Appendix

News Media Performance Evaluated by National Audiences: How Media Environments and User Preferences Matter

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1. Operationalization of media fragmentation and polarization

Media fragmentation and polarization take different forms and develop differently over time depending on the national context. The goal for our classification therefore is to identify factors that can serve as indicators for media fragmentation and polarization and that can be compared across different news media environments. Obviously, there are many different indicators to measure both concepts (e.g., Althaus & Trautman, 2008; Dvir-Gvirsman, 2017; Fletcher, Cornia, & Nielsen, 2019; Fletcher & Nielsen, 2017; Hmielowski, Beam, & Hutchens, 2016; Picard, 2011; Tewksbury, 2005; Webster & Ksiazek, 2012), since the aim of this paper clearly lies on comparing news media performance across different environments, we relied on indicators that can be directly tied to news performance. To classify our five countries according to their levels of media fragmentation and polarization, we identified five indicators—three for fragmentation and two for polarization—to illustrate our classification and build a well-informed, robust calibrated measure.

First, an important determinant for media fragmentation to take place is set by the size of the market. The argument goes as follows: For media outlets to be economically sustainable, a sizable market is of great advantage (Picard, 2011). The larger the potential number of consumers within a market, the more economically attractive it is for new entrepreneurs to enter this market (Porter, 1980). In larger media markets, a higher number of media outlets compete for a larger number of potential customers, resulting in more differentiation among different media audience segments (Lowe & Nissen, 2011). Naturally, where more media outlets compete with each other, audience shares for individual outlets become smaller since some news users select media outlets according to their political preferences or tastes (Mutz & Martin, 2001). Additionally, larger market sizes have been shown to have a negative impact on the quality of news reporting, as they concentrate more on soft news and perfunctorily political coverage (Althaus & Trautman, 2008). As we were first and foremost interested in news media markets, in our index of media fragmentation we included a *news media market size* indicator by looking at the active portion of news users among individuals surveyed by the Reuters Institute Digital News Report 2019. We based our analysis on their shares of news avoiders in our five countries (US= 41%; IT= 36%; PL= 41%; CH= 26%; DK= 15%) (Newman, Fletcher, Kalogeropoulos, & Nielsen, 2019) and subtracted the share of news avoiders from the overall population age 14 and above to constitute the market size for news users (news user market size in Mio: US= 158.08; IT= 33.34; PL= 19.02; CH= 5.42; DK= 4.11).

As a second factor to characterize media fragmentation, we identified the concept of *shared news*. Shared news, according to Nir (2012), refers to the overall audience share of media sources with the broadest reach in a given news media market. Media with a broad reach set quality standards in information provision and makes it easier for non-news-users' to encounter political information indirectly. This way, shared news helps "larger segments catch up with the news, and facilitates fewer disparities between groups" (Nir, 2012, p. 581). Especially in smaller media markets, media outlets with substantial audience shares are the drivers of high-quality media reporting (Meier & Trappel, 1998). Non-shared news, in reverse, refers to the fragmentation of audiences across different media sources. To consistently measure shared news across all countries, we based our analysis on the average weekly usage share of the most frequently used news outlet in each of our five countries identified in the Digital News Report 2019 (Newman et al., 2019) (non-shared news in percent: US= 71; IT= 54; PL= 46; CH= 33; DK= 39).

As a third factor adding to levels of media fragmentation, we used the proportion of news users choosing public service broadcasters (PSBs) (respectively the share of people not using the PSB) for political information. *PSB strength* differs from the former indicator (shared news) in that it takes into account the special public service remits most PSBs operate on. PSB strength undermines media fragmentation in the following ways. First, a well-funded and successful PSB concentrating a great amount of news market share leaves less room for other broadcasters to thrive. Formerly, PSBs had a monopoly-like position in many European TV markets. Katz (1996) described the liberalization of the TV market as one of the first steps toward societal fragmentation because it causes the audience to divide into smaller groups of users, thus ceasing to share a common news agenda. Second, as argued by Hallin and Mancini (2004, p. 41),

the existence of a PSB is the most significant interference in a media market because it contributes to social cohesion. PSBs play a key role in providing fair, balanced information to all groups in a society (Moe, 2008). Media systems with stronger PSBs are more independent of market demands and provide high quality news reporting that spills over to other media (Iyengar et al., 2010; Pfetsch, 1996; Sehl, Fletcher, & Picard, 2020). Additionally, PSBs aim to address the general public instead of fringe audiences, contributing to a well-informed citizenry (Castro Herrero, Nir, & Skovsgaard, 2018; McQuail, 1992). Since audience measures for broadcasting services highly differ across countries, we used data from the Reuters Digital News Report 2019, which asked respondents about their weekly usage of commercial TV and PSBs. We used the percentage of PSBs usage (reversed index) across our selected countries (Newman et al., 2019) (non-PSB audience in percent: US= 90; IT= 54; PL= 69; CH= 33; DK= 39).

Figure 1. Three indicators of media fragmentation
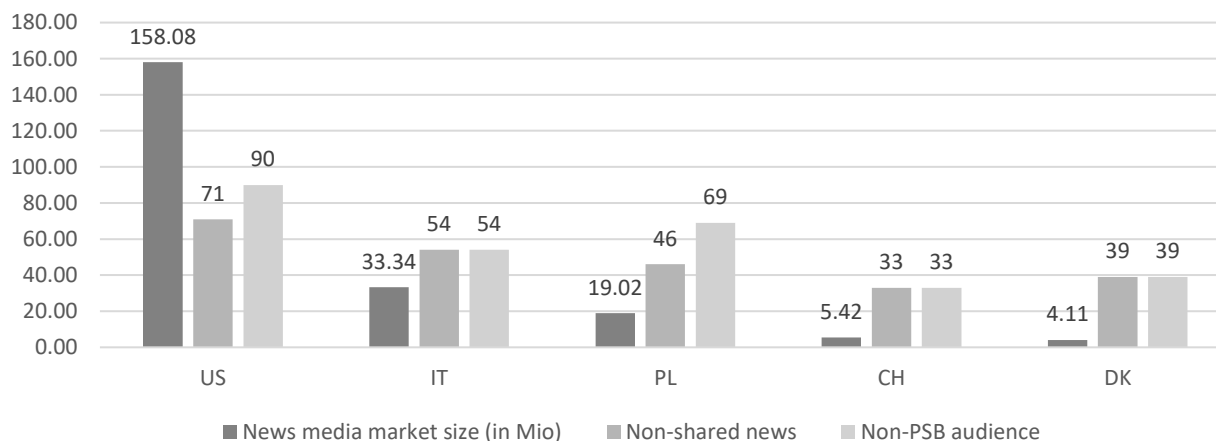
NOTE: (1) Active news user market size refers the proportion of the population above 14 years of age that uses news on a regular basis. (2) Non-PSB audience refers to the shares that other (private) TV stations, apart from the main PSB, have on the market. (3) Non-shared news refers to the proportion of news users not using the main news media outlet in their respective countries.

Turning now to our indicators for media polarization, we argue that where political and media systems are closely intertwined, media reporting highly reflects on this relationship (Kaiser & Kleinen-von Königslöw, 2019; Seymour-Ure, 1974). Thus, we used political parallelism as a first indicator of media polarization as has been previously proposed by other authors (Fletcher et al., 2019). According to Hallin and Mancini (2004), political parallelism mirrors the extent to which there is a one-to-one correspondence between media outlets and political parties or broader political trends. Contemporary political parallelism does not only reflect direct ownership of media outlets by political parties, but it manifests in many different ways e.g., media content favoring specific actors or political positions, journalists reporting according to their ideological affiliation. To account for the multi-facetness of this concept, we relied on different indicators previously identified and tested in the literature (Brüggemann, Engesser, Büchel, Humprecht, & Castro Herrero, 2014; Castro Herrero, Humprecht, Engesser, Brüggemann, & Büchel, 2017). Those indicators are a *lacking separation of news and commentary,* indicating the share of evaluative references in news stories; *partisan influence and policy advocacy,* meaning how politicians influence journalistic work routines and how relationships to political actors shape the news reporting; *political orientation of journalists* indicating to what extent journalists' political attitudes are well known to the public, *media-party-parallelism,* which stands for the political preferences of specific news users and how using particular news sources predicts voting for a particular party (van Kempen, 2007). Finally, the indicator *political bias* refers to public perceptions of imbalanced political reporting by different national news sources, and *PSB dependency* compares the rate of PSB CEO turnovers with the rate of government changes, using Hanretty's (2009) index. Our methodological approach is directly informed by the study conducted by Brüggemann et al. (2014) and the subsequent work by Castro Herrero et al. (2017) which both used secondary data from various sources (e.g., European Social Survey, European Media Systems Survey, Worlds of Journalism Survey) to test Hallin and Mancini's (2004) seminal work on media systems (political parallelism (standardized measures): US= -.09; IT= .75; PL= .42; CH= -.56; DK= -.96). For a more detailed account of question wording and operationalization of these indicators, see Brüggemann et al., 2014, Table 4, pp.11-12 ; Castro Herrero et al., 2017, Table A2 in the appendix.

Figure 2. Two indicators of media polarization
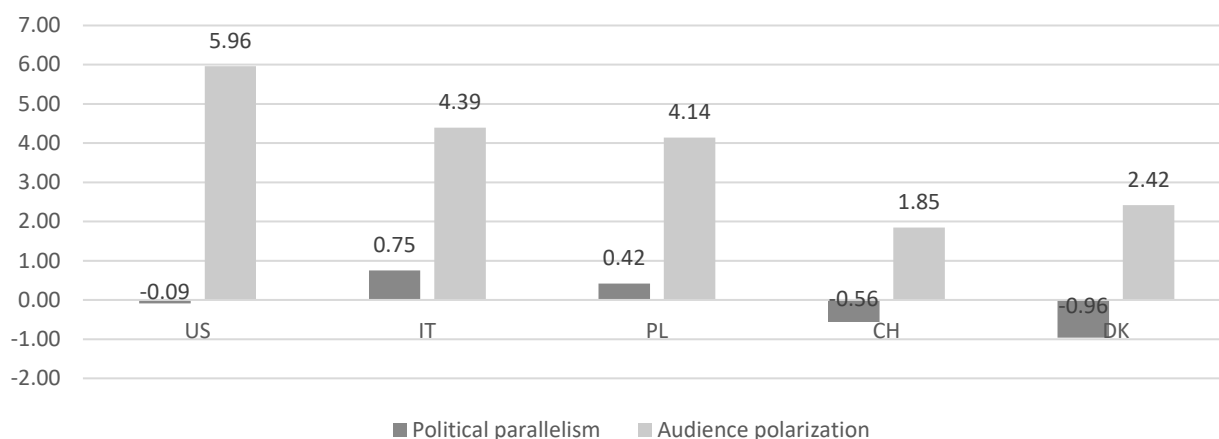
NOTE: (1) Political parallelism is a standardized measure taking the following categories into account: lacking separation of news and commentary, partisan influence, and policy advocacy, , political orientation of journalists, media-party parallelism, political bias, and PSB dependency. (2) Audience polarization takes into account the average distance of the political orientations of the five most used news outlets per media type from the average political orientations in each country (weighted by audience shares).

As the second media polarization indicator, we looked directly into audience polarization. Audience polarization should affect reporting in different ways. Where news outlets cater to a more homogeneous audience, media outlets slant the news in the direction of audience preferences undermining the principles of objectivity and impartiality in the reporting (Gentzkow & Shapiro, 2010; Mullainathan & Shleifer, 2005). Therefore, we argue that in media environments where audiences are heavily divided along political leanings, media sources have fewer incentives to provide balanced and impartial political information. To measure audience polarization, we looked at the five most used media outlets per country for five different media source types (television, radio, print, online-only news, and blogs) and the political positions of their audiences using our own data set. For each country, we calculated how far the respective audiences of the individual media outlets diverge, on average, from the population mean in terms of political orientation (Fletcher et al., 2019). Our final measure was constructed by calculating the average divergence score of all outlets and was additionally controlled by the proportion of the audience shares of each individual outlet (US= 5.96; IT= 4.39; PL= 4.14; CH= 1.85; DK= 2.42).

1 **2. Variable operationalization**

Variable	Questionnaire wording	Min	Max	M	SD
Gender	What is your gender? (0 = male; 1 = female)	0	1	.51	.50
Age	What year were you born? (open answer: year of birth transformed into years of age)	18	79	48.89	14.81
Education	What is the highest level of school you have completed? (1 = primary education; 2 = secondary education; 3 = tertiary education; missing = None of these levels of education) [(classification according to: ESS, 2017; NAES, 2008)	1	3	2.17	.69
Political interest	How interested are you in politics, in general? (1 = not at all interested to 5 = very interested)	1	5	3.16	1.20
Interest in news	How interested are you in news about political events? (1 = not at all interested to 5 = very interested)	1	5	3.26	1.16
Political orientation	Where would you position yourself, politically, on a scale from 1 = left to 11 = right? (1 = left to 11 = right)	1	11	6.21	2.74
Political extremity	Where would you position yourself, politically, on a scale from 1 = left to 11 = right? (1 = left to 11 = right) [Answers from question on political orientation folded in the middle]	1	6	3.24	1.60
Alternative media use	Some people are disappointed by political news coverage and have the feeling that the (most frequently used) mainstream media sources do not report information fully. As a result, these people seek out alternative sources of information (e.g., they may seek out sources on the internet, where they can find their opinion better represented or can cross-check information). Do you belong to this group? (1 = No, not at all; 2 = No, mostly not; 3 = Yes, mostly; 4 = Yes, definitely; missing = I do not know)	1	4	2.52	.92

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