

Social Media and Corruption[†]

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Does new media promote accountability in nondemocratic countries, where offline media is often suppressed? We show that blog posts, which exposed corruption in Russian state-controlled companies, had a negative causal impact on their market returns. For identification, we exploit the precise timing of blog posts by looking at within-day results with company-day fixed effects. Furthermore, we show that the posts are ultimately associated with higher management turnover and less minority shareholder conflicts. Taken together, our results suggest that social media can discipline corruption even in a country with limited political competition and heavily censored traditional media. (JEL G14, G34, L82, P23, P26, P34, Z13)

In democracies, mass media is an important instrument for monitoring the behavior of public officials, limiting corruption, and reducing political rents of incumbents (Strömberg 2004, Besley and Prat 2006, Ferraz and Finnan 2008, Snyder and Strömberg 2010). In contrast, in countries where governments censor news and suppress electoral institutions, the role of traditional mass media in promoting accountability might be limited (McMillan and Zoido 2004, Djankov et al. 2003), and the provision of better information does not necessarily lead to socially beneficial outcomes (Chong et al. 2015; Malesky, Schuler, and Tran 2012; Fergusson, Vargas, and Vela 2013).

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Emerging new media has recently become an alternative source of independent information for citizens and, potentially, an agent of political change in nondemocratic regimes.¹ Theoretically, citizens and activists might use social media for sharing information about wrongdoings by politicians or public officials. This information can, in turn, change the way both people and public officials behave by encouraging more transparency and improving accountability.² However, low entry barriers—anyone can easily create Twitter or Facebook content—make the reputation and quality of individual blogs a serious concern.³ In addition, many governments engage in various kinds of online censorship and propaganda activities.⁴ In this environment, it is not clear whether or not social media can have a real impact on political and corporate accountability.

This paper has three goals. First, we identify the *causal* impact of blog posts about corruption on the performance of state-controlled companies. These posts exposed corruption of top management of the companies, who are effectively public employees. Second, we investigate whether the effect is limited to short-term price changes or whether there is a longer term effect on corporate practices of the targeted firms, i.e., whether blog posts indeed help to promote accountability. Finally, we aim to discern the mechanisms of the social media influence. To achieve these goals, we study the impact of posts reporting corporate governance violations and outright corruption in Russian state-controlled companies written by an individual blogger, Alexey Navalny, on stock performance and measures of corporate practices in these companies.⁵

Navalny started to blog about corruption in state-controlled companies in 2008. For example, in one early post that attracted significant attention, he questioned the charitable spending of Transneft, a state company that owns the largest oil pipeline in the world and transports more than 90 percent of Russia's oil. In 2008, the company spent, according to its own accounting, more on charity than on capital investments. However, the company refused to disclose its recipient charities. Navalny then contacted a number of leading charity organizations in Russia, none of which

¹Enikolopov, Makarin, and Petrova (2016) show that social media penetration increased protest participation in Russia in 2011. Acemoglu, Hassan, and Tahoun (2014) demonstrate that Twitter activity during the Tahrir Square protests precedes spikes in protest participation, which is consistent with the voluminous anecdotal and survey evidence on the critical role the new media played in the uprisings of Arab Spring and elsewhere.

²In an effort to promote accountability around the world, the US Department of State spent at least \$120 million since 2008 on various initiatives to strengthen net freedom. The Indian crowdsourcing website "I Paid a Bribe" attracted more than 4 million visits since its launch in 2010, while the Chinese city of Guangzhou passed the law allowing anti-corruption investigators to act based on information from the Web (see Qin, Strömberg, and Wu 2016). In 2013, Uhuru Kenyatta, the President of Kenya, set up a website allowing visitors to report corruption cases directly to him.

³Gentzkow and Shapiro (2006) and Cagé (2014) emphasize the importance of reputation for traditional media. The online social media may not have any impact because online activity may crowd out offline actions or because social media may be strategically manipulated (Morozov 2011, Edmond 2013).

⁴Qin, Strömberg, and Wu (2016) provide a comprehensive overview of the role that social media plays in China, focusing on both online content and Chinese government's efforts in online censorship and propaganda. Online censorship in China is also studied in King, Pan, and Roberts (2013) and Lorentzen (2014).

⁵We focus on the period that predates the time when Navalny became a national political figure in Russia. Concentrating on a popular individual blog, rather than a randomly chosen one, we follow the tradition of scholars studying the effects of traditional mass media, e.g., the *New York Times* (Puglisi 2011), Fox News (DellaVigna and Kaplan 2007), or the NTV channel in Russia (Enikolopov, Petrova, and Zhuravskaya 2011).

reported receiving donations from Transneft. Soon after this story was published, Transneft started to disclose recipients of its charity donations.

Making a causal inference about the impact of social media posts is not straightforward. The content of social media is highly endogenous, since it typically reflects real-life events and mimics the content of offline media. To address this issue, we use the precise timing of blog posts within a trading day to trace their effect on performance of the companies with political connections to the Russian government.⁶ We employ five-minute trading data, controlling for dummies for company-trading days and for hours of the day. We take into account the online and offline information environment by focusing on posts that were not preceded by mentions of the companies in any other public source. We show that the stock returns of the companies mentioned in Navalny's posts go down within three hours after the posts are made, amounting to a daily effect of 0.33 percentage points, with some more focused posts (mentioning a certain company at least five times) having an effect of up to 1.26 percentage points. The magnitudes of these effects are comparable to the average effect of quarterly report announcements for these companies (2 percentage points). Overall, our results indicate that blog posts about corruption indeed have a measurable and significant impact on stock performance of the targeted companies.

Our second goal is to analyze whether the results are limited to temporary changes in stock prices or whether they have longer term consequences. Specifically, we examine the impact of blog posts on both longer term stock performance and corporate practices of the targeted companies. We find that the companies are more likely to have management turnover and are less likely to have shareholder conflicts following the blog posts targeting these companies, consistent with disciplining effects of social media. Also, we do not see any evidence of return reversal in either intraday or daily data.

Our final goal is to understand the mechanism underlying the effect of blog posts on stock market performance. A large literature attributes the effect of traditional media to either the reaction of investors to new information, or a change in investor sentiment (e.g., Tetlock 2007). New negative information might cause investors to revise downward their perception of the companies' management. Alternatively, the change in stock prices might reflect a change in the sentiment of noise traders. The fact that we do not see a reversal in the effect of blog posts on stock market returns supports the information theory.

Still, there is some evidence that the investor sentiment also plays a role. Using data on the popularity of the posts, written by other bloggers, that appeared during the same trading day, yet did not contain any market-relevant information, we find that the impact of Navalny's blog posts is smaller if people get distracted more. This is consistent with small individual shareholders responding to the information in the posts, as large institutional shareholders are not likely to be distracted by unrelated attention-grabbing posts in Russian-language blogs, which is also consistent with the finding that the average size of transactions goes down around the days of Navalny's posts.

⁶Our precise-timing approach is similar to that of Gentzkow, Shapiro, and Sinkinson (2011), who studied the impact of newspaper entries and exits on electoral politics.

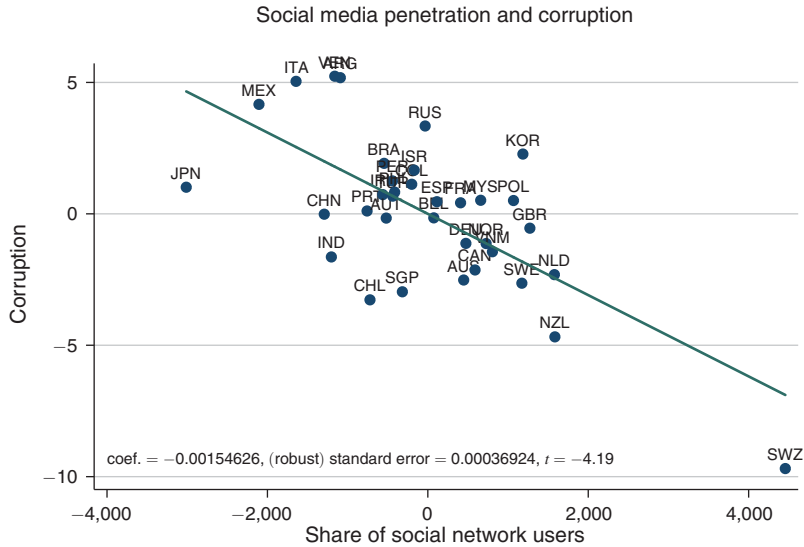


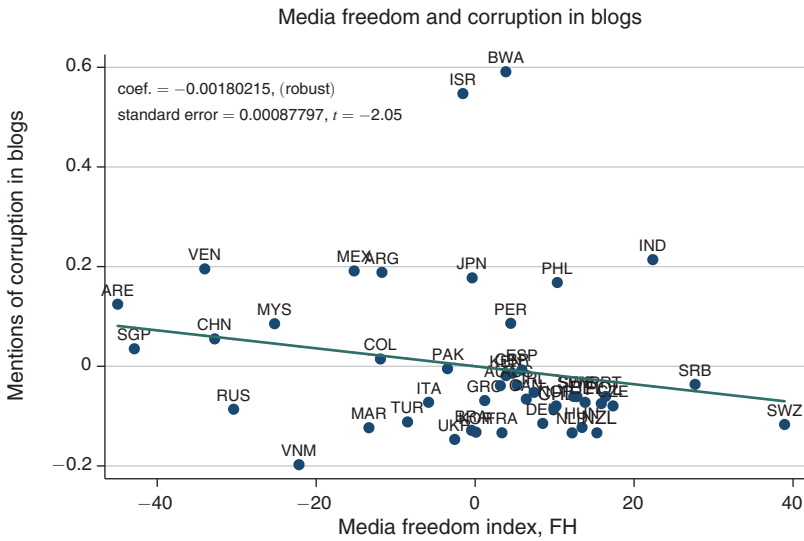
FIGURE 1. SOCIAL MEDIA PENETRATION AND CORRUPTION

Notes: Figure 1 is an added variable plot. GDP per capita is controlled for. Social media penetration is from *ComScore* 2011. Corruption is from Corruption Perception Index 2004–2012. Corruption index is transformed so that higher values mean higher corruption.

Taken together, our results provide evidence that social media can influence the market and trigger accountability mechanisms in large state-controlled companies even in a country with limited political competition and censorship of traditional media. We show that there is a causal effect of the publications in social media on the behavior of market participants, and correspondingly, on the valuation of state-controlled companies. These results counter the hypothesis that low entry barriers in the blogosphere make social media publications irrelevant. Similarly, governments' efforts to control mass media do not eliminate the significant role of social media. Our contribution is not only in documenting the real-world impact of social media, but also in identifying some of the mechanisms through which social media can affect accountability.

The effects that we study do not seem to be limited to an individual blog in one particular country. Figure 1 demonstrates that countries with greater social media penetration have less corruption, controlling for the level of economic development, while Figure 2 shows that native-language blogs are more likely to mention corruption or managerial misbehavior in countries with less media freedom. Indeed, if social media improves accountability by providing additional checks on corruption and becomes an alternative source of information, one should expect to see less corruption in countries with greater social media penetration and more information about corruption via social media in countries with lower traditional media freedom. Of course, such simple cross-country comparisons cannot be interpreted as evidence of a causal effect, and this is where our better identified within-country results add to the understanding of the impact of social media.

Panel A. Corruption in blogs



Panel B. Managerial misbehavior in blogs

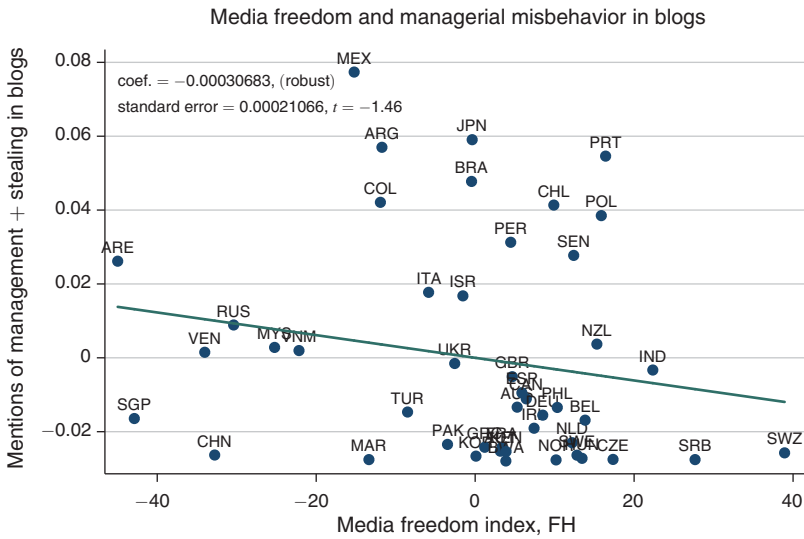


FIGURE 2. CORRUPTION IN BLOGS AND MEDIA FREEDOM

Notes: Figure 2 is an added variable plot. GDP per capita is controlled for. Media freedom is from World Press Freedom Index 2004–2012; the index is inverted so that higher value means more media freedom. Corruption mentions in blogs are adjusted by politician mentions in blogs; data is from Google Blogs searches in local languages, 2004–2012.

Our paper contributes to the literature that studies the causal impact of media on political outcomes.⁷ Malesky, Schuler, and Tran (2012) suggest that in an authoritarian country using online media to monitor public officials may lead to perverse consequences. On the contrary, our results suggest that in a context of an imperfect democracy, social media can promote accountability even in the situation, when traditional local media fail to make a difference (Dyck, Volchkova, and Zingales 2008).

Our paper also contributes to the literature on media and financial markets. Fang and Peress (2009) show that media coverage is negatively associated with future returns due to both limited attention and limited liquidity. Tetlock (2007) and Tetlock, Saar-Tsechansky, and Macskassy (2008) show that the fraction of negative words in firm-specific news articles predict the firm's earnings and stock returns. García (2013) shows that media sentiment is especially important during the recession. Griffin, Hirschey, and Kelly (2011) find that asset prices' reaction to news published in traditional media is stronger in developed markets than it is in emerging markets. DellaVigna and Pollet (2009); Hirshleifer, Lim, and Teoh (2009); and Fang, Peress, and Zheng (2014) emphasize the role of limited attention in market underreaction to earning announcements. Dougal et al. (2012), Engelberg and Parsons (2011), Peress (2014), and Tetlock (2011) look at the impact of traditional media, such as newswires and newspapers, on stock returns. A survey of this literature is available in Tetlock (2015). In contrast to all these papers, our focus is on the social media, with special attention to its effect on political and corporate accountability, in the context of an emerging market.

Finally, our paper contributes to the recent literature that uses online data to forecast political developments and financial markets. Acemoglu, Hassan, and Tahoun (2014) show that Twitter activity during the "Arab Springs" protests in Egypt in 2011–2012 helped predicting future returns of firms connected to President Mubarak. Da, Engelberg, and Gao (2011) show that Google Trends can be a good proxy for investor attention and that it predicts future returns. Chen et al. (2014) find that the content of the crowdsourcing platform *Seeking Alpha* predicts future returns. Halberstam and Knight (2016) find that Twitter users belonging to majority political groups are exposed to more information and get information more quickly than minority groups. All these papers are focused on predictions made using information available online (e.g., on Twitter), but they do not attempt to identify the causal effect (or lack thereof) of blogging and social media.⁸

The rest of the paper is organized as follows: Section I provides some background information on state-owned companies in Russia, the LiveJournal social network, and Alexey Navalny's blog. Section II describes our data. Section III

⁷Most of this literature is focused on the impact of media on people's behavior and policies in democracies such as the United States (e.g., DellaVigna and Kaplan 2007; Gentzkow, Shapiro, and Sinkinson 2011; Snyder and Strömberg 2010; Eisensee and Strömberg 2007; and Chiang and Knight 2011) or Italy (e.g., Barone, D'Acunto, and Narciso 2015; Drago, Nannincini, and Sobbrío 2014; and Durante, Pinotti, and Tesei 2015). For a thorough overview of this literature, see DellaVigna and Gentzkow (2010), Prat and Strömberg (2013), Enikolopov and Petrova (2015), and Strömberg (2015).

⁸Our paper is also related to the literature that studies the impact of ICTs on political preferences and policy outcomes. A number of recent works identifies the impact of broadband penetration on economic growth (e.g., Czernich et al. 2011), voting behavior (Miner 2012; Falck, Gold, and Heblich 2014; Campante, Durante, and Sobbrío 2013), sexual crime rates (Bhuller et al. 2013), and policy outcomes (Gavazza, Nardotto, and Valletti 2015).

presents analysis of the causal impact of blog posts. Section IV presents the results on real-life consequences of blog posts, discusses potential mechanisms, and in addition, reports some robustness checks. Section V concludes.

I. Background

A. State-Controlled Companies in Russia

Despite massive privatization in the 1990s, many companies in Russia are still state controlled or have been renationalized (Chernykh 2011). Since 2005, output of these companies accounted for more than 50 percent of Russia's GDP. Though the state is their largest owner, most of these companies are publicly traded. In theory, their management is checked by a board of directors, with the majority of directors appointed by the government. In practice, management at the Russian state-owned companies typically enjoys a degree of freedom unheard of in privately held companies around the world. Accordingly, multiple instances of corporate governance violations and outright fraud have been documented, including share dilution and asset stripping (Desai, Dyck, and Zingales 2007; Durnev and Guriev 2011; Dyck, Volchkova, and Zingales 2008; see also Shleifer and Treisman 2005).

Specific information about fraud has been difficult to find and digging into it could be dangerous, as the case of Sergei Magnitsky, the lawyer at Hermitage Capital who died in jail, suggests. As Russia suffers from the lack of political competition, widespread corruption, and unfair and inefficient courts, minority shareholders have few tools to address issues of corporate governance: attention from international newspapers such as the *Wall Street Journal* or *Financial Times* was a rare source they could rely on (Dyck, Volchkova, and Zingales 2008).⁹ However, such tools were inaccessible for ordinary minority shareholders, who had virtually no effective tools to prevent abuse.

B. The Internet and Social Media in Russia

Social media has been playing an increasingly important role as a channel of communication in Russia. Since 2009, Russian internet users have spent more than ten hours per month in social networks, which is one of the highest engagement rates in the world (Blinova 2013).¹⁰ By 2012, the country had more than 60 million active internet users, comprising more than 40 percent of the Russian population.

One of Russia's most popular and influential social media sites is LiveJournal (LiveJournal.com). Initially incorporated in the United States and aimed at an English-language audience, by 2005 LiveJournal was hosting 9 million accounts on its Russian site; at that time, 45 percent of all blog posts in Russia were made on LiveJournal.

⁹In contrast, our analysis implies that Navalny's blog has had no impact through the international press.

¹⁰As of 2012, the social network engagement of Russia's online population (88 percent) is similar to that in Norway (89 percent), Germany (90 percent), and France (91 percent). See comScore whitepaper at www.comscore.com/Insights/Presentations_and_Whitepapers/2011/it_is_a_social_world_top_10_need-to-knows_about_social_networking.

The internet in general and social media in particular have enjoyed relative freedom in Russia; attempts to control online content began occurring in 2012, i.e., after the period we examine in this paper. This freedom has made LiveJournal and other social media outlets important conduits for transmitting information and enhancing political debate, which was gradually phased out of Russian TV and major newspapers after Vladimir Putin came to power in 2000.¹¹

C. Alexey Navalny

Alexey Navalny, a then 32-year-old lawyer and a former member of the opposition party Yabloko, began blogging about corruption in state-controlled companies in 2008. From the very beginning, his goals were political rather than financial.¹² Unlike shareholder activists such as Bill Browder of Hermitage Capital, Navalny had very small stakes in the companies he wrote about. These stakes allowed him to enjoy some shareholder privileges, yet were not large enough to earn him significant profits from changes in stock prices. The popularity of Navalny's blog surged after he launched the *Rospil* project, which focuses on protecting minority shareholders of large state-owned companies and, by extension, the management of taxpayers' property by the Putin government (Healy and Ramanna 2013).

In 2012, Navalny's blog (navalny.livejournal.com) had more than 70,000 regular followers, making it one of Russia's most popular blogs in Russia (one of the top ten according to Yandex, Russia's most widely used search engine), with many more people following the blog through Facebook, VKontakte, Twitter, and RSS feeds. By this time, Navalny's blog had become mostly political, with posts related mainly to elections and politicians rather than to corruption in state-controlled companies. For that reason, we restrict our sample to the period before his first election-related posts. His blog continued to attract more and more attention; eventually, he became an informal leader of the Russian opposition. In December 2011, the BBC described him as "arguably the only major opposition figure to emerge in Russia in the past five years,"¹³ and in 2012 the *Wall Street Journal* called him "the man Vladimir Putin fears most."¹⁴

In this paper, we focus on the period between January 2008 and August 2011, when Navalny's blog was devoted almost exclusively to the issue of corruption in state-controlled companies; during this time period, Navalny was not yet considered a major political figure and had a very low name recognition in Russia.¹⁵

¹¹ See Gehlbach (2010), Gehlbach and Sonin (2014), Treisman (2011), and Guriev and Treisman (2015) on government control of the media in Russia.

¹² A personal interview with Alexey Navalny was conducted by the authors. He claims to invest stakes of around \$1,000 in each company (compare with, e.g., \$600 million market capitalization of Gazprom as of 2008), but being a minority shareholder allowed him to demand for information from these companies. Though there is no independent verification of his motive, media and blogs (including pro-government ones) have never discussed any evidence about his personal profiteering from the stock market investment.

¹³ <http://www.bbc.co.uk/news/world-europe-16057045> (accessed September 24, 2012).

¹⁴ <http://online.wsj.com/article/SB10001424052970203986604577257321601811092.html> (accessed September 24, 2012).

¹⁵ <http://www.levada.ru/2013/04/04/rossiyane-ob-aleksee-navalnom-i-mihaile-prohorove/>.

II. Data and Hypotheses

A. Data

We use data from several sources. First, we use data from social media. Our main variable of interest is the mentions of specific companies in Navalny's blog posts at navalny.livejournal.com. To identify them, we ran an automatic search for all publicly available posts between January 2008 and August 2011.

We distinguish between ordinary blog posts (mentioning a company at least once) and important blog posts (mentioning a company more than five times).¹⁶ If a post mentions different companies, we classify it as a post about each of the companies mentioned. We also record the exact time (hour and minute) at which it became publicly available. Since Navalny reported almost exclusively negative information on the companies he wrote about, we do not classify posts as positive and negative; this allows us to avoid subjective estimates of the tone of the coverage. In total, our dataset contains 318 blog posts about the companies on 233 different trading days.

Figure A1 in the online Appendix shows the timing of Navalny's posts. The posts were not evenly dispersed—sometimes he blogged actively, posting multiple entries in a short time span (e.g., at the end of 2008 and the beginning of 2010) and sometimes he went fallow, with almost no blog posts (e.g., at the end of 2010, when he was taking part in the Yale World Fellows Program).¹⁷ Figure A2 in the online Appendix shows the distribution of Navalny's posts across days of the week and hours of the day. He was more likely to post in the middle of the workweek and workday to maximize his audience.

We focus on ten companies Navalny owned shares in and wrote about: Transneft, VTB, Gazprom, Rosneft, Sberbank, Surgutneftegas, Lukoil, Gazprom Neft, RusHydro, and Inter RAO UES.¹⁸ This list contains all companies Navalny owned shares in as of January 2008 and wrote about during 2008–2011. Table A1 in the online Appendix summarizes statistics for Navalny's posts by type and by company. In the analysis, we look separately at four companies to which Navalny paid special attention, which we define as being mentioned in more than 75 posts (Transneft, VTB, Gazprom, and Rosneft).

In addition to the data on Navalny's blog posts, we also collected information on the number of times these posts were referred to in VKontakte, retweeted on Twitter, and reposted on LiveJournal.com and other blogs. We also use data on the number of comments for each post and a Google Trends' Search Volume Index (SVI) for "Navalny" as a proxy for Navalny's popularity. Figure A3 shows how

¹⁶We tried to separate posts into more important and less important with the help of research assistants (RAs), but resulting classification was not consistent among different RAs. In addition, it turns out that the automatic classification performs better (in terms of market reaction triggered) than any of the RA-based classification. We checked that our results are robust to small changes in the importance criterion.

¹⁷He was invited to Yale as an "anti-corruption activist and blogger" (<http://worldfellows.yale.edu/alexey-navalny>).

¹⁸One company in the baseline sample, Lukoil, is privately held. However, it is so tightly regulated and closely influenced that its market behavior and features are very similar to most of the other major oil companies, which are state owned. This was arguably the reason why Navalny included Lukoil in his list. Our empirical results are fully robust to exclusion of Lukoil (see Table A6 in the online Appendix).

Alexey Navalny's popularity has changed over time using Google Trends' SVI for the keyword "Navalny" (in Russian). It demonstrates that his popularity evolved exponentially between 2008 and the end of 2010.

Second, we employ data on stock prices on the Russian stock exchange MICEX from *finam.ru* (intraday data), *export.rbc.ru* (daily data), and *micex.ru* (data on the number of transactions). We use data on the stock prices, trading volume, and number of transactions.

Third, we use data on the precise timing of the mentions of the companies from the two leading newswires in Russia (Reuters and ITAR TASS). Similar to the data on blogs, we distinguish between "ordinary" and "important" news stories, depending on whether newswire stories mention the companies more or less than five times.

We also collected data on mentions of the companies in three alternate news sources: online news from Yandex News, a news aggregator of the most popular search engine in Russia; other blogs from Yandex's blog aggregator service; and the Web archives of the two most respectable Russian business daily newspapers, *Vedomosti* (a joint project of the *Financial Times* and the *Wall Street Journal*) and *Kommersant*.¹⁹

Fourth, we use data on the number of visitors to LiveJournal.com (from <http://top100.rambler.ru/>) and data on the top 30 blog posts in the Russian blogosphere (from *yablor.ru*). This data is available only from November 2009.

Finally, we use data on the exact dates and times of quarterly reports and information on management turnover from these reports. We also employ data on ongoing corporate conflicts with minority shareholders from the Investor Protection Association, a leading Russian association of institutional investors.²⁰

B. Hypotheses

The main empirical hypothesis is that blog posts by Navalny affect stock returns of the companies he mentions. Blog posts can affect shareholder value through several different channels.²¹ First, new information might lower market perceptions of the quality of management and, as a result, lower their expectations about future cash flows, thus reducing stock prices. This effect does not imply any real changes in cash flows and only changes the expectations of the investors. Second, the blog posts might increase regulators' and politicians' awareness of mismanagement in the company and, thus, make corruption more costly for managers. This can reduce the diversion of money by management and increase future cash flows to investors, producing a positive effect on stock prices. Third, exposure of corrupt practices can also make it harder to tunnel illicit payments to politicians, which may weaken firms' political connections and cause a reduction in shareholder value (Fisman 2001, Fisman and Wang 2015), thus reducing stock prices. These arguments are summarized more formally in a theoretical model in the online Appendix. We expect

¹⁹The same two Russian newspapers were used by Dyck, Volchkova, and Zingales (2008).

²⁰For more information on IPA, see <http://ipa-moscow.com/>. Dyck, Volchkova, and Zingales (2008) use data on corporate governance violations by Troika Dialog, which stopped to provide data prior to 2008. IPA continues to collect the same data using the term "presence of a conflict with minority shareholders."

²¹Section 1 of online Appendix contains a formal theoretical framework that describes these channels.

the negative effects through the first and the third channel to dominate, at least on average, so we formulate the following hypothesis:

HYPOTHESIS 1: Blog posts by Navalny have a negative effect on the stock prices of the companies he writes about.

The effect of blog posts on stock returns can reflect changes in investor sentiment of noise traders (as, e.g., in De Long et al. 1990), rather than the arrival of new information about their fundamental value. The distinguishing feature of this channel is that such effects are temporary, and prices typically return to their pre-event levels, thus, causing a reversal in the effect of blog posts. Since we expect that blog posts primarily affect the stock price through the information channel, rather than through investor sentiment, we formulate the following hypothesis:

HYPOTHESIS 2: There is no reversal in the effect of blog posts by Navalny on the stock prices of the companies he writes about.

If blog posts affect prices, not only by providing new information but also by decreasing diversion of money by the management, we would expect to see observable changes in corporate governance as a result of blog posts. In our analysis, we use two measures of change in corporate governance practices: management turnover and ongoing corporate conflicts with minority shareholders. If blog posts indeed improve corporate governance, we would expect to see an increase in management turnover and reduction in conflicts with minority shareholders, who suffer the most from the diversion. Note that even if this prediction holds, it does not indicate that the other channels are not relevant or important. We would also expect the accountability channel to become more important as the Navalny's blog becomes more popular, and, thus, is more likely to trigger changes in the companies. Thus, we formulate the following hypothesis:

HYPOTHESIS 3: Blog posts by Navalny increase management turnover and decrease the number of conflicts with minority shareholders in the firms he writes about; this effect increases with the popularity of Navalny's blog.

Even if Hypotheses 1 and 2 hold, and there is evidence that stock reaction to blog posts reflects information effects, it does not exclude the possibility that at least part of the effect is driven by just attracting attention of individual investors to the companies mentioned in the blog posts (as, e.g., in Da, Engelberg, and Gao 2011). If this mechanism is also at work, we expect the effect of Navalny's blog posts to be smaller in situations in which the attention of his readers is distracted, e.g., by posts of other bloggers. We would also see an increase in market participation by small individual investors following Navalny's blog posts, which would likely lower the average size of market transactions.

HYPOTHESIS 4: The effect of the blog posts by Navalny on stock returns is smaller if the attention of his readers is distracted.

HYPOTHESIS 5: *Blog posts by Navalny decrease the average size of market transactions.*

III. Impact of Blog Posts on Stock Returns

A. Within-Day Results

To study the impact of blog posts, we first focus on the within-day specifications. Specifically, we compute the abnormal return AR_{it} of company i in period t , estimated from the market model as a predicted residual from the equation $r_{it} = \alpha + \beta_i r_{mt} + \gamma_i + \epsilon_{it}$, where r_{mt} is the market return, β_i s are company-specific betas, and γ_i s are company fixed effects.²² We compute both returns and abnormal returns for five-minute intervals (the five-minute return here is given by $r_{it} = \frac{p_{it} - p_{it-5}}{p_{it-5}}$, where p_{it} is a share's price of company i in minute t). For our baseline results, we estimate the following empirical specification:

$$(1) \quad AR_{it} = \gamma_0 + \sum_{\tau=t-k}^t \gamma_{1\tau} post_{i\tau} + \gamma_2 \delta_{cd} + \gamma_4 \delta_h + \varepsilon_{it},$$

where $post_{i\tau}$ is a dummy variable equal to one if Navalny posted about company i at time period τ , δ_{cd} is a company-day fixed effect, and δ_h is a trading hour fixed effect. Here, τ changes from $t - k$ to t for cumulative returns before the post and changes from t to $t + k$ for cumulative returns after the post.²³ To limit the effect of potential outliers, we winsorize abnormal returns at the first and the ninety-ninth percentile, but the results are robust if we do not use winsorization (see panel A in Table A3 in the online Appendix).

In this specification, the abnormal return, associated with a post about company i at moment in time τ , is given by the coefficient $\gamma_{1\tau}$ for dummy variable $post_{i\tau}$. Thus, the sum of abnormal returns, the *cumulative abnormal return* (CAR), is equal to $\sum_{\tau=t-k}^t \gamma_{1\tau}$. To test if CAR is equal to zero, we compute the Wald test for the hypothesis that $\sum_{\tau=t-k}^t \gamma_{1\tau} = 0$, taking into account the error structure. We assume that standard errors could be correlated both spatially and temporarily, and we compute standard errors clustered by trading day. Such clustering accounts for both

²²Ideally, controls for four Fama-French factors in a market model should be included. However, this is nearly impossible to do using within-day or daily data given the low liquidity of companies not included in the Russian stock market index and the almost complete absence of small publicly traded companies. Usually, in this situation these factors are estimated monthly. Because our results include company-day or company-month fixed effects, it makes estimating monthly levels of Fama-French factors redundant.

²³This specification is similar to Tetlock's (2007) VAR specification under the independence assumption with a varying number of lags. Since we look at individual stocks rather than at the market returns, we use abnormal returns of individual stocks as the dependent variable to make it comparable across firms and dates. Tetlock's specification also includes daily trading, which we take into account through the company-day fixed effect. Unfortunately, we do not have access to within-day trading volumes. In the benchmark specification, we do not include lags of abnormal returns, but we show that the results are robust to including them (see panels A and B of Table A2 in the online Appendix). Including the lags of abnormal returns increases the magnitude of the effects, but this increase is driven by the reduction in the sample caused by missing lagged values for periods in the beginning of the trading day (see panel C of Table A2 in the online Appendix). We cluster standard errors by trading day, which is less restrictive than Newey-West standard errors in our case.

cross-sectional and time-series variation, as there are 120 five-minute intervals per trading day.

Although such estimates use the precise timing for identification, it is possible that some of the underlying events that happen just before the blog posts trigger the reaction, and the traders do not learn about these events from the blog. In other words, the results may be endogenous to preexisting coverage of companies in other blogs, newspapers, or traditional media. To deal with this possibility, we use data on the precise timing of mentions of the companies in alternative news sources such as news agencies. Specifically, we report the results only for blog posts about companies not preceded by *any* mention of these companies within two hours.²⁴

Panel A of Table 1 presents the results of estimating the effect of blog posts on cumulative abnormal returns (CARs) before and after the posts based on equation (1).²⁵ The first row shows results for all posts pooled together, while the second row shows results for the subsample of posts, which are more likely to be focused on a particular company (posts that mention companies at least five times). These results indicate that, on average, CARs were not significantly different from zero before blog posts, i.e., no significant pre-trends were detected. However, after the blog posts, CARs gradually increase in both magnitude and statistical significance in the next several hours, so that the three-hour CAR is equal to -0.19 p.p. (significant at 1 percent level) and the six-hour CAR is already -0.35 p.p. (significant at 1 percent level). After the important blog posts, CARs increase from -0.39 p.p. for the two-hour return (5 percent significance) to -0.78 for the six-hour return (1 percent significance). Overall, the results in panel A of Table 1 are consistent with Hypothesis 1 that blog posts have a causal impact on abnormal returns of the companies in question.

Figure 3 graphs our basic results. Specifically, it reports cumulative abnormal returns for all time periods, for which we can estimate CARs based on a reasonable number of posts, approximately from four hours before a blog post to six hours after a blog post.²⁶ Each point is computed as a cumulative abnormal return, e.g., $\sum_{\tau=t-k}^t \gamma_{1i}$ from a separate regression based on equation (1), including either $5 \times k$ minutes before a blog post or $5 \times k$ minutes after a blog post.²⁷ In total, the figure shows the results of 248 different regressions. We show these results for all the posts (panel A of Figure 3) and for the posts, that have at least five mentions of a company in the body of a blog post (panel B of Figure 3). These figures are consistent with the results of regression analysis and visually illustrate the absence of pre-trends before the posts and a significant stable negative effect after the posts.

Panel B of Table 1 shows regressions without the restriction of no mentions of the companies in other news sources. The results are similar to the results in panel A,

²⁴Our results are robust to excluding posts not preceded by mentions during longer time periods. However, such exclusion decreases the number of posts in our sample substantially. Two-hours threshold is chosen as 50 percent of reposts and retweets of Navalny's blog posts happen within the first two hours, as shown in Figure A4 in the online Appendix.

²⁵Note that we use $(0; k)$ to denote the k -minutes (or k -day) period beginning with the minute (day) of the event, and we use $(k; 0)$ to denote the k -minutes (or k -day) period ending with the minute (day) of the event.

²⁶We use a conservatively low threshold of having data on leads/lags for at least ten important posts per period to include the period into our calculations.

²⁷In constructing these figures, we follow the methodology by Dube, Kaplan, and Naidu (2011).

TABLE 1—BLOG POSTINGS AND ABNORMAL RETURNS

	Minutes around blog postings						
	(-240, 0)	(-120, 0)	(0, 5)	(0, 120)	(0, 180)	(0, 240)	(0, 360)
<i>Panel A. Intraday evidence: Cumulative abnormal returns (in percentage points) EXCLUDING posts with preceding mentions of the companies</i>							
All blog postings, fixed effects for company-year and trading day included	-0.0354 [0.122]	-0.0385 [0.0687]	-0.000716 [0.0165]	-0.0548 [0.0542]	-0.194 [0.0738]	-0.233 [0.0875]	-0.348 [0.101]
Important (5+) blog postings, fixed effects for company-year and trading day included	-0.241 [0.364]	0.00509 [0.165]	0.0144 [0.0503]	-0.386 [0.155]	-0.755 [0.257]	-0.820 [0.256]	-0.780 [0.250]
Observations	641,684	641,684	641,684	641,684	641,684	641,684	641,684
<i>Panel B. Intraday evidence: Cumulative abnormal returns (in percentage points) including all posts</i>							
All blog postings, fixed effects for company-year and trading day included	-0.0463 [0.0945]	-0.0541 [0.0533]	-0.00421 [0.0125]	-0.0254 [0.0437]	-0.112 [0.0517]	-0.131 [0.0630]	-0.200 [0.0778]
Important (5+) blog postings, fixed effects for company-year and trading day included	-0.305 [0.286]	-0.164 [0.131]	0.0154 [0.0343]	-0.247 [0.134]	-0.482 [0.183]	-0.489 [0.177]	-0.590 [0.217]
Observations	800,806	800,806	800,806	800,806	800,806	800,806	800,806
	Days around blog postings						
	(-3, -1)	(-1, -1)	(0, 0)	(0, 1)	(0, 2)	(0, 3)	(0, 4)
<i>Panel C. Daily evidence: Cumulative abnormal returns (in percentage points)</i>							
All blog postings, fixed effects for company-year and day of the week included	-0.233 [0.351] (0.310)	-0.166 [0.165] (0.226)	-0.330 [0.163] (0.215)	-0.0698 [0.212] (0.281)	-0.0831 [0.280] (0.344)	-0.0598 [0.316] (0.401)	0.166 [0.391] (0.468)
Observations	9,248	9,258	9,271	9,268	9,265	9,262	9,259
Important blog postings, fixed effects for company-year and day of the week included	-0.143 [0.773] (0.603)	-0.00310 [0.446] (0.344)	-0.847 [0.275] (0.349)	-0.945 [0.422] (0.547)	-1.239 [0.527] (0.639)	-1.266 [0.699] (0.750)	-1.140 [0.680] (0.831)
Observations	9,241	9,251	9,271	9,268	9,265	9,262	9,259

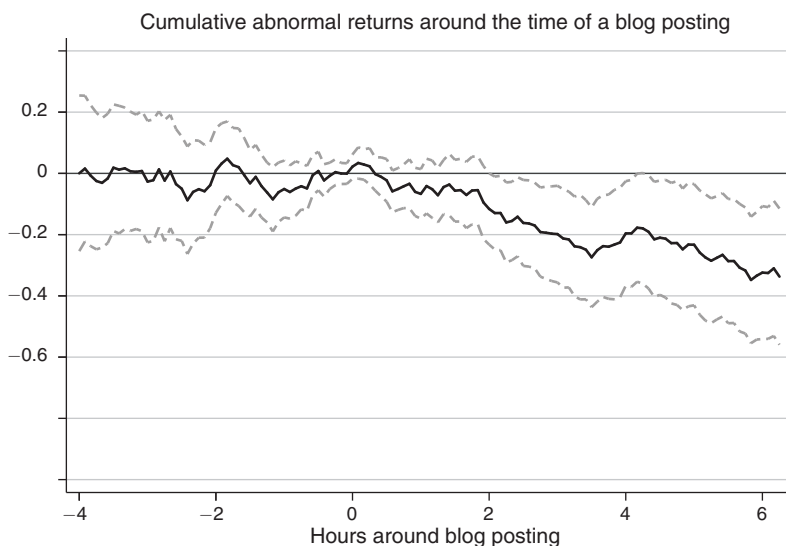
Notes: Abnormal returns are measured in percentage points. Robust standard errors are adjusted for clusters by trading day in brackets in panel A and panel B. For panel C, robust standard errors are adjusted for clusters by company-month in square brackets, and robust standard errors are adjusted for clusters by trading day in parentheses. Cumulative abnormal returns are computed from a standard market model with company-specific betas. Abnormal returns are winsorized at first and ninety-ninth percentiles. Our results are very similar in terms of statistical significance and magnitudes if we do not use winsorizing (see Table A4 in the online Appendix).

but are smaller in magnitude, suggesting that, if anything, ignoring mentions of the companies in other media sources biases the results against our hypothesis. We see no evidence of the reversal in stock returns, which is consistent with the information effects, rather than the market sentiment explanation (Hypothesis 2).

B. Daily Results

Next, we examine whether the effect is limited to within-day changes in stock returns or it persists for longer time horizons. Panel C of Table 1 presents CARs based on daily abnormal returns between three days before the post and five days after the post. Specifically, we compute abnormal return AR_{id} of company i on day d , estimated from the market model as a predicted residual from the equation $r_{id} = \alpha + \beta_i r_{md} + \gamma_i + \epsilon_{id}$, where r_{md} is market return, and γ_i is a company fixed effect. We then use daily abnormal return as a dependent variable (daily return here

Panel A. All blog postings



Panel B. Important (with at least five mentions of a company) blog postings

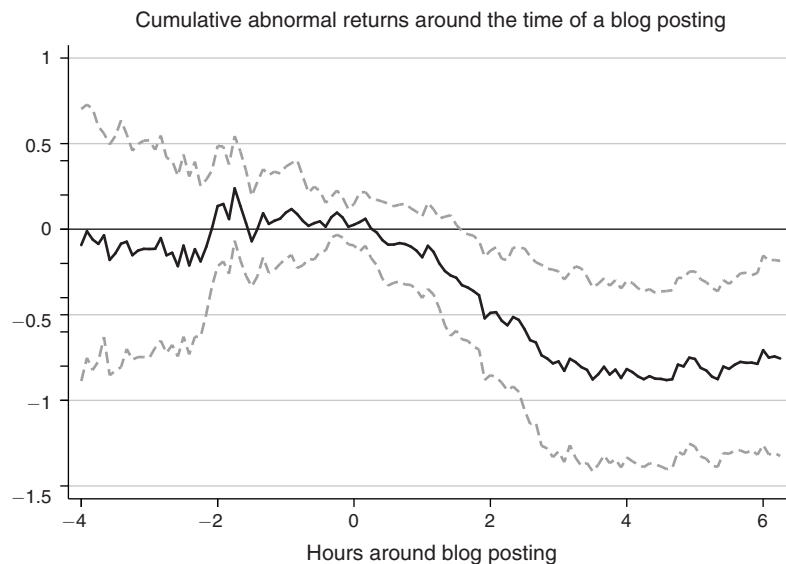


FIGURE 3. FIVE-MINUTE CUMULATIVE ABNORMAL RETURNS AND NAVALNY'S BLOG POSTINGS

Notes: Hour and company-day fixed effects are controlled for. Non-trading time (evenings and weekends) is excluded. Abnormal returns are winsorized at first and ninety-ninth percentiles. Posts with preceding mentions of companies in online or offline media are excluded. Ninety-five percent confidence intervals are shown by dotted lines.

is given by $\frac{P_{id} - P_{id-1}}{P_{id-1}}$, where p_{id} is a share's price of company i in day d). Hence, the estimated equation is

$$(2) \quad AR_{id} = \gamma_0 + \sum_{\tau=d-k}^d \gamma_{1\tau} post_{i\tau} + \gamma_2 X_{id} + \gamma_3 \delta_{cm} + \varepsilon_{id}$$

where AR_{id} is the daily abnormal return of company i on day d , estimated from the market model; $post_{i\tau}$ is a dummy variable equal to one if Navalny posted about company i on day τ ; X_{id} is the vector of controls for the information environment, which includes mentions of the company i in online newspapers, offline business newspapers, and in blogs, in addition to day of the week fixed effects; and δ_{cm} is a company-month fixed effect. In this specification, abnormal return, associated with a post about company i for day τ , is given by the coefficient $\gamma_{1\tau}$ for dummy variable $post_{i\tau}$. Thus, a cumulative abnormal return (CAR) from period $d - k$ to d (or from d to $d + k$) is equal to $\sum_{\tau=d-k}^d \gamma_{1\tau}$ ($\sum_{\tau=d}^{d+k} \gamma_{1\tau}$). We consider two alternative ways of clustering: clustering by trading day, which accounts for potential interconnections among abnormal returns within the same trading day, especially important when one post mentions several companies; and clustering by company-month, which accounts for within-company correlation.²⁸

The results indicate that the average daily CAR after a blog post was -0.33 p.p. (significant at 5 percent for company-month clustering), but after the first day, CARs are smaller in magnitude and stop being statistically significant.²⁹ Daily, CAR after an important blog post was -0.85 p.p. (significant at the 1 percent level for company-month clustering), with CAR gradually increasing to 1.27 p.p. for the four-day return (significant at the 10 percent level). CARs for longer periods are smaller in magnitude and are not statistically significant. Importantly, we do not see any evidence of the reversal in stock returns in the daily data as well, which provides further evidence in favor of information effects, rather than the market sentiment explanation.

In sum, the results reported in Table 1 suggest that, consistent with Hypothesis 1, blog posts about corruption negatively affect stock performance of the companies whose managers were accused of corruption, and this effect persists over time, which is consistent with Hypothesis 2.

IV. Real Effects and Mechanisms

A. Effects on Corporate Governance

To examine whether Navalny's posts are indeed associated with some real-life changes in corporate governance of targeted companies, we investigate whether the posts were associated with higher management turnover and with the probability

²⁸We do not report results with clustering by company because of the relatively small number of companies in our baseline sample. However, the results are robust to clustering by company.

²⁹Note that the coefficient for daily return loses the significance if clustering by trading day is used. Overall, we think of these results as weak evidence of the daily effect for ordinary posts, in contrast to important (5+) posts, for which the coefficients are consistently significant for any type of clustering.

of having a conflict with minority shareholders. A positive relationship between these measures and blog posts would suggest that the blog posts were able to trigger positive changes in these companies, similar to the impact documented by Dyck, Volchkova, and Zingales (2008).

In particular, we estimate the following specification:

$$(3) \text{ Governance}_{iq} = \gamma_0 + \gamma_1 Nposts_{iq} + \gamma_2 X_{iq} [+ \gamma_3 Nposts_{iq} \cdot SVI_{iq} + \gamma_4 SVI_{iq}] + \varepsilon_{iq},$$

where we use the management turnover and a dummy for a conflict with minority shareholders in the end of the quarter as proxies for the governance changes in company i in quarter q . $Nposts_{iq}$ is the number of Navalny's posts about the company i in quarter q ; vector X_{iq} includes company and year fixed effects. In some specifications, we also report results for the interaction with a measure of popularity of Navalny's blog, SVI_{iq} , specifically, a dummy for Google SVI for Navalny being larger than 10 (the corresponding terms are in brackets in equation (5)).

First, we test whether the probability of managerial turnover is higher following Navalny's blog posts about a company. Based on the quarterly reports of the companies, we collected data on actual changes in the top management throughout the period and use it as a dependent variable. We find that in the quarters with more important blog posts about the company, the probability of a management turnover was 3.3 percent higher (see column 1 in panel A of Table 2). The results in column 2 show that the effect of Navalny's posts became significant only when his blog became sufficiently popular, i.e., when we include the dummy variable for a Google Trends' SVI for Navalny being larger than 10, with 6.9 percent higher probability of turnover following the blog entries he posted as he grew more popular. If we consider all the blog posts, the coefficients for the average effect of the blog posts in column 3 and for the interaction with the measure of the popularity of Navalny's blog in column 4 are not statistically significant, although positive.³⁰

While we do not observe the specific reasons for the management turnover and if it was ultimately beneficial for companies, we can test whether or not the posts were associated with tangible benefits for minority shareholders. Specifically, we look at the effect of posts on the incidence of conflicts with minority shareholders. The results presented in panel B of Table 2 indicate that one additional post from Navalny about a particular company decreased the probability of an ongoing conflict with minority shareholders in this company at the end of the quarter by 6 percent to 7 percent, depending on the specification. The effect is stronger for more popular posts, though the difference is not statistically significant. Thus, the results in Table 2 suggest that Navalny's posts are associated with tangible changes of corporate governance in the targeted companies.

Overall, the results in Table 2 are consistent with Hypothesis 3 and suggest that blog posts are associated with improvements in corporate governance in the

³⁰Note that by the time when Navalny's blog becomes popular (at the end of our time frame), the average market reaction to his posts becomes positive, consistent with the market expecting some positive changes in the companies (see Table A4 in the online Appendix).

TABLE 2—BLOG POSTINGS AND CHANGES IN CORPORATE GOVERNANCE OF TARGET COMPANIES

<i>Panel A. Managerial turnover</i>				
Variables	Dummy for management changes			
	Important blog postings		All blog postings	
	(1)	(2)	(3)	(4)
Type of blog posting:				
Number of Navalny's postings	0.0332 [0.0177]	0.0087 [0.0233]	0.0038 [0.0244]	-0.0093 [0.0199]
Number of postings × Navalny popularity dummy		0.0693 [0.0290]		0.0534 [0.0673]
Navalny popularity dummy (SVI > 10)		-0.2724 [0.1004]		0.2373 [0.1403]
Company and year fixed effects	Yes	Yes	Yes	Yes
Observations	157	157	157	157
R ²	0.1508	0.1722	0.1432	0.1603
<i>Panel B. Conflicts with minority shareholders</i>				
Variables	Dummy for ongoing conflict with minority shareholders			
	Important blog postings		All blog postings	
	(1)	(2)	(3)	(4)
Type of blog posting:				
Number of Navalny's postings	-0.0703 [0.0329]	-0.0595 [0.0345]	-0.0215 [0.0112]	-0.0172 [0.0102]
Number of postings × Navalny popularity dummy		-0.0311 [0.0652]		-0.0355 [0.0347]
Navalny popularity dummy (SVI > 10)		0.0197 [0.0786]		-0.0073 [0.0751]
Company and year fixed effects	Yes	Yes	Yes	Yes
Observations	118	118	118	118
R ²	0.6642	0.6650	0.6565	0.6601

Notes: Robust standard errors are in brackets. Standard errors are clustered by quarter. Ongoing conflict (panel B) is computed for the end of the quarter. SVI is Google Trends' Search Volume Index, and SVI > 10 means the number of searches for Navalny during the quarter is at least 10 percent of the maximum number of searches.

targeted companies, at least when they attract enough attention. These results, however, should be interpreted with caution, as our methodology, which employs company-quarter data, does not allow us to make strong causal claims.

B. Attention to Alternative Blogs

As we discussed in Section III, the lack of reversal in both intraday and daily results indicates that the effect of blog posts on stock returns is driven primarily by information effects rather than noise trading (Tetlock 2007). Still, this evidence does not allow ruling out that at least some part of the effect comes through market sentiment. In this and the subsequent subsection, we test whether at least part of the effect is explained by changing attention of individual investors, which leads to short-term fluctuations in prices (Da, Engelberg, and Gao 2011). In particular, we use data on the popularity of posts by other bloggers, which are unrelated to the companies, to demonstrate that investor attention plays a role in how blog posts affect stock returns. Such posts should not have a direct effect on stock returns, but can distract the attention of the readers of Navalny's blog.

We employ two different measures of popularity of the alternative blog posts. The first measure is the largest number of comments in non-Navalny's blog posts on a given trading day. We normalize this measure so that its mean is zero, and its variance is one. The second measure takes into account the fact that the top ten posts on LiveJournal were specifically advertised on its main page everyday. We cannot directly compare the popularity of blog posts in this top ten list in different days, so we create a dummy for whether or not the post with the largest number of comments (popularity according to the first measure) was at the same time a top ten post on a given day (popularity according to LiveJournal's own measure, which we do not directly observe). We use this dummy as a second measure of the popularity of the most popular alternative post in a given trading day.³¹

Table 3 reports the results of this estimation. Columns 1 and 2 show that the average impact of Navalny's blog posts was smaller on days with popular alternative posts. The result holds for both measures, and the magnitudes of the interaction coefficients are large enough to change the sign of the aggregate effect of the blog posts. These results suggest that when the attention of the readers is distracted from Navalny's blog, his posts no longer have an impact on the market. However, results in columns 3 and 4 demonstrate that the distraction of attention does not happen for the more informative blog posts (posts with more than five mentions of the companies), i.e., posts that presumably had more informational content.

Note that Navalny's posting behavior was not significantly correlated with any of the popularity measures for alternative posts that we use (Table A5 in the online Appendix), so it is not the case that Navalny was checking for the presence of popular blog posts elsewhere before deciding to blog about the companies. It also does not seem to be the case that other bloggers took Navalny's behavior into account when making decisions about the timing of their posts.

C. Average Transaction Size

To better understand what types of investors are affected by Navalny's blog, we investigate whether the average size of market transactions is different on the days with blog posts. Smaller market transactions point to trading by the individual rather than institutional investors, consistent with the role of noise trading. Ideally, we would like to compare the whole distribution of transactions, but data availability allows us to use only the average size of trades. We estimate the following equation:

$$(4) \quad \text{Average_Size_of_Trade}_{id} = \gamma_0 + \gamma_1 \text{post}_{id} + \gamma_2 X_{id} + \gamma_3 \delta_{cy} + \varepsilon_{id},$$

where $\text{Average_Size_of_Trade}_{id}$ is the daily trading volume for company i on day d , divided by the number of transactions; post_{id} is a dummy variable equal to one if Navalny posted about company i on day d ; X_{id} is the same vector of controls, as in equation (3); and δ_{cy} are company-year fixed effects.

³¹The construction of these measures is dictated by data availability; unfortunately, we do not have continuous data on the number of visits to different posts for the time period preceding mid-2009.

TABLE 3—ABNORMAL RETURNS AND POPULARITY OF ALTERNATIVE POSTS: INFORMATION VERSUS ATTENTION

	Daily abnormal returns			
	(1)	(2)	(3)	(4)
Dummy for posting × popularity of alternative blog postings (normalized)	0.4690 (0.2455)			
Dummy for posting × popularity of alternative blog postings (alternative measure, dummy)		0.8748 (0.4370)		
Dummy for posting	-3.6429 (1.8353)	-0.3953 (0.1991)		
Dummy for important posting × popularity of alternative blog posting (normalized)			0.0585 (0.7952)	
Dummy for important posting × popularity of alternative blog postings (alternative measure, dummy)				-0.0413 (0.8410)
Dummy for important posting			-0.9870 (5.8831)	-0.5746 (0.4773)
Popularity of alternative blog posting (normalized)	0.0221 (0.0557)		0.0296 (0.0551)	
Popularity of alternative blog postings (alternative measure, dummy)		-0.1343 (0.1224)		-0.1131 (0.1218)
Controls + fixed effects	Yes	Yes	Yes	Yes
Observations	3,790	3,790	3,790	3,790
R ²	0.0708	0.0712	0.0704	0.0707

Notes: Robust standard errors are adjusted for clusters by company-month in brackets. All specifications include company-month and day of the week fixed effects together with controls for mentions in online news, business newspapers, newswires, and other blogs. Popularity of alternative blog posting is measured as $\log(1 + \text{number of comments to the most popular alternative posting})$ during the trading day, normalized to have a mean of zero and standard deviation of one. An alternative measure of popularity is a dummy for most commented on alternative posts belonging to the top ten list during the trading day, i.e., it indicates that the post with the largest number of comments was in the list of ten most visited posts during the trading day. Important postings are postings with at least five mentions of the company. Daily abnormal returns are computed from a standard market model with company-specific betas. Abnormal returns are winsorized at first and ninety-ninth percentiles. Abnormal returns are measured in percentage points.

Table 4 presents the results of these estimations. Column 1 shows that the average size of trades was 6.4 percent smaller in the days with posts (significant at the 5 percent level), and column 2 shows that the average size of trade was not significantly different on the days with more informative posts. In sum, these results are consistent with Hypothesis 5 and suggest that individual shareholders are likely to be affected by Navalny's posts.

It is theoretically possible that the market transaction size goes down in specific periods for reasons unrelated to blog postings. To address this possibility, we test to see whether placebo posts (dummies for one and two days ahead of the posts) have any significant impact on the average size of transactions. The results, reported in columns 3–6, show that there are no significant pre-trends, and the size of transactions goes down during the days of the posts, but not before them.

Overall, the results presented in Tables 3 and 4 are consistent with Hypothesis 4 and allow for the following conclusions. First, some part of the effect of Navalny's blog posts is driven by attention-based noise trading, and some of the readers of his blog are easily distracted by unrelated content. Second, traders affected by

TABLE 4—BLOG POSTINGS AND AVERAGE SIZE OF MARKET TRANSACTIONS

	log (average size of trade transaction)					
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for posting	-0.0639 (0.0277)					
Dummy for important posting		-0.0834 (0.0678)				
Dummy for posting tomorrow (placebo)			-0.0422 (0.0306)			
Dummy for important posting tomorrow (placebo)				0.0206 (0.0407)		
Dummy for posting day after tomorrow (placebo)					-0.0272 (0.0644)	
Dummy for important posting day after tomorrow (placebo)						-0.0490 (0.0906)
Controls + fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,988	6,988	6,988	6,988	6,988	6,988
R^2	0.7583	0.7582	0.7581	0.7581	0.7581	0.7581

Notes: All specifications include company-year and day of the week fixed effects together with controls for mentions in online news, business newspapers, newswires, or other blogs, and the total trading volume for other companies. The unit of observation is company-trading day. Important postings are postings with at least five mentions of the company. Robust standard errors are adjusted for clusters by trading day in brackets.

Navalny's posts through the attention mechanism are unlikely to be institutional investors, as their attention seems to be distracted by Russian-language nonfinancial blogs. Third, there is no evidence of an attention mechanism for more focused posts, i.e., posts that mention the companies at least five times.

D. Robustness Checks

We estimate a number of alternative specifications to check the sensitivity of our results. First, we check that our results are robust to the inclusion of the lead of Google Trends' Search Volume Index (SVI), which Da, Engelberg, and Gao (2011) found to be related to stock performance. Second, we checked that our results are robust for looking only at 2008–2009, the period far from 2011 when Navalny started to post about politics (Table A3, panel B). Finally, instead of regression-based estimation, we use a more traditional, “out-of-sample” event-study design, where normal returns are computed for a time period before the blog posts, and abnormal returns are computed as an out-of-sample prediction. We find that for reasonable values of parameters (with the estimation window being one year before the start of blogging) this approach generates similar results. However, these results are quite sensitive to the choice of the estimation window and the event-window parameters, which seems to be a general problem of this type of event-study methodology (Kothari and Warner 2007). For this reason, we chose to report the results using the in-sample methodology, as these results are robust to different specifications and changes in estimation procedures.

V. Conclusion

Does online social media change the way businesses and governments work? The existing literature provides conflicting arguments about the potential impact of new media. In this paper, we focus on the case of an influential Russian blogger to empirically demonstrate that an anti-corruption blog can have a measurable, sizable impact on accountability. Specifically, we show that the anti-corruption blog posts by Alexey Navalny, a popular blogger, shareholder activist, and a future opposition leader, have significantly affected the stock performance of companies whose wrongdoings he has exposed. We also provide indirect evidence that these blog posts were associated with an increase in accountability within state-controlled companies he was writing about.

While the existing literature demonstrates the impact of traditional mass media on corporate and political accountability in democratic countries, we show that similar effects are present for online social media in countries with limited political competition, which are often plagued by information inefficiencies and corruption at many levels. Thus, our results suggest that social media can improve the quality of governance in places that need it the most.

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