RESEARCH ARTICLE

Electoral Rules and Manufacturing Legislative Supermajority: Evidence from Singapore

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Abstract

Electoral authoritarian regimes usually preserve the dominance of the ruling party through electoral fraud, violence and intimidation. This paper focuses on the subtler forms of manipulation that undermine electoral integrity and democratic outcomes. Specifically, we examine how an unusual electoral rule, involving multimember districts (MMDs) elected through plurality bloc voting for party slates, exaggerate the legislative seat shares of the People's Action Party (PAP) in Singapore. This rule, used also by other electoral authoritarian regimes, facilitates the manipulation of district magnitude and gerrymandering, especially the "stacking " form, to produce a large disproportionality which distorts the seats-votes linkage. It operates in an undemocratic fashion by precluding the opposition to gain anything but token seats as long as the PAP remains the plurality winning party. The importance of this electoral rule and its manipulation has been overlooked in current work that emphasizes redistributive strategies or coercion to repress electoral competition.

Key Words

Electoral autocracy, apportionment, redistricting, seats-votes relationship, gerrymandering, partisan bias

Words

8,616 (including notes)

Electoral Rules and Manufacturing Legislative Supermajority: Evidence from Singapore

Introduction

This paper is driven by the puzzle of the legislative supermajority enjoyed by Singapore's ruling People's Action Party (PAP) over the last three decades. Singapore, like most former British commonwealth states inherited a first-past-the-post plurality system, designed to produce a clear winner and a stable, single-party government. Yet, the large legislative supermajority that Singapore's PBV rule is used in single and multimember group districts is exceptional, and deserves study. The PAP has maintained a legislative seat share in excess of 96% despite a long term trend of declining vote share, with an average vote share of only 65% since 1988.

We investigate the role of Singapore's peculiar electoral system, the *plurality party bloc voting* (PBV) rule[1] used since 1988, in manufacturing the PAP's high levels of seat share relative to vote share. We also consider alternative or complementary explanations of PAP dominance, such as malapportionment and gerrymandering. Our focus on the link between vote share and seat share is especially timely given the 2016 presidential election in the United States, with its divergence between vote share and Electoral College seat share.

The PAP is one of the longest ruling hegemonic parties in the world today (Magaloni, 2006; N. Tan, 2014b). Previous work on the PAP's success have attibuted to the suppression of electoral competition through well-known tools such as calibrated coercion (George, 2007), media censorship (George, 2012; Rodan, 1998), campaign restrictions (Gomez, 2008; Tey, 2008) or the use of libel or defamation suits (Jeyaretnam, 2012; Rajah, 2012; Tremewan,

1994). However, the growing literature on electoral authoritarianism has also highlighted how authoritarian dominant parties can enhance their electoral performance through limiting the franchise, selective malapportionment, and electoral fraud (Donno, 2012; Gandhi & Przeworski, 2007; Sartori, 2005).[2]

While Singapore is viewed as a classic electoral authoritarian regime[3], it does not rely on brute force or overt manipulatory tools as seen in neighbouring states such as Malaysia or Cambodia with a history of dominance by a single party or coalition. Singapore's electoral districts, while malapportioned are unlike Malaysia and not substantially malapportioned to partisan ends (Chin, 2013; Ostwald, 2013; Welsh, 2013). Singapore's Chinese-dominated PAP has also not disenfranchised the minority Malay population, in the way that Ceylonese Sinhalese used the Citizenship Acts of 1948 and 1949 to disenfranchise the Indian Tamils (Rabushka & Shepsle, 1972, p. 140). In fact, the PAP government introduced an ethnic quota or the Group Representative Constituency scheme in 1988 to ensure the legislative representation of ethnic minorities (Hussin, 2002; N. Tan, 2014a). Unlike most electoral autocracies, Singapore elections are not marred by ballot stuffing or electoral fraud as in Mexico under the Institutional Revolutionary Party (Magaloni, 2010). According to Freedom House, Singapore elections are "free from irregularities and vote rigging" (2015).

Scholars such as Michael Barr has highlighted the role of performance legitimacy as a reason for the PAP's resilience, proposing that "an electorally legitimized authoritarian regime can perpetuate itself in the long term, provided it delivers public goods to the population and is assiduous in responding to complaints" (2014, p. 29). Indeed, economic performance is a strong predictor of regime durability (Haggard & Kaufman, 1995; Pepinsky, 2009). However, economic performance alone does not help to explain the PAP's legislative

supermajority despite its trend of declining popular vote shares. If economic performance explains the PAP's popularity, we should see higher vote shares for the PAP in years where the economy is enjoying high growth and vice versa. Yet, there is no clear correlation between Singapore's gross domestic product (GDP) per capita, a measure of economic growth, and the PAP's popular vote share in the last 12 general elections.[4]

Our explanation for this puzzle is focus on Singapore's peculiar electoral system, the *plurality party bloc voting* rule used since 1988, as aided by the skilled strategic manipulation of constituency boundaries.[5] Our goal is to highlight the mechanisms through which this unique plurality PBV operates and can be used by an incumbent party to manufacture seat shares. We intend to go beyond exisiting studies by Hussin (2002), Tan (2013), Tey (2008) to measure the partisan bias and highlight the interaction effects on seat shares given the alleged redistricting and malapportionment that regularly occurs prior to each election. Our emphasis on the power and limits of this electoral rule to affect outcomes thus adds to Schedler's "menu of manipulation" (2002) and complements the list of eleven pre-election tools of misconduct identified in Donno and Roussia's work (2012, p. 584).

Plurality party bloc voting is one of a family of electoral rules, party bloc voting (PBV), where slates of candidates are pitted against each other in multiseat districts (MMDs), with the plurality or majority winning slate in each district automatically gaining all (or most of) the seats in the constituency.[6] When used in conjunction with standard gerrymandering tools such as packing and cracking,[7] along with the *stacking* technique available when using multi-seat consitutencies,[8] plurality PBV has allowed the PAP to be far more efficient in translating its votes into seats, than is the case for its (often divided) opposition. We also demonstrate how the ethnic quota rules for public housing, in which more than 80% of resident

Singaporeans live, has eliminated the potential for an ethnic-based party to win seats in plurality PBV elections via a geographically concentrated base of electoral support.[9]

It is well known that, in contrast to elections held using some form of proportional representation, plurality elections can magnify the seat share of the largest parties beyond their apparent voting strength (Blais & Carty, 1987; Lijphart & Grofman, 1984; Tufte, 1973), and can produce "artificial" legislative seat majorities. However, for a fixed geographic distribution of partisan electoral support, the expected degree of distortion varies with the form of the plurality rule.[10] *Ceteris paribus*, the purely mechanical/statistical (law of large number) effects of plurality voting rules in moving away from proportionality of votes to seats relationships in a legislature will be least, when plurality is used in single member constituencies, next largest when used in multiseat constituencies, known as *plurality bloc voting* in the U.S. and highest under what we are referring to as *plurality PBV*. In the most common form of U.S., plurality multi-seat elections, voters vote for individual candidates and have as many votes as there are seats to be filled in the constituency. In Singapore, in contrast, voters have only a single vote. Voters have no choice but to either support a party slate fully or not at all.[11] *Ceteris paribus*, the magnifying effects of the voting rule on party success can be expected to be higher under the plurality PBV than under plurality bloc voting.

While any plurality-based districting scheme can be manipulated via standard gerrymandering tools to a greater extent than it is possible under the proportional representative (PR) system (see Birch, 2007a), a multiseat PBV system has the additional wrinkle of allowing for variable district magnitude, which is highly conducive to partisan gerrymandering.[12] As we show below, it is the PAP's skillful manipulation of the distribution of district magnitudes, in conjunction with other gerrymandering tools, that has allowed it to

hold on to a legislative super majority of seats under the plurality PBV rule. Except for Senegal, whose rating has varied over time, all of the countries that use or used PBV in one of its variants may be regarded as an electoral authoritarian regime based on Schedler's definition (2002) and classified "Partly free" or "Unfree" by Freedom House. Cameroon, Chad and Senegal, like Singapore, have a mix of SMC and MMDs, while Djibouti only has MMDs. In each of these African cases, the form of PBV used exaggerates the translation of votes into seats for the largest party. PBV was also used in Turkey, for four national elections from 1946 to 1957, and yielded very high disproportionality in favor of the ruling party.[13]

Parliamentary Elections in Singapore

There is no independent election commission in Singapore and control of the redistricting process is essentially political.[14] Singapore's Elections Department is under the Prime Minister (PM)'s office and the PM appoints an Electoral Boundaries Review Committee (EBRC) that redraws electoral boundaries before every election, without the need for Parliamentary approval.[15] From 1965 to 1987, Singapore was spatially divided into single-member constituencies (SMCs) based on simple plurality. In 1988, the PAP government introduced multiseat districts via the the Group Representation Scheme (GRC), ostensibly to improve ethnic minority representation in the legislature. The GRC scheme, a form of ethnic quota, requires at least one ethnic minority candidate (Indian, Malay or mixed ethnicity) in each GRC. As earlier noted, Singapore's GRCs use the *plurality PBV* rule, with each voter having a single vote to cast for a party list and the party with the most votes having its entire slate elected.

Figure 1 shows the PAP's vote and seat shares. What this figure shows is that, regardless of the opposition vote share -- opposition vote shares have sometimes been close to one-third of the votes -- the PAP's seat share has *never* fallen below 93%. In fact, from 1988 to 2015, after adopting the multiseat GRC scheme, the mean *effective number of parties* (Laakso & Taagepera, 1979) in Parliament has been 1.05. This is, indeed, a hegemonic party!

<<Figure 1 about here>>

Table 1 shows the disproportionality for the PAP and the combined total opposition vote shares using the two standard indices in the electoral system literature, the *Loosemore-Hanby Index of Distortion* and the *Gallagher Index* (Gallagher, 1991). Singapore is characterized by an extraordinarily high level of disproportionality in its translation of votes to seats (N. Tan, 2013). In fact, it is one of the highest in Asia (Hicken, 2008).

<<Table 1 about here>>

Key Arguments

Given the PAP government's control over the redistricting process, we highlight three explanatory factors that are linked to the use of multi-seat plurality PBV, focusing on the government's strategic changes in the electoral geography that could allow the PAP to compensate for declining vote share and to reduce the dangers of successful contestation by its opponents. Addtionally, we also discuss electoral secrecy and malapportionment -- two electoral features that are not specific to PBV. However, given their prevalence in Singapore elections, we will include them in our study to see how they limit or exaggerate the effects of PBV rule.

The first is the imposition of a residential housing ethnic quota (or Ethnic Housing Integration Policy, EIP) after the 1991 GE. This quota has worked well in conjunction with the PBV rule to prevent any ethnic based parties from winning based on ethnic support. Second, the choice of the *PBV rule* that involves multiseat districts has "mechanically" advantaged the incumbent PAP as it is the largest party, this mechanical advantage was further augmented by careful strategic adjustment of the mean number of seats elected per district.[16] Third, tools of partisan gerrymandering were also skillfully deployed in a way that can be more efficacious under plurality PBV with variable district magnitude than under any non PBV rule.

Electoral secrecy is a fourth factor, though not unique to the use of plurality PBV. However, the lack of information or public discussion of frequent electoral boundary changes and short notice of newly created constituencies[17] disadvantage the opposition as it makes it harder for them to plan, identify candidates and organize their campaign. Given that the EBRC is under the PM's direct control, we expect the PAP leaders to know the new boundary lines before the official report is released.

Finally, we consider the effects of malapportionment, a well-known problem in Singapore (E. Tan, 2010). We expected to find malapportionment to aid the ruling party, as this powerful manipulatory tool is characteristic of many electoral autocracies where the ruling party controls the districting process, such as in Malaysia (Ostwald, 2013). However, our study did not find strong pro-PAP effects due to malapportionment.[18]

Each of these mechanisms will be discussed in detail below.

Changing Ethnic Electoral Geography Through Ethnic Housing Quotas

The PAP government's justification for introducing the GRCs in 1988, with its requirement of an ethnically mixed slate, was to limit polarizing ethnic voting, and to ensure minority representation.[19] In 1989, an ethnic housing quota or the EIP was imposed on all public housing to prevent any ethnic minority group from exceeding 20% in any housing block or estate.[20] As around 80.4% of all Singapore housing is state-owned[21] and widely dispersed around the island, this ethnic housing quota would effectively affect a large proportion of Singapore residential population. It also means that ethnic minority groups such as the Malays and Indians will always constitute a minority in any constituency.[22] The dispersion of ethnic groups through EIP means that ethnic-based parties must have broad-base support and cannot win based on spatially concentrated ethnic support in one constituency.[23]

While is no official statistic on the ethnic demography in each constituency, the author's estimate based on the 2010 Singapore Census Report (Statistics Singapore, 2011) and media reports on the selected constituencies before the 2011 elections, shows that ethnic minorities have been successfully distributed in all electoral constituencies since the ethnic housing quotas were introduced in 1989. Presently, the Malay population in all SMCs and GRCs are within a narrow range. Our estimates drawn from public sources of the demographic breakdown of Singapore's 2011 electoral constituencies show the range of Malay voters to be from around 6% (Potong Pasir) to 23.4% (Tampines).[24] This range approximates Malays' national average of 13.3% (Department of Statistics Singapore, 2015b, p. 4). We believe the 2015 figures to be not much different.

Before the GRC and ethnic housing quota schemes were introduced, the PAP Malay candidates had a tough time winning seats in constituencies with large Malay presence such

as in Kampong Kembangan and Geyland Serai. For example, in the 1972 election, PAP Malay candidate had to face stiff challenge against candidates from Malay-based parties such as the Pertubuhan Kebangsaan Melayu[25] (PKMS). The PAP Malay candidates were unpopular among their community because they were viewed as co-opted members of the PAP to promote party policies rather than to advance Malay interests (Mutalib, 2004; Rahim, 2012).[26]

While the GRC scheme successful ensured the legislative presence of ethnic minorities, it has altered Singapore's electoral geography -- dispersing all ethnic minorities through the ethnic housing quota and eliminating any credible challenge from a Malay based party such as the PKMS. Indeed, since 1997, no Malay candidate from the opposition parties -- and indeed no Malay candidate from the PAP itself -- has contested in any single seat constituency.[27]

Effects of Manipulating District Magnitudes

The most direct way which the PAP uses the tools available under the plurality PBV rule to maintain its electoral dominance is through the manipulation of the mean district magnitude. Table 2 gives the district magnitude information for the period of 1988 to 2015 elections. There are two important time trends vis-a-vis Singapore's district magnitude. First, the sizes of the GRCs were increasing: from three initially in 1988, to four in 1991, to a modal size of five in 1997 and later to five and six-member seats in 1997 in all subsequent apportionments. Second, the proportion of the GRCs also increased, from zero percent in 1984 to a high of nearly 90% by 2006. In 2015 elections, there was slight reversal. However, of this long run trend; still 76 out of the 89 constituencies were still GRCs (85.4%).

<< Table 2 about here >>

Figure 2 plots the mean district magnitude, which shows that, with the exception of the slight dips in the 2011 and 2015 elections, the mean district magnitude in Singapore rose from 1 in 1984 to a high of 3.65 by 2001, requiring considerable boundary changes.

<< Figure 2 about here>>

As Table 3 shows, the rise in mean district magnitude is paralleled by a rise in *aggregate level swing ratio*[28] over the same period. This positive link between *aggregate level swing ratio* and mean district magnitude is what is theoretically expected for multiseat plurality systems.[29] The effect of increasing district magnitude is analogous to the effects of increasing sample size in guaranteeing convergence to the true mean. *Ceteris paribus*, increasing district magnitude makes it ever more likely that the plurality party will capture all the seats (Grofman, 1994).

<<Table 3 about here>>

In the pre-GRC period, the average aggregate level swing ratio is 2.2; in the post-GRC period, the mean aggregate swing ratio is 3.1. This nearly 50% increase in *aggregate level swing ratio* means that, for any given vote share, the PAP's seat share will be higher in the later periods. That is, even a lower vote share in the post-GRC period can yield the same seat share as a higher vote share in the pre-GRC period. While the exaggeration of vote share can be expected in any plurality system, as shown by the aggregate swing ratio of 2.2. during the period when Singapore only had single seat plurality elections,[30] the exaggeration effect is much greater under the plurality PBV. For example, if the PAP earns 70% of the votes in the pre-GRC period, it can expect 94% of the seats, with a swing ratio of 2.2. But it could expect to do just as well with only 64% of the vote in the post-GRC period, since (64%-50%)*3.1 +

50% equals 93.4%. Thus, when the PAP's vote share declines, it could compensate by raising district magnitude so as to maintain its legislative dominance.

Prior to the 2011 elections, the EBRC decreased the average number of MPs per GRC from 5.4 to 5. The number of six-member GRCs was also reduced, from five to two, while the SMCs increased from 9 to 12. Then, Prime Minister Lee Hsien Loong said that the changes "should lower the hurdle for parties intending to contest the election"(Li, 2011) -- an implicit acknowledgement that the larger GRCs were an impediment to the opposition.[31] The mean district magnitude was later reduced from 3.22 to 3.07 in the 2015 election. However, the two larger six-member GRCs were retained, despite earlier promise to reduce the larger GRCs.[32]

Electoral Boundary Manipulation

Birch's (2007a) cross-national study shows that SMC elections held under plurality or majority rule are more likely to be manipulated for partisan purposes than MMD elections held under proportional representation. However, Singapore's mix of single and multiseat plurality, with variable district magnitude, offers even more opportunities for partisan manipulation of boundaries than in single-seat districting, especially when the manipulation of boundaries is done in conjunction with the district magnitude changes reported earlier.[33]

As we have argued, the changes in district magnitude can exaggerate PAP's voting strength through the mechanical effect on *swing ratio* of increasing district magnitude. But gerrymandering to affect the distribution of opposition electoral strength can further reduce the opposition's ability to gain representation. Some districts can be dissolved and other districts can be redrawn to more efficiently distribute PAP's voting strength. Usually this recrafting results in the form of shoring up weak districts or paring down PAP strength in safe

districts, but gerrymandering can also occur by ceding certain districts to the opposition in a way that wastes opposition votes.[34] There may be portions of the country where a ruling party is advantaged by drawing MMDs and winning seats by the *stacking* form of gerrymandering -- fragmenting the opposition strength and submerging its strength within a stronger pro-PAP larger constituency.[35] In other areas, it is advantaged by drawing SMCs into which it can *pack* the opposition. In general, if a party can control the line drawing process, and it has the potential to vary district magnitude, *ceteris paribus*, it will prefer a mix of SMCs and MMDs, but the balance of MMDs and SMCs will vary with the electoral geography.[36]

Unless the GRCs are being conceded to the opposition, it is generally more important for the PAP to limit variance in the GRCs than in the SMCs, i.e., to win all GRCS with similar vote share, as there are more seats at stake in the GRCs. As Table 4 shows, the standard deviation of PAP support has generally been lower in the GRC component of the election than in the SMC component. However, *ceteris paribus*, if PAP's mean vote share fall enough, the desirability of strategies that cede a limited number of districts to the opposition rises, and thus variability in PAP vote share across districts, can also be expected to rise.

<<Table 4 about here>>

Since 1988, most SMCs with over 40% oppositional voting have disappeared or been submerged into GRCs (e.g. Braddell Heights, Bukit Batok, Changi, Nee Soon South, Ulu Pandan and Yuhua after 1991; Bukit Panjang, Fengshan, Paya Lebar, Punggol and Whampoa after 1988). Similarly, the GRCs with more than 40% oppositional support have been dissolved or reshaped (e.g. Moulmein-Kallang after 2011; Cheng San after 1997; Eunos after 1991 and Tiong Bahru after 1988). Between 1988 and 2015, we find, on average, the PAP had a 64.9% vote share in the dissolved SMCs, a value below the mean PAP SMC performance.

Similarly, the PAP had a lower vote share in the dissolved GRCs than in other GRCs. See

Table 5. In the 2015 redistricting, the most controversial boundary change was the elimination

of Joo Chiat SMC, a district that was hotly contested by the opposition Worker's Party (WP)

candidate, Yee Jenn Jong. In the 2011 election. Yee, lost narrowly by 1% to his PAP

opponent. Joo Chia SMC was later absorbed into Marine Parade GRC in the 2015 election

and the PAP won 64.1% vote share in the new district[37] – an example of *stacking* at work.

    <<Table 5 about here>>

    On the other hand, the dissolution of pro-PAP Kampong Glam SMC (after 1997) and

Buona Vista and Mountbatten SMCs (after 1991) have likely occurred because, at 75%,

79.5% and 78% PAP vote shares respectively, they were already far above the mean vote

share of 63% average over the two elections. Given the plurality rule, it is more efficient to

redistribute the PAP's vote strength to shore up other constituencies. Similarly, prior to 1991

elections, pro-PAP SMCs such as Kebun Baru (75.4%), Serangoon Gardens (74%) and Teck

Ghee (79%) were most likely dissolved for the same reason, as they have far exceeded the

PAP's average vote share of 63% in the last 1988 elections. Those engaged in

gerrymandering seek such an "efficient" distribution of their own support.

    Before the 2011 elections, eight additional SMCs were created.[38] Configuration of three

new SMCs (Radin Mas, Yuhua and Sengkang West) and one older SMC (Bukit Panjang)

appeared most suspicious, as they are crafted literally inside or or on the edges of the

respective PAP GRC strongholds of Tanjong Pagar, Holland-Bukit Timah and Chua Chu

Kang. It is hard to imagine a rationale for creating an SMC inside a GRC other than the PAP's

wish to assuage the mass demand for more SMCs without actually affecting its own seat

winning abilities. The three single-member seats in 2011 created within the existing GRCs

now enjoyed above average PAP vote share. In the last 2015 election, three new SMCs (Bukit Batok, Fengshan and Macpherson) were added, without explanation. Two of these SMCs (Bukit Batok and Macpherson) were created on the edges of the PAP strongholds in whose candidates included heavy-weight PAP Cabinet Ministers in Jurong and Marine Parade GRCs. See Appendix 1 for the 2011 and the 2015 electoral maps.

Electoral Secrecy

While the effects of electoral secrecy are largely independent of the voting rule used, electoral secrecy effects are exacerbated by the plurality PVB used in Singapore, because the arbitrary manipulation of the constituency sizes and boundaries raise electoral uncertainties, and the timing of public release of information about new lines makes it harder for the opposition to identify suitable candidates and plan campaigns in advance of the new elections. These effects are further exacerbated by the frequency of redistricting.

By the 1996 elections, 42 SMCs in existence in 1988 were whittled down to just 9 SMCs. In the 2006 elections, the boundaries of 11 out of 23 constituencies were changed. Prior to the 2011 elections, 16 out of 27 constituencies were redrawn, affecting more than 30% of all voters (N. Tan, 2012, p. 5). In the 2015 elections, parliamentary seats were increased from 87 to 89 and electoral constituencies were raised from 27 to 29, with many districts changed in configuration. In particular, an SMC and a GRC were dissolved, while three SMCs and one new four-member GRC were created. These changes were carried out unilaterally by the EBRC without consultation or accountability to the Parliament or the political parties.

Not only is the EBRC not independent, its actions also lack transparency (ACE Electoral Knowledge, 2012). In the 2011 election boundary report, only one paragraph was given to explain that the boundary changes were made to reflect the "configurations and population changes since the last boundary delineation exercise [in 2006]" (Li, 2010). The non-specific explanation is basically useless. Similarly, in 2015, no explanation was given to the dissolution of Joo Chiat SMC, a hotly contested seat by the opposition WP in 2011, nor was an explanation given to the elimination of Moulmein-Kallang GRC from the electoral map, or why three new SMCs (Bukit Batok, Fengshan or Macpherson) were created (EBRC, 2015). The opaque redistricting process has led to complaints by the opposition and human rights group (see Maruah, 2014).[39]

Malapportionment

The wide variation in registrants per seat in Singapore is another well-known problem (E. Tan, 2010). Given the lack of an independent election commission, there is potential for malapportionment to be used by the PAP as a partisan tool, but whether it does so is an empirical question. Table 6 shows the deviation from electoral quota or the average number of registrants per elected seat. The plus or minus 30% from ideal used in Singapore provides great room for manipulation. If the largest district is 130% of ideal and the smallest district is 70% of ideal, then the largest district can be twice as large as the smallest (130/70 = 1.86).[40]

<<Table 6 about here>>

As Table 6 shows, the ratios of largest to smallest districts are at their maximum, or even fractionally higher than is technically allowable, giving rise to considerable variance in

per capita representation. The devation from EQ for the largest and smallest constituencies were plus or minus 30% in most elections.

One way to assess for malapportionment is to compare the population sizes in PAP strongholds with the population size in opposition strongholds. If malapportionment is used for partisan gains then, we should expect to see a pattern in which the PAP strongholds are underpopulated and pro-opposition strongholds are overpopulated. However, our study of the population sizes of pro-PAP and pro-opposition constituencies shows mixed results. Table 7 shows little evidence of an overall pattern. In the four earliest elections, there were some differences in the pro-opposition and PAP strongholds in a direction consistent with the hypothesis of malapportionment being used for partisan ends. In fact in 2006, 2011 and 2015 elections, the population discrepancies are in favor of the opposition, i.e. opposition strongholds were underpopulated.

<<Table 7 about here>>

Another way to assess for malapportionment is to examine whether the average PAP vote share in the under-populated constituencies (1/4th of the total) is higher than those in the over-populated ones (1/4th of the total). As Table 8 shows, in the two earlier elections (1988-1991), the PAP does show a few higher points in vote share in the most under-populated GRCs and SMCs than in the most over-populated ones, but no such pattern is found in the subsequent elections (2006-2015). On balance, we find no clear evidence for the use of malapportionment as a partisan tool.

<<Table 8 about here>>

Implications: Electoral Rules and Gerrymandering to Preserve Party Dominance

This study on Singapore offers insights into the specific mechanisms that allow sophisticated dominant parties such as the PAP to maintain legislative supermajority. First and most importantly, Singapore's case shows how the manipulation of electoral laws that may appear neutral, e.g., choice of a plurality based voting rule and choice of mean district magnitude under that rule, can result from strategic choices aimed at clear partisan advantage (Benoit, 2007; Birch, 2007b). Autocratic leaders turn to electoral system manipulation as it is less salient to the public than outright fraud or hard repression. Tweaking the electoral rule is efficient and difficult for layman to spot the unfairness or challenge the outcome.

Second, while an electoral system is expected to have "mechanical effects" even if there is no deliberate partisan manipulation, these effects can be reduced or exaggerated when there is selective manipulation of electoral boundaries. As demonstrated above, the fragmenting of the opposition strength and submerging its strength via *stacking* in the multimember constituencies is one of the PAP's key techniques. Where the opposition showed strength, the boundaries and sizes of the GRCs were changed to submerge that opposition. Sometimes, the PAP concedes "token" districts (e.g. Potong Pasir, Hougang and Aljunied) to the opposition, to enhance the PAP's legitimacy. Indeed, as the PAP vote share declines, concentrating and "packing" may become a more attractive tactic.

Third, who controls the redistricting process is also critical if we want to understand the effects of electoral rules.[41] Without an independent election commission, opposition check in the Parliament or **judicial** appeal process, the unilateral boundary changes can have partisan effects.

Fourth, no electoral rule works in a vacuum. Singapore's case shows how the potential for electoral manipulation is closely linked to the geographic distribution of electoral support. In Singapore, the PAP has successfully manipulated the distribution of the electorate through the ethnic housing quotas to prevent the success of a Malay-based opposition party.[42] Fifth, the analysis of patterns in Singapore reinforces the claim derived from the study of other dominant parties to show when major electoral changes are likely to occur when the ruling party faces challenge (McElwain, 2008; Remmer, 2008). In 1984, the election before the GRC scheme was introduced, ethnic minority candidates were competitive, with more than nine minority candidates from the WP and PKMS, earning more than a 35% vote shares. Taken in conjunction, the GRC scheme in 1988 and the ethnic housing quota in 1989 operated to repress the rising support for the opposition ethnic minority leaders.

Looking to the Future

In 2015 elections, the PAP boosted its vote share to 69% largely because of the patriotic fervor in respond to the death of its former Prime Minister Lee Kuan Yew and the country's golden jubilee celebration. We expect this electoral achievement to be a blip in a longer term pattern of PAP vote decline. If the economy continues to slow and the income gap widens, the Chinese working class, located in the north-east region of the country, might pose a challenge to the PAP's claims to performance legitimacy. While the ethnic housing quotas has worked to neutralize the emergence of ethnic based parties, the PAP has yet to formulate a an electoral strategy that will neutralize the threat from an opposition that comes from the Chinese majority communities, as seen in the Aljunied or Hougang constituencies.

However, the PAP has not exhausted all the potential for using redistricting to increase its seats to votes ratio. It has preserved the strategy of having a limited number of "Potemkin Villages" won or closely contested by the opposition to buttress the claim that Singapore is a competitive electoral democracy. In particular, we may see more SMCs or smaller GRCs created to siphon off opposition strength with the least cost to the PAP (Driscoll, 2016). We saw this being done in Bukit Panjang SMC (within Holland-Bukit Timah GRC); Yuhua SMC (within Jurong GRC) and Pioneer SMC (within West Coast GRC). See Figure 3. Such a strategy appeases the masses' demand for more SMCs and at the same time concentrates the opposition forces to minimize the number of seats that they could win.[43]

Looking forward, a more proportional representative (PR) system would help Singapore guarantee minority gains and improve democratic outcomes (see Blais & Carty, 1987). However, the PAP leaders have consistently rejected the PR system as they claim it would encourage racial politics (Wong, 2013). If all the GRC seats were to be distributed based on the most common list PR rule (D'Hondt) (Reynolds, Reilly, & Andrew, 2008) in 2011 elections, then, *ceteris paribus*, the opposition would have won 27 seats out of 75 (36%) instead of the only 5 seats (7%) that they won under the PBV rule. In 2015, even when the PAP gained in votes, the opposition would have secured 20 out of 76 (26%) seats under PR instead of 5 (7%). Had the opposition parties been successful, it would increase their ability to recruit good candidates, mount effective candidates and improve electoral competitiveness and representation. Yet, given present developments, there is no reason to believe that the PAP leadership, which has rejected proposals for a PR system, or a mix of PR and plurality SMCs, will change its mind in the foreseeable future. Our work on Singapore have implications for the broader study on electoral authoritarianism. In our view, the plurality

PBV rule used in Singapore, and the PBV variants used in Chad, Djibouti, Cameroon and Senegal, ought to be regarded as among the most undesirable electoral rules in the world from a democracy standpoint, truly an "authoritarian's friend".

Notes

[1] For a survey of the types of electoral rules, see Reynolds, Reilly, & Andrew (2008).

[2] In a hegemonic party regime, electoral fraud is rarely necessary to win (Daxecker, 2012; Lehoucq, 2003; Simpser, 2013)

[3] See (Schedler, 2006). (Bellin, 2005; Case, 2006; Escribà-Folch, 2013)

[4] The PAP vote share went up in 2001 and 2015 elections after a major dip in economic performance following the 1997 Asian Financial crisis and slow economic growth after 2011.

[5] For a survey of the types of electoral rules used worldwide see Reynolds, Reilly, & Andrew (2008).

[6] We use the terms 'district' and 'constituency' interchangeably in this paper.

[7] *Packing* refers to the concentration of the voting support of a given party in a limited number of districts so that its electoral strength is wasted in winning seats with a (considerably) higher vote share than is needed. Its mirror image, *cracking*, refers to the dispersal of the voting support of a given party in a large number of districts so that its electoral strength is wasted in losing seats with vote share just below what might be needed to make the party successful (Grofman, 1985).

[8] *Stacking* is another gerrymandering tool. It is available when there are districts with different numbers of representatives. It refers to submerging an oppositional party's support that would be large enough to win in a single seat constituency by putting that bloc of voters inside a larger multi-seat constituency with greater strength from the dominant party (Grofman, 1985).

[9] Our study dovetails with Fetzer's work to show how ethnic desegregation divided Malay voters and potential ethnic-based opposition to the PAP (2008).

[10] Plurality is not the only method that can be used to exaggerate the strength of the largest party/larger parties. Some countries have bonus rules that give extra seats to the largest party (e.g. Greece) or to the largest coalition (e.g. Italy since 2006).

[11] We refer to the party ticket in a multiseat constituency using the plurality or majority voting forms of PBV as a *slate,* rather than as a *list*, since the names are not ordered, while in a party-list form of proportional representation (PR) the list of names is ordered.

[12] Birch's work highlights how a majoritarian electoral rule, the two-round ballot system, operating well in democracies such as France, can also be used to sustain electoral autocracies in power (2007a).

[13] We reserve to future work (in conjunction with an expert on African elections) a full discussion of these cases because of space limitations, and the variation in ethnic compositions and ways in which the PBV system are used in the other cases. PBV variants have also been used in pre-Arab Spring Tunisia and in Salazar's Portugal. We like to thank Esra Issever Ekinci for bringing the Turkish historical example to our attention.

[14] The same is true for Djibouti and Chad. See also (CommonWealth Expert Team, 2013, p. 13)

[15] See a study by Maruah, a local human rights group, on Singapore delimitation practices (2014).

[16] See (N. Tan, 2012, p. Table 2).

[17] In 2001 GE, the EBRC report was released on 17 Oct, 3 weeks before polling day on 3 Nov. In 2015 GE, the EBRC report was released on 24 Jul, about 7 weeks before polling day (N. Tan, 2016, p. 182)

[18] For an earlier discussion see (E. Tan, 2010).

[19] The use of ethnic quotas is controversial as Malay's legislative representation was not too far below proportionality in the pre GRC period.

[20] Constraints on the minority population share in public housing is also implemented in democracies to prevent racial segregation, see (Bagdon, 1985) For Singapore's EIP, see (Sim, Yu, & Han, 2003)

[21] In 1960, the government owned 44% of the land. Now, about 80.4% of land is state owned. See (Department of Statistics Singapore, 2015a)

[22] During the colonial period, Singapore's housing was concentrated in ethnic-based districts. Between 1961-84, the PAP government relocated Malay villagers from their enclaves in Kampung Glam, Geylang Serai and Jalan Eunos to urbanized areas as part of the country's housing redevelopment

plans (Chua, 1997; Yuen, 2007). Archival history shows that the resettlement of Malays contributed to 1964 racial riots (Blackburn, 2011).

[23] This is also disadvantageous to minor parties with no spatially concentrated support (Norris, 2004, p. 94).

[24] Estimates of the ethnic demographic breakdown were drawn from 21 "On the Ground" Insight reports on 8 SMCs and 13 GRCs published in *The Straits Times* from 30 Jul 2010 to 26 Nov 2010.

[25] The PKMS is widely viewed as a "Malay-first" party, as reflected in the party's constitution (Mutalib, 2004).

[26] Former PAP Malay MP Othman Wok and Yaacob Mohammed had difficulties forming relations with Malays at the grassroots level (Mutalib, 2012, pp. 81–2).

[27] For the first two decades after the GRC and EIP schemes were introduced using PBV, no opposition party was able to capture a GRC, until the 2011 GE. Before 1988, the opposition parties contested an average of 64% of the total seats. However, after being roundly defeated in subsequent elections, the opposition parties ended up contesting in an average of less than 46% of seats in four elections (1991-2006). The number of eligible voters who could not vote as a result of uncontested seats rose from 13.1% in 1988 to a high of 66.9% by 2001. See (N. Tan, 2013). The opposition parties are more competitive now, contesting in 95% and 100% of the seats in the 2011 and 2015 GEs respectively.

[28] The *aggregate level swing ratio* for a party with a vote share (VS) at or above 50% is simply the ratio of seat share (SS) above 50% to vote share above 50%, i.e. *swing ratio* $= \frac{50\%-SS}{50\%-VS}$.

[29] In U.S. parlance is called an *at-large plurality election,* i.e., where there all the seats in the legislature are elected by simple plurality with each voter having as many votes as there are seats to be filled, the majority bloc can elect its chosen representatives to 100% of the seats. This same limit result applies to plurality PBV.

[30] The range of swing ratio in Singapore's pre-GRC electoral period falls within the range in most English speaking democracies with plurality rule in single seat constituencies. See Table 4 in (Grofman, 1975, p. 323)

[31] The other impediment for opposition includes the high electoral deposit for larger multi-member team. In 2015 election, the electoral deposit for each candidate was set at S$14,500 or a total of S$87,000 (US $62,328) for a six-member team.

[32] The two six-member GRCs, led by PM Lee Hsien Loong (Ang Mo Kio) and DPM Teo Chee Hean (Pasir Ris-Punggol) may be kept to allow new PAP candidates to get elected on the coattails of senior leaders.

[33] Gerrymandering was reported when Singapore had only SMC elections under plurality rule. Then the focus was on minimizing the impact of Malay enclaves (Rahim, 2008, p. 109).

[34] Potong Pasir SMC was viewed as a pro-opposition district and experienced no boundary changes.

[35] In 1991, Kampong Glam SMC was mysteriously dissolved, revived in 1996 and dissolved again in 2001. Likewise, Bukit Timah SMC also underwent several boundary changes. It first merged into a GRC in 1997, then recrafted as an SMC in the 2001 election and reconfigured into another Holland-Bukit Timah GRC in 2006. When comparing the vote share results of these constituencies over the different time periods, the PAP's vote share in Kampong Glam improved from 67% to 76% for 1997 after boundary changes, while Bukit Timah was uncontested by the opposition for three elections (1997, 2001 and 2006) after boundary changes.

[36] As a dominant party begins to lose support, the attractiveness of concentrating opposition strength in a few districts ceded to the opposition rises.

[37] Joo Chiat was an SMC from 1959 to 1988 and for the last three elections since 2001. As Yee complained on his Facebook: "[T]here is no clear justification for the changes. With the eraser and the pencil, the mighty committee has made the Joo Chiat SMC with such a rich and unique tradition disappear" (Kek, 2015).

[38] They are Hong Kah North, Mountbatten, Pioneer, Punggol East, Radin Mas, Sengkang West, Whampoa and Yuhua.

[39] See complaint of gerrymandering by WP leader Sylvia Lim in Parliament (Lim, 2010).

[40] In contrast, with a plus or minus 5% legal limitation, as in U.S. legislative districting, the worst-case scenario is 105/95 = 1.11 (Grofman, 1985).

[41] The U.S. literature on gerrymandering shows there can be substantial changes in partisan composition when there is partisan control of the redistricting process (McGann, Smith, Latner, & Keena, 2016).

[42] Our work contributes to the study of the interactions between electoral system and electoral geography (Bochsler, 2010; Gudgin & Taylor, 2012; Johnston, 2002).

[43] Aljunied is a natural candidate to concentrate opposition forces within the 5-seat district into a smaller district. In 2015, the PAP leaders argued that the redistricting was fair because Aljunied GRC, which was won by the opposition in 2011 was left untouched (Teng, 2015) This suggests the PAP is reluctant to tinker with Aljunied as it would showcase Singapore elections as competitive.

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Table 1. Loosemore-Hanby and Gallagher Indices of Disproportionality in Party Representation in Singapore

General Election	D	G
1968	13.3	11.8
1972	29.6	23.5
1976	25.7	20.7
1980	22.3	17.2
1984	32.7	25.7
1988	35.0	28.6
1991	34.1	27.1
1997	33.2	26.4
2001	22.3	18.5
2006	31.0	25.9
2011	32.0	24.5
2015	21.8	17.8

Source: Calculated by authors.
Note: D: *Loosemore-Hanby Index of Distortion (1971);* G: *Gallagher Index* (Gallagher, 1991)

Table 2. Distribution of SMCs and GRCs in Singapore (1984-2015)

General Election	Total Seats	SMC seats (%)	GRC seats (%)	GRC Magnitudes
22 Dec 1984	79	79 (100)	0	0
23 Sep 1988	81	42 (51.9)	39 (48.1)	13 x 3-MP GRCs
31 Aug 1991	81	21(25.9)	60 (74.1)	15 x 4-MP GRCs
2 Jan 1997	83	29 (10.8)	74 (89.2)	15 5 x 4-MP GRCs 6 x 5-MP GRCs 4 x 6-MP GRCs
3 Nov 2001	84	9 (10.7)	75 (89.3)	14 9 x 5-MP GRCs 5 x 6-MP GRCs
6 May 2006	84	9 (10.7)	75 (89.3)	14 9 x 5-MP GRCs 5 x 6-MP GRCs
7 May 2011	87	12 (13.8)	75 (86.2)	15 2 x 4-MP GRCs 11 x 5-MP GRCs 2 x 6-MP GRCs
11 Sep 2015	89	13 (14.6)	76 (85.4)	16 6 X 4-MP GRCs 8 X 5-MP GRCs 2 X 6-MP GRCs

Source: Calculated based on data from *Singapore Elections Department*
(http://www.eld.gov.sg/elections_past_parliamentary.html)

Table 3. Aggregate Level Calculations of Swing Ratio in Singapore, 1968-2015

General Election	PAP Vote Shares	PAP Seat Shares	PAP Swing Ratio
1968	86.7	100.0	1.4
1972	70.4	100.0	2.4
1976	74.1	100.0	2.1
1980	77.7	100.0	1.8
1984	64.8	97.5	3.2
Average Swing Ratio pre- GRC			**2.2**
1988	63.2	98.8	3.7
1991	61.0	95.1	4.1
1997	65.0	97.6	3.2
2001	75.3	97.6	1.9
2006	66.6	97.6	2.9
2011	60.1	93.1	4.3
2015	69.9	93.3	2.2
Average Swing Ratio post- GRC			**3.1**

Source: Calculated based on data from *Singapore Elections Department*
(http://www.eld.gov.sg/elections_past_parliamentary.html)

Table 4. Standard Deviation of the PAP's Vote Share in GRCs and SMCs, 1988-2015 Elections

General Election	GRC stdev	SMC stdev
1988	6.76	8.57
1991	7.98	12.59
1997	5.42	10.60
2001	3.55	14.69
2006	3.42	12.08
2011	3.86	9.54
2015	7.78	11.18

Source: Calculated based on data from *Singapore Elections Department*
(http://www.eld.gov.sg/elections_past_parliamentary.html)
Note: Uncontested elections are omitted.

Table 5. Average Vote Shares of the PAP and Opposition Parties in All Newly Created Constituencies and Dissolved Constituencies since 1988 to 2015

	Dissolved GRCs (%)	Newly Created GRCs (%)	Difference	Dissolved SMCs (%)	Newly Created SMCs (%)	Difference
Average Total PAP Vote Share	62.7	64.6	+1.9	64.9	66	+1.1
Average Total Opp. Vote Share	37.3	35.4	-1.9	34.8	33.4	-1.4

Source: Calculated based on data from *Singapore Elections Department* website (http://www.eld.gov.sg/elections_past_parliamentary.html)

Table 6. Distribution of Registrants in SMC and GRC Seats (1984-2015)

General Election	Total Seats	Total Electorate	Electoral Quota (EQ)	Largest Constituency	Deviation from EQ (%)	Smallest Constituency	Deviation from EQ (%)	Ratio
1988	81	1,669,013	20,605	33,824	**64**	7,248	-65	**4.7**
1991	81	1,692,384	20,894	31,246	**50**	11,998	-43	**2.6**
1997	83	1,881,011	22,663	31,358	**38**	17,981	-21	**1.7**
2001	84	2,036,923	24,249	33,329	**37**	16,616	-31	**2.0**
2006	84	2,159,721	25,711	32,586	**27**	15,888	-38	**2.1**
2011	87	2,350,873	27,022	35,814	**33**	17,327	-36	**2.1**
2015	89	2,462,926	27,673	34,466	**25**	17,407	-37	**2.0**

Source: Calculated based on data from *Singapore Elections Department*
(http://www.eld.gov.sg/elections_past_parliamentary.html)

Table 7. Population Size of Best and Worst Opposition Districts in Singapore

General Election	Population size of Pro-Opposition SMC	Population size of Worst Opposition SMC	Evidence for pro-PAP population manipulation	Population size of Pro-Opposition GRC	Population size of Worst Opposition GRC	Evidence for pro-PAP population manipulation
1988	Potong Pasir SDP: 63.1% (19,582)	Tanjong Pagar INDP: 18.4% (19,041)	Yes	Eunos (3 MPs) WP: 49.1% 75,723 (25,241)	Marine Parade (3MPs) JPS: 26.2% 62,385 (20,795)	Yes
1991	Potong Pasir SDP: 69.6% (19,263)	Buona Vista PKMS: 20.6% (14,596)	Yes	Eunos (4 MPs) WP: 47.6% 92,728 (23,182)	Marine Parade (4 MPs) JPS: 22.8% 74,032 (18,508)	Yes
1997	Hougang WP: 58.0% (24,423)	Boon Lay NSP: 33.9% (20,014)	Yes	Cheng San (4 MPs) WP: 45.2% 103,323 (25,830)	Pasir Ris (4 MPs) WP: 29.1% 85,908 (21,477)	Yes
2001	Hougang WP: 54.9% (23,320)	Ayer Rajah DPP: 12.04% (18,475)	Yes	Pasir Ris (5 MPs) WP 134,151 (25, 086)	Jurong (5 MPs) SDP: 20.3% 115,113 (23,022)	Yes
2006	Hougang WP: 62.7% (23,759)	Bukit Panjang SDP: 22.8% (30,452)	No	Aljunied (5 MPs) WP: 43.9% 145,141 (29,028)	Sembawang (6 MPs) SDP: 23.3% 184,804 (30,800)	No
2011	Hougang WP: 64.8% (24,560)	Hong Kah North SPP: 29.4% (27,701)	No	Aljunied (5 MPs) WP: 54.7% 143,148 (28,629)	Ang Mo Kio (6 MPs) RP: 30.7% 179,071 (29,845)	No
2015	Hougang WP: 57.7% (24,097)	Radin Mas RP: 12.7% (28,906)	No	Aljunied (5 MPs) WP: 51% 148,142 (29,628)	Jurong (5 MPs) SingFirst: 20.7% 130,498 (26,099)	No

Source: Calculated based on data from *Singapore Elections Department*
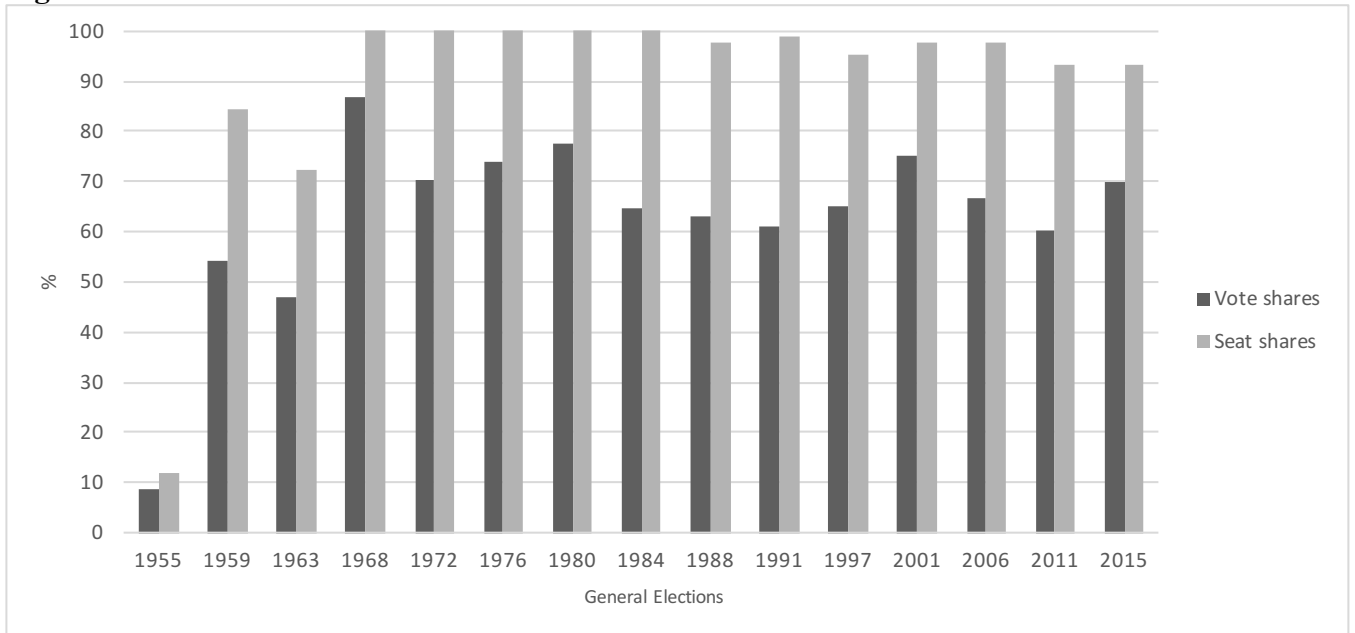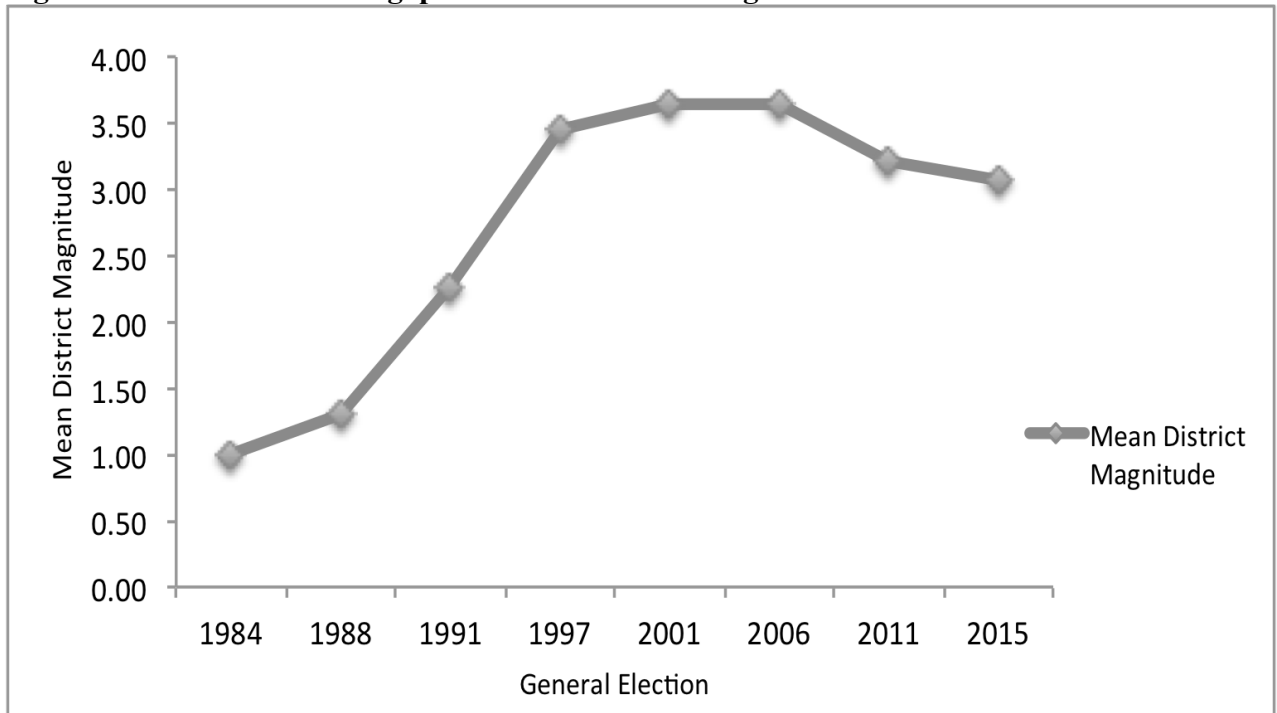(http://www.eld.gov.sg/elections_past_parliamentary.html)
Note: Numbers in bracket is the mean population per representative of GRCs

Table 8. The PAP's Average Vote Share in (1/4th) Most and (1/4th) Least Populated Constituencies (%)

General Election	PAP's Vi (%) 1/4th Most Populated GRCs	PAP's Vi (%) 1/4th Least Populated GRCs	Evidence of Pro -PAP Population Manipulation	PAP's Vi (%) 1/4th Most populated SMCs	PAP's Vi (%) 1/4th Least populated SMCs	Evidence of Pro - PAP Population Manipulation
1988	56	61	Yes	60	67	Yes
1991	64	60	No	51	73	Yes
1997	69	69	Yes	56	62	Yes
2001	71	74	Yes	72	73	Yes
2006	71	67	No	71	59	No
2011	62	55	No	63	61	No
2015	70	69	No	66	66	No
Average	**66**	**65**		**63**	**66**	

Source: Calculated based on data from *Singapore Elections Department*
(http://www.eld.gov.sg/elections_past_parliamentary.html)

Figure 1. Vote and Seat Shares of the PAP from 1968-2015

Source: Data from *Singapore Elections Department* (http://www.eld.gov.sg/).

Figure 2. Time Trend in Singapore: Mean District Magnitude from 1984-2015
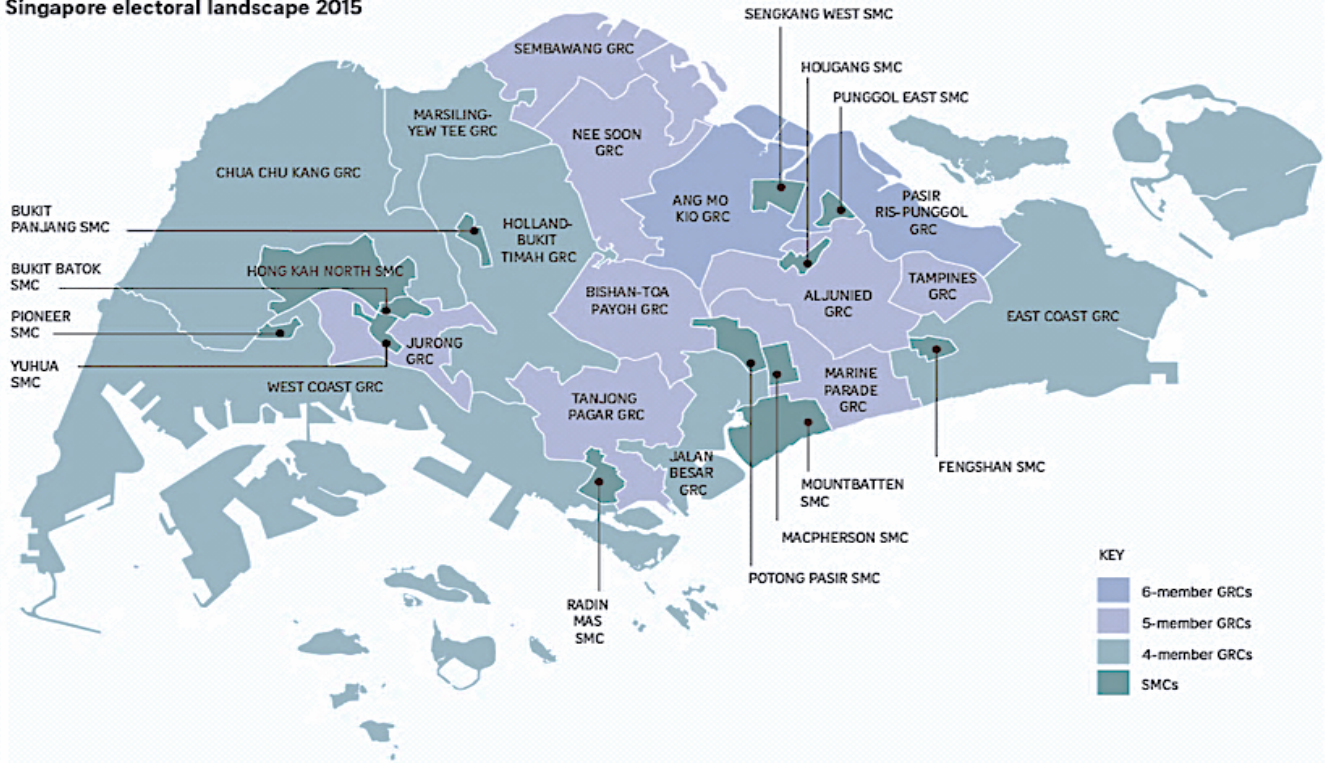

Source: Calculated based data from *Singapore Elections Department*
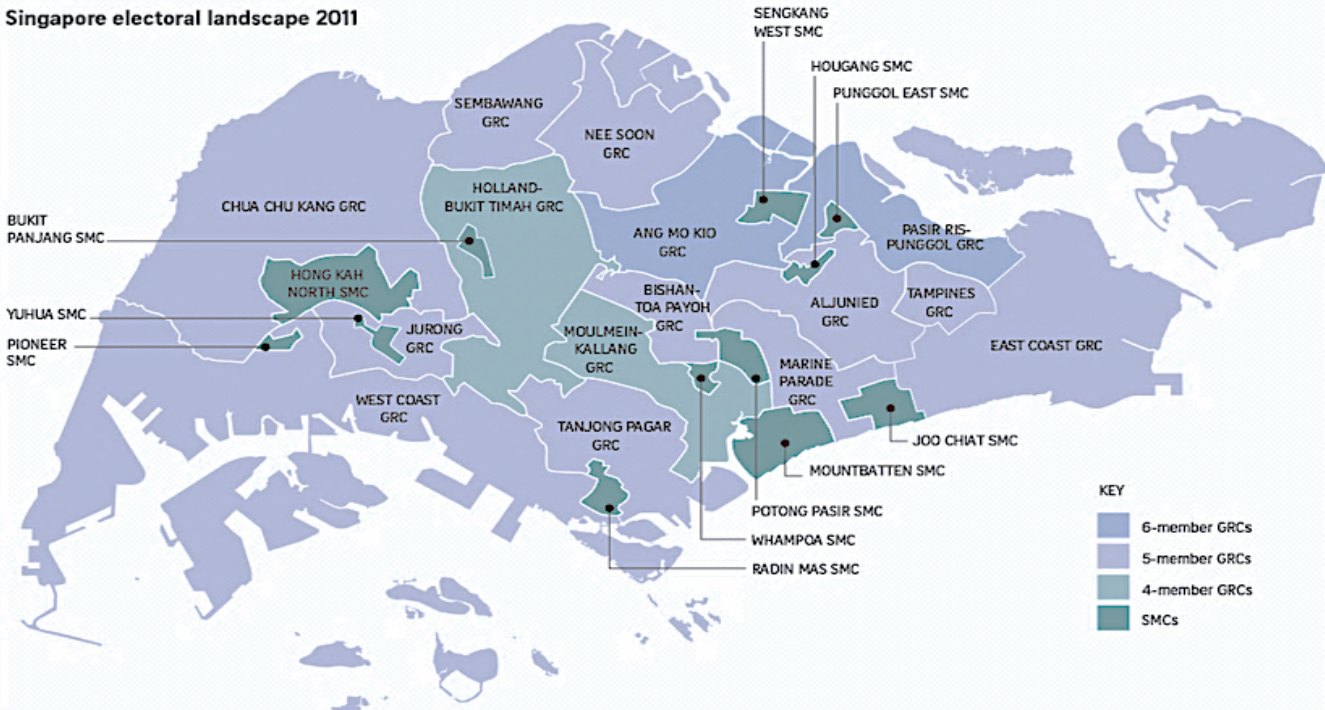(http://www.eld.gov.sg/).

Appendix 1. Maps of Singapore Electoral Districts in 2011 and 2015 GEs

Source: (Hussain, 2015).