Alternative Voting in Proportion

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Abstract

Measurably fairer than either Single Member Plurality (SMP), Supplementary Voting (SV) or Two–Round Voting (TRV), even the simplest, fully transferable electoral system — Alternative Voting (AV) — is poorly comprehended. In particular, considering both first and final preferences, AV is rarely if ever less proportional than SMP; and would constitute a reasonable, provisional reform of the UK House of Commons.

1 Introduction

Following the 1950 UK General Election, a London *Times* editorial (27 February 1950) reproached the Liberal Party for over–nominating Parliamentary candidates: "nothing can excuse the irresponsible spattering of the electoral map with hundreds of candidatures for which there was never the remotest chance of substantial support, but which might just deprive the members elected of certainty that they represented the majority of their constituents ... in the great majority of constituencies, the Liberal Party can best serve Liberalism by leaving, or helping, its supporters to judge for themselves which of the two larger parties can do most to put the Liberal spirit into practice".

Over half a century later, British MPs are still elected by *Single Member Plurality* (SMP: so-called 'First-Past-the-Post'); and hardly less forlornly, the Liberal Democratic Party (LDP) nominates candidates in most constituencies. *Alternative Voting*(AV: single member majority, instant run-off) enables voters to express their *sincere* first preferences; ensuring that MPs represent absolute majorities of constituency voters.

However (like SMP), AV scarcely mediates proportional representation (PR). Indeed, the Electoral Reform Society [3, p42], claimed that AV "could produce even more disproportional results than FPTP"; and that AV would have so proved at the last three UK general elections (1997, 2001 and 2005). And following the 2005 General Election, John Curtice (*Independent*, 10 May 2005) contended that AV "would have produced an even more disproportional result – a Labour majority of 98" (instead of 66 Seats).

The Independent Commission on the Voting System (the Jenkins Commission) likewise claimed that AV "is capable of substantially adding to [SMP] disproportionality" [10, p26]. The Independent Commission on PR [9, p118] also maintained that "AV can produce a hugely disproportionate result". The same view was echoed in the long-awaited desk review by the Department of Justice [12, p155], — with neither evidence nor reference.

This article seeks to contest that formidable consensus; and to highlight widespread misunderstandings of AV — both parliamentary and public. It is argued that, bearing in mind not only first preferences, AV has rarely if ever proved less proportional than SMP. In practice, AV has proved more proportional than SMP — and *measurably* so.

2 Quantifying Proportionality

Proportionality mainly concerns the relationship between party vote-fractions and seat-fractions: but *which* vote-fractions? The answer may seem obvious in categorical voting systems (SMP and Party Lists) — overlooking tactical voting (and personal votes for party candidates). The problem arises acutely in preferential, transferable voting systems, notably: Supplementary Voting (SV: contingency voting); Two-Round Voting (TRV: double balloting); Alternative Voting (AV); and multi-member Single Transferable Voting (STV).

How should the proportionality of *transferable* voting be measured? And in particular, how should we compare proportionality between categorical and transferable voting?

For the 1997 General Election in Britain, Dunleavy *et al* [2, p5] calculated a *Deviation from pro-*

portionality (DV) of 21 percent for SMP (actual); and 23.5 percent for AV (estimated): implying that AV was less proportional than SMP. The Jenkins Commission [10, p47] adopted that "statistical measuring rod known as a DV score".

DV is simply the overall difference between over-represented (or under-represented) party vote- and seat-fractions; the *Loosemore-Hanby Index:*

$$\text{LHI } \textit{(\%)} \quad = 0.5\Sigma\mathbf{abs}(V_P\% - S_P\%),$$

where $V_P\%$ = *P-th* Party vote-fraction*(%)*
and $S_P\%$ = *P-th* Party seat-fraction *(%)* [13, p13]

Table 1 illustrates the calculation of LHI for the 2009 European Parliamentary Election in Britain (d'Hondt regional closed party lists). Notice the substantial over-representation of the top four parties; and the large contribution of unrepresented party voters (8.5 percent = 48 percent of LHI = 17.6 percent): implying some need for transferable voting, and the limitation of an exclusive focus on *first* preference disproportionality.

Jenkins [10, p47] equated "full proportionality" with DV = LHI = 4–8 percent; and *full PR* elections may be characterised, a trifle more generously, as yielding LHIs under 10 percent. *Semi-PR* — 'broad PR' — elections may then be defined by LHIs ranging 10–20 percent (say); leaving *non-PR* elections with LHIs over 20 percent.

Thus the last three UK general elections (1997–2005: SMP), with LHIs of 21–22 percent, typified non-PR. Nominally PR, the first three European Elections in Britain (1999–2009), with LHIs ranging 14–18 percent, have proved consistently semi-PR. The fairest *Sainte-Laguë* regional party apportionments would have yielded LHIs ranging 6–10 percent (full PR) [13, pp 12, 21: updated].

An Additional Member System (SMP-plus) elected the Scottish Parliament (1999–2007), the National Assembly for Wales (1999–2007) and the London Assembly (2000–2008). In their first three elections, LHIs (between party list votes and total seats) ranged 11–13 percent, 11–19 percent and 14–15 percent, respectively: all semi-PR [13, p21: updated].

At the 2007 Scottish Council Elections (multi-member STV), first preference LHI averaged 15 percent (ranging 6–33 percent): largely semi-PR [14, p23]. The last three Irish general elections (multi-member STV) have also proved semi-proportional to first preferences (1997–2007: LHI = 12–13 percent); though fully proportional over the previous 10 elections (1965–1992: LHI = 3–10 percent) [13, p22: updated].

All three Northern Ireland Assembly elections (1998–2007: multi-member STV) mediated full PR, first count LHIs ranging 6–7 percent [13, p21: updated]. And at the last 10 Maltese general elections (1966–2008: multi-member STV), first preference LHIs ranged 1–9 percent: also fully proportional — despite the wrong party winning four STV elections — before compensation with additional members in 1987, 1996 and 2008 (Table 2).

3 Other Disproportionality Measures

The simplest — and perhaps most intuitive — measure of party total disproportionality, LHI is only one of several different indices [14, pp18-19]. Notice that LHI *(percent)*:

$$= 0.5\Sigma\mathbf{abs}(1 - S_P\%/V_P\%) \times V_P\%$$

Compare another promising disproportionality measure, the *Gini Index* GnI *(percent)*:

$$= 0.005\Sigma\Sigma\mathbf{abs}(V_P\% \times S_Q\% - S_P\% \times V_Q\%)$$

GnI is analogous to the widespread *Gini Coefficient*, measuring inequality of income or wealth.

In academic circles, the most widespread measure [7, p602] is the *Gallagher Index* GLI *(percent)*:

$$= \sqrt{0.5\Sigma(V_P\% - S_P\%)^2}$$

Nonetheless, in the much-cited article proposing this 'Least Squares Index', Gallagher [6, p49], recommended, "as the standard measure of disproportionality", the *Sainte-Laguë Index* SLI *(percent)*:

$$= \Sigma(V_P\% - S_P\%)^2/V_P\%$$

The Sainte-Laguë (Webster) method is the least biased divisor method of seat *apportionment*, and invulnerable to the paradoxes to which LHI and GhI are susceptible [13, p12].

4 Transferable Voting Proportionality

When calculating the party total disproportionality mediated by transferable voting, Lijphart recommended [15, p19], that: "Because first-preference and final-count votes can differ substantially, the index of proportionality calculated on the basis of first-preference votes may present a distorted picture

of the actual extent of disproportionality. It is therefore advisable to use the final-count percentages for the calculation of the index of disproportionality".

On the other hand, Sinnott [17, p117], maintained that "we have no option but to compare parties' first preference votes with their shares of the seats"; while Gallagher [5, p255] argued that "using later-stage figures overstates the proportionality of STV".

Indeed, between STV first and final counts (excluding non-transferable votes), party total disproportionality may be expected to decrease steeply. At the Northern Ireland Assembly elections (1998–2007), LHI decreased from 6–7 to 3–5 percent; and at the Scottish Council Elections (2007), mean LHI decreased from 15 to 9 percent [14, pp22–23]. At the last 10 general elections in Ireland (1977–2007), mean LHI decreased from 8 to 3 percent [13, p22: updated]; and in Malta (1966–2008), from 3 to 2 percent (Table 2).

At the 2003 Northern Ireland Assembly Election, LHI, GnI and SLI decreased, but GhI actually *increased*, between STV first and final counts. And at all 32 Scottish Council Elections in 2007, LHI, GnI and SLI decreased consistently; but GhI increased in two councils [14, p22].

Between first and final counts at the last 10 Maltese general elections, LHI, GnI and SLI usually decreased, unlike GhI in 1996 and 2003 (Table 2). Judged by the standard of the Sainte-Laguë Index [6, p49], LHI appears more reliable than GhI, at least for measuring *transferable* voting disproportionality.

5 Single Member Transferable Proportionality

Table 3 illustrates the calculation of LHI in the most rudimentary form of transferable voting — *Supplementary Voting* (SV) — at the 2008 London Mayoral Election. Between SV first and second counts, party total disproportionality (LHI) — the *wasted* vote-fraction — decreased from 57 to 52 percent (47 percent, excluding non-transferable votes).

However, the SV second count non-transferable vote-fraction (nine percent) exceeded the winner's margin of victory (six percent). Voting for neither first count front-runner — and ignorant of both — those non-transferable voters might have preferred another candidate. SV effectively disfranchises such voters; obliging them to contemplate tactical *(insincere)* second 'preferences', in order to avoid complete vote-wastage (just like SMP).

That problem is partially solved by *Two-Round Voting* (TRV), as in the notorious 2002 French Presidential Election (Table 4a). Between TRV first and second rounds, LHI decreased steeply, from 80 to 18 percent. In TRV (unlike SV), voters enjoy the advantage of expressing their second preferences in the full knowledge of both first preference front-runners.

The 2002 French Presidential Election exposed another flaw in *truncated* preferential voting: the possibility that even sincere first preferences may prove recklessly fissiparous. Between TRV first and second rounds, the *Effective Number of Parties* decreased extremely, from 8.7 to 1.4 parties; and — with voters doubtless chastened tactically by that earlier experience — rather more narrowly in 2007, from 4.7 to 2.0 parties (Table 4b).

Between SV first and second counts (Table 3), and between TRV first and second rounds (Table 4a), party total disproportionality never increases in each constituency. What about national *aggregate* disproportionality? With only a few English mayors elected by SV, there is no real example of such aggregation.

However, a similar form of TRV elects Parliamentary Deputies in France (Table 4b). Averaging 2002 and 2007 French general elections, LHI halved, from 29 to 15 percent, between TRV first and second rounds; leaving TRV *non-PR* overall (like SMP).

The main remedy for the tactical constraints of SMP, SV and TRV is fully transferable voting — and arguably, full preference completion — *Alternative Voting* (AV), in the case of single member constituencies. The classic example is the 1998 Australian General Election in Blair, Queensland (Table 5). Both SMP and SV would probably have elected the racist Hanson (One Nation); while TRV might well have elected Clarke (Labor); whereas AV actually elected Thompson (Liberal). Between AV first and final counts, party total disproportionality (LHI) decreased steadily, from 78 to 47 percent.

The Australian House of Representatives furnishes the only real example of AV national aggregation. At the last 10 general elections, the UK (1970–2005: SMP) and Australia (1983–2007: AV) exhibited comparable numbers of parties (in terms of voters). AV seats have proved more proportional even to *first* preferences than have SMP seats to votes (mean LHIs = 16 and 19 percent, respectively); and significantly more proportional to *final* preferences (mean LHI = 12 percent) [14, p25].

6 Comparing AV with SMP

Closer to home, is there something peculiar about the UK which altogether invalidates such international comparison? What of the claim that, at the last three UK general elections, AV would have proved even less proportional than SMP?

At the 2005 UK General Election, as the Electoral Reform Society [3, p42] explained: "The reason AV would swell the Labour majority is that the second preferences of Lib Dem supporters still tend to favour Labour over Conservative".

Which implied that SMP (actual) party voters were expressing AV *first* preferences; and that seats would be less proportional to AV first preferences than to SMP votes. The former implication seems rather implausible. After all, unlike SMP (partially tactical) voting, AV allows voters to express (wholly sincere) *first* preferences for a wider spectrum of less popular parties; secure in the knowledge that their lower preferences are *transferable* to more popular parties.

Accordingly, the latter implication is plausible, but irrelevant. AV *first* preference disproportionality may well exceed SMP disproportionality; but we are hardly comparing like with like. That comparison between AV and SMP is both artificial and unfair.

Yet just suppose that we equate SMP (actual) party votes with AV first preferences; and assume that, from LDP third-placed candidates, one third of votes are transferred to Conservative candidates, and two-thirds to Labour candidates; and that, from both Conservative and Labour third-placed candidates, two-thirds of votes are transferred to LDP candidates. At the last three general elections in England (1997–2005), for the three main parties, such crude estimates yield the following results [14, p24].

At the 2005 General Election, between AV first and final counts, Labour become slightly less over-represented; and the Conservatives become more under-represented; but the LDP becomes less under-represented. Then SMP (actual) disproportionality lies between AV first and final count (estimated) disproportionality — however measured. Thus AV would have been more-or-less as disproportional as SMP — *despite increasing Labour's overall majority!*

Likewise in 2001, SMP (actual) LHI and GhI lie between AV first and final count (estimated) LHI and GhI. Moreover, SMP (actual) GnI and SLI exceed even AV first count (estimated) GnI and SLI.

At the 1997 General Election — with tactical voting (LDP-supporters voting Labour, and Labour-supporters voting LDP) at its height — AV first and final count (estimated) LHI and GhI exceed SMP (actual) LHI and GhI. Nonetheless, SMP (actual) GnI approximates AV first count (estimated) GnI; while SMP (actual) SLI approximates AV final count (estimated) SLI — theoretically more satisfactory — again leaving AV and SMP comparably disproportional.

At the 1997 General Election in Britain, Dunleavy *et al* [2, p15], simulated SV and AV outcomes by applying regional voters' second preferences (sample-surveyed) to each constituency. LDP transfers were divided between 18 percent Conservative, 49 percent Labour and 33 percent other parties (or non-transferable); making AV (simulated) more disproportional than SMP (actual). However, SMP (actual) party votes were equated with AV *first* preferences; and AV *final* preference disproportionality was not considered.

Thus comparing SMP with AV disproportionality is not straightforward. It depends on what is being compared with SMP party votes (AV first and/or final preferences); and on how the overall vote-seat relationship is measured (the choice of index).

7 Comprehending Transferability

The Jenkins Commission [10, p39], considered that "the decisive objection to AV on its own ... was its potential short-term unfairness to Conservative party supporters ... parties in adversity should not be treated unfairly".

Yet the Conservatives were *not* the sole party in adversity! SMP seats have long under-represented LDP voters — both absolutely and relatively — far more than Conservative Party voters.

Even at the 1997 UK General Election, party-specific disproportionalities $(S_P\,\% - V_P\,\%)$ measured: Conservative, -5.6 percent; and LDP, -9.8 percent ($S_P\,\% / V_P\,\% = 0.82$ and 0.42, respectively), [10, p24]

To be sure, Jenkins was not advocating AV alone; but topped-up AV (AV-plus). However, the 1998 Commission made no attempt to dispute other arguments against AV, raised in the *Note of Reservation by Lord Alexander* [10, pp53–55], and summarised without comment in the 2008 Department of Justice desk review [12, pp35–36].

Lord Alexander disclosed fundamental problems in understanding even the simplest method of fully transferable voting; notably wondering: "Why should the second preferences of those voters who favoured the two stronger candidates on the first vote

be totally ignored ... ? Why, too, should the second preferences of ... those who support the lower placed and less popular candidates ... be given equal weight with the first preferences of supporters of the stronger candidates?".

Somewhat lamely, the Commission [10, p25], acknowledged, without discussion, that "the second or subsequent preferences of a losing candidate, if they are decisive, are seen by some as carrying less value ... and so contributing less to the legitimacy of the result, than first preference votes".

Nonetheless, the Commission argued that AV "would increase voter choice ... and thus free ... voters ... from a bifurcating choice between realistic and ideological commitment or ... voting tactically". Yet Lord Alexander contended that "AV could further heighten ... tactical voting"!

Such misapprehensions are not confined to these shores. Even the Australian House of Representatives Joint Standing Committee on Electoral Matters [11, p113] — quoted without comment in Farrell and McAllister [4, p56] — defended obligatory full preference completion: "there is a strong chance that an optional preferential system will eventually lead to voters casting only one preference as the realisation sinks in to voters that, to indicate second and subsequent preferences, will decrease the possibility that their most preferred candidate will win".

On the contrary: transferable voters need reassuring that expressing their lower preferences cannot prejudice the chance of electing their higher preference candidates. However (unlike Australians), British voters need not be obliged to express lower preferences: after all, some LDP-supporters may view both Conservative and Labour parties with equal distaste!

8 Conclusions

It is arguable that SMP and AV disproportionalities are strictly incommensurable. Nonetheless, the proportionality of categorical voting should not only be compared with that of first preference, transferable voting. As Reilly [16, p176], put the matter: "assessments of preferential voting systems on the basis of their proportionality which do not consider the impact of lower-order preferences ... offer a misconceived and sometimes misleading interpretation of the true relationship between seats and votes".

In each single member constituency, where no candidate enjoys an absolute majority of votes, even SV (or TRV) would be more representative, less wasteful and more equitable than SMP. Likewise considering both first and final preferences, AV is never less proportional than SMP in each constituency.

It may be possible to devise artificial examples where every constituency is more proportional to AV final preferences than to SMP party votes; but less proportional overall [I.D. Hill, personal communication, 2006]. However, there appears to be no such published argument against AV, which needs some plausibility — and evidence — to be fully persuasive.

Taking account of both first and final counts overall, AV has mediated semi-PR in Australia; while multi-member STV has mediated semi-PR in Scotland, and full PR in the Irish Republic. And with LHIs well under 10 percent, both Maltese MPs and Northern Irish MLAs have proved fully proportional even to STV first preferences.

The measurement of electoral proportionality remains debatable. Not much has changed since Gallagher [6, p33], lamented "surprisingly little discussion of what exactly we mean by proportionality and how we should measure it". The Gallagher Index (GhI) has largely displaced the Loosemore-Hanby Index (LHI), which appears more reliable for evaluating transferable voting disproportionality. (And unlike LHI, GnI and SLI, calculating 'exact' GhI necessitates disaggregating unrepresented party voters [7, pp603–5]).

LHI retains the advantage of simplicity; being the fraction of total seats, transferred from over– to under-represented parties, for exact PR. LHI is analogous to the little-known *Robin Hood Index* of inequality: the fraction of total income, transferred from rich to poor people, for complete equality [18, p41].

Hart [8, p276] rendered the sentiment, expressed in that 1950 *Times* editorial (quoted above), rather more forcefully: "Liberals should be forced to choose between the two other parties". At the 1951 General Election, 77 percent fewer Liberal candidates were nominated; Labour won a plurality of votes (48.8 percent); but Conservatives won an absolute majority of MPs (51.4 percent); and SMP mediated full PR (LHI = 4.1 percent) [12, p92]!

AV would resolve that dilemma; allowing minor party-supporters, in hopeless constituencies, to express their *sincere* first preferences, ultimately *transferable* to major party candidates. Guaranteeing voters absolute majority representation in every constituency, AV could inaugurate less confrontational politics between parties competing for second preferences; and even a choice of candidate within parties.

Long infantilised by SMP, British voters and MPs may need a decade to appreciate even the simplest, fully transferable electoral system. Thanks to tactical considerations, categorical voting (SMP or Party Lists) is no simpler than preferential voting (STV, including AV), which would introduce novel challenges. AV could provide a valuable learning experience; and need not be inhibited by fears that AV might prove less proportional than SMP.

The Electoral Reform Society find AV "only a very minor ... step in the right direction" (towards multi-member STV); while Baston [1, pp6, 25, 50], considers AV a worthwhile reform: "AV could be introduced quickly and simply – it would not require complex legislation, new boundaries or a referendum . . . It does not justify the hopes (or fears) of those who regard it as a piece of pro-Labour manipulation".

AV for MPs in the UK would disclose voters' genuine preferences; while frustrating anything like their proportional representation (much like SMP). Once the principle of fully transferable voting is established, more radical electoral reforms (like AV-plus or multi-member STV) may well follow; needing more complex legislation, boundary revision and a referendum.

At the 1997 UK General Election, Labour promised a referendum on what would have been AV-plus. Over a decade later, Labour could still redeem that pledge — not wholly, but in substantial part — by offering AV in time for the 2010 General Election.

9 References

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Table 1: Party Votes, Seats and Disproportionality
(*d'Hondt regional closed party lists*):
European Election (MEPs): Great Britain*, June 2009.

Party	Number		Fraction		Seat-to-vote Fraction	
	Votes (V)	Seats (S)	Votes (V%)	Seats (S%)	Ratio (S%/V%)	Deviation (S% − V%)
Total	15,076,935	69	100.0	100.0	1.00	0.0
Conservative	4,138,394	25	27.4	36.2	1.32	+ 8.8
UK Independence	2,498,226	13	16.6	18.8	1.14	+ 2.3
Labour	2,381,760	13	15.8	18.8	1.19	+ 3.0
Liberal Democrat	2,080,613	11	13.8	15.9	1.16	+ 2.1
Green	1,303,748	2	8.6	2.9	0.34	− 5.7
British National	943,598	2	6.3	2.9	0.46	− 3.4
Scottish National	321,007	2	2.1	2.9	1.36	+ 0.8
Plaid Cymru	126,702	1	0.8	1.4	1.72	+ 0.6
English Democrat	279,801	0	1.9	0.0	0.00	− 1.9
Christian	249,493	0	1.7	0.0	0.00	− 1.7
Socialist Labour	173,115	0	1.1	0.0	0.00	− 1.1
No2EU	153,236	0	1.0	0.0	0.00	− 1.0
Others (V% < 1%)	427,242	0	2.8	0.0	0.00	− 2.8
Over-represented	11,546,702	65	76.6	94.2	1.23	+17.6†
Under-represented	3,530,233	4	23.4	5.8	0.25	−17.6

***** Great Britain (England, Scotland, Wales) and Gibraltar (South West Region).

† LHI = 17.6 percent (*semi-PR*). Compare Sainte-Laguë LHI = 9.6 percent (*full-PR*)‡.

‡ The Sainte-Laguë method was used to *apportion* 72 MEPs between 12 UK Regions: South East (10); London and North West (8); Eastern (7); South West, West Midlands, Yorkshire & Humberside and Scotland (6); East Midlands (5); Wales (4); and North East and Northern Ireland (3): most fairly *proportionating* regional seats to electorates.

Data source : Guardian (9 June 2009).

Table 2: Number of parties, and party total disproportionality,
by selected index (multi-member STV first → final count: before top-up compensation),
and General Election: Malta, 1966-2008.

Election (Year)	Parties (N_v)	LHI%	GhI%	GnI%	SLI%
1966	2.4	9.0 → 1.6	7.3 → 1.5	12.1 → 2.2	10.4 → 1.5
1971	2.0	1.1 → 0.5	1.0 → 0.5	1.6 → 0.5	1.1 → 0.0
1976	2.0	0.8 → 1.1	0.8 → 1.1	0.8 → 1.1	0.0 → 0.0
1981	2.0	3.2 → 2.8	3.2 → 2.8	3.2 → 2.8	0.4 → 0.3
1987	2.0	3.4 → 3.8	3.3 → 3.8	3.5 → 3.8	0.7 → 0.6
1992	2.1	1.7 → 1.4	1.5 → 1.4	2.1 → 1.4	1.8 → 0.1
1996	2.1	4.5 → 4.0	4.0 → 4.0	5.2 → 4.0	2.1 → 0.6
1998	2.0	2.0 → 0.3	1.8 → 0.3	2.6 → 0.3	1.3 → 0.0
2003	2.0	2.1 → 1.9	1.8 → 1.9	2.4 → 1.9	0.8 → 0.1
2008	2.1	3.5 → 2.5	2.9 → 2.5	4.4 → 2.5	2.2 → 0.2
1966-2008 Mean		3.1 → 2.0	2.8 → 2.0	3.8 → 2.0	2.1 → 0.4

Effective number of parties, $N_v = 1/\Sigma(V_P\%/100)^2$
where $V_P\% = P$-th Party (first count) vote-fraction (percent).

Parties : Despite the opportunities afforded by multi–member STV, Malta has become a two–party polity. For Irish and Scottish Council (2007) voters, the median number of parties (N_v) is four; while Australia (AV) and the UK (SMP) are three–party polities.

Parliament : Despite very low disproportionality, the party with an *absolute majority* of total STV final preferences (50.1–51.6 percent, excluding NT votes) won a *minority* of STV seats (31/65 = 48 percent) in 1981, 1987, 1996 and 2008; and (in 1987, 1996 and 2008) was compensated with four top–up seats (final count best losers), thereby securing a bare overall majority (35/69 = 51 percent).

Main data source : www.maltadata.com/alltrans.xls

Table 3: Mayoral Election (Supplementary Voting): London, June 2008.

Candidate (Party)	First → Second count Vote−fraction (percent)	Seat−fraction (percent)
Boris Johnson (Conservative)	43.2 → 48.4	100.0
Ken Livingstone (Labour)	37.0 → 42.6	0.0
Brian Paddick (Liberal Democrat)	9.8 → 0.0	0.0
Seven Others (V% < 5 percent)	10.0 → 0.0	0.0
Non-transferable (NT)	0.0 → 9.0	0.0
Total Disproportionality (LHI%) = Unrepresented Voters (percent)	56.8 → 46.8 (excluding NT)	

Data sources : Guardian, 3 May 2008; and London Elects (www.londonelects.org.uk).

Table 4: Presidential and General Elections (two-round voting): France, 2002-2007.

Table 4a: Presidential Election: France, April-May 2002.

Candidate (Party)	First → Second round Vote-fraction (percent)	Seat-fraction (percent)
Jacques Chirac (Rally for the Republic)	19.9 → 82.2	100.0
Jean-Marie Le Pen (National Front)	16.9 → 17.8	0.0
Lionel Jospin (Socialist Party)	16.2 → 0.0	0.0
François Bayrou (Union for French Democracy)	6.8 → 0.0	0.0
Arlette Laguiller (Workers' Struggle)	5.7 → 0.0	0.0
Jean-Pierre Chevènement (Citizens' Movement)	5.3 → 0.0	0.0
Noël Mamère (Greens)	5.2 → 0.0	0.0
Nine Others (V% < 5 percent)	24.0 → 0.0	0.0
Total Disproportionality (LHI%) = Unrepresented Voters (percent)	80.1 → 17.8	

Table 4b: Presidential and General Elections: France, 2002-2007.

Election	Year	TRV first → second round	
		Parties (N_v)	LHI%
Presidential	2002	8.7 → 1.4	80.1 → 17.8
	2007	4.7 → 2.0	68.8 → 46.9
General	2002	5.3 → 3.0	31.1 → 18.0
	2007	4.4 → 2.8	26.9 → 11.2

Data source : French Interior Ministry website
(www.interieur.gouv.fr/sections/a_votre_service/elections/resultats).

Table 5: Blair, Queensland General Election (Alternative Voting): Australia, 1998.

Candidate (Party)	Count: Vote-fraction (percent)				
	1	2-5	6	7	8
Pauline Hanson (One Nation)	36.0	+ 0.6 = 36.6	+ 0.6 = 37.2	+ 1.7 = 38.9	+ 7.7 = 46.6
Virginia Clarke (Labor)	25.3	+ 0.7 = 26.0	+ 1.7 = 27.7	+ 1.6 = 29.3	− 29.3 = 0.0
Cameron Thompson (Liberal)	21.7	+ 0.4 = 22.1	+ 1.1 = 23.1	+ 8.6 = 31.8	+ 21.6 = 53.4
Brett White (National)	10.3	+ 0.3 = 10.6	+ 1.4 = 11.9	− 11.9 = 0.0	0.0
Neal McKenzie (Democrats)	3.6	+ 1.1 = 4.8	− 4.8 = 0.0	0.0	0.0
Four others (V% < 2 percent)	3.2	− 3.2 = 0.0	0.0	0.0	0.0
Total Disproportionality (LHI%) = Unrepresented Voters (percent)	78.3	77.9	76.9	68.2	46.6

Data source : Australian Electoral Commission website (www.aec.gov.au).