

Measuring Partisan Media Bias Cross-Nationally *

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Online Appendix

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Appendix A. Detailed Computation of Measures

To illustrate the computation of each of the three indicators using each of the two benchmarks of political balance, Germany will be used as an example. Accordingly, let

$k = \text{Germany}$,

$P^k = (\text{C})\text{DU}/\text{CSU}, (\text{S})\text{PD}, (\text{F})\text{DP}, (\text{L})\text{inke}, (\text{G})\text{rüne}$, and

$O^k = (\text{b})\text{ild}, (\text{f})\text{az}, (\text{s})\text{z}, \text{sa}(\text{t})1, (\text{z})\text{df}, (\text{r})\text{tl}, (\text{a})\text{rd}$.

To construct partisan media use (PMU), we follow a four-step procedure.

Step 1: Measure computation at the party-outlet level

First, we build a regression model:

$$\begin{aligned} y_{Ci} = & \beta_C + \beta_{Cb} \cdot x_{bi} + \beta_{Cf} \cdot x_{fi} + \beta_{Cs} \cdot x_{si} + \beta_{Ct} \cdot x_{ti} \\ & + \beta_{Cz} \cdot x_{zi} + \beta_{Cr} \cdot x_{ri} + \beta_{Ca} \cdot x_{ai} + \varepsilon_{Ci}, \end{aligned}$$

where y_{Ci} is the reported probability that citizen i votes for (C)DU/CSU in an 11-point scale (see Appendix B for a description of variable coding and question wording), x_{oi} is the frequency of use of any given news media outlet o by citizen i (seven-point scale), and ε_{Ci} is the error term. Each coefficient β_{Po} is interpreted as how well reading or watching a certain media outlet o on a weekly basis predicts the likelihood of voting for a certain party P (in the example, (C)DU/CSU). Once the regression coefficients are obtained, a measure for each party and for each outlet is constructed considering the first benchmark of political balance, namely neutrality. In the case of (C)DU/CSU and (b)ild,

$$\text{PMU}_{Cb} = \frac{\frac{e^{\beta_{Cb}}}{1+e^{\beta_{Cb}}}}{T_b} - V_C, \quad (1)$$

where V_c is the voting share for (C)DU/CSU, and $\frac{e^{\beta_{Cb}}}{1+e^{\beta_{Cb}}}$ corresponds to the logistic transformation of each β coefficient obtained in the above-mentioned regression model. T_b is the sum of the logistic transformations of all coefficients β_{Pb} for (b)ild, i.e., the sum of the scores in this outlet for all the parties P considered. These logistic transformations are done to convert coefficients β_{Pb} into positive numbers, thereby avoiding any trouble in the denominator of equation (1) due to negative signs when adding them. That is,

$$\begin{aligned} T_b = & \frac{e^{\beta_{Cb}}}{1+e^{\beta_{Cb}}} + \frac{e^{\beta_{Sb}}}{1+e^{\beta_{Sb}}} + \frac{e^{\beta_{Fb}}}{1+e^{\beta_{Fb}}} \\ & + \frac{e^{\beta_{Lb}}}{1+e^{\beta_{Lb}}} + \frac{e^{\beta_{Gb}}}{1+e^{\beta_{Gb}}}. \end{aligned}$$

Therefore, the measure yields the relative score for CDU in (b)ild on the total of scores in (b)ild for the rest of the parties. Van Kempen (2007) also used regression coefficients of media use on individual party preference to proxy the extent to which (all) the mainstream media in a given country favoured specific parties. A crucial difference with our approach is that she weighted each party coefficient by its vote share afterwards, allowing the size of each party to increase/decrease each party advantage in media coverage. However, we use such size as a benchmark of how over/under represented a party is.

The same indicator accounting for objectivity as a reference of political balance in the case of (C)DU/CSU and (b)ild is constructed as follows:

$$PMU_{Cb} = \frac{\frac{e^{\beta_{Cb}}}{1+e^{\beta_{Cb}}}}{T_b} - \frac{1}{7} \left(\frac{\frac{e^{\beta_{Cb}}}{1+e^{\beta_{Cb}}}}{T_b} + \frac{\frac{e^{\beta_{Cf}}}{1+e^{\beta_{Cf}}}}{T_f} + \frac{\frac{e^{\beta_{Cs}}}{1+e^{\beta_{Cs}}}}{T_s} + \frac{\frac{e^{\beta_{Ct}}}{1+e^{\beta_{Ct}}}}{T_t} + \frac{\frac{e^{\beta_{Cz}}}{1+e^{\beta_{Cz}}}}{T_z} + \frac{\frac{e^{\beta_{Cr}}}{1+e^{\beta_{Cr}}}}{T_r} + \frac{\frac{e^{\beta_{Ca}}}{1+e^{\beta_{Ca}}}}{T_a} \right).$$

The extent to which using each media outlet predicts the likelihood to vote for a party is added, then divided by the number of media outlets considered in a given country (in this case, seven). This sum is then subtracted from the coefficient for each media outlet and party (in this case, for (C)DU/CSU and (b)ild). The described process yields a number for each pairing of party and outlet, to be interpreted as the extent to which the partisan preferences of each outlet's audience/readership reflect bias toward a given party, compared with the others.

Building on such scores, aggregated measures at the party, outlet, and media-system levels can be constructed.

Step 2: Measure computation at the party level

In a second step, a measure of partisan media use for the party (C)DU/CSU is computed as follows:

$$PMU_C = PMU_{Cb} \cdot \sigma_b + PMU_{Cf} \cdot \sigma_f + PMU_{Cs} \cdot \sigma_s + PMU_{Ct} \cdot \sigma_t + PMU_{Cz} \cdot \sigma_z \\ + PMU_{Cr} \cdot \sigma_r + PMU_{Ca} \cdot \sigma_a,$$

where σ_o is the share of any given outlet o . This formula yields the extent to which each party is favored by all the media outlets belonging to a given media system in a country, considering each outlet's audience share.

Step 3: Measure computation at the media outlet level

In the third step, a measure for each media outlet is built. In the case of (b)ild,

$$PMU_b = \frac{1}{5} \left[(PMU_{Cb})^2 + (PMU_{Sb})^2 + (PMU_{Fb})^2 + (PMU_{Lb})^2 + (PMU_{Gb})^2 \right],$$

where the value of PMU for each party and (b)ild is squared. This is done because the main concern in here is on the extent of partisanship of this media outlet, rather than on which party is more favored by (b)ild. The sum of PMU for each party and (b)ild is averaged to be able to compare values across party systems with different number of parties.

Step 4: Measure computation at the country level

In the fourth and last step, a measure at the country level is constructed by aggregating the former measure as follows:

$$\begin{aligned} \text{PMU}_k = & \text{PMU}_b \cdot \sigma_b + \text{PMU}_f \cdot \sigma_f + \text{PMU}_s \cdot \sigma_s + \text{PMU}_t \cdot \sigma_t + \text{PMU}_z \cdot \sigma_z \\ & + \text{PMU}_r \cdot \sigma_r + \text{PMU}_a \cdot \sigma_a. \end{aligned}$$

The score for Germany (with general label k) is the weighted sum of the level of partisanship for each media outlet considered in the country, with the weights being the audience share/readership of each outlet. The same four-step procedure is done for the two other indicators of partisan media bias, namely party favorability and party visibility.

The computation of party favorability (or PF) at the lowest level of analysis (outlet-party level) with neutrality as a benchmark of political balance is as follows:

$$\text{PF}_{Cb} = Z_{Cb} - V_C,$$

where Z_{Cb} is the percentage of experts that think that (b)ild favors (C)DU/CSU, and V_c the voting share for (C)DU/CSU. The same indicator accounting for objectivity as a benchmark of political balance is calculated as follows:

$$\text{PF}_{Cb} = Z_{Cb} - \frac{1}{7} \left(Z_{Cb} + Z_{Cf} + Z_{Cs} + Z_{Ct} + Z_{Cz} + Z_{Cr} + Z_{Ca} \right),$$

where the average sum of percentages of experts who think that each of the media outlets considered favored (C)DU/CSU was subtracted from the percentage of experts who think that (b)ild most often agrees with (C)DU/CSU (see Appendix B for a detailed description of question wording). The same indicators at party, outlet, and media-system levels are then calculated analogous to the procedure previously described for PMU.

For the last of the three indicators of partisan media bias, namely party visibility (PV), two equations are formulated. First, using the benchmark of neutrality,

$$\text{PV}_{Cb} = \frac{R_{Cb}}{R_b} - V_C.$$

Second, using the benchmark of objectivity,

$$PV_{Cb} = \frac{R_{Cb}}{R_b} - \frac{1}{7} \left(\frac{R_{Cb}}{R_b} + \frac{R_{Cf}}{R_f} + \frac{R_{Cs}}{R_s} + \frac{R_{Ct}}{R_t} + \frac{R_{Cz}}{R_z} + \frac{R_{Cr}}{R_r} + \frac{R_{Ca}}{R_a} \right).$$

In either case, R_{Cb} is the number of references to (C)DU/CSU in (b)ild, while R_b is the total number of references to all parties in (b)ild.¹

Appendix B. Question Wording and Variable Coding

Individual partisan preference. “How probable is it that you will ever vote for the following parties on a scale from 0 to 10 where 0 means not at all and 10 means very probable?” (EES, 2009).

Frequency of news media use. “In a typical week, how many days do you watch/read the following news programmes/newspapers?” (EES, 2009).

Experts’ assessments on media bias. Sum of percentage of experts who name a given party when asked: “How would you characterize the political colour of each of these media outlets? Please select for each media which political party it agrees with most often.” (EMSS. 2010).

Mentions to political parties in news stories. “List up to six different persons, groups, institutions or organizations that are mentioned verbally at least twice/verbally mentioned once and quoted/mentioned verbally at least once and depicted at least once” (EES, 2009).

¹Hopmann et al. (2017) measure political balance in news by using visibility of political parties in media content. Their approach differs from ours in that they rely on an index that applies to two groups and, therefore, suited to two-party systems (Duncan index of dissimilarity). See also (Eberl et al. 2018), who account for relative party visibility in campaign coverage by building a series of separate measures at the party-outlet level during the 2013 Austrian general election.

The same indicators at party, outlet, and media-system levels are then calculated as shown in the example for PMU (see Appendix C for a graphical depiction of how the measures apply to German media and parties).

Appendix C. Application of the Party Favorability Measure at Different Levels

Table 1: Party favorability (objectivity benchmark) in German media outlets.

Outlet	CDU/CSU	SPD	FDP	Linke	Grüne
Bild	0,38	-0,21	-0,03	0,01	-0,02
FAZ	0,35	-0,21	0,03	-0,02	-0,02
SZ	-0,37	0,48	0,03	-0,02	0,07
ARD	-0,28	0,22	-0,03	-0,02	0,01
ZDF	0,12	-0,12	0,00	-0,02	0,01
Sat1	0,03	-0,12	0,00	0,01	-0,02
RTL	-0,17	-0,01	0,03	0,04	-0,02

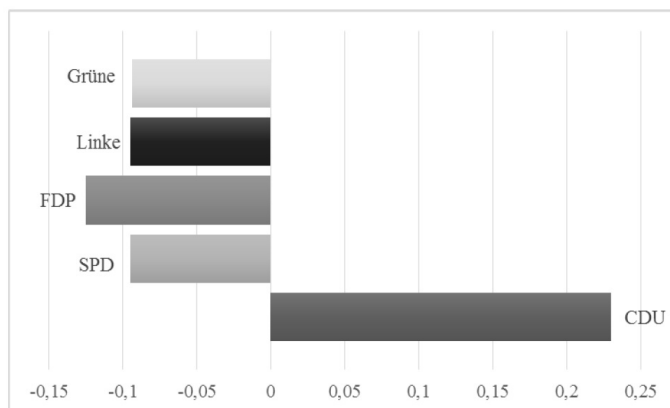


Figure 1: Favorability (neutrality benchmark) toward German parties. Note: Own calculations based on data from EMSS2010. Values range from -1 to 1.

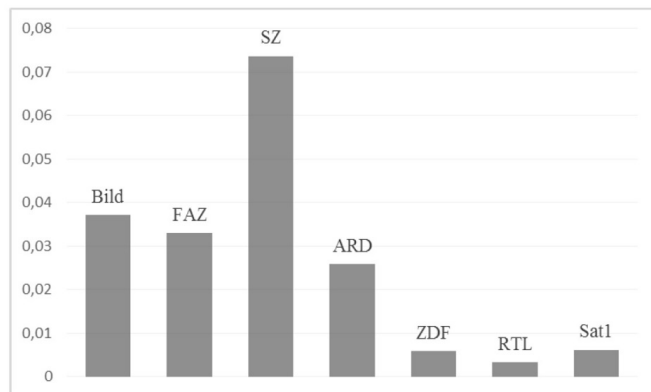


Figure 2: Level of party favorability (objectivity benchmark) per media outlet in Germany. Note: Own calculations based on data from EMSS2010. Values range from 0 to 1.

References

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