Mixed Member Proportional; equal influence and assembly size

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ABSTRACT

With the present (2020) tally rules, the number of seats in the Bundestag is highly volatile. In 2017 it got 709 seats, 111 of them extra-ordinary. The tally rules may double the influence of a voter who splits the vote; the proportionality requirement may multiply an unfortunate side effect by a high factor. The paper explains when and how this happens.

A ballot's combination of Erststimme and Zweitstimme is information that now is ignored; the tally is as if Erststimme and Zweitsimme were collected in different ballot boxes. The suggested *faithful accounting* uses this information. With 2017 data, it is estimated that the number of extra-ordinary seats would have been reduced by about 74, to 37.

Tallying 2017 data with present rules and CDU/CSU as one party reduces the size by 42 seats; combined with faithful accounting, the reduction is more than 74.

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Key words: Mixed member proportional, equal influence, legitimacy, assembly size.

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Preamble

In a "Leitsatz" to its ruling of July 3rd 2008, the German Federal Constitutional Court emphasized the "Grundsätze der Gleichheit und der Unmittelbarkeit der Wahl".

New rules came for good reasons: Old complicated rules for allocating party seats to states and parties were abandoned. This improved transparency – an important achievement.

With new tally rules, the Bundestag in 2017 got 709 seats, 111 of them extra-ordinary party seats. It is natural to consider what can be done. The new transparency facilitates the task.

The 2013 election gave the Bundestag 631 seats, but the increase to 709 seats in 2017 must be attributed to changes in voting: With 2017 tally rules, the 2013 assembly size would have been the 598 ordinary seats, even if the threshold had been 4.5% and let FDP and AfD in.

Zweitstimme are for proportional representation according to political preference, more or less ideological. Erststimme are for concentration around politicians and parties that are accepted also by voters some distance away in the political landscape. In 2017 the voting pattern changed: More voters supported one party with the Erststimme and another with the Zweitstimme. Their ballot splitting must be seen as sincere; the present tally rules should be scrutinized.

The present tally rules ignore essential ballot information; one might as well collect Erststimme and Zweitstimme in separate boxes: The tally would be the same. Lack of equality (Verletzung der Gleichheit) is linked to excessive assembly size. Amendments in the tally rules are suggested.

1 The 2017 Bundestag election

All information on the 2017 voting and tally used in this paper, appears in Table 1:

j	P_j	ERSTSTIMME		SEATS			ZWEITSTIMME		Zwst/tot
		%	#	LOCAL	TOTAL	LISTE	#	%	
1	CDU	30.2	14030751	185	200	15	12447656	26.8	62238
2	SPD	24.6	11429231	59	153	94	9539381	20.5	62349
3	AfD	11.5	5317499	3	94	91	5878115	12.6	62533
4	FDP	7.0	3249238	0	80	80	4999449	10.7	62493
5	Linke	8.6	3966637	5	69	64	4297270	9,2	62279
6	Grüne	8.0	3717922	1	67	66	4158400	8.9	62066
7	CSU	7.0	3255487	46	46	0	2869688	6.2	62385
		97-	44966765	299	709	410	44190959	95-	

TABLE 1

Sometimes a party does not nominate a candidate in a constituency. 38 parties were on the ballot in at least one state; only 7 passed the 5% threshold.

The tally 2017 **First, Erststimme tallies in 299 constituencies determine who will occupy the local seats. The 2017 accounting records in the LOCAL column the number of local seats won by candidates from each party. In the rest of the tally these numbers are interpreted as the success *party* P_j had in the local elections, as opposed to the success that *Zweitstimme group* $\Lambda(P_j)$, consisting of *voters* with Zweitstimme to P_j, had with their Erststimme. The TOTAL column in Table 1 shows proportional distribution, with good approximation, of all seats according to the sizes $|\Lambda(P_j)|$ of the Zweitstimme groups, e.g.:**

$$|\Lambda\,(\text{CSU})| \,/\, 46 = 2869688 \,/\, 46 = 62385 \text{ Zweitstimme per seat}$$
$$|\Lambda\,(\text{CDU})| \,/\, 200 = 14030751 \,/\, 200 = 62238 \text{ Zweitstimme per seat}$$
$$|\Lambda\,(\text{FDP})| \,/\, 80 = 4999449 \,/\, 80 = 62493 \text{ Zweitstimme per seat}$$

With 2017 rules, only the LOCAL column and the nationwide Zweitstimme column of Table 1 influence the outcome, i.e. the TOTAL column: 200, 153, … .

The pivotal party **One party, P_m, is seen to have a *pivotal* status. This is the party with *most local seats per Zweitstimme*. Thus, $P_m = P_7$ = CSU in the 2017 election.**

Critical assembly size **The Zweitstimme and the number of local winners from P_m determine the *critical assembly size*, i.e. *the smallest seat number that allows proportionality.* CSU got 46 seats and 2869688 Zweitstimme, while all seven parties together have 44190959 Zweitstimme. The proportionality requirement gives the critical size as 709 seats:**

$$46 \times 44190959 \,/\, 2869688 = 708.364154\ldots \text{ seats.}$$

The seat price **We imagine the ratio 62385 is a "price" set by P_m (= CSU) that every party should pay. CSU cannot afford more than 46 seats; the others pay for some party seats too.**

Completing the tally **By law, the work is done by the *"engine"* of *Sainte-Laguë* (1910); this is an algorithm that just is given the Zweitstimme number $|\Lambda(P_j)|$ for each P_j that passed the threshold. The engine deals out seats to the parties, one by one, following a simple rule:**

Contest number **With party P_j is associated a *contest number* which is reduced every time P_j receives a seat from the engine. While P_j is in contest for its s^{th} seat, its contest number is**

$$|\Lambda\,(P_j)| \,/\, (2\times s - 1)$$

At each step a seat is dealt out to the party with the *currently highest contest number*. The engine is kept working at least until critical size is reached. Let P_j-s be the s^{th} seat dealt to party P_j. Thus, CSU receives its 46^{th} seat, CSU-46 with contest number

$|\Lambda(\text{CSU})| / (2\times 46 - 1) = 2869688 / 91 \approx 31535.$

CSU-46 turns out to be seat number 700 from the engine, but the engine works on until *critical size* is reached, at seat number 709. The last nine seats are dealt out after CSU-46. With contest numbers and as enumerated by Sainte-Laguë, they are:

TABLE 2

701	702	703	704	705	706	707	708	709
CDU-198	SPD-152	FDP-80	AfD-94	Linke-69	CDU-199	SPD-153	Grüne-67	CDU-200
31513	31483	31443	31434	31367	31354	31277	31266	31197

This final stretch brings the other six parties up to the numbers shown in Table 1. From early stages the engine approximates proportionality well enough for any practical political purpose, but overhang seats are not allowed. Exactly proportional distribution with 46.000… seats to CSU becomes possible at assembly size 708.364154… seats. Already with seat 700 was CSU-46 "recognized" by Sainte-Laguë, but it was still in overhang until seat 709.

The size of the pivotal party **CSU is both smallest and pivotal. With its small size, its pivotal status lets proportionality blow up one extra local seat for CSU to much larger increases in the TOTAL column. CSU's next seat, CSU-47, would have to come 24 seats after CSU-46, at contest number 2869688/93 = 30856, as seat 724, but the tally was completed at 709.**

REMARK 1 **CSU runs only in Bavaria, CDU only in the 15 other states. If CDU/CSU counts as one party C*U, with 12447656 + 2869688 = 15317344 Zweitstimme and 185 + 46 = 231 local seats, then the ratio (price) is 15317344/231 ≈ 66309 Zweitstimme per seat. C*U is pivotal. The assembly size is 667 seats (by price, 44190959/66309 ≈ 666.4) with respectively**

231, 144, 89, 75, 65, 63 seats for C*U, SPD, AfD, FDP, Linke, Grüne.

The final nine-seat Sainte-Laguë stretch with contest numbers is as follows:

TABLE 3

659	660	661	662	663	664	665	666	667
FDP-75	C*U-229	SPD-143	C*U-230	Linke-65	Grüne-63	SPD-144	C*U-231	AfD-89
33553	33517	33472	33371	33312	33267	33238	33226	33209

The assembly size is reduced by 42 seats, due to Λ(CDU) helping to "pay" for CSU's 46 local seats. Practically, C*U gets the same relative strength as CDU/CSU got in 2017 (231/667 ≈ 0.346327; 246/709 ≈ 0.346968). A tally with CDU/CSU as one party may be implemented on short notice and with significant effect on the assembly size, but a size of 667 makes it clear that excessive assembly size remains a problem to be handled. With *"faithful accounting"*, the commitment account for Λ(C*U) drops well below 231.

Comparison of two elections **The previous election, of 2013, gave a Bundestag with 631 seats. Was the increase to 709 seats in 2017 due to the tally rules of 2017 or to a change in voter behavior? One easily checks that with the 2017 tally rules, the critical size in 2013 is 511 seats. However, for fair comparison, FDP and AfD, that both narrowly missed the 5% threshold in 2013, will here be included counterfactually: There were then 41007935 Zweitstimme. CSU won 45 local seats, received 3243569 Zweitstimme, and is clearly pivotal.**

Thus, with the same seven parties, the "exact" critical size is, by proportionality,

$$45 \times 41007935 / 3243569 = 568.9 \text{ seats.}$$

The critical size is 569 seats, with proportionality factor

$$41007935/569 \approx 3243569/45 \approx 72070 \quad \text{Zweitstimme per seat.}$$

The Sainte-Laguë engine deals out 29 more seats proportionally to fill all 598 ordinary seats.

REMARK 2 **Besides changes in Zweitstimme for CSU and for the seven parties, there was an increase from 45 to 46 single seat winners from CSU. All changes pulled in the same direction, increasing the crittical size from 45 x 41007935/3243569 to 46 X 44190559/2869688.**

2 Faithful accounting

The Erststimme part of MMP is intended for concentration. The Duvergerian mechanism is natural in single-seat constituencies: It gives voters an incentive to include *electability* as a criterion and support *the best liked of the front runners* with an *instrumental* Erststimme. Support from a large plurality, preferably a majority, is good for the legitimacy of the representative for a constituency. Combining it with an *expressive* Zweitstimme for the *best liked party* should be many voters' natural adaptation to MMP.

The purpose of *faithful accounting* is to redefine the LOCAL column in Table 1, so that it shows how well each Zweitstimme group $\Lambda(P_j)$ did with their Ersttimme, as opposed to how well the party P_j did. Erststimme from members of $\Lambda(P_j)$ are spread on many parties, and often support the local winner. A voter who supports a local winner is seen as *winning a share in the seat*; these shares are aggregated and recorded in the new LOCAL column in terms of *seat equivalents.* The calculation requires more scrutiny of the ballot data in the 299 constituencies.

Without this scrutiny, an exceptional circumstance in Bavaria still allows an assessment of the new LOCAL column entry for Λ(CSU): As shown below, it drops from 46 to about 40.55.

Unequal influence **Excessive assembly size is linked to unequal influence under the present (2020) tally rules. With a proportionality requirement, equality means that voters have the same influence on the total seat distribution, with local and party seats. Four parties get more Zweitstimme than Erststimme in the 2017 election. The differences are:**

TABLE 4

FDP:	4999449 – (3249238 – f) =	1750217 + f
AfD:	5878115 – (5317499 – a) =	560616 + a
Grüne:	4158400 – (3717822 – g) =	440478 + g
Linke:	4297270 – (3966637 – l) =	330633 + l

These are the numbers of Zweitstimme the four parties get in split ballots; the unknown non-negative f, a, g, l are the numbers of split ballots with Erststimme to the party.

Of the 4999449 Zweitstimme for FDP, more than 1.75 million come from voters who support local candidates from other parties, mainly CDU/CSU. Most of them again must be from the 185+46 = 231 constituencies with *local winner* from CDU/CSU, say 80%, i.e. 1.4 million voters. With the proportionality factor in Table 1, their influence on *the local elections* amounts to

1400000 / 62385 ≈ 22.4 seat equivalents.

With 28% of FDP's 5 million Zweitstimme, their influence on FDP's 80 *party seats* amounts to

0.28x80 ≈ 22.4 seat equivalents.

In total, their *influence* is 44.8 seat equivalents. For comparison, 1.4 million voters who do not split their ballot, are behind 22.4 in the TOTAL column. The pivotal CSU has all Zweitstimme gains set off against the commitment in the LOCAL column, and stays at 0 in the LISTE column.

A micro-example **At micro-level, consider two voters, A and B, both supporting a local winner from CSU. Voter A also gives Zweitstimme to CSU, helps to keep up the ratio $|\Lambda(\text{CSU})|/46$, contributing one Zweitstimme to "pay" for the 46 seats. Voter B runs away from the bill, gives Zweitstimme to FDP and contributes to "buy" party seats for FDP. By supporting CSU's candidate in the local tally, B has the same influence as A, *but in addition* B gets the same amount of influence on the representation of FDP.**

With voters like B, the critical size increases. Less Zweitstimme support for CSU also makes its contest numbers drop, and CSU-46 comes later than it would have done if B had done as A did. Before the already "recognized" CSU-46 changes status from overhang to "paid", the six other parties get compensated with even more seats; see Table 2.

Ballot splitting, *per se*, is not "strategic voting" in the popular meaning of the phrase: Ballots, whether expressive or instrumental, usually state the voters' true opinions. However, the

accounting of 2017, seen in the LOCAL column of Table 1, creates unequal influence and also causes assembly growth. The entry 46 in the LOCAL column for CSU is not the Erststiimme success of Zweitstimme group Λ(CSU) only, and voter B in the *micro-example* illustrates that also Λ(FDP) had some success with Erststimme to CSU-candidates.

Faithful accounting **With *faithful accounting*, the basic units are the Zweitstimme groups $\Lambda(P_j)$. Faithful accounting requires numbers N(j,k) from constituency k, $1 \le k \le 299$, such that**

N(j,k) *voters from* $\Lambda(P_j)$ *give Erststimme to the local winner*, $1 \le j \le p$;

here p is the number of parties (p=38 in the 2017 election).

The local winner receives E(k) = N(1,k) + N(2,k) + … + N(p,k) Erststimme.

Zweitstimme group $\Lambda(P_j)$ has a share, N(j,k)/E(k), in the local seat. In the j^{th} entry in the new LOCAL column, the shares are aggregated over the constituencies to give the new entry,

LOC(j) = N(j,1) / E(1) + N(j,2) / E(2) + … + N(j,299) / E(299) seat equivalents.

All seat fractions are accounted for: LOC(1) + LOC(2) + … + LOC(p) = 299.
For those $\Lambda(P_j)$ that pass the threshold ($1 \le j \le 7$ in the 2017 election), one should round off the LOC(j) to integers before the Sainte-Laguë engine takes over. Then it will be clear if a seat from the engine should be declared a party seat or recognized as an overhang parcel of seat fractions.

Faithful accounting and the assembly size **What would the assembly size have been with faithful accounting in the 2017 election? The assembly size is determined by the total Zweitstimme number 44190959 in Table 1 and two numbers associated with the pivotal unit; the data strongly indicate that Λ(CSU) is pivotal among the Zweitstimme groups.**

One of the two numbers is $|\Lambda(\text{CSU})|$, but number 46 in Table 1 has been replaced by LOC(7), which is a measure of Λ(CSU)'s success with their Erststimme. Since CSU runs only in the 46 constituencies of Bavaria, here enumerated 1, 2, …, 46, the entry LOC(7) has only 46 terms; it is determined by data from the 46 Bavarian constituencies:

(*) LOC(7) = N(7,1) / E(1) + N(7,2) / E(2) + … + N(7,46) / E(46) seat equivalents

Unfortunately, each term N(7,k) needs ballot information ignored in the tally report of Table 1. Luckily however (for this paper), CSU won *all* constituencies (46) in Bavaria; thus

***all* 3255487 voters who supported a candidate from CSU (see Table 1)**
also supported a local winner with their Erststimme.

Not all 2869688 members in $\Lambda(P_7) = \Lambda(CSU)$ were among these 3255487 voters. Let u be the number of exceptions: 2869688 – u of the Erststimme for the local winners came from $\Lambda(CSU)$.

By proportionality, it is reasonable to say that $\Lambda(CSU)$'s gain with Erststimme was as follows:

(**) $46 \times (2869688-u)/3255487 \approx 40.55 - u \times 0.00001413$ seat equivalents.

We let (**) replace the unknown LOC(7) as a measure of $\Lambda(CSU)$'s success with its Erststimme. In the LOC(7) of (*) however, an Erststimme for the local winner in constituency k wins a share that depends on E(k). Large and small E(k) will not balance each other exactly. Moreover, there is an unkown u in (**). With these imperfections, we estimate the critical size:

$(40.55 - u \times 0.00001413) \times 44190959/2869688 = 624.3 - u \times 0.0002176$ seat equivalents

Most likely, relatively few voters found political reason to support CSU with Zweitstimme but not Erststimme, so u is relatively small. However, in single-seat elections, personal factors also count, and the u-value may justify a roundoff of LOC(7) to 40 seat equivalents.

The full LOCAL column has 38 entries, and some seat equivalents are on accounts for those $\Lambda(P_j)$ that did not pass the threshold. An assembly size about 635 seats seems reasonable.

It is safe to assume that $\Lambda(CSU)$ is pivotal among the Zweitstimme groups; the only alternative is $\Lambda(CDU)$, but also the entry 185 in Table 1 will be significantly reduced with faithful accounting.

Plurality or Majority? **Imagine eight parties having 10% each of the Zweitstimme, and one party 20%. Unless massive ballot splitting helps a smaller party, Plurality tallies of the Erststimme (also called "first-past-the-post") let the 20% party take all local seats in the K constituencies, and become pivotal. By proportionality, every 10% party is entitled to K/2 seats. Critical assembly size is $5 \times K$ seats. The Duvergerian mechanism modifies the picture: Two parties nominate the front runners in most constituencies and get most of the Erststimme, but the 20% party has a clear advantage, depending less on instrumental voting.**

In the 2017 election, a very rough estimate indicates that 7 out of 15 voters supported the local winner: There are 3255487/46 ≈70771 Erststimme behind each local winner in Bavaria, and 70771×299 = 21160529: If Bavaria should be typical, about 21 million out of 45 million Erststimme (see Table 1) supported the winner.

In MMP with faithful accounting, a majority method in the local elections may lead to more split ballots; they move more commitment away from the pivotal party's commitment account in the new LOCAL column, and thereby reduce the assembly's critical size.

However, if as much as 7 of 15 voters support the winner in multicandidate Plurality elections, local winners already have significant instrumental support. A majority support obtained with some standard preferential method, is perhaps not worth the extra effort.

Table 1 also shows that at least 44966765 – 44190959 = 775806 voters who gave Zweitstimme to a party that missed the 5% threshold, gave Erststimme to a party that passed: Local elections focus on a small number of candidates, and more voters join the real local decision making: Some of them reduce Λ(CSU)'s commitment.

Again however, faithful accounting will reduce the unfortunate (i.e. with 2017 rules) incentive for many voters to split the ballot: A voter who instrumentally supports the local winner from party P with the Erststmme, and wants to support another party Q with the Zweitstimme, is no longer promised doubled influence. Instead, faithful accounting lets the split ballot carry one seat share from the commitment account of Λ(P) to that of Λ(Q). If the voter wants to help Q as well as possible, it is wiser to support Q with both Erststimme and Zweitstimme.

Amendment in the Erststimme tally **Faithful accounting may build on local preferential elections that find a winner W with majority support, who defeats a runner-up R in a final. Known elimination methods may be considered. However, with no change of voting rules, the "W-R rule" is a "Majority method with Plurality ballots"; W is first, R second in Erststimme:**

"The W-R rule" **In each constituency, ballots with Erststimme which is not for W or R, are counted as giving half an Erststimme for W and half an Erststimme for R.**

This requires some extra computer work in the local tallies. Very often an Erststimme for CDU/CSU or SPD supports W or R. Only ballots which support R with its Erststimme do not increase the commitment account for its Zweitstimme group.

3 Some background and final remarks

Surveying elections for legislatures, Reynolds & al (2005) listed 72 systems of Proportionality based on party lists, and 91 of Plurality/Majority in single-seat constituencies; Plurality dominates. Besides 2-day elections (ordinary runoff), IRV (Instant Runoff Voting) is probably the best known Majority system, practiced for 100 years in Australia.

Majority methods cost more money, time, and voter effort, so the dominance of Plurality is not surprising. With Plurality, instrumental voting is of central importance, as it usually results

in a race between two major candidates and a winner with wide support, although not always from a majority. This is the Duvergerian mechanism.

Presidential elections are important enough to justify extra costs: The fact that 78 countries use a 2-day method (e.g. France) and only 22 use Plurality, indicates that winning with majority support is important for legitimacy.

Only 30 systems are "mixed". They may be of the parallel kind, where party seats and local single seats are distributed independently of each other. Also MMP allows voters to split the ballot, cast an instrumental vote in the local election and get a winner with wider support.

A third kind of mixed system is used in Hungary. It is a "one-vote contest", not allowing split ballots: The concentration part is by Plurality in the constituencies, while "wasted" votes from the local elections are transferred to the Proportionality part of the tally, giving their voters doubled influence there as compensation. Csato (2016) studies this transfer mechanism.

The first MMP-election (Mixed Member Proportional) was for the Bundestag in 1949, but the rules have changed several times. Regarding the German experience as positive, some other countries have introduced their own MMP-variations. Their experiences however, have not always been good; a recent survey is in Linhart & al (2019).

MMP in OSCE/ODIHR **The Organization for Security and Cooperation in Europe, through OSCE Office for Democratic Institutions and Human Rights, observes and reports on elections in the 57 member nations, after invitation from the government.**

OSCE and Albania 2005 **The election July 3rd 2005 was an MMP-variation for an assembly with 100 constituency seats and only 40 "supplemental" party seats. In the final report OSCE (2005) writes:** ***… the objective of proportionality in the composition of parliament is hampered by a combination of four factors:***

1. The number of supplemental mandates is fixed rather than variable.

2. The number of supplemental mandates is relatively small (40) and thus may not be sufficient to achieve proportionality.

3. The impossibility of 'taking away' any of the single seats won by a party candidate; and

4. The provision that the election is a two-ballot contest (Electoral Code, art 90).

Other MMP-variations, proposed, tried, or presently used in some countries, have rules alluded to in Points 3 and 4. Points 1 and 2 should be seen in the light of the Bundestag experience from

2017: With 299 local seats and 410 party seats to obtain proportionality, it is evident that 40 supplemental party seats are far from sufficient to accompany 100 local seats.

Moreover, suppose that votesplitting to support FDP had been popular among those who gave Erststimme to CSU: If more of those 3255487 voters had joined the action, given Zweitstimme to e.g. FDP and cut down $|\Lambda(\text{CSU})|$ by 75%, from 2869688 to 717422, then the assembly size had quadrupled, from 709 to 2836 (≈ 46 × 44190959/717422).

OSCE's final report on Albania 2005 explains explicitly how vote-splitting works: ***Using various methods, political parties can circumvent the aim of the election system and distort the allocation of supplementary mandates in their favour. For example, if supporters of a party (Party A) systematically split their votes between the candidate representing Party A and the election list of another, formally or informally allied party (Party B), then the combined number of mandates won by the two parties is likely to be increased. While this strategy might be within the law, it is problematic for a number of reasons: … …***

Mudambi and Navarra (2004) describe the same mechanism with Italian examples. No doubt the "strategy" of ballot splitting is done in order to increase a political camp's number of seats; it clearly works against the aim of MMP, but only because the law works against it. One must assume that the actionists considered the ballot splitting to be within the law, in Albania 2005 as in Germany 2017. In fact, the action is based on unequal influence created by law.

In an "Executive summary" of the final report, OSCE writes: ***While there is room for further improvement of the legal framework, the law is overall conducive for the conduct of democratic elections. However, the major political parties are yet to demonstrate political will and responsibility commensurate with the broad authority granted to them for the electoral process. This was particularly evident in the parties' approach to the election administration, the full respect for citizens' fundamental freedoms, and the implementation of electoral strategies to maximise electoral gains."***

This shift of responsibility from lawmakers and their advisors, who make the rules, to political parties who advise their supporters, is unfortunate. The rules give each voter, who supports the local winner, the option to exercise double influence by splitting the ballot. Made unfair by present accounting, it works without obviously serious consequences – when done to small extent. Done a bit more, it explains most of the 111 extra-ordinary Bundestag seats in 2017.

In the politically polarized society of Albania, two dominating parties with supporters were confined in a "duel arena", and by law armed with the option of ballot splitting and possibly doubled influence (if their local candidate won), to grab as many as possible of the 40 party seats by means of a small auxiliary party.

OSCE and the Bundestag election 2017 **In the final report (OSCE 2017), four sentences from section IV, *Legal framework*, describe changes in German rules that were made after the Albania report. Footnotes from the report are here reinserted in curly {}:**

> ***Jurisprudence of the Federal Constitutional Court (FCC) has significantly shaped the electoral legal framework over the years. {In 2008 and 2012 the FCC ruled that elements of the electoral system such as the 'negative voting weight' and the number of overhang mandates respectively were unconstitutional. In 2012, it ruled on the requirements for the right to vote of Germans living abroad.}***
>
> ***The latest major legal reform took place ahead of the 2013 federal elections when significant changes were made to the electoral system. {The changes pertained to the method of allocation of seats and came into effect to address the disproportionality caused by components of the electoral system.}***
>
> ***The legal framework is robust and constitutes a solid basis for the conduct of genuine and democratic elections. However, some OSCE/ODIHR EET interlocutors expressed concerns that the electoral system, and specifically the compensation mechanism, could lead to an ever-expanding Bundestag, potentially affecting the efficiency of the legislative body. {The FEA provides that the Bundestag shall consist of 598 members, subject to variations, which, in practice, due to the electoral system, means that the actual number may be larger. The newly-elected Bundestag has 709 members.}***

With reference to the jurisprudence of the Federal Constitutional Court, and specifically to the ruling of 2008 (Bundesverfassungsgericht 2008), it should have been interesting with a more specific comment to para 92: ***Aus dem Grundsatz der Wahlgleichheit folgt für das Wahlgesetz, dass die Stimme eines jeden Wahlberechtigten grundsätzlich den gleichen Zählwert und die gleiche rechtliche Erfolgschance haben muss. Alle Wähler sollen mit der Stimme, die sie abgeben, den gleichen Einfluss auf das Wahlergebnis haben.***

While certainly concerning legality, the formulation highlights legitimacy. In particular, how does this apply to voters A and B in *the micro-example* above? By Table 1, there are at least 3255487 – 2869688 = 385799 disjoint pairs like {A, B}, where one split ballot gives Zweitstimme

to another party. B's action is legal, but so is now unequal influence, which violates the principle "One Man One Vote". Ballot splitting ought to be legal without harming legitimacy.

Legitimacy **Properties of election methods tend to raise questions about legality and legitimacy, perhaps at the same time. Hettlage (2018) was concerned about the following aspect: *A seat goes to a politician who was not a candidate for it.***

The candidacy is clear in a single-seat election, but is more or less depersonalized when party lists contend for a known set of seats. However, the 111 extra-ordinary seats did not even exist before the Bundestag election 2017. In our elections we want to choose among candidates for offices that are known to exist; the notion of candidature hinges on it. In Hettlage's words: *Ohne Kandidat kein Mandat*. The more citicens think that extra-ordinary seats harm legitimacy, the more legitimacy is harmed. Whether extra-ordinary seats also raise legal questions, is perhaps too much of a "technical" issue for voting laypersons.

Excessive assembly size may be avoided by changing the ratio of local seats to party list seats. Suppose for simplicity there are 300 constituencies, 300 ordinary party seats, and that it is safe to assume there will be at most 600 extra-ordinary seats, i.e. at most 3×300 party list seats. Imagine a pairwise fusion of constituencies and more ordinary party seats. In an assembly with 150 constituencies and size 600, 3×150 party list seats will be *classified* as ordinary.

However, the doubled influence option remains: A party list seat is obtained the same way with ballot splitting, whether there is a flexible number available (as in the Bundestag) or a fixed number (e.g. 450 of 600, or 40 of 140 as in the Albania case). Doubled influence harms legitimacy, and the legal relation to the Grundsatz der Gleichheit is not clarified.

Weinmann and Grotz (2020) consider reducing the ratio of local seats to ordinary party list seats while keeping voting and tally as they are now. How invasive into the functioning of MMP such a change will be, depends of course on how the term "invasive" is defined. If the concentration component in MMP is seen as important, a reduced ratio should be seen as very invasive:

When it was difficult to establish a government with parliamentary basis on the left or on the right, then there was a solid basis for a Grand Coalition. Representatives elected directly from their own constituency, with a broad electoral basis, have a special legitimacy when they support that solution. Even voters who support the local runner-up will usually consider the winner as a legitimate representative for the whole constituency.

Arguable, democracy should work that way, and arguably, it does in Bundestag elections. The estimate above, that 7 of 15 voters supported the local winner, indicates that the concentration intended with MMP is important to the voters.

The history of MMP starts in the late 1940s. Those who worked out the constitution and election system, did so under difficult circumstances for their country. They remembered the political fragmentation of the Reichstag in the Weimar time, under a proportionality rule alone.

Simplicity and common understanding **Voters' understanding of their election method is a theme of Jankowski & al (2020) and Behnke (2015). It is central for MMP's legitimacy. Without some understanding, an assembly size obviously out of control is unfortunately but easily, perceived as a sign that something is wrong with the very aim of MMP.**

Explanation problems **The price/accounting analogy should activate common knowledge and improve understanding of MMP. But explanation and understanding are easier if there is not an excessive assembly size that must also be explained. Starting with Table 1, how do we explain entries 0 and 46 in the commitment accounts? Obviously, the entries are in lines that inform about voter groups Λ(FDP) and Λ(CSU), as these are identified by their sizes. One expects, e.g. that the 0-entry must somehow be related to ballots from Λ(FDP). Unfortunately,**

- ***0 for FDP is as it would be if Λ(FDP) had no success at all with their Erststimme*;**
- ***46 for CSU is as it would be if Λ(CSU) brought all the Erststimme CSU-winners got.***

But equally obvious, 1.75 million voters in Λ(FDP) gave Erststimme to other parties than FDP, and they did so with great success. Under faithful accounting, what Zweitstimme group $\Lambda(P_j)$ does with its Erststimme, *does* influence its commitment account in the new LOCAL column. Data on Erststimme from each Zweitstimme group $\Lambda(P_j)$ exist in the ballots, but are now ignored.

How to explain an election method to voters, politicians, courts, and among research colleagues, is often a matter of difficult problem solving. Didactic guidelines do exist, e.g. in "*How to Solve it",* p.*xvi*: *Did you use all the data? Did you use the whole condition? Have you taken into account all essential notions involved in the problem?* (Polya 1945)

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