# Media Capture through Favor Exchange*

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**Abstract**

We establish three results about favoritism in the Hungarian media. (1) We document distortive two-way favors between politicians and the media, in the form of government advertising and media coverage. For both directions of favors, our empirical strategy is to compare the allocations of actors with changing versus unchanging connection status. We interpret our findings as media capture. (2) We document an organizational change in favoritism: a first phase when favored media was controlled by a single connected investor; a second phase when this relationship broke down and two-way favors were terminated; and a third phase when control of newly favored media was divided between multiple connected investors. (3) We develop and implement a portable structural approach to measure the economic cost of misallocative favoritism.

JEL codes: D72, D73, L82, P16, D61

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# 1 Introduction

Political distortions to media freedom limit government accountability and may assist the rise of autocracy.[1] But can such distortions emerge in the shadow of democratic institutions? If they can, how do they emerge, and what are their economic costs? Answering these questions can shed light on the sources and mechanisms of autocratic drift.

In this paper we use data from Hungary to explore these issues and establish three results. First, we document distortive two-way favors, in the form of advertising and coverage, between politicians and the media. For either direction of favors, our empirical strategy is to compare the allocations of actors with changing versus unchanging connection status. In doing this we build on existing work—especially DiTella and Franceschelli (2011) and DellaVigna, Durante, Knight and La Ferrara (2015)—and contribute by establishing both the favors' non-market nature and bidirectional presence between politicians and the media. These findings allow us to interpret the favors as media capture. Second, we document a change in the organization of favors. In a first phase control of most favored media was in the hands of a single connected investor; in a second phase this relationship broke down and two-way favors were terminated; and in a third phase control of favored media was divided between multiple different investors. These findings shed light on the dynamics of power sharing within the elite. Third, we develop a new structural approach to measure the economic cost of misallocative favoritism and find it to be substantial in our setting. Our approach is easily portable to other contexts studied in the literature.

In Section 2 we describe the political context and our data. During our sample period, 1994-2016, Hungary has been a parliamentary democracy, with political power alternating between left-wing parties and right-wing parties. Based on ownership and personal connections, we classify outlets in print media, billboards, online media and television as connected to the left, connected to the right, or unconnected. Most of our analysis focuses on media connected to the right, and based on changes in the structure of these connections we divide our sample period into three phases. In phase 1, before 2015, most right-connected media were owned by the business group of a single

[1] Prat and Stromberg (2013) survey the research on the political economy of mass media, while Enikolopov and Petrova (2015) survey the evidence on media capture. We review these literatures in detail below.

investor Lajos Simicska—former roommate of right-wing prime minister Viktor Orban—whom we label the "right-connected investor". In phase 2, around 2015 February, the two had a fallout. And in phase 3, since the fallout, the control of right-connected media has been divided between multiple connected investors.

In Section 3 we document favors from politicians to connected media in the form of state-owned firms' advertising. We define a favor to be a preferential allocation driven by non-market motives. To document favors, we compare state-owned firms' advertising composition to private firms' advertising composition and to circulation shares, where the latter two act as benchmarks for the market-based allocation.[2,3] We begin with phase 1 (1994-2014) and first explore advertising in the two most important daily newspapers, one of which was owned by the right-connected investor Simicska (Magyar Nemzet), while the other was connected to the left (Nepszabadsag). We find that, relative to both private firms' advertising composition and circulation shares, state-owned firms dramatically shifted advertising—by 37 percentage points in our main specification—to the right-connected daily under right-wing governments. In contrast, state-owned firms' advertising shares aligned with the market shares and circulation shares under left-wing governments.

These shifts look like distortive advertising favors under right-wing governments. But there is an alternative market-based explanation: that state-owned firms had a different target audience under right-wing governments. To rule out this explanation we exploit a change in media ownership. In 2011, the right-connected investor's group purchased Metropol, a major freely distributed tabloid newspaper. In a single month, state-owned firms increased the share of their print advertising allocated to Metropol from 20% to 50%. Private firms' advertising share of Metropol remained low. Because media consumption patterns are unlikely to change this quickly, we conclude that the patterns represent favors.

Possible motives for favors include the expectation of return favors, but also shared ideology: the desire to support the conservative values of the newspaper. We explore motives using billboard advertising. The right-connected investor's business group purchased several billboard companies

[2] This parallels Schoenherr (2016) who compares politically more and less influenced procurement in Korea.

[3] State-owned firms include the national lottery, the national tourism company, transportation and utilities companies.

in 2009. We show that after the 2010 electoral win of the right, the share of state-owned firms' billboard advertising placed on these billboards rapidly increased from 30% to over 80%. Private firms' advertising share remained below 30%. Because billboards do not carry additional content, these facts cannot be easily explained with shared ideology.

We next turn to phase 2. In February 2015, several journalists in the right-connected daily resigned—soon to join the state media—and in interviews the right-connected investor personally attacked the prime minister. This event seems to signal a breakdown in their relationship. Consistent with this interpretation, advertising favors immediately stopped. State-owned firms' print advertising share allocated to Simicska's two dailies (Magyar Nemzet and Metropol) dropped from 60% to 20%, and there was a similar decline in their advertising on the investor's billboards. In contrast, private firms' advertising composition did not change. Because it is hard to think of a market-based motive driving these changes, they further support the favors interpretation.

In the period since 2015—phase 3—several new right-connected media emerged. Their ownership was divided between multiple connected investors who did not have close business ties between them. In the paper we document advertising favors in this phase in three markets, but for brevity here we only discuss one, online media, which we also exploit in the content analysis. One of the two leading online news portals, Origo, was bought in 2016 by a business group connected to the governor of the central bank who is political ally of Orban. Subsequently state-owned firms sharply increased their relative advertising on Origo. There was no associated increase for private firms' advertising or for page views. We obtain similar results in the television and print markets. Taken together, the evidence from the three phases suggests a shift in the organization of favors towards a divide-and-rule style arrangement.

In Section 4 we document favors from the media to politicians. We first explore news coverage and then the selective hosting of political campaigns. In this context too, we define a favor as an allocation driven by non-market motives. For news coverage we interpret this to mean that coverage is shaped not by the demand for, but by the supply of news. Our empirical approach is to compare the coverage of government corruption scandals before versus after various events. We begin with the fallout (phase 2) and compare the online content of Simicska's main political

daily Magyar Nemzet—the "affected" daily—with two benchmarks: the left-connected daily, and a smaller "unaffected" right-connected daily (unrelated to Simicska). We show that after the fallout the share of articles covering corruption scandals in the affected daily significantly increased, from the low level of the unaffected right-connected daily to the much higher level of the left-connected daily.[4] We next conduct a similar analysis for online media, and show that after the purchase of Origo, its corruption coverage—relative to a similarly large but unaffected portal—significantly decreased. Under the identifying assumption that holding fixed everything else an outlet's connection status does not affect news demand for that outlet, these results imply that media content was shaped by the supply side, i.e., by a non-market motive.

We then turn to the second form of media favor: the selective hosting of political campaigns on billboards. Because the group of Simicska purchased key billboard companies in 2009, we separately look at elections during 1998-2006 and during 2010-14. In the former period, the right-wing party, other political parties, and private firm advertisers placed essentially the same share of their billboard advertising on these—not yet connected—billboards. But in the latter period, the right-wing party placed a significantly larger, and the other parties a significantly smaller, share of advertising on these billboards, than did private firm advertisers. Our interpretation is that connected billboards sponsored the campaign advertising of the right-wing party and rationed that of other parties, i.e., that billboard campaign advertising was shaped by a non-market motive.

Our results show two-way favors between politicians and connected media. The most natural interpretation is that they represent media capture through favor exchange: that advertising revenue was exchanged for favorable coverage. We briefly discuss two alternatives. One is mutual altruism between the prime minister and media owners. While this explanation may help rationalize the first phase of favors, it is at odds with the third phase during which connected media owners were not—at least based on the available information—personally close to the prime minister. A second interpretation is shared values: that connected media provided favorable coverage not because of advertising revenue but because of owners' genuine political beliefs. Although it seems implausible to us that connected owners ignored the high revenues associated with favorable coverage, even if

[4] We collectively label news to be corruption scandals if they involve allegations of the abuse of public resources.

this explanation is correct the broader point remains that distortive advertising supported precisely those media which chose to favorably cover politicians for reasons unrelated to news demand. We conclude that even under this logic the patterns represent a form of media capture.

In Section 5 we study economic costs and magnitudes. Our main contribution here is a new methodology to measure the economic cost of misallocative favoritism. In contrast to existing work (Khwaja and Mian 2005, Mironov and Zhuravskaya 2016, Schoenherr 2016), our approach is based not on particular consequences but on a comparison of allocations. This approach requires stronger structural assumptions, but can more fully capture the cost of misallocation and is easily portable to other settings. Our starting point is a simple model of firms' demand for advertising, in which—paralleling the Hsieh and Klenow (2009) analysis of supply-side distortions—we express the welfare loss from demand-side distortions with the difference between the actual and the optimal allocation shares and the elasticity of substitution between different outlets. Using elasticities in a plausible range—both direct estimates and off-the-shelf values—we find that on average favoritism cost 9-33% of advertising expenses. Combining our direct estimates with the value of favors, we estimate the Besley and Prat (2006) tunneling inefficiency parameter, the cost to the government of a dollar of connected advertising, to be about 1.9 dollars.

In the concluding Section 6 we discuss some caveats with and broader implications of our results. We note that probably there were additional favors beyond those we document. But given their large magnitude advertising favors were likely important, and hence we expect that a policy of regulating government advertising would significantly reduce media capture. In light of the evidence that media affects electoral outcomes (DellaVigna and Kaplan 2007, Enikolopov, Petrova and Zhuravskaya 2011), our results suggest that a key motive for misallocative favoritism was the desire to protect political power. This motive represents a new link between institutions as the fundamental driver and misallocation as the proximate cause of cross-country income differences. Beyond misallocation, another likely social cost of media favoritism was the distortion in voters' beliefs. We believe this cost to be important but do not measure it in this paper. Finally, we speculatively argue that a within-elite relational contract can rationalize several observed patterns through a tradeoff between efficiency and loyalty (Board 2011).

Our work builds on a literature studying media capture. Theories in this area include Besley and Prat (2006), Petrova (2008) and Gehlbach and Sonin (2014). The most convincing evidence is for autocracies and documents capture through bribes or direct state ownership (McMillan and Zoido 2004, Qin, Stromberg and Wu 2016). For democracies, a key study by DiTella and Franceschelli (2011) presents correlational evidence from Argentina consistent with two-way favors, but cannot rule out plausible market-based explanations such as private advertising crowding out government advertising when corruption scandals increase newspaper demand. We contribute to this work by establishing the favors' non-market nature, which allows us to interpret them as media capture.[5] We also contribute by documenting changes in the organization of favors, and with a methodology to measure their economic cost.

Other research emphasizes the demand-side determinants of media content, including the models in Mullainathan and Shleifer (2005) and Gentzkow and Shapiro (2006), and the evidence that audiences shape US newspapers' slant in Gentzkow and Shapiro (2010). Our contribution to this work is to show the importance of a supply-side determinant of coverage.

We also build on a literature about favoritism emanating from Fisman (2001), which includes studies of asset prices (Faccio 2006), procurement (Goldman, Rocholl and So 2013, Borgaard, Denes and Duchin 2015, Schoenherr 2016), credit (Khwaja and Mian 2005) and sales (Cingano and Pinotti 2013), among other contributions. These papers all focus on favors in a single direction. The work on favoritism most closely related to ours is DellaVigna et al. (2015) who document favors from third party businesses to connected media. In contrast to that paper, we document favors between different actors—politicians and connected media—which allow us to interpret the results as media capture. More broadly, we contribute to this body of research by establishing the presence of bidirectional favors, a change in the organization of favors, and with a methodology to measure their economic cost.

[5] In related work, for historic US newspapers Petrova (2011) shows that growing private advertising increased media independence, but does not study capture. In the same market Gentzkow, Petek, Shapiro and Sinkinson (2015) find essentially no evidence for capture. Enikolopov and Petrova (2015) and Prat (2015) are excellent surveys of political media capture. And a growing literature documents capture by non-political groups (Reuter and Zitzewitz 2006, Gambaro and Puglisi 2015).

Table 1: Political cycle in Hungary

| | Share in parliament of | | | Central |
|---|---|---|---|---|
| | Left | Right | Far right | government |
| 1994-1998 | **72%** | 28% | 0% | left |
| 1998-2002 | 42% | **55%** | 4% | right |
| 2002-2006 | **52%** | 48% | 0% | left |
| 2006-2010 | **54%** | 46% | 0% | left |
| 2010-2014 | 20% | **68%** | 12% | right |
| 2014-2018 | 23% | **65%** | 12% | right |

# 2 Context and data

## 2.1 Politics and media in Hungary

Since 1990 Hungary has been a parliamentary democracy. Table 1 presents summary statistics on the political cycle during our sample period 1994-2016. We divide parliamentary parties into three groups: the left, the right, and the far right, and the first three columns in the table show the share of members of parliament who belong to each.[6] The final column shows the political affiliation of the government and the prime minister, which always agrees with the political side that has the majority of seats in parliament. During our sample period political power was held by either the left or the right, and there were three changes in power: 1998, 2002 and 2010. During both the 1998-2002 and the 2010-16 right wing governments, the prime minister was the same person, Viktor Orban.

*Media.* We study four media markets: publicly oriented daily newspapers, billboards, online news portals and television. The daily newspaper market—to which we also slightly imprecisely refer as print media—includes all major daily newspapers that cover at least some political news. The billboards market includes all major billboard companies with the exception of one firm about which we do not have data.[7] The online market includes all major online news portals, which have

[6] Independent members on average represented less than a quarter percent of parliament and are not reported.

[7] That firm, Mahir, was also owned by the right-connected investor, so our results which do not account for it are likely to be conservative.

been an increasingly important source of news in Hungary. And we define the television market to include the two main commercial channels as well as the state-owned national channel. In all of these markets we classify privately owned media outlets based on the political connections of owners into three categories: connected to the left, connected to the right, or independent. We base the classification on media reports, especially the detailed documentation in Batorfy (2015) and Renyi (2017), and we directly verify the links using data on firm ownership. Here we give an overview of the classification and then provide more details when we present the results.

We begin with connections to the right, our main focus in the analysis. Because of changes in the structure of these connections we divide the sample period into three phases. During the first phase, 1994-2014, almost all media connected to the right was owned by the business group of a single investor, Lajos Simicska, who was a college roommate of the right-wing prime minister Viktor Orban. Simicska was also head of the Tax Authority for a period during 1998-2002. Because of these connections we sometimes refer to him as the "right-connected investor". Simicska's business group has owned the main right-wing daily newspaper *Magyar Nemzet* since 2000, and before 2000 owned various predecessors which were then merged into Magyar Nemzet. His close business partner (co-owner in several companies) purchased a large tabloid daily newspaper, *Metropol*, in 2011. In addition to the holdings in the print market, Simicska's group purchased several billboard companies in 2009. And it was later revealed that in 2013 Simicska had secretely purchased an option to buy one of the two main commercial television channels, TV2.[8]

In phase 2, in February 2015, in a surprise event, on a single day several top journalists in the right-connected daily Magyar Nemzet resigned. A number of these journalists subsequently joined the state media. Later the same day, the right-wing investor Simicska called the prime minister unprintable names in interviews. We interpret this event as a fallout between Simicska and Orban, and we classify media owned by Simicska's group as independent after the fallout.

In phase 3, after the fallout, multiple new right-connected media emerged. In the print market, the former editor of Simicska's daily Magyar Nemzet who left at the fallout (who had also been founding member of the right-wing party MDF), became owner and editor of a newly created

[8] The fact that a single investor owned several media outlets is consistent with the worldwide pattern that a majority of private media organizations are owned by families (Djankov, McLiesh, Nenova and Shleifer 2003).

right-leaning daily newspaper *Magyar Idok* in April 2015. And a friend of Orban—mayor of the village of his weekend home—purchased multiple local daily newspapers in October 2016. In the online market, in early 2016 a firm connected to the cousin of the central bank's governor—who is a former minister of the economy and a political ally of Orban—purchased *Origo*, one of the two main online portals. And in the television market, a government commissioner bought, after a legal struggle with Simicska, TV2.

Concerning connections to the left, the main left-connected daily newspaper was *Nepszabadsag*, which was until 2013 co-owned by a foundation of MSZP, the largest left-wing party in Hungary. Two other media often labeled by the press as left-connected for parts of our sample period—but with less clear ties—were daily newspaper *Nepszava* and billboard company *ESMA*. We treat these as left-connected but do not focus on them in the analysis.[9] Finally, another smaller daily newspaper which we do use in our content analysis is *Magyar Hirlap*. This newspaper had ties to the left until 2006, when it was purchased by an investor—unrelated to Simicska—who was a former member of the right-wing party MDF. Since then, and in particular during the period in which we use its content, we classify the newspaper as connected to the right.

Table 2 summarizes in our four markets the market shares of connected media—measured with the share of private firms' advertising—at different points in time. In 2000 the left was dominant with a 33% share in the print market. By 2006 their market share declined to 11%, in part because of the entry of new independent print media. In 2012, after Simicska's group purchased billboards and Metropol, the right became dominant with over 25% market shares in both the print and billboards market. Finally, in 2016 after the fallout, the new right-connected media represented large shares in three of the four markets: over 25% of the print and online market, and over 40% of the television market.[10]

## 2.2 Data and sample definitions

We work with three main datasets.

[9] In 2015 ESMA allegedly changed sides when an investor reported to be a friend of Orban purchased it. Because this connection is less clear, we make the conservative assumption that ESMA became independent in 2015.

[10] For television we measure market shares using minutes of advertising time because after 2013 the list price data in this market are not reliable.

Table 2: Market shares of connected media

| | 2000 | 2006 | 2012 | 2016 |
|---|---|---|---|---|
| Share of right-connected media | | | | |
| Print | 3% | 4% | 26% | 26% |
| Billboards | 0% | 0% | 28% | 0% |
| Online | 0% | 0% | 0% | 25% |
| Television | 0% | 0% | 0% | 42% |
| Share of left-connected media | | | | |
| Print | 33% | 11% | 7% | 3% |
| Billboards | 0% | 7% | 8% | 0% |

Note: Market shares defined with private firms' advertising, measured with minutes in the television, and value at list prices in the other markets. Left-connected media had zero shares in the online and television markets.

*Advertising, 1994-2016.* We have monthly data on the list price and advertising surface of most large advertisers in most newspapers, magazines, billboards, radios and televisions, which we obtained from a private company Kantar Media, whose business is to collect and sell advertising data. We study three types of advertisers: private firms, state-owned firms, and government agencies. Among government agencies we distinguish between agencies that are involved in government administration, such as ministries; and agencies involved in the provision of public goods, such as hospitals or theaters.

In our analysis we focus only on the 500 largest private firm advertisers, the 200 largest state-owned firm advertisers, and all 470 government agencies, which constitute our main sample.[11] Table 3 present summary statistics on advertising spending in this sample. State-owned firms, which are of primary interest to us, account for 26%, 15%, 15% and 7% of total advertising in the print, billboard, online and television markets. In this table we report advertising value at list prices for all markets, computed by Kantar Media as the product of advertising surface and list price, using

[11] We define the largest advertisers based on the sum of the value of advertising in print plus billboard markets for the print and the billboard markets; and the analogous sum of television plus online advertising for the television and the online markets. Using other definitions has small effects on our results.

Table 3: Summary statistics on advertising, 1994-2016

| | Number of advertisers | Spending shares | | | |
|---|---|---|---|---|---|
| | | print | billboards | online | television |
| Private firm | 500 | 65.1% | 79.9% | 80.3% | 91.6% |
| State-owned firm | 200 | 25.5% | 14.9% | 15.1% | 7.2% |
| Govt. agency | 470 | 9.5% | 5.2% | 4.6% | 1.2% |
| Total spending (USD M) | | 2,228 | 2,186 | 795 | 18,631 |

Note: Total spending and spending shares are computed for the sample period 1994-2016.

the the price specific to the concrete ad (position, color, day, media, etc.). Because after 2013 list price data are of poorer quality in the television market, in that market we use minutes to measure advertising volume in the rest of the paper.[12]

*Firm level data, 1992-2015.* We have balance sheet information for essentially all firms in Hungary, approximately 910,000 firms, from the Hungarian Tax Authority for 1992-1999, from the Hungarian Statistics Office for 2000-2012, and from the Hungarian Company Register for 2013-15. These data contain ownership shares for each firm by the following categories of owners: the central government, municipal governments, domestic private entities, and foreign entities. In addition the Hungarian Company Register contains for 1992-2016 name and address data of firm owners and firm officials with signing rights, including directors, board members, the CEO, and some important employees. We use these data to verify the political connections of media outlets.

*Media content and circulation.* We scraped the online content of three daily newspapers and two online portals: Nepszabadsag, the main left-connected daily (content available 2012-16), Magyar Nemzet, the main right-connected daily (content available 2010-16) and Magyar Hirlap, a smaller daily connected to the right in the relevant period (content available 2014-16); as well as Index and Origo, the two main online portals, of which Origo became right-connected in 2016 (content available 2013-16). And we also obtained data on the circulation, page views and prime time

[12] Although there is variation in list prices because of price changes and composition effects, the results we present in the analysis below are largely driven by variation in advertising surface. Because we do not observe advertiser-specific prices, we cannot study price discrimination, such as inflated prices at connected media for state-owned firm advertisers.

viewers of print media, online media and television from public sources (matesz.hu, dkt.hu, and brandtrend.hu).

# 3 Favors from Politicians to the Media

In this section we present evidence on advertising favors from politicians to connected media.

## 3.1 Graphical Evidence

We begin with figures which illustrate the main patterns in the data, separately looking at the three phases. Because the patterns are sharp, the figures tell essentially the whole story.

### 3.1.1 Phase 1: One dominant investor (1994-2014)

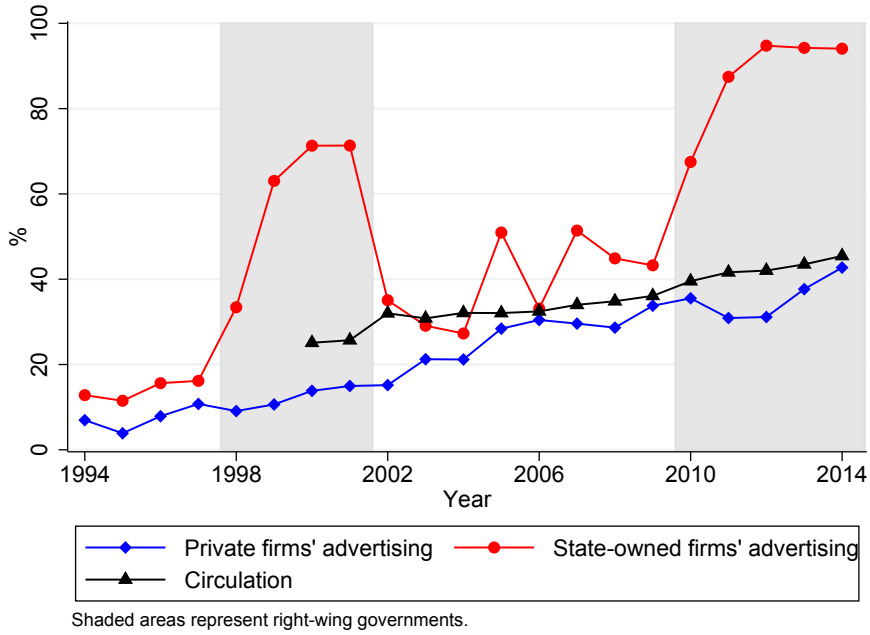
We explore three markets in the first phase. We start with daily newspapers: Figure 1 plots a variable we call *rightshare*, computed as the share of advertising in the main right-connected daily (Magyar Nemzet) relative to that in the left and the right-connected daily (Nepszabadsag and Magyar Nemzet), that is, $R/(L+R)$. This variable is always between zero and one, and is higher when the share of advertising allocated to the right-connected daily is higher. We plot *rightshare* separately for state-owned firms' advertising and for private firms' advertising. For comparison, we also plot the relative circulation of the two newspapers. Shaded areas correspond to right-wing governments.[13,14]

Begin the interpretation with the plot of relative circulation, which—due to data availability—starts in 2000. In the early 2000s the right-connected daily represented only about 25% of the combined circulation of the two newspapers, but by 2014 its circulation share increased to 45%. The figure shows that the composition of advertising by private firms closely tracked the composition of circulation: as the relative circulation of the right-connected daily increased, a corresponding share of advertising migrated to that newspaper.

[13] Observations are 12-month periods starting in June of each year, which is the approximate date when a change in political power occurs after an election.

[14] In the definition of the right-connected daily also we included the antecedents of Magyar Nemzet: Uj Magyarorszag, renamed Napi Magyarorszag in 1997 and merged into Magyar Nemzet in 2000.

Figure 1: Share of right daily relative to left and right daily, $R/(L+R)$

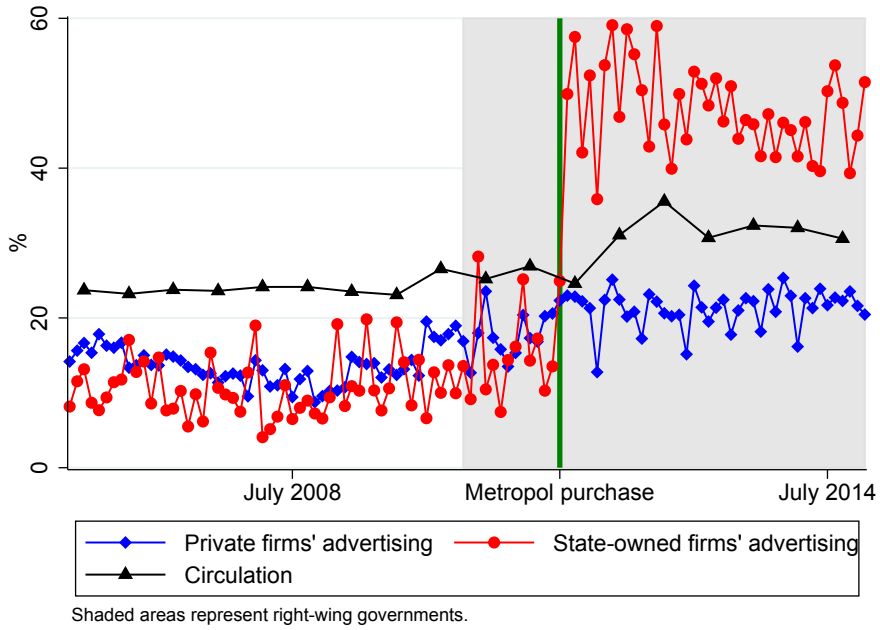



The interesting part of the figure is the pattern of advertising for state-owned firms. During left-wing governments, their composition of advertising was fairly similar to that of private firms, that is, it roughly aligned with the market shares. However, during right-wing governments there was a dramatic shift towards advertising in the right-connected daily. During the first right-wing administration *rightshare* increased from 21% to a peak of 71%. After the change in government in 2002 it quickly dropped; and after the next change in government in 2010 there was another increase from 43% all the way up to 91%.

A natural interpretation of the figure is that under right-wing governments state-owned firms' advertising was distorted, i.e., governed by non-market motives. The leading alternative explanation is that the shifting allocations represent a more subtle market motive, such as a change in the target audience. We now present direct evidence that rules out this alternative explanation. As we discuss below, our results on phases 2 and 3 further support the favors interpretation.

*Target audiences and Metropol.* We show that advertising shifts were shaped not by the audience of the media but by its owner using a different source of variation: a change in ownership. In 2011, a

Figure 2: Share of Metropol around purchase by connected investor, *Metropol/All*



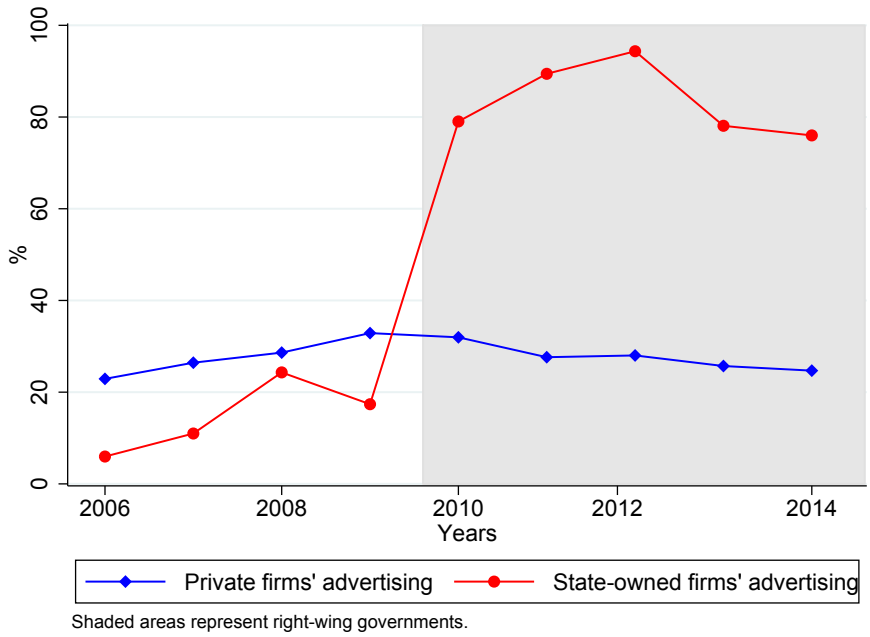

regular business partner of the right-wing investor Simicska purchased Metropol, a freely distributed newspaper which represented a large share of the print advertising market. Metropol was essentially a tabloid which covered political news lightly. In Figure 2 we plot the advertising and circulation share of Metropol relative to all publicly oriented daily print media.[15]

Before the change in ownership, Metropol's share in state-owned firms' and in private firms' print advertising was below 20%, slightly lower than its circulation share. Immediately after the month of purchase, its share in state-owned firms' print advertising jumped to above 50%. This was accompanied by a much smaller increase of its circulation and essentially no change of its share in private firms' print advertising. Because audiences—especially for a newspaper distributed in subway stations—are unlikely to change this quickly, the rapid change in allocations is direct evidence for distortive favors.

*Shared values and billboards.* We next explore the motive for distortive favors. A natural possibility is that favors were given in expectation of return favors. An alternative may be shared

[15] Because it was purchased after 2010, we cannot use variation coming from changes in political power for Metropol.

Figure 3: Share of right-connected billboards, $R/All$

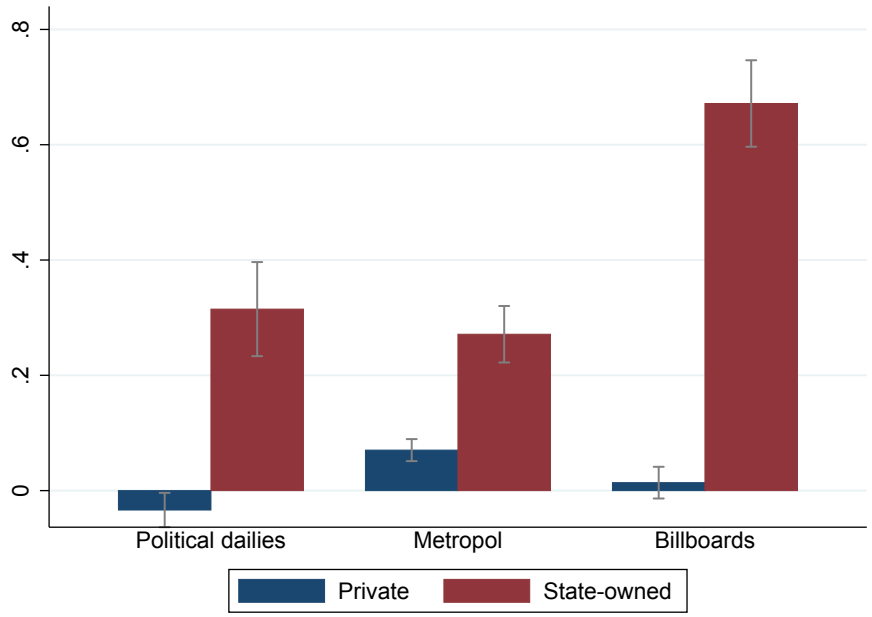



ideology or values (DiTella and Franceschelli 2011): that right-wing governments advertised in connected media to support the conservative values these represented. A key point here is that even if shared values was the motive, the favors still distorted the media market by helping particular outlets to survive or thrive. But we also have direct evidence that speaks about motives: advertising on billboards, which do not carry additional content and therefore do not represent values or ideologies.

Several billboard companies were purchased in 2009 by the right-connected investor. Figure 3 plots the share of these right-connected billboards in state-owned firms' and private firms' total billboard advertising during 2006-2014. The patterns are clear. Before 2010 both state-owned and private firms allocated less than 30% of their billboard advertising to these right-connected billboards. After the 2010 election, the share of these billboards in state-owned firms' billboard advertising increased all the way up to 93%, while their share in private firms' advertising was essentially unchanged. These patterns are not easily explained by shared values.

*Summary of phase 1.* Figure 4 summarizes the patterns in these three markets by plotting the

Figure 4: Phase 1—Change in allocation shares of right-connected outlets



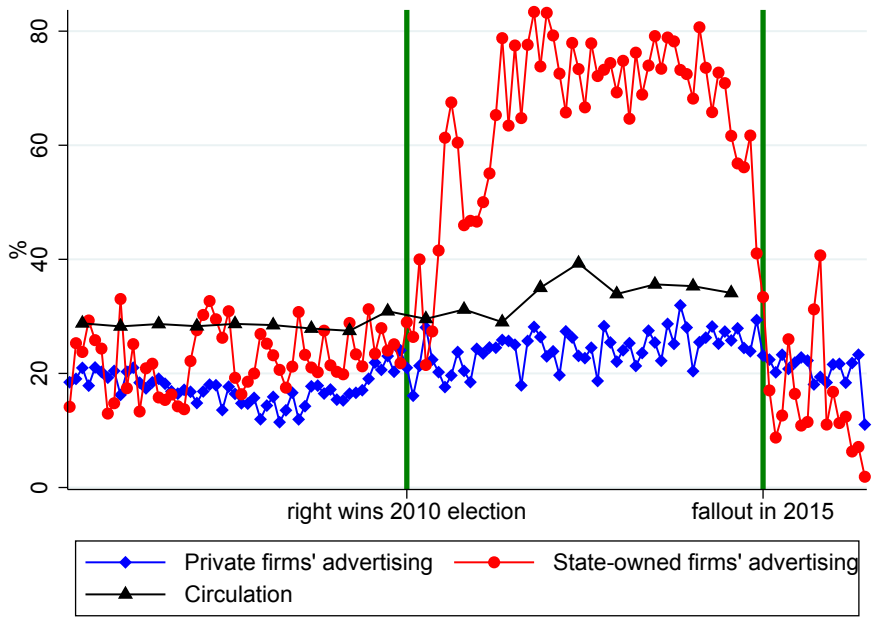

difference in the allocation share of connected media around the discussed changes in government and in ownership status. We consistently see small changes in private firms' allocation shares but large changes in state-owned firms' allocation shares. The 95% confidence bands indicate that all our effects are highly significant. Importantly, all connected media in this figure were owned by the right-connected investor Simicska and his close business partners.

### 3.1.2 Phase 2: Fallout (2015 February)

In February 2015, in a surprise event, on a single day several top journalists in the right-connected daily Magyar Nemzet resigned. Several of these journalists subsequently joined the state media. Later the same day, the right-connected investor Simicska called the prime minister unprintable names in interviews. This event signalled the breakdown in the relationship between the prime minister and Simicska.

To confirm this interpretation, in Figure 5 we show the combined advertising share of the two daily newspapers of the investor, Magyar Nemzet and Metropol. The increase in state-owned firms

Figure 5: Share of investor's dailies around fallout, $R/All$

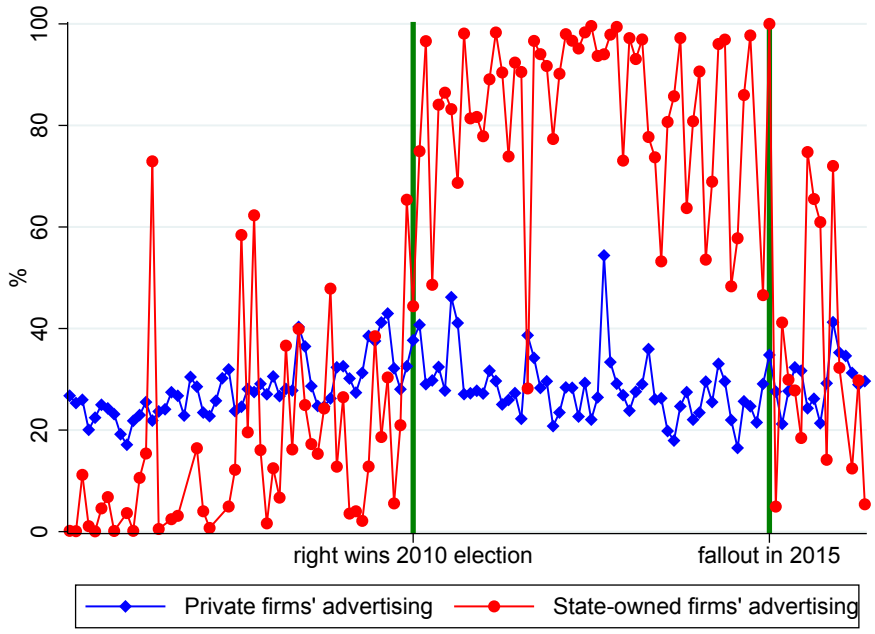



advertising after the 2010 election is the familiar pattern of phase 1. The novelty in the Figure is the period of the "fallout" in February 2015. In the course of just a few months, the share of state-owned firms' advertising in the investor's papers dropped from above 60% to below 20%. That is, advertising favors were terminated. The decline started a few months earlier, suggesting that cracks in the relationship appeared before the public fallout.

Figure 6 shows a similar if somewhat more noisy pattern in the billboard market: advertising favors on billboards also stopped immediately after the fallout. The rapid reallocations in both markets provide further evidence that the patterns represent distortions, as changes in target or actual audiences are unlikely to be this quick.

The fallout likely represents a power struggle within the elite. One possible explanation for its occurrence and timing is an increase in the political power of the prime minister. In the 2014 election, as a result of both permanent and temporary factors—institutional changes such as redistricting as well as a campaign partly based on reducing utility costs—the right-wing party won

Figure 6: Share of investor's billboards around fallout, $R/All$




67% of seats in a landslide victory.[16] The prime minister may have wanted to convert this increased strength with voters into a stronger position in the elite by forcing out a dominant partner.

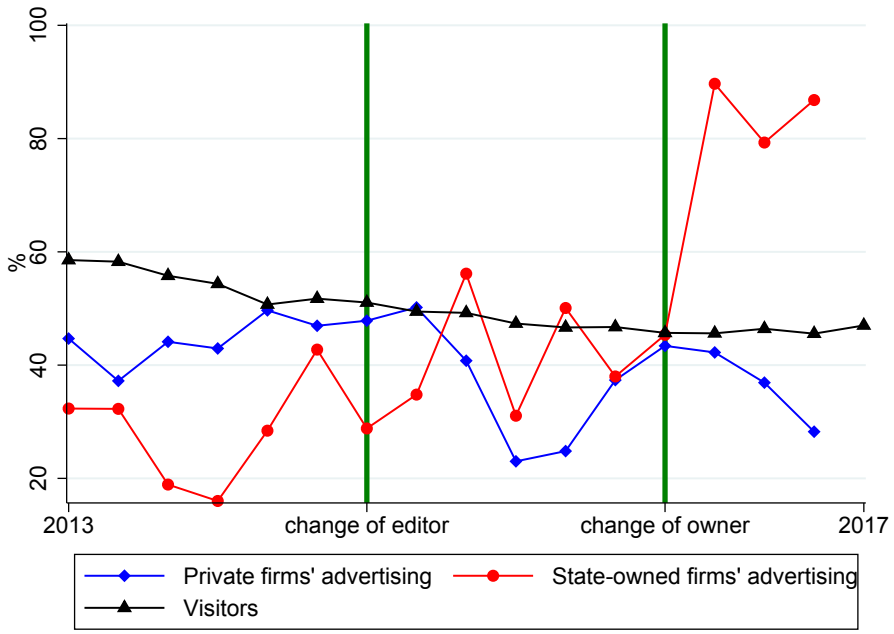
### 3.1.3 Phase 3: Multiple smaller investors (2015-present)

After the fallout new connected media outlets emerged. We explore three such outlets, in the online, television and print markets. Because the value added from discussing all three markets is small, in the text we focus on online media—which is relevant for the content analysis we present below—and only show a summary figure for the other two. The full analysis is in Appendix A.1.

*Online media.* In the 2010s in Hungary online news portals have been a growing source of news and entertainment. Data on page views shows the emergence of two about equally popular leading portals, *Index* and *Origo*. Here we explore two events concerning Origo, which was owned by the Hungarian subsidiary of the German telecommunications giant Telekom until 2016. In August

[16] A report by the OSCE Office for Democratic Institutions and Human Rights (2014) discusses institutional changes and their impact on the 2014 election.

Figure 7: Share of Origo around change in editor and owner, $Origo/(Index + Origo)$



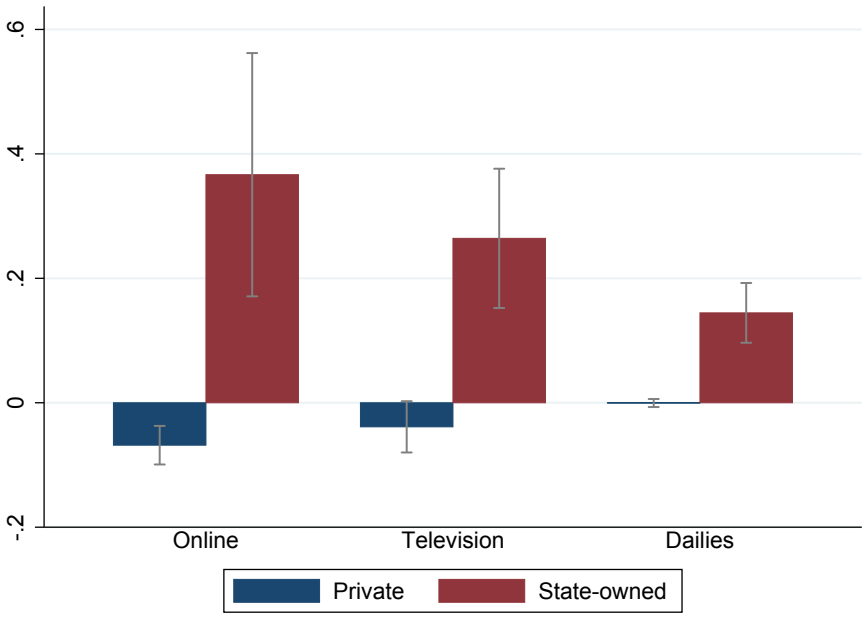

2014 the editor of Origo was replaced, allegedly because of pressure from the government after Origo investigated a government scandal (Batorfy 2015). And in January 2016 Origo was sold to a business group connected to the cousin of the governor of the central bank. The governor was formerly a member of the cabinet in both Orban's first and second administrations.[17]

Figure 7 plots the advertising share of Origo in the combined advertising on Origo and Index. We also show the composition of page views, which serves as a measure of relative market size and confirms that the two portals were roughly equally popular during the period. The figure indicates a small increase in state-owned firms' relative advertising on Origo after the first event; and a large increase in their relative advertising on Origo after the second event. There were no corresponding increases in private firms' relative advertising or in the relative number of page views.

The evidence from the first event is consistent with the government rewarding Telekom after the removal of an editor. And the second event is an example of favors flowing to newly connected

[17] The specific connection was that a business partner of the governor's cousin was a co-owner of the firm that purchased Origo. Then in 2017 Origo was sold on to the son of the central bank's governor.

Figure 8: Phase 3—Change in allocation shares of new right-connected outlets




media after the fallout in 2015.

*Summary of phase 3.* Figure 8 summarizes the patterns of phase 3 from the three markets we investigate. The figure plots the changes in the advertising share between periods when the respective outlet was unconnected versus connected. For Origo, these are periods before the change in editor in 2014 versus after the change in owner in 2016. For television, they are periods before Simicska signed a secret option contract on TV2 in 2013 versus after a government commissioner finally bought TV2 in 2016. And for print media they are periods before versus after the profile change leading to the emergence of the new right-connected daily Magyar Idok.[18] The figure consistently shows small changes in private firms' allocation shares but large changes in state-owned firms' allocation shares. The 95% confidence bands indicate that all our effects are highly significant. In all three markets connected outlets received distortive advertising favors.

A key point here is that—based on the Hungarian Company Register—there have been no

[18] Earlier this daily was a business newspaper called Napi Gazdasag; it was purchased in 2015 by the former editor of Magyar Nemzet who left that daily at the fallout, and then underwent a name and profile change to become a political newspaper.

direct business relationships between the owners of these three media. In addition, each owner is connected to the prime minister and his party through a different path. We conclude that control of connected media was divided between multiple unrelated investors after the fallout.

### 3.2 Regression analysis

In the text we only present regression evidence for three results: the left versus right-connected daily, Metropol, and Origo. This evidence further confirms that our effects are highly significant and yields some insights about the behavior of other actors. We present the analogous evidence for the other markets and periods in Appendix A.1.

*Left- versus right-connected daily.* We aggregate the spending of each advertiser in each of the two main dailies to the the electoral cycle level, and estimate

$$\text{Right share}_{ac} = \text{const} + \sum_{l=1}^{m} \rho_l \cdot \text{advertiser category}^l_{ac} \times \text{right cycle}_{ac} + \text{controls} + \mu_c + \varepsilon_{ac}. \quad (1)$$

The dependent variable is "Right/(Left+Right)", the share of advertising in the right-connected daily relative to advertising in the two dailies, measured at the level of an advertiser $a$ in a given electoral cycle $c$. Advertiser categories can be private firms, state-owned firms, and different types of government agencies; and the controls include either indicators for advertising categories or—in more demanding specifications—advertiser fixed effects. We always include cycle fixed effects $\mu_c$. Our main interest is in the $\rho_l$ coefficients, which measure, by advertiser category, the extent to which the composition of advertising differs when the right is in power.

Table 4 reports results from this regression in various specifications. We focus on four advertiser categories: (i) state-owned firms; (ii) government agencies involved in administration, such as ministries; (iii) government agencies involved in public goods provision, such as hospitals; and (iv) private firms, which are the omitted category. Columns 1 and 2 present unweighted specifications which measure the behavior of the average advertiser. Column 1 shows a baseline specification without advertiser fixed effects. Relative to the omitted category of private firms, state-owned firms changed the composition of advertising substantially more with the political cycle: they allocated 29 percentage points more of their advertising budget to the right-connected newspaper

Table 4: Daily newspapers: political cycle and advertising composition

| Dependent variable: | Share of right-connected daily, R/(L+R) | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned × right cycle | 0.290*** | 0.267*** | 0.385*** | 0.365*** |
| | (0.0344) | (0.0347) | (0.0556) | (0.0603) |
| Govt. agency (admin) × right cycle | 0.276*** | 0.243*** | 0.403*** | 0.374*** |
| | (0.0363) | (0.0373) | (0.0484) | (0.0538) |
| Govt. agency (public good) × right cycle | 0.124*** | 0.137*** | 0.0861** | 0.103*** |
| | (0.0331) | (0.0322) | (0.0385) | (0.0392) |
| State-owned | 0.0978*** | | 0.116*** | |
| | (0.0242) | | (0.0311) | |
| Govt. agency (admin) | 0.129*** | | 0.0497 | |
| | (0.0251) | | (0.0332) | |
| Govt. agency (public good) | 0.133*** | | 0.0801 | |
| | (0.0249) | | (0.0636) | |
| Advertiser FE | | X | | X |
| Cycle FE | X | X | X | X |
| Observations | 2841 | 2841 | 2841 | 2841 |

Note: Each observation is an advertiser × cycle pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers for 1994-2014. Columns 3 and 4 are weighted by the advertiser's total spending in the two newspapers. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

under right-wing governments than under left-wing governments. Similarly, administrative government agencies allocated 28 percentage points more, and public good providing agencies allocated 12 percentage points more to the right-connected newspaper under right-wing governments. All these estimates are highly significant. Finally, the coefficient of the (uninteracted) state-owned firm variable shows that under left-wing governments state-owned companies allocated about 10 percentage points more to the right-connected newspaper —that is, 10 percentage points *less* to the left-connected newspaper—than did private firms. It appears that there was no favoritism under left-wing governments in this market.

In column 2 we include advertiser fixed effects. These soak up level differences between government-controlled and private advertisers, and hence do not allow us to determine which

side engaged in favoritism. But we can now identify the effect of changes in government from time-series variation *within* advertisers. The results are essentially unchanged and confirm the statistical significance of the advertising favors.

Columns 3 and 4 repeat these specifications but—following DellaVigna et al. (2015)—weight observations by the total value (at list prices) of the advertiser's advertising in the two newspapers. With these weights, the results measure how the allocation of the average advertising dollar changed with the political cycle. For state-owned firms and administrative government agencies the patterns are similar to columns 1 and 2, but the magnitudes are larger. Intuitively, large advertisers shifted their spending more than small advertisers. For example, column 4 shows that the share of state-owned firms' advertising allocated to the right-connected daily increased by 37 percentage points under right-wing governments. A possible explanation—which also helps explain the smaller reallocation of public-good providing agencies—is that larger advertisers were under tighter political control.

*Metropol.* Because for Metropol we are interested in the immediate effect of the change in ownership, we conduct an event study. Focusing on the sample of private firm and state-owned firm advertisers, zooming in on the two-year window surrounding the acquisition, and using quarterly data, we estimate

$$\text{Metropol share}_{at} = \text{const} + \sum_{-4 \leq q \leq 3, q \neq -1} \rho_k \cdot \text{state owned}_{at} \times \text{post acquisition}_t^q + \text{controls} + \varepsilon_{at}. \quad (2)$$

The dependent variable is measured as "Metropol/All", that is, the share of the advertising spending of advertiser $a$ in quarter $t$ in the print market which is allocated to Metropol. And $\textit{post acquisition}_{it}^q$ is an indicator for the $q$-th quarter after Metropol was acquired by the right-connected business group, where a negative $q$ denotes a period before the acquisition. We omit the period immediately before the acquisition ($q = -1$), hence we compare changes in the public-to-private advertising gap relative to this quarter. As controls we always include quarter effects, and either an indicator for state-owned firms or advertiser fixed effects.

Table 5 shows the results. Confirming the graphical evidence, state-owned firms significantly shifted advertising to Metropol right after the acquisition. For example, column 2 shows that the average state-owned firm increased the share of advertising allocated to Metropol by more than 10

Table 5: Metropol: ownership change and advertising composition

| Dependent variable: | Share of Metropol, Metropol/All | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned×pre-acquisition 4 | 0.00804 | -0.0113 | -0.000672 | -0.00138 |
| | (0.0515) | (0.0471) | (0.0867) | (0.0863) |
| State-owned×pre-acquisition 3 | 0.0189 | -0.00866 | -0.0104 | -0.00708 |
| | (0.0409) | (0.0274) | (0.0246) | (0.0211) |
| State-owned×pre-acquisition 2 | 0.0453 | 0.00708 | 0.00296 | -0.00411 |
| | (0.0498) | (0.0315) | (0.0386) | (0.0393) |
| State-owned×post-acquisition 0 | 0.0831 | 0.0399 | 0.281*** | 0.284*** |
| | (0.0511) | (0.0449) | (0.105) | (0.106) |
| State-owned×post-acquisition 1 | 0.106* | 0.0493 | 0.228*** | 0.236*** |
| | (0.0546) | (0.0456) | (0.0843) | (0.0848) |
| State-owned×post-acquisition 2 | 0.183*** | 0.151*** | 0.286*** | 0.291*** |
| | (0.0648) | (0.0577) | (0.0712) | (0.0642) |
| State-owned×post-acquisition 3 | 0.168** | 0.112* | 0.300*** | 0.294*** |
| | (0.0738) | (0.0630) | (0.0678) | (0.0679) |
| Advertiser FE | | X | | X |
| Quarter FE | X | X | X | X |
| Observations | 3487 | 3487 | 3487 | 3487 |

Note: Each observation is an advertiser × quarter pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers in a 2 year window around the acquisition in 2011. Columns 3 and 4 are weighted by the advertiser's total spending in daily newspapers. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

percentage points by the second quarter after the acquisition. The weighted specifications show more rapid and larger adjustment: for example, in column 4 we see an immediate and persistent effect of over 20 percentage points ($p < 0.01$ in all quarters). These results imply that larger advertisers responded faster and tilted more. Because the audience of Metropol, a freely available newspaper distributed in subway stations, is unlikely to change this quickly, the results are evidence for distortive favors.

*Online media.* For online media we focus on the sample of private firm, state-owned firm and administrative government agency advertisers, consider the period 2013-16 and estimate using

quarterly data

$$\text{Origo share}_{at} = \text{const} + \sum_{l=1}^{m} \rho_l^e \cdot \text{advertiser category}_{at} \times \text{new editor}_t + \sum_{l=1}^{m} \rho_l^o \cdot \text{advertiser category}_{at} \times \text{new owner}_t + \text{controls} + \varepsilon_{at}. \quad (3)$$

The dependent variable is measured as "Origo/(Index+Origo)", that is, the share of the advertising spending of advertiser $a$ in quarter $t$ in the combined market of the two main portals which is allocated to Origo. And *new editor*$_t$ respectively *new owner*$_t$ are indicators for the period when Origo had a new editor during the Telekom ownership, and the period when Origo had a new owner connected to the governor of the central bank. As controls we always include quarter effects, and either an indicator for state-owned firms or advertiser fixed effects.

Table 6 shows the results. Compared to the period before the events, state-owned firms increased their advertising share on Origo (relative to private firms) by 17-21 percentage points after the change in editor, and by 49-61 percentage points after the change in owner. Both effects are significant in all specifications. The results are slightly weaker but broadly similar for administrative government agencies.

### 3.3 Discussion

Our leading interpretation of the results is that they represent distortive favors: preferential advertising based on non-market motives. Here we briefly discuss alternative explanations and the motive for favors, and then compare our results with related findings in the literature.

*Different target audiences.* The leading alternative explanation is that state-owned firms had different target audiences under right-wing governments. As discussed above, this explanation is inconsistent with the Metropol result. It also cannot easily explain the drop in advertising after fallout as audiences—especially for billboards—are unlikely to rapidly change in response to that event. Finally, to explain the variation in state-owned firms' advertising between left-wing and right-wing governments the target audience of these firms must also change with the political cycle. If target audiences vary so much within advertisers, we expect them to also vary considerably across

Table 6: Origo: connection changes and advertising composition

| Dependent variable: | Share of Origo, O/(I+O) | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned × new editor | 0.169** | 0.181** | 0.209*** | 0.177** |
| | (0.0778) | (0.0738) | (0.0603) | (0.0700) |
| State-owned × new owner | 0.494*** | 0.545*** | 0.611*** | 0.604*** |
| | (0.156) | (0.171) | (0.188) | (0.197) |
| Govt. agency (admin) × new editor | 0.402*** | 0.422*** | 0.260** | 0.311*** |
| | (0.0850) | (0.0919) | (0.116) | (0.0940) |
| Govt. agency (admin) × new owner | 0.404*** | 0.473*** | 0.366 | 0.381 |
| | (0.144) | (0.156) | (0.312) | (0.310) |
| State owned | -0.178* | | -0.281** | |
| | (0.0944) | | (0.109) | |
| Govt. agency (admin) | -0.269*** | | -0.147** | |
| | (0.0649) | | (0.0669) | |
| Advertiser FE | | X | | X |
| Quarter FE | X | X | X | X |
| Observations | 2917 | 2917 | 2917 | 2917 |

Note: Each observation is an advertiser × quarter pair. The sample contains the top 500 private, the top 200 state-owned, and all administrative government agency advertisers in 2013-2016. Columns 3 and 4 are weighted by the advertiser's total spending in the two online portals. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

advertisers. As we show in Appendix A.2, there were no major differences in private advertisers' allocation shares across industries or by firm size; and for private advertisers these allocation shares did not vary with the political cycle.

*Media giving discounts to the right-wing government.* Another explanation may be that the patterns represent favors in the opposite direction: that connected media supported the government by offering discounts. This story seems to go against basic economic logic. State-owned firms are controlled by the government which has direct access to the budget, and hence are unlikely to need support. And a more effective way to support the governing party would be gifts or campaign finance. This interpretation is also at odds with the fact that the annual average profit of the

publisher of Magyar Nemzet increased by about 200% from 2002-09 to 2010-14. A variant of this explanation is that right-wing governments could use their connections to get better deals out of connected newspapers. The fact that profits increased is inconsistent with this logic.

*Shared values.* What motivated distortive favors? A possible answer is shared values. But—because billboards do not represent values—this logic cannot easily explain the favors on billboards, or the drop in billboard advertising after the fallout. A variant of this logic is that advertising on billboards was used to indirectly support the values of Magyar Nemzet, owned by the same business group owning the billboards. But this also seems implausible as Magyar Nemzet was already making a profit in the period.[19]

*Connections to the literature.* DiTella and Franceschelli (2011) show that government advertising in Argentina was negatively correlated with corruption coverage within newspapers, a pattern consistent with advertising favors. As they clarify, their findings also have market-based explanations, such as increases in the price of advertising following increased demand due to the corruption scandals. We advance on their results by using the comparison with private firms' advertising and with circulation, and by exploiting several changes in connection status. This approach allows us to convincingly establish the presence of non-market favors.

DellaVigna et al. (2015) document advertising favors from private actors to media owned by Berlusconi. Our results show favors flowing between different actors: from the government to connected media. A key distinction between these sets of results is that the favors we document can lead to media capture by the government. Indeed, we argue below that this is their most likely interpretation.

The changing organization of favors highlights a power struggle within the elite. This result lends support to a small theoretical literature emphasizing the key role of within-elite interactions, including the models of Myerson (2008) and Boix and Svolik (2013) which show that a sufficiently strong autocratic ruler chooses to dismantle power-sharing institutions. And the arrangement with multiple investors we document in phase 3 resembles the divide-and-rule strategy formalized in

[19] A related question is how politicians controlled state-owned firms' advertising. Anecdotal evidence suggests, and in ongoing work we explore, a clientelism channel in which former employees of the right-connected investor were placed in key positions in state-owned firms.

Acemoglu, Verdier and Robinson (2004).

# 4 Favors from the Media to Politicians

We document two forms of media favors: scandal coverage and campaign hosting. Our definition of favors continues to be preferential treatment based on non-market motives. In the context of scandal coverage this means that media content is shaped not by the demand for news but by the supply of news. And in the context of campaign hosting it means that billboard space is not allocated to all political parties at the same price.

## 4.1 Scandal coverage

We explore changes in corruption coverage around changes in connection status. First we look at the right-connected investor's main daily newspaper around the fallout, and then we look at Origo around the changes in editor and owner. In both cases we compare coverage to other media not directly affected by the events.

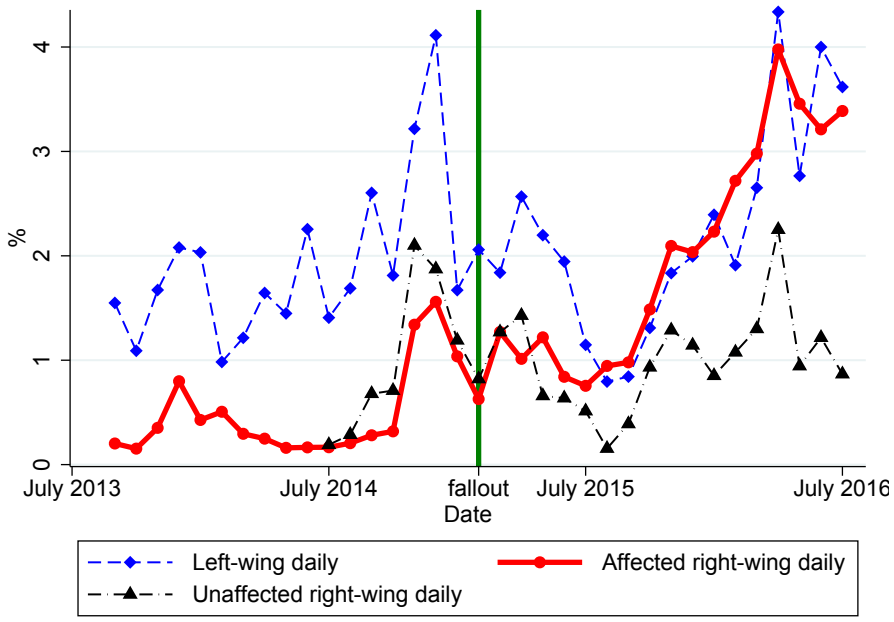
To conduct the analysis, we first created a procedure to measure corruption coverage. We reviewed a number of articles in several daily and online newspapers and built a list of scandals which involved allegations of the abuse of public resources. We collectively label these corruption scandals.[20] Then, for each scandal, we identified a set of relevant keywords.[21] We then searched the online content of all media used in the comparisons, and for each scandal identified all articles containing the set of keywords. We hand-checked a random subset of these articles to ensure that they indeed mention the relevant scandal, and adjusted keywords when necessary to eliminate false matches. Finally, using this definition, we computed for each month the share of articles that covered at least one corruption scandal.

*Dailies around fallout.* Beginning with the fallout, we compare the online content of Simicska's main daily newspaper, Magyar Nemzet—which we label the "affected" right-connected daily—

[20] It is possible that we missed some scandals, but because our analysis compares *between* media, this does not affect the interpretation of our results.

[21] For example, when foundations created by the central bank gave money to firms affiliated with relatives of the bank's governor, we used as keywords the abbreviation of the central bank's name and the word "foundation". A list of scandals and keywords is available upon request.

Figure 9: Coverage of corruption scandals around fallout




with the online content of two benchmarks: the left-connected daily Nepszabadsag, and the smaller "unaffected" right-connected daily Magyar Hirlap, which was not related to Simicska.[22]

Figure 9 plots the fraction of articles covering scandals for the three newspapers. We focus on the period September 2013-July 2016 which forms a symmetric window around the fallout. There were fluctuation in corruption coverage, in part because of fluctuations in the number of scandals. The key point of the figure is that corruption coverage in the affected right-wing daily gradually increased after the fallout: from the low level of the unaffected right-connected daily to the higher level of the left-connected daily. In contrast, the gap between the two benchmark daily newspapers was essentially unchanged. Thus the affected daily had low corruption coverage while it received advertising favors, but high corruption coverage after favors were terminated.

To infer the statistical significance of the observed shift in coverage, we estimate

$$\text{Corruption coverage}_{it} = \text{const} + \sum_{i=1}^{n} \eta_i \cdot \text{newspaper}_i \times \text{post fallout}_t + \nu_i + \mu_t + \varepsilon_{it}. \qquad (4)$$

[22] Simicska's other daily newspaper, Metropol, was a tabloid that covered political news lightly, which is the reason in the content analysis we focus on Magyar Nemzet.

Table 7: Corruption coverage in dailies around fallout

| Dependent variable: | Share of articles on corruption (pp) | |
|---|---|---|
| | All three dailies | Right and left daily |
| Affected right-wing daily × post fallout | 1.25*** | 0.95*** |
| | (0.24) | (0.21) |
| Left-wing daily × post fallout | -0.08 | |
| | (0.27) | |
| Affected right-wing daily | -0.36** | -1.1*** |
| | (0.14) | (0.13) |
| Left-wing daily | 1.13*** | |
| | (0.19) | |
| Month FE | X | X |
| Observations | 75 | 96 |

Note: Each observation is a newspaper × month pair. Dependent variable measured in percentage points. Column 1 uses all three dailies in 2014-2016. Column 2 uses the two main dailies in 2012-2016. Heteroscedasticity corrected standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

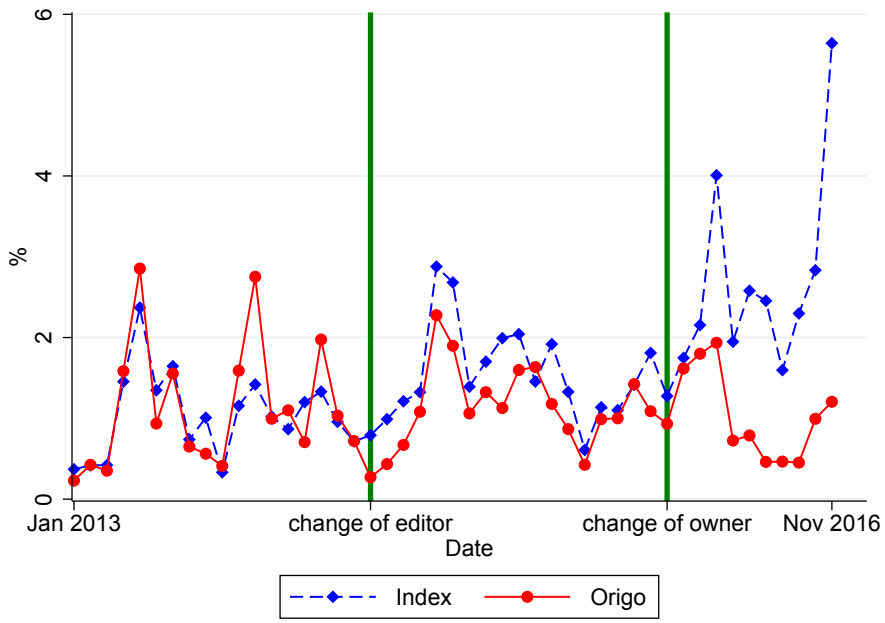
Observations are (newspaper, month) cells, and the dependent variable is the share of articles in newspaper $i$ in month $t$ which cover corruption scandals. The controls always include newspaper and month fixed effects. The $\eta_i$ coefficients of the interactions measure the change in coverage in newspaper $i$ after the fallout.

Table 7 reports the results. Column 1 shows a specification for the period 2014-2016 during which we have content data for all three newspapers. The uninteracted coefficients compare corruption coverage across newspapers before the fallout. These reveal that relative to the unaffected right-connected daily (the omitted category), the left-connected daily covered corruption in a significantly higher share of articles (1.1 pp), while the affected right-connected daily covered corruption in a slightly lower share of articles (-0.36 pp).

The interactions show that corruption coverage did not change after the fallout in the left-connected daily Nepszabadsag, but did significantly increase in the affected right-connected daily Magyar Nemzet (1.3 pp). From this we infer that after the fallout the affected right-connected daily allocated about 70 percent more space to corruption than the unaffected right-connected daily.[23]

[23] The mean dependent variable for the omitted newspaper after the fallout was 1.3%, and (1.25-0.36)/1.3=0.68.

Figure 10: Coverage of corruption scandals in Origo around new editor and acquisition




Column 2 shows a specification that includes only the two main political newspapers, the affected right-connected daily and the left-connected daily. Because for these two papers online content was available for a longer time window, this specification allows us to go back as far as August 2012. The patterns are similar. The significant gap between these dailies' corruption coverage before the fallout (1.1pp) fell significantly (by 0.95pp) and thus essentially closed after the fallout.

*Online media.* We conduct a similar exercise for online media: we compare the online content of Origo with that of the other main portal Index. Figure 10 plots the fraction of articles covering scandals for Origo and Index, during the same period used in Figure 7 which showed advertising in these portals. Corruption coverage in Origo was slightly higher than that in Index in the period before the new editor; dropped below that of Index during the period with the new editor; and the gap widened substantially in the period with the new owner. The comparison with the advertising results shows that Origo decreased corruption coverage simultaneously with receiving more government advertising in two stages: in a small adjustment following the change in editor, and in a large adjustment following the change in owner.

Table 8: Corruption coverage in online portals

| Dependent variable: | Share of articles on corruption (pp) | |
|---|---|---|
| Origo × new editor | -0.5* | -0.5*** |
| | (0.29) | (0.12) |
| Origo × new owner | -1.65*** | -1.65*** |
| | (0.46) | (0.37) |
| Origo | 0.09 | 0.09 |
| | (0.22) | (0.1) |
| Period FE | X | |
| Month FE | | X |
| Observations | 94 | 94 |

Note: Each observation is a newspaper × month pair. Dependent variable measured in percentage points. Both columns use the two main online portals in 2013-2016. Heteroscedasticity corrected standard errors in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

To assess significance of these coverage changes we estimate a variant of (4) for Origo and Index. Table 8 reports the results. Compared to the period before the events, corruption coverage on Origo (relative to Index) declined by 0.5 percentage points after the change in editor, and by 1.65 percentage points after the change in owner. Both of these changes are significant.

*Interpretation.* To interpret these results we make the key identification assumption that the connection status of a media affects the demand for that media only through content. That is, absent changes in content, changes in connection status do not affect demand. Under this key assumption, the above patterns are evidence for supply-side determination of media content. Since this is our definition of favors, under our identification assumption all three events represent favors from connected media to politicians.

Our identification assumption is slightly less plausible for the fallout, which may have directly created hostility in the supporters of the prime minister towards the media owner and as a result may have independently affected the demand for Magyar Nemzet. But the assumption appears quite plausible for the changes in editor and owner of Origo, which were much less publicized events. All three events generated similar patterns, and each change in coverage coincided with a change in advertising revenue, lending additional support to our interpretation.

We also note that the lower corruption coverage of connected media probably harmed consumers, since—given that readers often do not read all articles—more reporting of corruption generally helps increase awareness. Indeed, models such as Besley and Prat (2006) suggest that independent and opposition newspapers cover government scandals more objectively, so that closing the gap relative to such outlets corresponds to more balanced reporting.[24]

### 4.2 Political campaigns on billboards

We turn to the second form of media bias: selective campaign hosting on connected billboards. We focus on political parties' campaign advertising during parliamentary and municipal election periods. Because the right-connected investor's group purchased its key billboard companies in 2009, we separately look at the elections before and after 2009. And since the main right-wing party Fidesz was relatively small in 1994, we start the analysis in 1998.

We study billboard advertising using regressions of the form

$$\text{Right share}_{at} = \text{const} + \sum_{l=1}^{m} \lambda_l \cdot \text{advertiser category}_{at}^{l} + \mu_t + \varepsilon_{at} \tag{5}$$

Observations are (advertiser, campaign period) pairs, where campaign periods are the three month windows before parliamentary or municipal elections. The dependent variable is the share of advertising placed on the billboards which became connected in 2009. We estimate this regression separately for 1998-2006 (campaigns in 1998, 2002 and 2006) and for 2010-14 (2010 and 2014). Advertiser categories are the right wing party, other parties, and private firm advertisers, the later being the omitted category.

Table 9 shows the results. The first two columns refer to the 1998-2006 period. The constant in the weighted specification of column 2 indicates that during 1998-2006, private firm advertisers placed about 33 percent of their billboard advertising on these (not yet connected) billboards. The other coefficients show that the right-wing party, and other parties, placed a similar share of their advertising on these billboards. These results support the interpretation that in pre-2009 elections

[24] Consistent with this logic, we are not aware of any model that predicts "too much" corruption coverage; while Stanig (2015) shows in a cross section of Mexican states that legal restrictions on freedom of speech were associated with lower corruption coverage.

Table 9: Campaign finance

| Dependent variable: | Share of right-connected billboards, R/All | | | |
|---|---|---|---|---|
| | 1998-2006 | | 2010-2014 | |
| Right party | -0.0766*** | -0.0415 | 0.306*** | 0.305*** |
| | (0.0220) | (0.0278) | (0.0257) | (0.0405) |
| Other party | -0.0380 | 0.0284 | -0.225*** | -0.215*** |
| | (0.0256) | (0.0317) | (0.0260) | (0.0402) |
| Constant | 0.398*** | 0.327*** | 0.395*** | 0.340*** |
| | (0.0560) | (0.0786) | (0.0494) | (0.0582) |
| Month FE | X | X | X | X |
| Weighted | | X | | X |
| Observations | 819 | 819 | 718 | 718 |

Note: Each observation is an advertiser × campaign pair. The sample contains the top 500 private firms, right and other party advertisers. Columns 1 and 2 use the 3 month periods before 1998, 2002, and 2006 parliamentary and municipal elections, columns 3 and 4 uses the campaign periods before 2010 and 2014 elections. Columns 2 and 4 are weighted by the advertiser's total spending in billboards. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

campaign advertising, just like private advertising, was governed by market forces.[25] The last two columns use data from 2010-14 when the billboards were already connected to the right. Column 4 shows that during this period the right-wing party placed 31 percentage points more, and other parties placed 22 percentage points less advertising on the right-connected billboards than did private firms. Both of these coefficients are highly significant. The unweighted specification gives similar results.

The leading interpretation of these patterns is that connected billboards gave discounts to the right-wing party and rationed other parties, that is, allocated space based on a non-market motive, which is our definition of favors. A possible alternative interpretation is favors in the opposite direction: from the party to billboards. But this logic fails to explain the reduced advertising on connected billboards by other parties. It also feels implausible as during campaigns political parties are typically in need rather than in excess of resources.

[25] In the unweighted specification political parties placed a somewhat lower share of advertising on these not-yet connected billboards than private firms; but the change after 2009 is sharp in these specifications as well.

### 4.3 Discussion

The evidence discussed so far documents simultaneous two-way favors between politicians and connected media. The most natural interpretation is media capture through favor exchange: that advertising revenue was exchanged for favorable coverage. We briefly discuss two possible alternatives. The first is that two-way favors emerged because of mutual altruism between the prime minister and media owners. While this explanation may help rationalize the first phase of favors, it is at odds with the third phase during which the newly emerging connected media owners were not—at least based on the publicly available information—personally close to the prime minister. This is especially clear for Origo, where the change in editor occurred while the portal was owned by German multinational Telekom, and where the eventual new owner was connected to the cousin of the governor of the central bank, with no clear personal ties to Orban.

A second possible interpretation is a variant of the shared values logic: that connected media provided favorable coverage not because of the advertising revenue but because of the owners' genuine political beliefs. The key point here is that irrespective of the motives of media owners, the resulting allocation is a form of media capture. Indeed, our results show that distortive advertising was used to support precise those media which chose for non-market reasons to favorably cover politicians, thus creating a political distortion in the market for news.

Our results contribute to an empirical literature on media capture (McMillan and Zoido 2004, DiTella and Franceschelli 2011, Gentzkow et al. 2015, Qin et al. 2016) by documenting media capture in a democracy.[26] They also inform a literature that emphasizes the demand-side determinants of media content in democracies (Gentzkow and Shapiro 2010) by identifying a supply-side determinant. And they contribute to the work on favoritism by being the first study (to our knowledge) that documents the simultaneous presence of two-way favors.[27] We now turn to explore the economic costs of these favors.

[26] The key role of advertising in our context is consistent with its role in increasing the independence of the press in historic US newspapers (Petrova 2011).

[27] Beyond the papers cited earlier, this literature include work on ethnic favoritism (Burgess, Jedwaby, Miguel, Morjariax and Padro i Miquel 2014, Do, Nguyen and Tran 2013) and regional favoritism (Hodler and Rashky 2014). Also related are studies about the revolving door in lobbying (Blanes i Vidal, Draca and Fons-Rosen 2012, Bertrand, Bombardini and Trebbi 2014).

# 5 Economic Cost and Magnitudes

Our main contribution in this section is to develop a new portable structural approach to measure the economic cost of distortive favoritism. In our setting this approach shows that the favors were fairly costly, indicating that politicians highly valued the indirect benefits of favoritism.

## 5.1 An approach to measure the economic cost of misallocative favoritism

Existing efforts to measure its economic costs focus on particular consequences of favoritism, such as defaults, delays in project completion, or the productivity of contractors (Khwaja and Mian 2005, Schoenherr 2016, Mironov and Zhuravskaya 2016). Instead of using such proxies, we develop a new methodology in which we directly compare distorted allocations with the market benchmark. Formally, we express the welfare loss from demand-side allocational distortions with a structural approach that parallels but is distinct from the Hsieh and Klenow (2009) analysis of supply-side distortions. An advantage of our approach is that it is easily portable and can more fully capture the economic costs of misallocation. Indeed, assuming that private advertisers correctly anticipate the impact of their choices, and that the media do not treat government and private advertising differently, the departure from the market allocation should capture all consequences of favoritism. A disadvantage is that our approach relies on structural assumptions and in particular on an elasticity parameter. We argue that using a range of values for this parameter—based on our own estimates as well as estimates in other work—can provide meaningful bounds on the magnitude of the economic cost.

*Model of advertising demand.* We begin with a stylized structural model. Consider a firm which advertises in $n$ different media in a given market—for example, $n$ newspapers in the print market. Assume that, holding fixed all other input, factor, and pricing choices, total firm revenue is a monotone increasing function of

$$R(x_1, x_2, ..., x_n) = \left[ \sum_{i=1}^{n} \lambda_i x_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}. \tag{6}$$

Here $x_i$ denotes advertising surface in media $i$, $\lambda_i$ is a demand shifter that could be governed by the circulation of media $i$ or other factors, and $\sigma$ is the elasticity of substitution between different

media.[28] The implicit assumption behind (6) is that different media reach a somewhat different set of readers and hence dividing advertising across media is beneficial. A higher $\sigma$ means that different media are closer substitutes, in which case it matters less for profits where the firm advertises.

Suppose that the advertiser allocates budget $W_A$ for advertising, so that—denoting the price of advertising per unit of surface in media $i$ by $p_i$—it faces the budget constraint

$$\sum_{i=1}^{n} p_i x_i = W_A. \tag{7}$$

Fix $p_i$ and $W_A$, then the budget shares $s_i = p_i x_i / W_A$ fully characterize an advertising allocation. Denote the optimal allocations by $x_i^*$ and the optimal budget shares by $s_i^*$. Let $L(s_1, ..., s_n) = 1 - R(x_1, ..., x_n)/R(x_1^*, ..., x_n^*)$, a measure of the reduction in revenue (and profit) in allocation $s$ relative to allocation $s^*$. Because $R$ is homogenous of degree one, $L(s)$ equals the share of the advertising budget that could be saved by using the efficient allocation: the advertiser could reduce $W_A$ by a share $L(s)$ and maintain the same level of firm revenue by switching from allocation $s$ to allocation $s^*$. As a result $L(s)$ is a measure of the welfare loss from allocation $s$.[29]

**Proposition 1.** *We can express the welfare loss as*

$$L(s) = 1 - \left[\sum_{i=1}^{n} s_i^* \left(\frac{s_i}{s_i^*}\right)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}} \approx \frac{1}{2\sigma} \sum_{i=1}^{n} s_i^* \left(\frac{s_i - s_i^*}{s_i^*}\right)^2 \tag{8}$$

*where the last expression is a second-order approximation.*

The first expression shows that to measure $L(s)$ we need data on the actual and optimal allocation shares and the elasticity of substitution $\sigma$. The second, approximate, expression provides some intuition for the impact of these parameters. That expression is zero when $s = s^*$, because there is no welfare loss in the optimal allocation. It does not have a linear term because of the envelope theorem: deviations from the optimum have second-order welfare effects. It implies that proportional deviations from the optimum are more costly for more important media ($s_i^*$ high).

[28] A concrete example is when firm sales to consumers are given by $F(K, L, M, R)$ where $K$ is capital, $L$ is labor, $M$ is a vector of intermediate inputs, and $F$ is a production function. In this formulation advertising is just another intermediate input which makes output visible to consumers.

[29] Switching to the efficient composition $s^*$ will in general also imply a different optimal level of total advertising. This reflects additional misallocation which we do not measure here, hence our estimated welfare loss can be interpreted as a lower bound.

And the loss is inversely proportional to $\sigma$: when the different media are close substitutes ($\sigma$ high), shifting advertising between them has smaller welfare effects.

*Empirical implementation.* Proposition 1 shows that to infer the economic cost of misallocation we need three pieces of data: (i) actual allocation shares; (ii) optimal allocation shares; and (iii) the elasticity of substitution. Because proxies for these data are likely to exist in many contexts with favoritism, our approach has the potential to be portable. We now implement the approach for the three advertising markets we discussed in the main text: daily newspapers, billboards and online media. We measure the optimal allocation share $s^*$ with the allocation share of private firm advertisers, and the actual allocation share $s$ with the allocation share of state-owned firm advertisers. The assumption that profit maximization requires similar advertising strategies for these two groups of firms is supported by the fact that under left-wing governments their advertising composition was similar. For further support, in Appendix A.2 we show that among private firms there was only slight heterogeneity in advertising composition by advertiser size and industry.

The key remaining parameter is $\sigma$. Here we use two approaches. First we estimate it directly with a demand system for each market, exploiting variation in private firms' advertising in response to changes in prices, controlling for shifts in demand. This estimation is fairly standard, and Appendix A.3 presents the analysis and the results. We obtain $\sigma$ estimates of 0.61, 1.41 and 1.05 for daily newspapers, billboards and online media. While these elasticities may appear small, to us they seem plausible. Indeed, if the readers of different media do not overlap much—which is especially likely in the print and online markets—then we should expect a lack of substitution. Second, we follow Hsieh and Klenow (2009) in using elasticities of 3 and 5 as benchmarks based on the literature estimating the substitutability of competing firm products. We view these values as conservative because we believe competing manufactures to be more substitutable than different media outlets.

We represent the daily newspaper market with five actors when we apply the model: the four largest daily newspapers by advertising volume in the given period, and all other dailies combined into a hypothetical fifth newspaper. Similarly, we represent the billboard market with five actors: the four largest publishers by advertising volume, and all other billboards. And we represent online

Table 10: Economic cost of misallocation as a share of the advertising budget

| | Direct estimate $0.61 \leq \sigma \leq 1.41$ | Conservative estimate 1 $\sigma = 3$ | Conservative estimate 2 $\sigma = 5$ |
|---|---|---|---|
| | | Right-wing governments | |
| Dailies 1998-2002 | 23% | 9% | 6% |
| Dailies 2010-2014 | 47% | 16% | 10% |
| Billboards 2010-2014 | 50% | 27% | 17% |
| Online 2015 | 11% | 4% | 2% |
| | | Left-wing governments | |
| Dailies 2002-2010 | 15% | 3% | 2% |
| Billboards 2006-2010 | 5% | 2% | 1% |

media with three actors: the two largest, and all other media.[30] We then compute the economic cost using the exact formula in Proposition 1, and express it as a share of the advertising budget for the particular market that state-owned firms could have saved by switching to the efficient allocation.

Table 10 reports the results. Focusing on the top panel (right-wing governments), our direct estimates show fairly high welfare losses due to favoritism, ranging between 11 and 50 percent. Although the welfare loss is second order in the extent of misallocation, because misallocation is so substantial the loss is quite large. The loss in the print market is smaller in 1998-2002 than in 2010-14, because in the former period only one newspaper (Magyar Nemzet) while in the latter period two newspapers (Magyar Nemzet and Metropol) were favored.

The conservative estimates with $\sigma = 3$ and $\sigma = 5$ show smaller but still substantial losses. On average across the four different markets and periods, the lost budget share was 33% using the directly estimated $\sigma$, 14% using $\sigma = 3$, and 9% using $\sigma = 5$. Taking the most conservative and the direct estimates as lower and upper bounds, we conclude that misallocation wasted on average 9-33% of the advertising budget. Favoritism substantially reduced economic efficiency.[31]

[30] Using other plausible definitions has little effect on our results.

[31] For comparison we also included in the table the welfare losses under the left-wing administrations of 2002-2006 and 2006-2010. Consistent with the similar allocation shares for state-owned and private firms in these periods, the estimated welfare losses are much lower. In fact, much of the welfare loss for the print market during 2002-2010 is driven by the fact that during this period state-owned firms advertised relatively less in tabloids than private firms.

Table 11: Magnitudes

| | Dailies | | Billboards | Online |
|---|---|---|---|---|
| | 1998-2002 | 2010-14 | 2010-14 | 2016 |
| | Fraction of industry value added | | | |
| Favors from politician to media | 1.5% | 3.7% | 2.6% | 1.9% |
| Economic loss (direct estimate) | 1.3% | 3.9% | 2.3% | 1.4% |
| Transaction cost of tunneling ($\tau$) | 1.90 | 2.06 | 1.87 | 1.74 |

## 5.2 Magnitudes

Here we compare the magnitudes of the favors and economic costs. The first row of Table 11 measures the value of advertising favors, computed as the total value of state-owned firms' misallocated advertising: $s - s^*$ multiplied by the advertising budget of state-owned firms, expressed as a share of industry value added.[32,33] The values are the tunneled amounts, which exceed the money actually reaching media owners because the costs of advertising are not subtracted. The numbers range between 1.5% and 3.7%, suggesting that tunneling is substantial even relative to the size of the industry.

The second row in the table reports the economic loss due to misallocation. These are the direct—and our preferred—estimates from Table 10, expressed as shares of industry value added.

We can combine these estimates to measure the efficiency of tunneling. Row 3 reports the implied measure of the $\tau$ transaction cost parameter of Besley and Prat (2006), computed as the total cost of advertising favors (row 1 plus row 2) divided by the tunneled amount (row 1). Consistently across markets, the estimates range between 1.74 and 2.06, indicating that each dollar transferred to the connected media cost about 1.9 dollars to the government budget. Politicians valued the vote-buying power of media bias to be almost twice the vote-buying power of efficient public spending. These estimates are larger but comparable to estimates by Schoenherr (2016) of

[32] Industry is defined as the four-digit publishing industry for print and online media, and the four-digit advertising industry for billboards.

[33] Because favors are computed using list prices, the estimates do not reflect discounts to advertisers. While discounts are common in the industry, they are probably much less common for state-owned advertisers whose motive is in part to provide favors.

$\tau$ for procurement in Korea, which range between 1.17-1.21.

# 6 Conclusion

In this paper we documented two-way favors between politicians and the media, and argued that they represent media capture through favor exchange. We also documented the shifting organization of favors towards a within-elite divide-and-rule arrangement. And we developed and implemented a portable approach to measure the economic cost of misallocative favoritism.

We conclude by discussing some caveats with and broader implications of our results. We first note that we probably did not document all favors in either direction. For example, politicians may use regulation, and media owners may use direct bribes. But the large magnitudes documented in Section 5, and the fact that politicians were willing to use them despite their costs, suggest that advertising favors were important. We conclude that a policy intervention which regulates government advertising is likely to reduce media capture.

We focused on measuring the economic cost of favoritism. Another cost is voters' misinformation due to the media distortion. Evidence on the effect of media coverage on votes (DellaVigna and Kaplan 2007, Chiang and Knight 2011, Enikolopov et al. 2011, Barone, D'Acunto and Narciso 2015) suggests this cost can be high, but in the current paper we do not measure it.

A possible mechanism underlying the two-way favors we document is a relational contract. Such a contract can rationalize several key facts. It solves the commitment problem inherent in within-elite interactions (Acemoglu 2003), generates persistently inefficient allocations by trading off efficiency for loyalty (Board 2011), and can break down when the balance of power in the elite changes (Myerson 2008, Boix and Svolik 2013). This logic suggests that our results may be more broadly relevant for within-elite interactions.

Our findings highlight a new link between institutions as the fundamental driver and misallocation as the proximate cause of cross-country income differences, through the logic that misallocative favoritism helps protect political power. This link is distinct from the "political losers" channel of Acemoglu, Johnson and Robinson (2005) in which the desire to protect power leads the elite to block economic innovation. Further exploring this link seems important to us.

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# A Supplementary evidence and proofs

## A.1 Evidence from other markets and periods

*Billboards.* For billboards we report regression estimates here. We change specification (1) slightly: our dependent variable is "Right/All", that is, the share of all billboard spending which was allocated to right-connected billboards. Table A1 shows the results.

The estimates confirm the graphical patterns. Column 2, a specification which includes advertiser fixed effects, shows that under right-wing governments the share of right-connected billboards in the billboard advertising of the average state-owned firm increased by 46 percentage points. And column 4 shows that their share in the average billboard advertising dollar of state-owned firms increased by 68 percentage points. These coefficients are highly significant. The corresponding shifts for administrative government agencies were 28 percentage points ($p < 0.1$) respectively 27 percentage points, although the latter is not significant. For public good providing government agencies the coefficients are negative and insignificant, consistent with the idea that their spending was not under direct political control.

*Phase 2.* Because the graphical patterns in phase 2 are so sharp we chose not to include the regression evidence here. The estimates (not reported) confirm that the shifts are highly significant.

*Print media in phase 3.* For phase 3 we report both graphical and regression evidence for print media and television. We start with print media. In September 2015 a former business newspaper Napi Gazdasag underwent a name and brand change and became political newspaper Magyar Idok. This newspaper was owned and edited by the former editor of Magyar Nemzet, who left at the fallout. Figure A1 shows the advertising share of Magyar Idok and its predecessor relative to the entire daily newspaper market around this event. State-owned firms substantially increased their advertising after the event, while we observe no change for private firms. Table A2 estimates a regression analogous to (1) but with the dependent variable "Magyar Idok/All". The analysis focuses on the period 2014-16 and uses quarterly data. The coefficients confirm the graphical patterns.

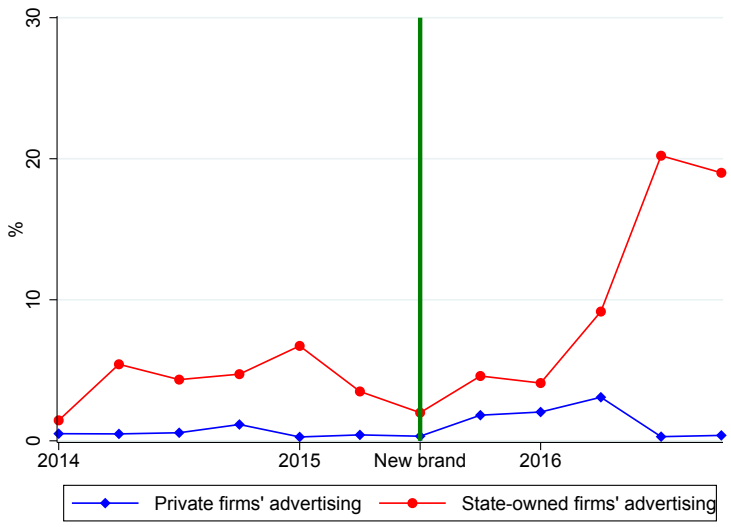
*Television in phase 3.* The two main commercial television channels in Hungary have been TV2 and RTL. Before the fallout, in December 2013, Simicska bought an option for purchasing the former. After the fallout, following a legal battle TV2 ended up in the hands of a government commissioner, Andy Vajna in December 2015. Figure A2 shows the advertising share of TV2 relative to the combined market of TV2 and RTL. Because list prices for television advertising underwent several changes and appear to be unreliable the figure uses the minutes of advertising. The two events correspond to the purchase by Simicska and then by Vajna. After both events the

Table A1: Billboards: political cycle and advertising composition

| Dependent variable: | Share of right-connected billboards, R/All | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned × right cycle | 0.441*** | 0.461*** | 0.676*** | 0.682*** |
| | (0.0721) | (0.0825) | (0.0578) | (0.0574) |
| Govt. agency (admin) × right cycle | 0.286*** | 0.275* | 0.324 | 0.273 |
| | (0.106) | (0.145) | (0.231) | (0.254) |
| Govt. agency (public good) × right cycle | -0.00588 | 0.0287 | 0.0113 | 0.0246 |
| | (0.0335) | (0.0314) | (0.0549) | (0.0518) |
| Advertiser category | X | | X | |
| Advertiser FE | | X | | X |
| Cycle FE | X | X | X | X |
| Observations | 2713 | 2713 | 2713 | 2713 |

Note: Each observation is an advertiser × cycle pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers in 2006-2014. Columns 3 and 4 are weighted by the advertiser's total spending on billboards. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1: Share of Magyar Idok, *Magyar Idok/All*




advertising share of state-owned firms on TV2 sharply increased. The figure also shows the fallout in early 2015, in between these two events.

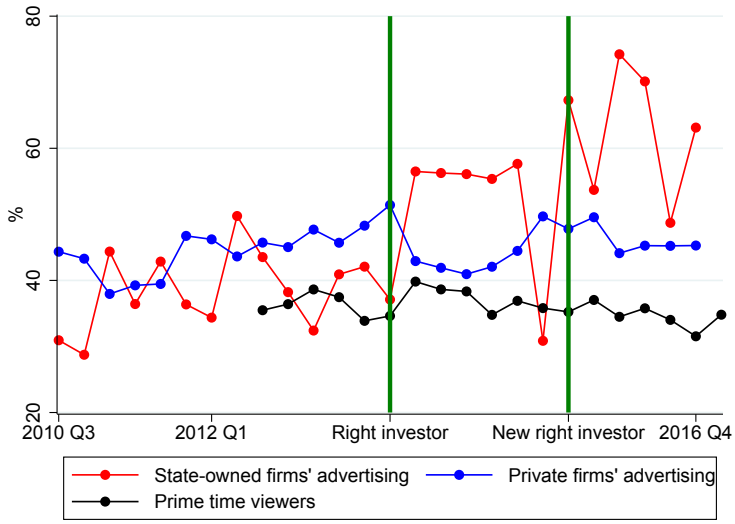
Table A3 reports the results from estimating a regression similar to (1) with "TV2/(TV2+RTL)" as the dependent variable. Both state-owned firms and (in the weighted specifications) government

Table A2: Advertising in Magyar Idok

| Dependent variable: | Share of Magyar idok, R/All | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned × new brand | 0.0454* | 0.0144 | 0.0490*** | 0.0482** |
| | (0.0241) | (0.0191) | (0.0170) | (0.0189) |
| Govt. agency (admin) × new brand | -0.0234 | -0.00648 | 0.0893*** | 0.0913*** |
| | (0.0432) | (0.0489) | (0.0179) | (0.0182) |
| Govt. agency (public good) × new brand | 0.0291** | 0.0325*** | 0.0177* | 0.0220** |
| | (0.0117) | (0.0122) | (0.00991) | (0.0112) |
| Advertiser category FE | X | | X | |
| Advertiser FE | | X | | X |
| Quarter FE | X | X | X | X |
| Observations | 4270 | 4270 | 4270 | 4270 |

Note: Each observation is an advertiser × quarter pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers in 2014-2016. Columns 3 and 4 are weighted by the advertiser's total spending in daily newspapers. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A2: Share of TV2, $TV2/(TV2 + RTL)$




agencies significantly increased their advertising on TV2 after the new investor Vajna purchased it.

Table A3: Advertising in TV2

| Dependent variable: | Share of TV2, TV2/(TV2+RTL) | | | |
|---|---|---|---|---|
| | unweighted | | weighted | |
| State-owned × Right investor | 0.106 | 0.121* | 0.0880 | 0.116 |
| | (0.0742) | (0.0723) | (0.0874) | (0.0827) |
| State-owned × New right investor | 0.220*** | 0.247*** | 0.221** | 0.236*** |
| | (0.0815) | (0.0774) | (0.0975) | (0.0824) |
| Govt. agency (admin) × Right investor | 0.0683 | 0.0963 | 0.209* | 0.211** |
| | (0.0758) | (0.0798) | (0.108) | (0.103) |
| Govt. agency (admin) × New right investor | 0.0159 | 0.0976 | 0.215* | 0.261*** |
| | (0.0990) | (0.0795) | (0.118) | (0.0867) |
| Advertiser category FE | X | | X | |
| Advertiser FE | | X | | X |
| Quarter FE | X | X | X | X |
| Observations | 9724 | 9724 | 9724 | 9724 |

Note: Each observation is an advertiser × quarter pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers in 2006-2016. Columns 3 and 4 are weighted by the advertiser's total purchased minutes in television. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

## A.2 Advertising by industry and size

An important element of our approach is to use private firms as a benchmark for state-owned advertising behavior. This approach is built on the assumption that state-owned advertisers have similar objectives as their private counterparts. However, the industrial composition and size distribution of these groups differ and may contribute to the differences in their advertising.

To deal with this concern in Table A4 we investigate the heterogeneity of advertising, in the two main daily newspapers, among private advertisers. Column 1 reports a specification which includes one-digit industry indicators and their interaction with right cycle, with "trade" as the omitted industry. It shows that trade and manufacturing firms allocate somewhat less to the right-connected daily than do other industries, but these differences are modest relative to the extent to which state-owned firms tilted their advertising for political reasons. Moreover, we see no political cycle in private firms' advertising behavior. Columns 2 and 3 show essentially no heterogeneity by firm size. Column 4-6 report the corresponding weighted results which are qualitatively similar.

## A.3 Estimating the elasticity

Assuming that private firms advertise efficiently, maximizing (6) subject to (7) yields

$$\log(x_{it}^{a*}/x_{jt}^{a*}) = -\sigma \cdot \log(p_i/p_j) + \sigma \cdot \log(\lambda_{it}^{a}/\lambda_{jt}^{a}). \tag{A1}$$

Conditional on the demand shifters $\lambda_{it}^{a}$ of advertiser $a$ in period $t$ over different media $i$ and $j$, the relative price of advertising negatively affects the relative quantity of advertising, with a coefficient

Table A4: Heterogeneity among private advertisers in two main dailies

| Dependent variable: | Share of right-connected daily, R/(L+R) | | | | | |
|---|---|---|---|---|---|---|
| | unweighted | | | weighted | | |
| Manufacturing × right cycle | -0.00336 | | | 0.0117 | | |
| | (0.0296) | | | (0.0409) | | |
| Finance × right cycle | -0.0517 | | | -0.0541 | | |
| | (0.0411) | | | (0.0433) | | |
| Transportation × right cycle | 0.0298 | | | 0.00882 | | |
| | (0.0566) | | | (0.0390) | | |
| Real estate × right cycle | -0.0637 | | | -0.0365 | | |
| | (0.0448) | | | (0.0560) | | |
| Other × right cycle | -0.0598 | | | -0.114* | | |
| | (0.0409) | | | (0.0680) | | |
| Manufacturing | 0.0223 | | | 0.00780 | | |
| | (0.0175) | | | (0.0238) | | |
| Finance | 0.0940*** | | | 0.0899*** | | |
| | (0.0330) | | | (0.0236) | | |
| Transportation | 0.120** | | | 0.0428* | | |
| | (0.0497) | | | (0.0241) | | |
| Real estate | 0.0870** | | | 0.0594 | | |
| | (0.0422) | | | (0.0598) | | |
| Other | 0.131*** | | | 0.167** | | |
| | (0.0436) | | | (0.0676) | | |
| Log(employment) × right cycle | | 0.00677 | | | 0.0114* | |
| | | (0.00751) | | | (0.00646) | |
| Log(employment) | | -0.00739 | | | 0.000273 | |
| | | (0.00632) | | | (0.00642) | |
| Log(sales) × right cycle | | | 0.000572 | | | 0.00726 |
| | | | (0.00695) | | | (0.00567) |
| Log(sales) | | | -0.00802* | | | -0.00669 |
| | | | (0.00475) | | | (0.00427) |
| Cycle FE | X | X | X | X | X | X |
| Observations | 1424 | 1394 | 1404 | 1424 | 1394 | 1404 |

Note: Each observation is an advertiser × cycle pair. The sample contains the top 500 private, the top 200 state-owned, and all government agency advertisers for the period 1994-2014. Columns 4-6 are weighted by the advertiser's total spending in the two newspapers during the sample period. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$\sigma$. To estimate this demand system we proxy $\lambda^a_{it}$ with observables and fixed effects by assuming

$$\log(\lambda^a_{jt}/\lambda^a_{jt}) = \beta' \cdot (z^a_{it} - z^a_{jt}) + f^a_i - f^a_j + \varepsilon^a_{it} - \varepsilon^a_{jt} \tag{A2}$$

Table A5: Demand elasticities

| Dependent variable: | Log(advertising ratio) | | |
|---|---|---|---|
| | Print media | Billboards | Online |
| Log(price ratio) | -0.611** | -1.414*** | -1.051*** |
| | (0.297) | (0.517) | (0.0876) |
| Other covariates | X | X | X |
| Observations | 1950 | 1648 | 1066 |

Note: Each observation is an advertiser × month pair. The sample contains the bottom 80% of the top 500 private advertisers. Column 1 uses the two main daily newspapers, column 2 the two largest non-connected billboard companies, column 3 the two largest online newspapers. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

where $z_{it}^a$ is a vector of observable demand shifters, $\beta$ is a parameter vector, $f_i^a$ are advertiser-media fixed effects, and $\varepsilon_{it}^a$ are i.i.d. taste shocks. In effect, we assume that shifts in the relative demand of $a$ over media $i$ versus media $j$ are spanned by observables $z$ and by advertiser-media fixed effects. A key observable to include in $z_{it}^a$ is circulation.

Substituting (A2) into (A1) yields our estimating equation for $\sigma$:

$$\log(x_{it}^{a*}/x_{jt}^{a*}) = -\sigma \cdot \log \frac{p_i}{p_j} + \sigma\beta \cdot (z_{it} - z_{jt}) + \sigma \log f_i^a - \sigma \log f_j^a + \sigma(\varepsilon_{it}^a - \varepsilon_{jt}^a). \tag{A3}$$

We estimate (A3) for private firm advertisers separately by market. Within each market assume a constant elasticity $\sigma$ across all outlets. In each market we exclude the top 20% of advertisers because their demand shocks may have a larger price effect, creating a possible confound.[34] For print media we infer the elasticity from advertising in the two main daily newspapers. For demand shifters we use relative circulation, the relative support in polls of the main right-wing and the main left-wing party, and the interaction of both of these with advertiser size measured as the log of total advertising expenditure.[35] For billboards we infer the elasticity from private firms' advertising at two major unconnected billboard companies—we focus on these because their price data are of higher quality. For billboards we do not have circulation numbers, but we do include the relative support of the two main parties and its interaction with advertiser size. And for online media we have a specification analogous to that for print media, using advertising in the two main portals Index and Origo and using relative page views instead of relative circulation.

Table A5 shows the results. The elasticity is lowest for print media and highest for billboards, consistent with the intuition that billboards, which do not provide content, are less differentiated.

[34] Also including the top advertisers results in a somewhat smaller, though not significantly different, elasticity for daily newspapers.

[35] We use the polls of Tarki, one of the largest Hungarian polling companies.

## A.4 Proofs

**Proof of Proposition 1.** Let $\gamma_i = \lambda_i^\sigma p_i^{1-\sigma}/(\sum_{j=1}^n \lambda_j^\sigma p_j^{1-\sigma})$. Maximizing (6) subject to (7) yields, after some calculations, that $s_i^* = \gamma_i$. Moreover, denoting $V(s) = 1 - L(s)$ it is straightforward to verify that

$$V(s) = \left[\sum_{i=1}^n \gamma_i^{\frac{1}{\sigma}} s_i^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}. \tag{A4}$$

This gives the first expression in the Proposition. To derive the approximation, for any $s = (s_1, ..., s_n)$ which satisfies $\sum_{i=1}^n = 1$, let $\tilde{s} = (s_1, ..., s_{n-1})$. Define $\tilde{V}(\tilde{s}) = V(s_1, ..., s_{n-1}, 1 - \sum_{i=1}^{n-1} s_i)$. Clearly $V(s) = \tilde{V}(\tilde{s})$. A second-order Taylor approximation of $\tilde{V}(\tilde{s})$ around $\tilde{s}^*$ gives

$$\tilde{V}(\tilde{s}) \approx \tilde{V}(\tilde{s}^*) + \frac{\partial \tilde{V}}{\partial \tilde{s}}(\tilde{s}^*) \cdot (\tilde{s} - \tilde{s}^*) + \frac{1}{2}(\tilde{s} - \tilde{s}^*)' \cdot \frac{\partial^2 \tilde{V}}{\partial^2 \tilde{s}}(\tilde{s}^*) \cdot (\tilde{s} - \tilde{s}^*)'. \tag{A5}$$

Here by definition $\tilde{V}(\tilde{s}^*) = 1$, and by the first-order condition the vector $\partial \tilde{V}(\tilde{s}^*)/\partial \tilde{s} = 0$. Computing the second derivatives requires several steps of straightforward algebra and yields, when $i \neq j$

$$\frac{\partial^2 \tilde{V}(\tilde{s}^*)}{\partial s_i \partial s_j} = -\frac{1}{\sigma \gamma_n}$$

and when $i = j$

$$\frac{\partial^2 \tilde{V}(\tilde{s}^*)}{\partial^2 s_i} = \frac{1}{\sigma} - \frac{1}{\sigma \gamma_i}.$$

Substituting these expressions into (A5) and using $s_n - s_n^* = -\sum_{i=1}^{n-1}(s_i - s_i^*)$ the Proposition follows.