

Media Capture through Favor Exchange*

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Abstract

We uncover the full circle of favors leading to media capture in Hungary. We first document favors from politicians to the media. Exploiting changes in government and media ownership, we show that under right-wing—but not left-wing—governments, state-owned firms heavily tilted advertising to connected newspapers and billboards, relative to the advertising composition of private firms or circulation shares. We then document two forms of media bias as return favors. We show that the connected newspaper had lower corruption coverage than the opposition newspaper before, but not after, a public breakdown in its relationship to the politician which also lead to the termination of advertising favors. And we show that billboard companies, after they became right-connected, selectively hosted the political campaigns of the right-wing party. Using a structural model we infer the welfare cost of advertising misallocation to be a third of the advertising budget, and estimate that each dollar spent on media capture cost 1.9 dollars to taxpayers. Our results suggest that the mechanism underlying media capture was a misallocation-inducing relational contract.

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

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1 Introduction

When political influence drives the media to depart from fair and balanced representation, we talk about media capture. Because of the media’s large effects on opinions and beliefs, in many autocracies media capture is a fact of life, often achieved through direct control or explicit bribes.¹ With moderately strong institutions which prevent such arrangements, more subtle forms of capture may emerge, limiting accountability and increasing the risk of a drift towards autocracy. But how can capture emerge in the shadow of democratic institutions? And if it does emerge, what are its mechanisms and welfare implications? Answering these questions can shed light on the politico-economic distortions created by the demand for political power.

In this paper we document and analyze how under democratic institutions the media can be captured through favor exchange. Specifically, we uncover the full circle of favors leading to media capture in Hungary, measure an economic welfare cost, and highlight an underlying mechanism. We begin our analysis by documenting advertising favors from politicians to connected media. Our identification strategy is to compare state-owned firms’ politically influenced advertising with private firms’ market-based advertising, before and after changes in political power and media ownership. We then document two forms of media bias as return favors. We exploit a public breakdown in its relationship with the politician to show that the connected newspaper suppressed corruption coverage as long as it received advertising favors. And we show that billboard companies, after they became connected, selectively hosted the political campaigns of the right-wing party. We then use a structural model to estimate the welfare cost of misallocating advertising, and argue that a misallocation-inducing relational contract can explain our findings.

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. In our analysis we focus on print media and billboards, and classify outlets in these markets—based on ownership and personal connections—as connected to the left, connected to the right, or unconnected. We show in particular that several media

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.

companies were owned by a business group whose leader, to whom we refer as the “right-connected investor,” had strong ties to the right-wing prime minister.

In Section 3 we document favors from politicians to the media. Our approach is to compare state-owned firms’ advertising composition to private firms’ advertising composition and to circulation shares, where the latter two act as benchmarks for the efficient allocation.^{2,3} We start by exploring advertising in the two most important daily newspapers, one of which was connected to the right (Magyar Nemzet), the other to the left (Nepszabadsag). We find that, relative to both benchmarks, state-owned firms dramatically tilted advertising to the right-connected daily under right-wing governments. For example, a difference-in-differences specification shows that state-owned firms (relative to private firms) increased the share of their advertising allocated to the right-connected daily by 39 percentage points under right-wing governments. In contrast, there was no analogous tilting to the left: state-owned firms’ and private firms’ advertising shares were similar under left-wing governments. Moreover, the changes in allocations were rapid: we observe sharp increases in state-owned firms’ right-connected advertising after 1998 and 2010 when the right won power, and a dramatic drop after 2002 when they lost power.

A straightforward explanation for these patterns is that right-wing governments directed advertising to the right-connected daily in expectation of political or financial return favors. We next discuss possible alternative explanations, and present additional pieces of evidence which rule them out and shed further light on the patterns on favoritism.

One alternative explanation, also highlighted by DiTella and Franceschelli (2011), is shared ideology: that advertising favors were provided not in expectation of return favors, but purely to support the conservative values of the right-connected newspaper. To explore this we next look at billboard advertising. The right-connected investor’s business group purchased several billboard 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 about 30% to over 80%. Private firms’ advertising share remained below 30% both before and after the election.

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.

Because billboards do not represent values or ideologies, these facts are inconsistent with the shared ideology explanation.

A second alternative explanation is that state-owned firms had a different target audience under right-wing governments, which happened to coincide with the readers of the right-connected media. To rule out this explanation we exploit a change in media ownership. In 2011, the right-wing investor’s group purchased Metropol, a freely distributed tabloid newspaper with large circulation. In a single month, state-owned firms increased the share of their print advertising allocated to Metropol from about 20% to about 50%. In contrast, private firms did not increase their advertising share of Metropol. Because media consumption patterns are unlikely to change this quickly, the results show that media ownership, not media audience drove advertising favors.

Taken together, these three pieces of evidence—from different markets and based on different sources of variation—strongly support the favor exchange interpretation over plausible alternatives. The evidence also reveals that several favors were channeled to the group of a single investor, highlighting the key role of his relationship with the right-wing political elite.⁴

In Section 4 we document two forms of media bias as return favors: newspapers hiding corruption scandals and billboards selectively hosting political campaigns. For corruption coverage our identification comes from an event which is also of direct interest: a breakdown in the relationship between the right-connected investor and the right-wing prime minister. In February 2015, several journalists in the right-connected daily resigned—soon to join the state media—and in interviews the right-wing investor personally attacked the prime minister. Advertising favors immediately stopped. State-owned firms’ print advertising share allocated to the investor’s two dailies (Magyar Nemzet and Metropol) dropped from above 60% to below 20%, and there was a similar decline in their billboard advertising allocated to the investor’s billboards. In contrast, private firms’ advertising composition did not change.

We investigate how coverage of government corruption scandals changed after this event. We

⁴ One explanation for state-owned firms’ willingness to direct advertising to connected media—which we explore in ongoing work—is that they themselves were captured: a number of their managers came from the business group of the right-connected investor. This logic suggests that one reason we observe stronger favoritism on the political right in Hungary is its higher political centralization, a factor also emphasized by Fazekas and Toth (2016) in their study of procurement networks in Hungary.

compare the online content of the investor’s main political daily Magyar Nemzet—the “affected” daily—with two benchmarks: the left-connected daily, and another “unaffected” right-connected daily (unrelated to the investor falling out with the prime minister). 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.⁵ The natural interpretation is that before the fallout, in return for advertising favors, the affected daily suppressed news on corruption: advertising favors lead to media capture, limiting government accountability (Stromberg 2015). Possible alternative interpretations—for example, that after the fallout the daily started to cover corruption “too much”—cannot easily explain why the daily would distort news precisely when it stopped receiving favors; and feel implausible because, in all models we are aware of, corruption coverage is beneficial.

We then turn to the second form of media bias: the selective hosting of political campaigns on billboards. Because the right-connected investor 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. A natural interpretation is that connected billboards sponsored the campaign advertising of the right-wing party and limited that of other parties, i.e., media capture for billboards. Taken together, the results on the capture of both newspapers and billboards, in combination with the evidence that media coverage affects electoral outcomes (DellaVigna and Kaplan 2007, Enikolopov, Petrova and Zhuravskaya 2011), suggest that a key motive for inefficient advertising favors was the desire to protect political power.

In Section 5 we study welfare, magnitudes and mechanisms. We start by measuring the welfare cost of misallocating government advertising. We contribute to the work on the welfare effects of favoritism (Khwaja and Mian 2005, Mironov and Zhuravskaya 2016, Schoenherr 2016) with an approach based not on particular consequences, but on a comparison of allocations, which can

⁵ We collectively label news to be corruption scandals if they involve allegations of the abuse of public resources.

more fully capture the cost of misallocation. We present a simple model of firms' demand for advertising, and—paralleling the Hsieh and Klenow (2009) analysis of supply-side distortions—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 media. Estimating the elasticity from variation in the relative price of advertising, we find that, on average across the different markets and periods, favoritism cost 38% of advertising expenses. Intuitively, by using the efficient composition, state-owned firms could have reduced their advertising expenses by this fraction and still generate the same revenue.

Pulling together results from different parts of the paper, we next compare magnitudes. Because we study narrowly-defined industries—publishing and advertising—we compute magnitudes as a share of industry value added. Expressed in this way, the value of excess advertising tunneled to connected media was, on average across the different markets and periods, 2.6% per year, suggesting that favors were large even relative to industry size. Using our structural model we estimate that hosting the party's campaign—the second return favor—had an annual monetary value of 0.6%. And our welfare loss estimate amounts to an annual 2.4% of industry value added. Combining the first and the third measure we estimate the Besley and Prat (2006) tunneling inefficiency parameter, the cost to the government of a dollar of connected advertising, to be 1.9 dollars. The fact that we observe capture in spite of this high value suggests that the main transaction cost limiting media capture in other contexts is likely not economic but political.

Finally we highlight a mechanism that explains our findings: that politicians secure media support through a misallocation-inducing relational contract. Three arguments support this interpretation. First, absent external enforcement, the interaction between politicians and business owners is subject to a commitment problem (Acemoglu 2003). This can be solved by a relational contract in which the promise of future interactions provides enforcement. Second, consistent with our evidence, such a relational contract creates misallocation because of a tradeoff between efficiency and loyalty (Board 2011). Intuitively, the politician has additional incentive to favor the loyal actor because doing so generates return favors. Third, paralleling the logic of Myerson (2008), when the leader gains sufficient political power, he has an incentive to end rent-sharing. This

helps explain the timing of the breakdown after changes in electoral rules contributed to a large right-wing majority in the 2014 election. More broadly, this mechanism may link institutions as the fundamental driver and misallocation as the proximate cause of income differences.⁶

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 comes from non-democracies: McMillan and Zoido (2004) document capture through bribes during Peru’s decline into autocracy, and Qin, Stromberg and Wu (2016) study capture through direct state ownership in China. There is limited evidence from democracies. In a key study DiTella and Franceschelli (2011) present suggestive evidence on capture through favor exchange in Argentina, but cannot rule out some plausible alternative explanations. And Gentzkow, Petek, Shapiro and Sinkinson (2015) find essentially no evidence for capture in historic US newspapers.⁷ Our contribution to this work is clean evidence on media capture and its mechanism—relational favor exchange—in a democracy.

Other research on media content emphasizes the demand-side determinants of media bias, 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 clean evidence on a supply-side determinant and its mechanism: media capture through favor exchange.

We also build on a literature about favoritism emanating from Fisman (2001), which includes studies of asset prices (Faccio 2006), procurement (Borgaard, Denes and Duchin 2015, Mironov and Zhuravskaya 2016, Schoenherr 2016), credit (Khwaja and Mian 2005) and sales (Cingano and Pinotti 2013), among other contributions. The paper on favoritism most closely related to ours is DellaVigna, Durante, Knight and Ferrara (2015) who highlight an indirect channel of advertising favors in Berlusconi’s Italy. Our contribution to this literature is to cleanly document the full circle of favors, to develop a new approach measuring its welfare cost, and to highlight a mechanism.

⁶ This mechanism is related to, but 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.

⁷ 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

Hungary is 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.⁸ 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.

Media. We focus on two media markets, publicly oriented daily newspapers and billboards. The former—to which we also slightly imprecisely refer as print media—includes all major daily newspapers that cover at least some political news. The latter includes all billboards about which we have data, which represent a large share of the market.⁹ We classify both newspapers and billboards into three categories: connected to the left, connected to the right, or independent. The classification is based on the political connections of the owners and, for newspapers, their self-reported ideological position.

⁸ Independent members represent less than a quarter percent of parliament and are not reported.

⁹ We have data on all major billboard companies with the exception of a single firm.

A key owner of media connected to the right in our sample period is Lajos Simicska, an investor with strong political ties. Simicska was a college roommate of Viktor Orban, prime minister during the right-wing governments of 1998-2002 and 2010-16. Simicska was also head of the Tax Authority for a period during 1998-2002. Because of these connections we 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 business group also 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. We classify these newspapers and billboards as right-connected, and in the analysis exploit both their status and the timing of ownership changes for identification. 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). As we discuss in detail below, Simicska and Orban had a public fallout in 2015, so we use the classification of these newspapers and billboards as right-connected only until the end of 2014.

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. There was also a billboard company connected to the left, *ESMA*. Because this company was much smaller than those connected to the right, we will not exploit its connected status in the analysis.

Finally, another daily newspaper which plays an important role in our study is *Magyar Hirlap*. This newspaper was connected to the left until 2006, when it was purchased by an investor with ties to the right (different from Simicska, the main right-connected investor) and has been connected to the right since then. Because it has substantially smaller circulation than the others discussed above, for simplicity in most of the analysis we classify this newspaper as independent.¹⁰ But we do exploit its connection to the right in the content analysis which focuses on a period after 2006.

¹⁰ Because of its small size, classifying it as connected does not change any of our results. And an event study of its ownership change—under a left-wing government—shows no change in advertising, consistent with the results on lack of favoritism for the left we document below.

Table 2: Summary statistics on advertising

	Number of advertisers	Spending share (%)		Spending value (USD M)	
		print	billboards	print	billboards
Private firm	500	71.2	83.8	1545	1718
State-owned firm	200	19.7	11.4	428	234
Govt. agency	284	9.1	4.8	197	99

2.2 Data and sample definitions

We work with three main datasets.

Advertising, 1994-2015. 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 split advertisers into three categories: 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 284 government agencies, which constitute our main sample. Table 2 present summary statistics on advertising spending in this sample. State-owned firms, which are of primary interest to us, account for 20% of total advertising value in the print market and 11% in the billboard market. The corresponding numbers for government agencies are 11% and 5%. Spending is computed by Kantar Media as the product of advertising surface and list price, using the the price specific to the concrete ad (position, color, day, media, etc.). 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.¹¹

Firm performance, 1992-2014. 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

¹¹ We do not observe advertiser-specific prices and hence cannot study price discrimination, such as connected media charging inflated prices for state-owned firm advertisers.

Hungarian Statistics Office for 2000-2012, and from the Hungarian Company Register for 2013-14. 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. We use company names to link the advertising and the balance sheet data.

Media content. For content analysis we scraped the online content of three daily newspapers discussed earlier: Nepszabadsag, the main left-connected daily (content available 2012-16); Magyar Nemzet, the main right-wing daily, which was affected by the 2015 fallout between media and politics (content available 2010-16); and Magyar Hirlap, the smaller daily which was right-connected in the period for which its online content was available (2014-16).

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

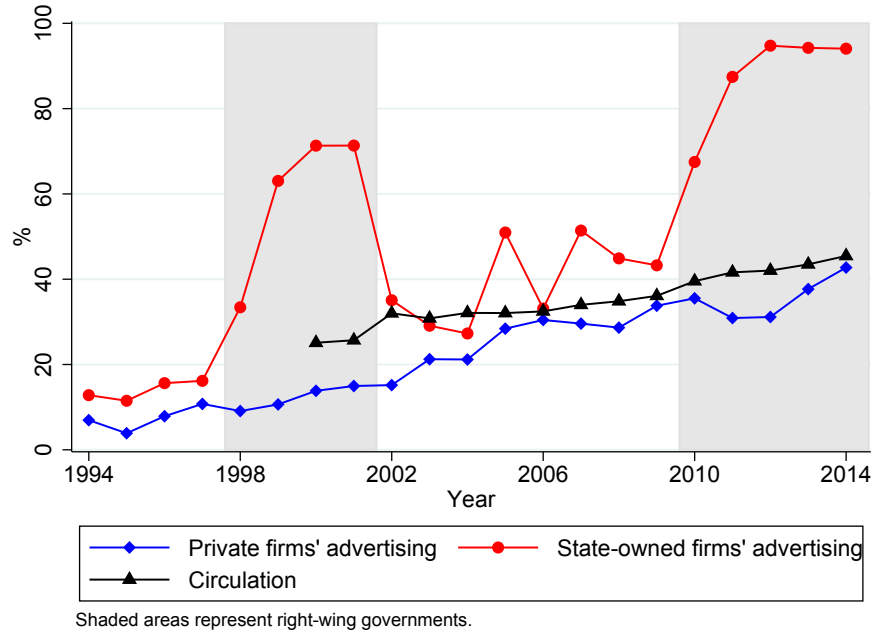
We begin with figures which illustrate the main patterns in the data. Our approach is to look at how the composition of advertising in right-connected and left-connected media varies depending on whether the advertiser is controlled by the state, and on the political leaning of the government.

Left-connected vs right-connected daily. Focusing on 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.^{12,13}

¹² 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.

¹³ 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, $R/(L + R)$

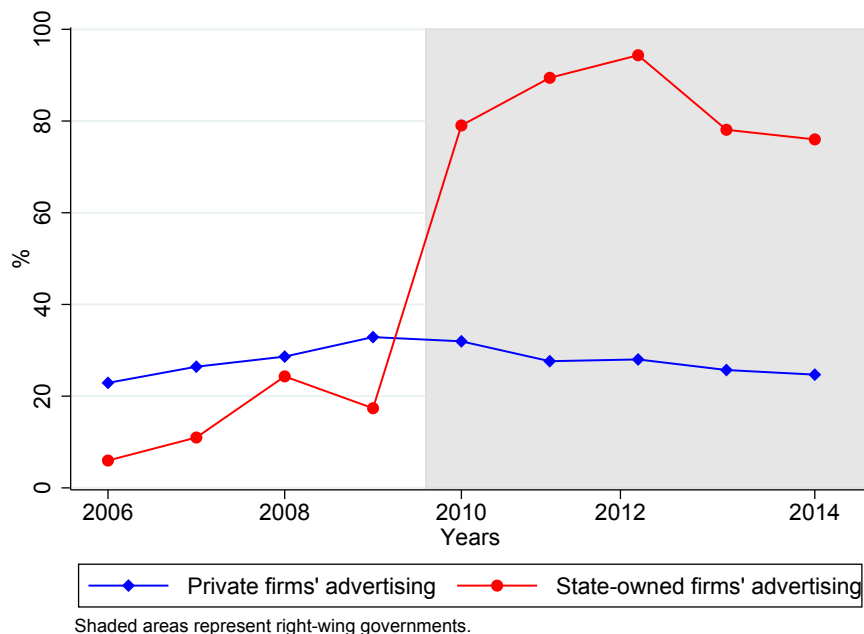


Begin the interpretation with the plot of relative circulation, which—due to data availability—starts in 2000. In the early 2000s the right-connected daily represented only about 25% of the combined circulation of the two newspapers, but by 2014 its circulation share increased to 45%. The figure shows 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.

The main lesson of the figure is contained in the pattern of advertising for state-owned firms. During left-wing governments, the composition of advertising for these firms was fairly similar to that of private firms. 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 right-wing governments engaged in welfare-reducing

Figure 2: Share of right-connected billboards, R/All

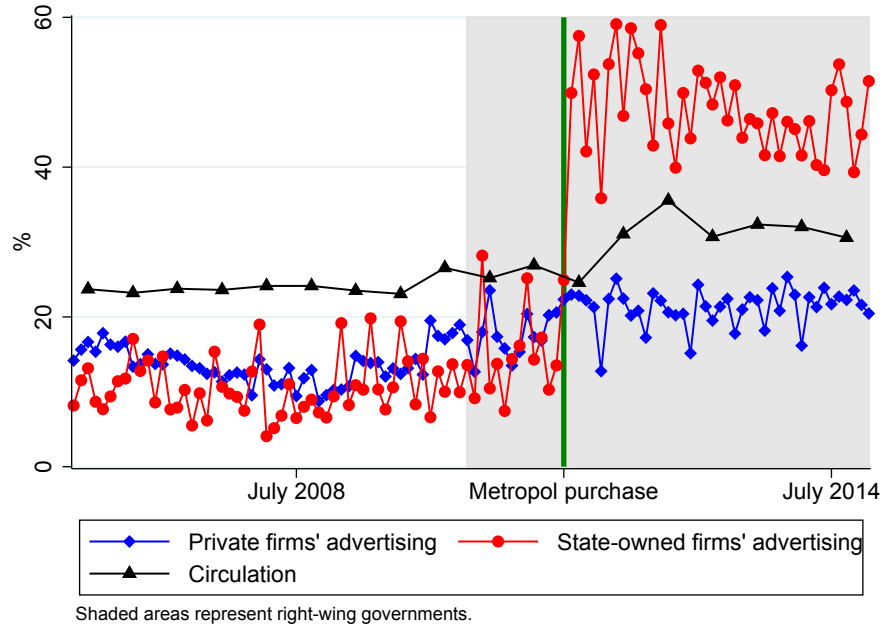


favor exchange. According to this interpretation, these governments allocated advertising to connected media in exchange for return favors; and by doing so they departed from the market allocation for advertising and thus reduced welfare. However, there are also alternative explanations. We now discuss two leading alternative explanations and present evidence that rules them out. We discuss some other less plausible alternative explanations in Section 3.3 below. And then we present evidence on return favors in Section 4 which provide further support for the favor exchange interpretation.

Shared values and billboards. One possible explanation for the patterns in the print market is shared ideology or shared values (DiTella and Franceschelli 2011). According to this logic, the right-wing government did not expect return favors; instead it simply used advertising to support the conservative values represented by the right-connected newspaper. To address this explanation we now turn to 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 2

Figure 3: Share of Metropol around purchase by connected investor, *Metropol/All*



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 consistent with the favor exchange interpretation, but not with the shared values interpretation.

Target audiences and Metropol. A second alternative explanation is that state-owned firms had a different target audience under right-wing governments, and this audience was easier to access through the right-connected media. We first note that it is unclear why the target audience of these firms would change with an election. More important, we can directly show that advertising favors 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, the right-wing investor's group 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 3 we plot the advertising and circulation share of Metropol relative to all publicly oriented daily print media.¹⁴

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 media consumption patterns are unlikely to change this quickly, the rapid change in allocations provides direct evidence that ownership, rather than audience, drove advertising favors.

3.2 Regression analysis

To measure statistical confidence, and to further explore the patterns of favoritism, we now turn to regressions. We proceed in the order of the graphical analysis.

Daily newspapers. We aggregate the spending of each advertiser in each of the two main dailies to the the electoral cycle level, and estimate

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

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 μ_c . Our main interest is in the ρ_l coefficients, which measure, by advertiser category, the extent to which the composition of advertising differs when the right is in power.

Table 3 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)

¹⁴ Because it was purchased after 2010, we cannot use variation coming from changes in political power for Metropol.

Table 3: Daily newspapers: political cycle and advertising composition

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

Note: Each observation is an advertiser \times 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 3 and 4 are weighted by the advertiser's total spending in the two newspapers during the sample period. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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 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. There was no favoritism under left-wing governments in this market.

Column 2 presents the same specification with advertiser fixed effects. Because the fixed effects soak up level differences between government-controlled and private advertisers, this specification can no longer 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 remain strong: relative to the omitted category of private firm advertisers, advertisers controlled by the government dramatically shifted their advertising to the right-connected daily under right-wing governments.

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 spending allocated to right-connected media increased by 37 percentage points under right-wing governments. The coefficients for public good providing agencies are also significant, but much smaller: misallocation was mainly driven by state-owned firms and administrative agencies.

Beyond showing the robustness of the graphical patterns, the regressions highlight two new results. First, administrative government agencies also reallocated much of their advertising, and second, public good providing agencies did not reallocate much. One likely explanation is that administrative agencies, which were under direct political control, engaged in favoritism just like state-owned firms; but public-good providing agencies such as hospitals, because they were politi-

Table 4: Billboards: political cycle and advertising composition

Dependent variable:	Share of right-connected billboards, R/All			
	unweighted		weighted	
State-owned \times right cycle	0.441*** (0.0721)	0.461*** (0.0825)	0.676*** (0.0578)	0.682*** (0.0574)
Govt. agency (admin) \times right cycle	0.286*** (0.106)	0.275* (0.145)	0.324 (0.231)	0.273 (0.254)
Govt. agency (public good) \times right cycle	-0.00588 (0.0335)	0.0287 (0.0314)	0.0113 (0.0549)	0.0246 (0.0518)
State-owned	-0.0875*** (0.0319)		-0.0942** (0.0378)	
Govt. agency (admin)	-0.000289 (0.0625)		-0.0296 (0.117)	
Govt. agency (public good)	-0.0919** (0.0403)		0.00265 (0.107)	
Advertiser FE		X		X
Cycle FE	X	X	X	X
Observations	2713	2713	2713	2713

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

cally less important and had smaller advertising budgets, were under weaker control and did not need to reallocate as much.

Billboards. For billboards we change specification (1) slightly: our dependent variable here is “Right/All”, that is, the share of all billboard spending which was allocated to right-connected billboards. Table 4 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.

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 $\text{post acquisition}_{it}^q$ 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 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 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. We conclude that advertising reacted rapidly to the change in ownership. Because the audience of Metropol, a freely available newspaper distributed in subway stations, is unlikely to change this quickly, these results indicate that favors were governed by the ownership and not the audience of the media.

Table 5: Metropol: ownership change and advertising composition

Dependent variable:	Share of Metropol, Metropol/All			
	unweighted		weighted	
State-owned×pre-acquisition 4	0.00804 (0.0515)	-0.0113 (0.0471)	-0.000672 (0.0867)	-0.00138 (0.0863)
State-owned×pre-acquisition 3	0.0189 (0.0409)	-0.00866 (0.0274)	-0.0104 (0.0246)	-0.00708 (0.0211)
State-owned×pre-acquisition 2	0.0453 (0.0498)	0.00708 (0.0315)	0.00296 (0.0386)	-0.00411 (0.0393)
State-owned×post-acquisition 0	0.0831 (0.0511)	0.0399 (0.0449)	0.281*** (0.105)	0.284*** (0.106)
State-owned×post-acquisition 1	0.106* (0.0546)	0.0493 (0.0456)	0.228*** (0.0843)	0.236*** (0.0848)
State-owned×post-acquisition 2	0.183*** (0.0648)	0.151*** (0.0577)	0.286*** (0.0712)	0.291*** (0.0642)
State-owned×post-acquisition 3	0.168** (0.0738)	0.112* (0.0630)	0.300*** (0.0678)	0.294*** (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 for a 2 year window around the acquisition in the 3rd quarter of 2011. Columns 3 and 4 are weighted by the advertiser’s total spending in daily newspapers during the sample period. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.3 Discussion

Here we discuss alternative explanations for the advertising results, highlight a likely mechanism through which politicians exercised control over state-owned firms, and speculate about possible reasons why we do not observe favoritism on the left.

3.3.1 Alternative Explanations

Shared values. As discussed earlier, the shared values explanation is inconsistent with the billboards result. It is also hard to reconcile with the fact we will discuss in Section 4 that after the prime minister and the right-wing investor had a fallout in 2015 advertising favors on billboards (as well as in print media) stopped.

Media giving discounts to the right-wing government. A variant of the shared values hypothesis is that the observed patterns represent favors flowing in the opposite direction: that media companies supported the connected government by offering discounts on advertising. This story seems to go against basic economic logic. State-owned firms are controlled by the government which has direct access to the government budget, and hence are unlikely to need direct support. And a more effective way for media owners to support the governing party would be gifts or campaign finance. This interpretation also seems at odds with the fact that the annual average profit of the publisher of the right-wing daily, 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 right-wing newspapers. The fact that profits increased is inconsistent with this explanation as well.

Different target audience of state-owned firm advertisers. As discussed above, this explanation is inconsistent with the Metropol result. Moreover, 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 advertisers. As we show in the Appendix, there is little difference between private advertisers' allocation shares across industries; and for private advertisers these allocation shares do not seem to vary with the political cycle.

3.3.2 Politicians' Control over State-owned Firms

How did politicians influence state-owned firms' advertising? Anecdotal evidence suggests, and in ongoing work we explore, a clientelism channel. According to this channel, many new managers of state-owned firms after the 2010 election came from the business empire of the right-connected

investor; and those state-owned firms which were “captured” in this way reallocated advertising more strongly to connected media. This logic suggest that control was achieved through a form of capture in which loyal actors were placed in key decision making positions.

3.3.3 Lack of Advertising Favoritism by the Left

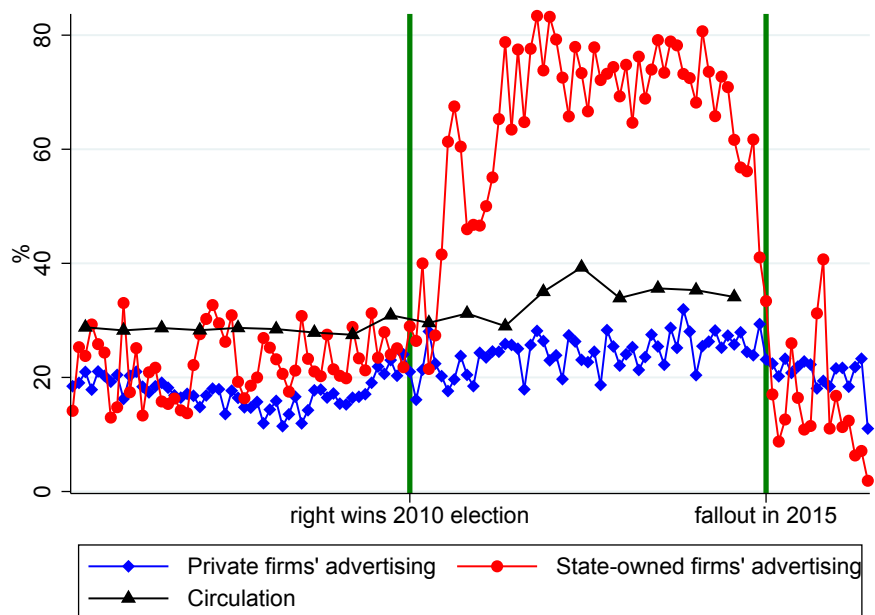
Our evidence shows that there was essentially no advertising favoritism under left-wing governments. Here we discuss possible explanations of this fact. Importantly, there were several major corruption scandals under left-wing governments, suggesting that the answer is not, or not only, a difference in corruption attitudes.¹⁵ An alternative answer may be differences in political centralization. Kertesz (2013) documents that in Hungary right-wing parties were more centralized than left-wing parties. Higher centralization may increase favoritism through a “multimarket contact” (Bernheim and Whinston 1990) logic: a government which controls the allocation of projects at more agencies can extract a higher return favor in exchange for each project, and as a result has a stronger incentive to allocate projects to favored actors. Fazekas and Toth (2016) also emphasize increased centralization after 2010 in their study of Hungarian procurement networks. A variant of the centralization story is that creating a media empire to which resources can be channeled involves a fixed cost. Financing this fixed cost is a “commons” problem which is easier to solve when the political side is centralized. Either of these forces may have contributed to the differences we observe.

4 Return Favors: Media Bias

In this section we document two forms of media bias as return favors: scandal coverage and campaign hosting. In the process we also uncover additional evidence suggesting that a relational contract underlies favor exchange.

¹⁵ See for example the cases discussed in the Freedom House (2006) Freedom in the World Report.

Figure 4: Share of investor's dailies around fallout, R/All



4.1 Scandal coverage

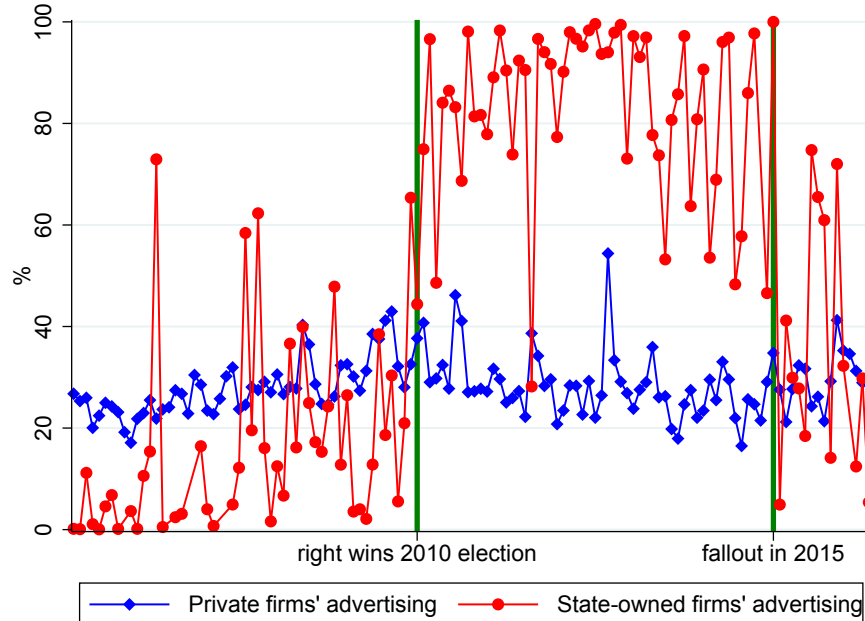
For scandal coverage, our identification comes from an event which is also of direct interest: a breakdown in the relationship between the right-connected investor and the right-wing prime minister. The breakdown provides a source of variation in both advertising favors and media content, allowing us to identify media bias.

4.1.1 A breakdown in the relationship

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

To confirm this interpretation, in Figure 4 we show the advertising share of the two daily

Figure 5: Share of investor’s billboards around fallout, R/All



newspapers of the investor, Magyar Nemzet and Metropol around this event. The increase in state-owned firms advertising after the 2010 election is the familiar pattern we had documented in Section 3. 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, consistent with the idea of a breakdown, advertising favors were terminated. The decline started a few months earlier, suggesting that cracks in the relationship appeared before the public fallout.

Figure 5 shows a similar if somewhat more noisy pattern in the billboard market: advertising favors on billboards also stopped immediately after the fallout.¹⁶ The rapid reallocations in both markets provide further evidence that the patterns we document represent favor exchange. Indeed, changing target audiences are unlikely to explain the rapid change in print advertising; and changes in shared values cannot explain the changes in value-free billboard advertising. A breakdown in the

¹⁶ Regressions of the sort we had estimated earlier (not reported) show that the drop around the fallout is large and significant in both the print and the billboard market.

favor exchange relationship can explain both, and also the fact that they occurred simultaneously in the two markets.

In addition, the favor exchange interpretation can also explain the timing of the breakdown, with an argument based on the increased political power of the right-wing party. During the 2010-14 cycle, the government introduced institutional changes in the electoral system, including changes in district boundaries, and the transfer of surplus votes of winning candidates to their parties.¹⁷ Partly as a result, in the 2014 election, though winning only 45% of the votes, the right-wing party obtained 67% of seats in parliament. Given this demonstrated political strength, the value to the party of the investor’s media support may have diminished, no longer justifying expensive favors. This logic is consistent with the models of Myerson (2008) and Boix and Svulik (2013) who show that a sufficiently strong autocratic ruler does not need to rely on power-sharing institutions.

4.1.2 Impact on corruption coverage

How did corruption coverage in the investor’s main daily newspaper change after the breakdown? For an answer, we compare the online content of this newspaper, Magyar Nemzet—which we label the “affected” right-connected daily—with the online content of two benchmarks: the left-connected daily Nepszabadsag, and an “unaffected” right-connected daily Magyar Hirlap, which was not related to the investor.¹⁸

We use the following procedure to measure corruption coverage. First we reviewed a number of articles in the above three and other newspapers, and created a list of scandals which involved allegations of the abuse of public resources. We collectively label these corruption scandals.¹⁹ Then, for each scandal, we identified a set of relevant keywords.²⁰ We then searched the online content of all three newspapers and for each scandal identified all articles containing the set of keywords.

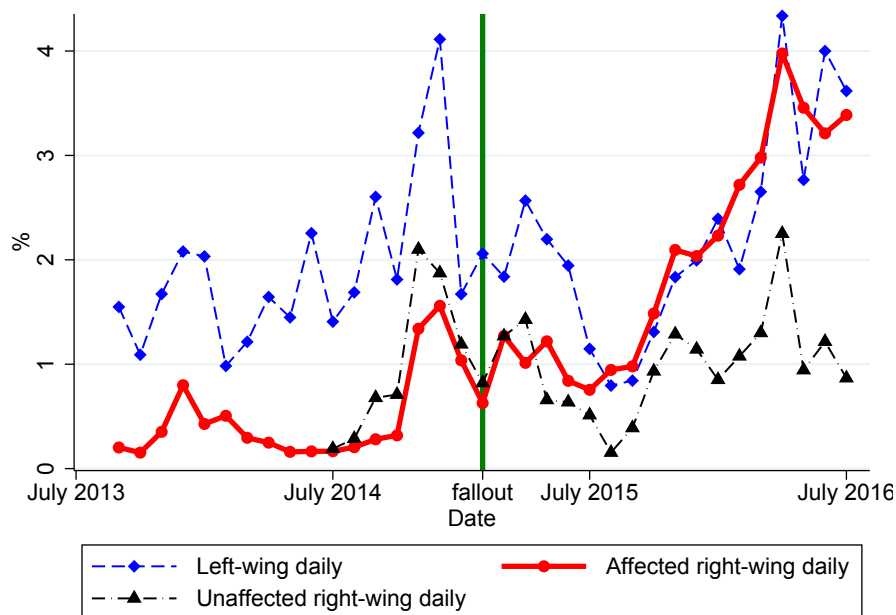
¹⁷ A report by the OSCE Office for Democratic Institutions and Human Rights (2014) discusses these changes and their impact on the 2014 election.

¹⁸ The investor’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, his main political daily.

¹⁹ It is possible that we missed some scandals, but because our analysis compares *between* newspapers, this does not affect the interpretation of our results.

²⁰ 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 6: Coverage of corruption scandals in different newspapers



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.

Figure 6 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 was fluctuation in corruption coverage, in part because not all periods had the same 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. In summary, the affected daily had low corruption coverage while it received advertising favors, but high corruption coverage after favors were terminated. This pattern strongly suggests that media bias—suppressing corruption coverage—was a return favor.

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

Table 6: Corruption coverage

Dependent variable:	Share of articles on corruption	
	All three dailies	Right and left daily
Affected right-wing daily \times post fallout	0.0125*** (0.00242)	0.00948*** (0.00205)
Left-wing daily \times post fallout	-0.000777 (0.00272)	
Affected right-wing daily	-0.00361** (0.00135)	-0.0110*** (0.00127)
Left-wing daily	0.0113*** (0.00185)	
Month FE	X	X
Observations	75	96

Note: Each observation is a newspaper \times month pair. Column 1 uses the sample of the two main dailies and a right-connected control newspaper for the period 2014-2016. Column 2 focuses on the two main dailies and extends the period to 2012-2016. Heteroscedasticity corrected standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the form

$$\text{Corruption coverage}_{it} = \text{const} + \sum_{i=1}^n \eta_i \cdot \text{newspaper}_i \times \text{post fallout}_t + \nu_i + \mu_t + \varepsilon_{it}. \quad (3)$$

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 η_i coefficients of the interactions measure the change in coverage in newspaper i after the fallout.

Table 6 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). Given that the mean dependent variable for the omitted newspaper before the fallout was 1%, the left-connected daily allocated about twice the space to corruption than either right-connected daily.

The interactions in the same specification show the change in corruption coverage after the fallout. These reveal no change for the left-connected daily Nepszabadsag, but a significant increase for the affected right-connected daily (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.²¹

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.

Interpretation. Media capture through favor exchange is a parsimonious explanation for our results. We now discuss two possible alternative interpretations. One is revenge: that the affected daily provided fair coverage of corruption before, but excessive coverage after the fallout, perhaps to bring down the prime minister. Although we cannot fully exclude this interpretation, we highlight three arguments that seem more consistent with suppressing corruption before the fallout. First, and most important, if coverage was objective before the fallout, then the enormous advertising favors documented in Section 3 lack an explanation. Second, we think that for corruption scandals—given that readers often do not read all articles—more reporting is generally better as it increases awareness. 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. Third, models such as Besley and Prat (2006) suggest that opposition newspapers should cover government scandals more objectively, suggesting that closing the gap relative to the left-connected daily corresponded to more balanced reporting.

²¹ The mean dependent variable for the omitted newspaper after the fallout was 1.3%, and $(1.25-0.36)/1.3=0.68$.

A second alternative interpretation is that both directions of favors represented altruism between friends—the prime minister and the investor—but their coincidence was not transactional. When the friendship turned sour, favors stopped. This explanation also implies media capture, although through a mechanism slightly different from favor exchange. One fact suggesting that altruism is not the main story is that the breakdown occurred shortly after the 2014 election. Under favor exchange that fact can naturally be explained with the improved political position of the prime minister, while under altruism it lacks an explanation.

Overall, our results strongly suggest that biased corruption coverage was one return favor in exchange for advertising.

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

$$\text{Right share}_{at} = \text{const} + \sum_{l=1}^m \lambda_l \cdot \text{advertiser category}_{at}^l + \mu_t + \varepsilon_{at} \quad (4)$$

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 7 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

Table 7: Campaign finance

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

Note: Each observation is an advertiser \times campaign pair. The sample contains the top 500 private firm and both right and other party advertisers. Column 1 and 2 focuses on the 3 month periods before 1998, 2002, and 2006 parliamentary and municipal elections, while column 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 during the sample period. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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 campaign advertising, just like private advertising, was governed by market forces.²²

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. If we treat private firms' advertising composition as the market benchmark, the patterns are consistent with the connected billboards giving discounts to the right-wing party and blocking out other parties. The resulting departure from balanced representation

²² 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.

is a form of media bias.

One possible alternative interpretation is that Table 7 reflects not favors from billboards to the party, but instead favors from the party to billboards. This explanation seems unlikely, as during campaigns political parties are typically in need rather than in excess of resources. It also fails to explain the reduced advertising on connected billboards by other parties. We conclude that the most likely explanation is selective hosting of campaigns, that is, media bias.

4.3 Discussion

Taken together, our results so far show favors flowing in both directions, and in this sense we document the full circle of favors. Importantly, we do not claim to document all favors in either direction. Politicians may have provided the investor with other favors, such as procurement; and the investor may have used other return favors, such as campaign finance. As a result, the advertising favors may not have been solely responsible for media bias, and conversely, bias may not have been the only reason for advertising favors. Still, the results from the fallout show a direct connection between favors and return favors: favors were given as long as return favors were received. As we discuss below, the most natural interpretation of these findings is a relational contract balancing favors and return favors in multiple domains.

Our results in the previous and this section 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 cleanly documenting media capture in a democracy, as well as the underlying mechanism of favor exchange.²³ 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 full circle of favors.²⁴ Evidence on the full circle is relevant both because it further supports identification, and because it reveals the motive for favoritism. In

²³ The key role of advertising in our context is consistent with its role in increasing press freedom in historic US newspapers (Petrova 2011).

²⁴ Beyond the papers cited earlier, this literature include work on ethnic favoritism (Burgess, Jedwab, 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); and the work on corruption (Svensson 2003, Olken 2007).

particular, the fact that return favors took the form of media bias suggests—given the evidence that media affects electoral outcomes (DellaVigna and Kaplan 2007, Chiang and Knight 2011, Enikolopov et al. 2011, Barone, D’Acunto and Narciso 2015)—that the reason for favoritism was, at least partly, political gain. Thus the demand for political power lead to economic misallocation. We now turn to more fully explore the welfare cost and mechanism of misallocation.

5 Welfare, Magnitudes and Mechanism

In this section we develop a methodology to measure the welfare effects of misallocation; compare magnitudes in a favor exchange accounting calculation; and discuss the mechanism underlying favor exchange.

5.1 Welfare cost of misallocating advertising

Existing efforts to measure its welfare effects 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 directly compare distorted allocations with the market benchmark. 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. To formalize this idea, we express the welfare loss from demand-side allocational distortions using a structural approach that parallels but is distinct from the Hsieh and Klenow (2009) analysis of supply-side distortions. To evaluate this expression we need to measure the elasticity of substitution of advertising between different media. We estimate this elasticity from price variation using an estimating equation implied by our model.

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

$$R(x_1, x_2, \dots, x_n) = \left[\sum_{i=1}^n \lambda_i x_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}. \quad (5)$$

Here x_i denotes advertising surface in media i , λ_i is a demand shifter that could be governed by the circulation of media i or other factors, and σ is the elasticity of substitution between different media.²⁵ The implicit assumption behind (5) is that different media reach a somewhat different set of readers and hence dividing advertising across media is beneficial. A higher σ 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

$$\sum_{i=1}^n p_i x_i = W_A. \quad (6)$$

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 $L(s_1, \dots, s_n) = 1 - R(x_1, \dots, x_n) / R(x_1^*, \dots, x_n^*)$, 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 .²⁶

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

$$L(s) = 1 - \left[\sum_{i=1}^n s_i^* \left(\frac{s_i}{s_i^*} \right)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \approx \frac{1}{2\sigma} \sum_{i=1}^n s_i^* \left(\frac{s_i - s_i^*}{s_i^*} \right)^2 \quad (7)$$

where the last expression is a second-order approximation.

²⁵ 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.

²⁶ 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.

The first expression shows that to measure $L(s)$ we need data on the actual and optimal allocation shares and the elasticity of substitution σ . 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). And the loss is inversely proportional to σ : when the different media are close substitutes (σ high), shifting advertising between them has smaller welfare effects.

Empirical implementation. We use Proposition 1 to infer the welfare loss from misallocating advertising. 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 implicit assumption is that profit maximization requires similar advertising strategies for these two groups. This assumption is supported by the fact that under left-wing governments state-owned firms' advertising composition was similar to private firms' advertising composition and to circulation shares. In the Appendix we show that among private firms there is only slight heterogeneity in advertising allocations by advertiser size and industry, providing further support that firm heterogeneity has small effects on s^* .

The key remaining parameter to measure is σ , which we identify from private firms' change in advertising in response to changes in prices, controlling for shifts in demand. Assuming that private firms advertise efficiently given their demand shifters, maximizing (5) subject to the budget constraint (6) yields

$$\log \frac{x_{it}^{a*}}{x_{jt}^{a*}} = -\sigma \cdot \log \frac{p_i}{p_j} + \sigma \cdot \log \frac{\lambda_{it}^a}{\lambda_{jt}^a}. \quad (8)$$

Intuitively, conditional on the demand shifters λ_{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 σ . To estimate this demand system we proxy λ_{it}^a with observables and fixed effects by assuming that

$$\log \frac{\lambda_{jt}^a}{\lambda_{jt}^a} = \beta' \cdot (z_{it}^a - z_{jt}^a) + f_i^a - f_j^a + \varepsilon_{it}^a - \varepsilon_{jt}^a \quad (9)$$

where z_{it}^a is a vector of observable demand shifters, β is a parameter vector, f_i^a are advertiser-media

fixed effects, and ε_{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 (9) into (8) yields our estimating equation for σ :

$$\log \frac{x_{it}^{a*}}{x_{jt}^{a*}} = -\sigma \cdot \log \frac{p_i}{p_j} + \sigma\beta \cdot (z_{it} - z_{jt}) + \sigma \log f_i^a - \sigma \log f_j^a + \sigma(\log \varepsilon_{it}^a - \log \varepsilon_{jt}^a). \quad (10)$$

We estimate (10) for private firm advertisers separately for the daily newspaper and the billboard markets. Within each market assume a constant elasticity σ across all media. In each market we exclude the top 20% of advertisers because their demand shocks may have a larger price effect, creating a possible confound.²⁷ 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.²⁸ 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.

Table 8 shows the results. For print media, the estimated elasticity is 0.77 without and 0.74 with controls, the corresponding numbers for billboards are 1.36 and 1.45. The fact that we find a larger elasticity in the billboards market is intuitive: because billboards do not provide content they are less differentiated.

Welfare costs of misallocation. We now combine the estimated σ with Proposition 1 to infer the welfare loss of misallocation. We work with two sets of values for σ . Our baseline results use the point estimates from columns 2 and 4 of Table 8; while our conservative estimates use the 95th percentile of the confidence interval for the same estimates. We then apply the exact formula in Proposition 1 to compute the welfare loss in the various markets and time periods. We represent the daily newspaper market with five actors when we apply the model: the four

²⁷ Also including the top advertisers results in a somewhat smaller, though not significantly different, elasticity for daily newspapers.

²⁸ We use the polls of Tarki, one of the largest Hungarian polling companies.

Table 8: Demand elasticities

Dependent variable:	Log(advertising ratio)			
	Print media		Billboards	
Log(price ratio)	-0.771** (0.371)	-0.736** (0.363)	-1.364** (0.591)	-1.453** (0.584)
Other covariates	X		X	
Observations	1703	1703	1478	1478

Note: Each observation is an advertiser \times month pair. The sample contains the bottom 80% of the top 500 private advertisers for the period 1994-2014 for dailies and 2002-14 for billboards. Column 1 and 2 use the two main daily newspapers, while column 3 and 4 use the two largest non-connected billboard companies. Standard errors clustered by advertiser in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

largest daily newspapers by advertising volume in that 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.²⁹ We compute s_i^* and s_i as the mean allocation shares of private respectively state-owned advertisers in the various markets and time periods.

Table 9 reports the welfare loss, measured as the share of the advertising budget for the particular market (daily newspapers or billboards) that state-owned firms could have saved by switching to the efficient allocation. The baseline estimates—which are our preferred estimates—range from 21% in 1998-2002 in the print market to 43%-49% in 2010-14 in the print and billboards markets. Even the conservative estimates are fairly high and always exceed 15% under right-wing governments. 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.

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

²⁹ Using other plausible definitions in either market has little effect on our results.

Table 9: Welfare cost of misallocation as a share of the advertising budget

	Baseline estimate ($\sigma_D = 0.74, \sigma_B = 1.45$)	Conservative estimate ($\sigma_D = 1.4, \sigma_B = 2.6$)
Right-wing governments		
Dailies 1998-2002	21%	16%
Dailies 2010-2014	43%	29%
Billboards 2010-2014	49%	31%
Left-wing governments		
Dailies 2002-2010	13%	7%
Billboards 2006-2010	4%	2%

private firms in these periods, the estimated welfare losses are much lower: in the baseline specification they are 13% and 4% in the print media and billboards markets.³⁰ We conclude that favoritism under right-wing governments substantially reduced the allocative efficiency of state-owned firms' advertising.

This welfare analysis contributes to the literature in three ways. First, it presents a methodological innovation about measuring the welfare loss of demand-side misallocation, which can be used in other settings in which proxies for the efficient allocation are available. Second, it serves as an input in the favor exchange accounting analysis we conduct below in Section 5.2. Third, it provides evidence on the mechanism of favor exchange, which we discuss more fully in Section 5.3.

5.2 Favor exchange accounting

Pulling together estimates from different parts of the paper, here we compare the economic magnitudes of the favors, the return favors, and welfare losses.

We begin the analysis with estimating the magnitude of return favors. While we are not able to measure the value of distorting news coverage, we can use our structural model to back out the

³⁰ 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 10: Implied campaign prices on right-connected billboards

	Baseline estimate ($\sigma_B = 1.45$)	Conservative estimate ($\sigma_B = 2.6$)
Price discount for right-wing party	94%	55%
Price premium for other parties	2,286%	144%

value of selective campaign hosting on connected billboards. To do this, we first infer the price wedges that would imply the observed allocations of political parties' billboard advertising. This is a straightforward model-based calculation under the assumption that political parties' elasticity of substitution between advertising in different media is identical to that of private firm advertisers.

Table 10 reports the results. Using our point estimate for the elasticity of $\sigma = 1.45$, we find that the higher connected billboard share of the right wing party during 2010-14 (relative to the allocation of private advertisers) is equivalent to that party receiving a price discount of 94% from connected billboards. Similarly, we estimate that the lower connected billboard share of the other parties is equivalent to a price premium of over 2,000%. Using a more conservative estimate of $\sigma = 2.6$, the equivalent price discount for the right-wing party would be 55%, and the equivalent price premium for other parties would be 144%. While these magnitudes naturally rely on the specific preferences for advertising, and given the nonlinearities their exact values are sensitive to parameter changes, they do suggest that the observed allocations represent significant favors. The large magnitude of the implied price premium also suggests that quotas, rather than prices, were used to limit other parties' advertising. Most likely, other parties were not allowed to place as much campaign advertising on connected billboards as they would have liked.

Favor exchange accounting. We now have all the pieces ready to compare the magnitudes of favors, return favors and welfare costs. To enhance the comparability of our results with other studies, we express all magnitudes as shares of industry value added. Table 11 reports the results. The columns correspond to the different markets and periods: daily newspapers 1998-2002, daily newspapers 2010-14, and billboards 2010-14. And the rows measure the value of advertising favors,

Table 11: Favor exchange accounting

Period	Dailies		Billboards
	1998-2002	2010-14	2010-14
	Fraction of industry value added		
Favors from politician to media	1.5%	3.7%	2.6%
Return favors from media to politician	-	-	0.6%
Welfare loss	1.3%	3.6%	2.2%
Transaction cost of tunneling (τ)	1.84	1.97	1.85

the value of return favors (for billboards) and the welfare loss of advertising misallocation.

The first row is computed simply 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. Industry is defined as the four-digit publishing industry for print media, and the four-digit advertising industry for billboards. The reported values measure the amount of tunneled money, which exceeds the value 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 not just as a share of state-owned firms advertising budget but also relative to the total size of the industry.

The second row reports the value of return favors. This we can only measure for billboards, and compute it as the price discount from Table 10 multiplied by the right-wing party's total campaign advertising, again expressed as a share of industry value added. We estimate this value to be 0.6%. The fact that it is smaller than the amount tunneled is consistent with it being just one of multiple return favors; and also with the idea that media owners need rents to participate in favor exchange.

The third row reports the welfare loss of misallocation. These are the baseline estimates we reported in Table 9, here expressed as shares of industry value added. Welfare losses are in the same ballpark as the advertising favors, ranging between 1.3% and 3.6%.

Finally, we can combine the estimates of favors and welfare losses to measure the efficiency of tunneling. Row 4 reports one measure of the τ transaction cost parameter of Besley and Prat

(2006), computed as the total cost of advertising favors (row 1 plus row 3) divided by the tunneled amount (row 1). The estimates range between 1.84 and 1.97, 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.

The fact that even with such a high τ we observe capture suggests that a transaction cost that succeeds in preventing it would have to be not economic but political. Indeed, the sharp shifts in advertising we observe after changes in government indicate that actors faced no institutional constraints in influencing these allocations, and were willing to influence in spite of the economic cost. A more effective transaction cost may be an institutional arrangement in which state-owned firms have greater independence, or in which courts are willing to prosecute biased advertising. Consistent with the potential importance of political transaction costs, the probable reason why—unlike in Fujimori’s Peru (McMillan and Zoido 2004)—politicians used real allocations not monetary bribes for capture is that the former are politically less costly if detected. As a result, they may be preferred even if they create a larger welfare loss (Shleifer and Vishny 1993, Coate and Morris 1995).

It is instructive to compare our results in Table 11 to estimates obtained in other contexts. Schoenherr (2016) estimates the welfare loss from procurement misallocation in all industries in Korea to be 0.21-0.32% of GDP. These numbers can be compared to our welfare loss estimates in narrowly defined industries of 1.5-3.7% of industry value added. Schoenherr also reports estimates of τ for procurement in Korea, which range between 1.17-1.21. Our larger estimates may reflect differences between countries, or the logic that—because of its ability to directly influence voters—media is a special industry in which politicians are willing to tolerate greater inefficiencies.

5.3 Mechanism

Here we argue that the mechanism underlying our results is politicians securing media support through a relational contract that creates misallocation. Three reasons support this interpretation. First, as highlighted by Acemoglu (2003), due to the absence of external enforcement, within-elite interactions, such as those between politicians and media owners, are subject to a commitment

problem.³¹ A relational contract based on repeated interactions can solve this problem, because the promise of future favors helps secure transactions in the present. This logic can also explain the fact that the favored investor had personal ties to the politician, because the collateral created through social interactions also helps maintain cooperation (Karlan, Mobius, Rosenblat and Szeidl 2009).

Second, a relational contract inherently generates inefficient favoritism as the politician has an additional incentive to favor the loyal actor, namely to secure future return favors. This logic can explain the persistently inefficient allocations we observe. Although we are not aware of a model making this point in the political economy context, Board (2011) formalizes the analogous tradeoff between loyalty and efficiency in a supplier-client relationship.³² Because in this arrangement favors and return favors occur at different times, the commitment problem is two-sided, and loyal actors must also derive rents to ensure that they keep their end of the bargain.

Third, given that maintaining it implies giving up rents, when the leader gains sufficient political power, he has an incentive to end the relationship. This logic parallels the arguments of Myerson (2008) and Boix and Svobik (2013) that in autocratic societies a sufficiently powerful leader dismantles the institutions that guarantee rent sharing. And it helps explain the timing of the breakdown, which occurred after changes in electoral rules contributed to a large majority in the 2014 election.³³

The above reasoning highlights a new channel from the demand for political power to economic distortions, in which the within-elite commitment problem is solved by a misallocation-inducing relational contract. This channel is related to, but distinct from, the “political losers” channel emphasized by Acemoglu et al. (2005), in which the demand for political power leads elites to block innovation. Overall, our findings provide a link between the literature on political institutions as the fundamental driver of growth and the literature on misallocation as the proximate cause of income differences (Jones 2013). Further exploring this link seems important to us.

³¹ Grossman and Helpman (1994) study interactions between politicians and business owners in the presence of full commitment.

³² Our findings also suggest that the theory of relational contracts (Baker, Gibbons and Murphy 2002, Levin 2003) may be usefully applied to political economy.

³³ Gehlbach, Sonin and Svobik (2016) review models of the political economy of weakly institutionalized countries.

6 Conclusion

In this paper we documented the full circle of favors leading to media capture in Hungary, measured the welfare cost of advertising misallocation, and highlighted relational contracting as an underlying mechanism. We conclude by discussing two promising areas of future research.

One area is the network of favors. The circle of favors we documented relies on several intermediate actors, including the managers of state-owned firms as well as media agencies that act as intermediaries between advertisers and media. Why do intermediaries execute the favor trades? In ongoing work we explore the hypothesis that they themselves are captured by the interest group. Specifically, we ask what share of state-owned firms' managers came from the business group of the right-wing investor; whether these managers were especially likely to misallocate advertising to connected media; and whether these managers were worse than alternatives. This analysis can uncover a rich favor network, in which favors and return favors are decoupled from each other and as a result a larger set of favor exchange allocations are feasible, helping special interest groups but hurting society. Such arrangements seem especially likely in the presence of political centralization, which allows politicians to control allocations at several agencies and thus exercise greater leverage over individual actors.

A second area is changes in the structure of the elite. After the 2015 fallout government advertising did not return to the efficient composition; instead, anecdotal evidence suggests that new favorites emerged. But these new favorites are not owned by a single investor: now different media belong to different interest groups. A possible interpretation is that as the leader gained political power, he restructured the elite through a divide-and-rule logic resulting in reduced bargaining power for each elite member. These sorts of changes in the distribution of power seem central to the working of imperfectly institutionalized countries, and may generate economic instability which constrains growth.

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A Proofs

Proof of Proposition 1. Let

$$\gamma_i = \frac{\lambda_i^\sigma p_i^{1-\sigma}}{\sum_{j=1}^n \lambda_j^\sigma p_j^{1-\sigma}}. \quad (11)$$

Maximizing (5) subject to (6) yields, after some calculations, that $s_i^* = \gamma_i$. Moreover, denoting $V(s) = 1 - L(s)$ it is straightforward to verify that

$$V(s) = \left[\sum_{i=1}^n \gamma_i^{\frac{1}{\sigma}} s_i^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}. \quad (12)$$

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

$$\tilde{V}(\tilde{s}) \approx \tilde{V}(\tilde{s}^*) + \frac{\partial \tilde{V}}{\partial \tilde{s}}(\tilde{s}^*) \cdot (\tilde{s} - \tilde{s}^*) + \frac{1}{2} (\tilde{s} - \tilde{s}^*)' \cdot \frac{\partial^2 \tilde{V}}{\partial^2 \tilde{s}}(\tilde{s}^*) \cdot (\tilde{s} - \tilde{s}^*)'. \quad (13)$$

Here by definition $\tilde{V}(\tilde{s}^*) = 1$, and by the first-order condition for optimality the vector $\partial \tilde{V}(\tilde{s}^*) / \partial \tilde{s} = 0$.

To compute the matrix of second derivatives of $\tilde{V}(\tilde{s})$, we start by differentiating $V(s)$. Straightforward calculation gives

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

which implies

$$\frac{\partial V(s^*)}{\partial s_i} = 1.$$

Taking the second derivative, when $i \neq j$ we obtain

$$\frac{\partial^2 V(s)}{\partial s_i \partial s_j} = \frac{1}{\sigma} V(s)^{\frac{1}{\sigma}-1} \cdot \frac{\partial V(s)}{\partial s_j} \gamma_i^{\frac{1}{\sigma}} s_i^{-\frac{1}{\sigma}}$$

which implies

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

And when $i = j$ we have

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

which implies

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

Now note that

$$\frac{\partial^2 \tilde{V}(\tilde{s})}{\partial s_i \partial s_j} = \frac{\partial}{\partial s_j} \left[\frac{\partial V(s)}{\partial s_i} - \frac{\partial V(s)}{\partial s_n} \right] - \frac{\partial}{\partial s_n} \left[\frac{\partial V(s)}{\partial s_i} - \frac{\partial V(s)}{\partial s_n} \right].$$

Using the above expressions we obtain that, 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 (13) yields

$$\begin{aligned} \tilde{V}(\tilde{s}) &\approx 1 - \frac{1}{2\sigma} \left[\frac{1}{\gamma_n} \sum_{i,j=1}^{n-1} (s_i - s_i^*)(s_j - s_j^*) + \frac{1}{\gamma_i} \sum_{i=1}^{n-1} (s_i - s_i^*)^2 \right] \\ &= 1 - \frac{1}{2\sigma} \left[\frac{1}{\gamma_n} \left(\sum_{i=1}^{n-1} (s_i - s_i^*) \right) \left(\sum_{j=1}^{n-1} (s_j - s_j^*) \right) + \frac{1}{\gamma_i} \sum_{i=1}^{n-1} (s_i - s_i^*)^2 \right] \\ &= 1 - \frac{1}{2\sigma} \sum_{i=1}^n \frac{(s_i - s_i^*)^2}{\gamma_i} \end{aligned}$$

where at the last step we used that $s_n - s_n^* = -\sum_{i=1}^{n-1} (s_i - s_i^*)$. The Proposition follows.

B Supplementary Evidence

B.1 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 private advertisers have similar objectives as their private counterparts. On the other hand, the industrial and size distribution of these two groups of advertisers differ, which might drive the differences in their advertising decisions. To deal with this concern in Table A1 we investigate the heterogeneity among private advertisers. Column 1 reports a specification which includes industry indicators and their interaction with right-cycle, having trade as the omitted category. It shows that trade and manufacturing allocates somewhat less to the main right daily than other industries, but these differences are modest relative to the magnitude state-owned firms tilt their advertising to the connected daily. Moreover, we see no political cycles in private advertising behavior. Column 4 reports the corresponding weighted results and confirms the patterns we see in column 1, again there is limited variation across industries and no shifts between different administrations. Column 2 and 3 show how advertising composition differs with size measured with log-employment and log-sales, respectively. Larger firms allocate somewhat less to the right-wing daily but the interaction with cycle remains small and insignificant. The weighted results in column 5 and 6 suggest the same qualitative conclusion.

Table A1: Heterogeneity among private advertisers in two main dailies

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

Note: Each observation is an advertiser \times 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 48