., 2017. Malapportionment and Democracy: A Curvilinear Relationship. *Electoral Studies* 49: 118–27.

——— and Welsh, B., 2005. Electoral Delimitation: A Case Study of Kedah. In M. Puthucheary and O. Norani, eds., *Elections and Democracy in Malaysia*, pp. 316–45, Bangi: UKM Press.

Ostwald, K., 2013. How to Win a Lost Election: Malapportionment and Malaysia's 2013 General Election. *The Round Table* 102 (6): 521–32.

Owen, G. and Grofman, B., 1988. Optimal Partisan Gerrymandering. *Political Geography Quarterly* 7 (1): 5–22.

Polsby, D. D. and Popper, R. D., 1991. The Third Criterion: Compactness as a Procedural Safeguard against Partisan Gerrymandering. *Yale Law & Policy Review* 9 (301): 301–53.

Rachagan, S., 1992. Constituency Delimitation in Malaysia: A Geographical Interpretation. In P. K. Voon and B. Shamsul, eds., *The View from Within: Geographical Essays on Malaysia and Southeast Asia*, pp. 383–411, Kuala Lumpur: University Malaya Press.

Roberts, T. L., 2015. The Durability of Presidential and Parliament-Based Dictatorships. *Comparative Political Studies* 48 (7): 915–48.

Samuels, D. J. and Snyder, R., 2001. The Value of a Vote: Malapportionment in Comparative Perspective. *British Journal of Political Science* 31: 651–71.

Schedler, A., 2002. The Menu of Manipulation. *Journal of Democracy* 13 (2): 36–50.

Scheiner, E., 2006. *Democracy without Competition in Japan: Opposition Failure in a One-Party Dominant State*, Cambridge: Cambridge University Press.

Scott, J., 1985. *Weapons of the Weak: Everyday Forms of Peasant Resistance*, New Hampshire: Yale University Press.

Shamsul, A. B., 1986. *From British to Bumiputera Rule: Local Politics and Rural Development in Peninsular Malaysia*, Singapore: ISEAS.

Snyder, R. and Samuels, D. J., 2004. Legislative Malapportionment in Latin America: Historical and Comparative Perspectives. In E. L. Gibson, ed., *Federalism and Democracy in Latin America*, pp. 131–72. Baltimore: Johns Hopkins University Press.

Tan, N., 2011. Manipulating Electoral Laws in Singapore. *Electoral Studies* 32: 632–43.

Wada, J. and Kamahara, Y., 2018. Studying Unequal Representation Using α-Divergence. *Mathematical Social Science* 93: 77–89.

Washida, H., 2017. Gerrymandering under Authoritarian Party Dominance: GIS-Based Analysis of Malaysia. *Hikakuseijigakkai Nenpo* 19: 57–83. [In Japanese].

Winburn, J., 2008. *The Realities of Redistricting: Following the Rules and Limiting Gerrymandering in State Legislative Redistricting*, Lanham: Lexington.

Wong, S. H. W., 2017. Gerrymandering in Electoral Autocracies: Evidence from Hong Kong. *British Journal of Political Science*, online first (doi: 10.1017/ S0007123416000685).

Yoshinaka, A. and Murphy, C., 2009. Partisan Gerrymandering and Population Instability: Completing the Redistricting Puzzle. *Political Geography* 28: 451–62.