Corruption, News, and Sovereign Spreads*

Aleksei Kiselev

European University Institute
aleksei.kiselev@eui.eu

Vladimir Zabolotskiy

University of Bolzano
vzabolotskiy@unibz.it

November 8, 2024

Preliminary draft under revision. Please do not redistribute or cite without the authors' permission.

Abstract

Corruption is a pervasive societal problem and a factor of sovereign risk: it slows capital accumulation and indicates the government's distorted default and repayment incentives. Which of the two - reduced ability or willingness to pay in the future - concerns the lenders more? We address this question by analyzing debt and stock market responses to over a hundred corruption exposés in Russian state-owned enterprises of different sizes. Our empirical findings suggest that this news affected perceived sovereign risk *not* through disclosing state tax revenue losses but by revealing the government's lack of commitment. To quantify the total effect of revealed corruption on sovereign borrowing costs, we develop a sovereign debt and default model with sequential noisy signals (news) about the government's type. The calibrated model predicts that sovereign spreads increased by 40 basis points, making corruption relevant in country risk assessment.

Keywords: corruption, sovereign debt, sovereign risk, Russia

*We would like to thank Vladimir Asriyan, Tobias Berg, Edouard Challe, Russell Cooper, Giancarlo Corsetti, Ruben Enikolopov, Vitor Gaspar, Alok Johri, Inna Lobanova, Yang Lu, Ramon Marimon, Andrea Matozzi, Dmitry Mukhin, Maria Petrova and many others for valuable comments and discussions of this paper. We are grateful to participants of the Finance in the Tuscan Hills workshop, YES Summer school, and EUI working groups for their valuable comments. Any errors are our own.

1 Introduction

> Executives at Elf Aquitaine, France's largest oil company, took bribes in exchange for awarding business deals. Along with the extra cash, they got 7 years in jail and a 2 million euro fine for abuse of power. Russian oil firm Gazprom purchased materials for new pipelines through intermediaries owned by company officers. The high prices charged for the materials raised eyebrows, but not court battles.
>
> *World Bank's Doing Business in 2006*

Corruption imposes substantial efficiency costs on societies, especially in developing and resource-rich countries. Covertly diverting public resources for private gain, state-owned enterprise managers and politicians often ignore the societal costs of their actions. The associated distortions, when large enough, can increase sovereign risk through two distinct channels. First, corruption is indicative of the sovereign's *willingness to pay* because it reflects its poor cooperation incentives. Second, corruption lowers output and tax revenues so that *any* government has lower fiscal capacity, or lower *ability to pay*. In the end, both factors determine the creditworthiness of a sovereign in the eyes of its lenders.

This paper studies the effect of corruption on sovereign borrowing costs and its sources. We use Russia as a case study: the country's perceived creditworthiness deteriorated from its peak in 2006 when the prior debts were repaid early and fully to the Paris Club of Creditor Nations,[1] to the point in 2012 when, despite oil prices being at the record high levels, the government decided to hire a global investment bank to boost the sovereign image abroad.[2] We use a sequence of corruption exposés in Russian largest state-owned enterprises (SOEs) to answer the following questions: how do widespread and worsening corruption situation affect sovereign borrowing costs? do international lenders respond to corruption news because of direct value destruction (lower ability to pay) or because they understand the governments's incentives (willingness to pay)? By tracking moments when the market participants revised their perceptions of public governance in SOEs, we infer the adverse effects of corruption on sovereign borrowing and distinguish between the two channels.

Our main contribution is understanding why corruption might affect a country's image abroad and quantifying the evolving effect of corruption perceptions on sovereign spreads in an emerging market economy. In our case study, the news about oil&gas SOEs could have affected the financial markets solely because of the large size of the natural resource reserves under the government's control [Hamann et al., 2023, Esquivel, 2024]. This explanation would correspond to the idea that the news revealed that *any* sovereign would have lower ability, or fiscal capacity, to repay the debts. However, we find that that the sovereign spreads responded equally strongly to news about smaller SOEs which implies that the price response mostly reflected the growing market awareness of the government's lack of commitment to repay [Aguiar and Amador, 2011]. The sequence of news we consider led to a significant increase in the borrowing costs which stresses the relevance of public sector corruption for sovereign risk assessment.

Our identification is based on the series of impactful blog posts of the Russian politician Alexei Navalny, who exposed the diversion of funds and poor management at the country's largest SOEs throughout 2008-2011. A sequence of these posts attracted widespread attention and eventually made the author one of the main political opposition figures in the country. Using detailed data collected in Enikolopov et al. [2018], we study the response of the market prices to over one hundred blog posts exposing corruption in the SOEs. Prior research has

[1] https://www.theguardian.com/business/2006/aug/22/russia (accessed August 8, 2024).

[2] https://www.forbes.ru/news/230232-rossiya-nadeetsya-uluchshit-svoi-imidzh-v-reitingah-pri-pomoshchi-goldman-sachs (accessed August 8, 2024).

documented that these blog posts led to an average 33 basis points (b.p.) decline in the market valuations of the targeted companies. We control for global factors (stock market stance, risk appetite, oil price) and compare the first differences of sovereign spreads, stock market index, and foreign exchange rate on the days around blog posts to the days without those to elicit the average effect of information revelation on the markets.

Using the time distance between the posts and the average fade-out period of the impact on sovereign spreads, we calibrate a learning process of a stylized sovereign debt and default model with investment and sequential noisy signals (news) about the degree of commitment to repay the lenders.The *corrupt* government does not internalise fully the consequences of default compared to the *benevolent* one, because of his lower commitment to cooperate. The foreign lenders do not observe the government type or the investment level. In the interim period, before the production and default decisions are realised, a sequence of news arrives; the lenders observe news's arrival and dynamically infer the degree of corruption distortions. Periods without news are informative: they improve the perceptions of lenders regarding the government. The effect of news on spreads on a given date depends on the latest prior. The model allows us to rationalize the findings and build an additional intensity measure for the change in market perceptions for days with and without news.

We find that corruption news was accompanied by an average 2.5 b.p. same-day increase of the Russian sovereign spreads with adverse albeit less pronounced effects on the stock market and exchange rate. By exploiting differences in the targeted SOE asset sizes, we show that the reputational - and *not* management - factor played the main role. Some exposed companies' capitalisation was as much as 15% of the main stock market index (Gazprom), while for some it was around 1%. However, we find that news about smaller companies affected the sovereign spreads at a magnitude equal to the effect of news about larger companies. While we do not argue that the sovereign spreads would have been lower without these blog posts, we do argue that Alexei Navalny's activity adversely affected the markets' perceptions of the Russian top managers and public officials and reflected deteriorating quality of public governance. Similar news appear in different countries, but our case stands out because of its documented effect on the SOE share prices and homogeneity which allows to study the news as one sequence.

Our model rationalizes several empirical patterns. Aligning with the idea of reputation as a form of intangible capital than can depreciate or grow, the modelled sovereign spread responses positively to corruption news and negatively to no-news days. As in the data, it is stronger at the start of the sample period when the image abroad presumably was better. Using the measure of news intensity extracted from our baseline model, we estimate the cumulative reputational effect on the sovereign spreads of around 40 basis points. That is, immediately after observing the whole sequence of corruption news, lenders charged the Russian government higher interest rates. Finally, a model extension with news about productivity illustrates substitutability between physical capital and reputation and explains why the corruption news is more impactful when oil prices are lower and why the reputation loss effect is not evident when oil prices were booming.

We run several tests to further verify the relevance of corruption to sovereign borrowing costs. We do not find evidence that Navalny's posts were timed to macro news. The effect on sovereign spreads was persistent at the five-day horizon and, thus, likely was not driven by noise traders. The documented results are robust to inclusion of local financial market liquidity measures. Finally, we document that the stock market index went down during two-hour window after the blog posts were released while there was no spillover effects on individual share prices of other (non-exposed) SOEs.

Our case study sheds light on the role of reputation for sovereign risk. In our environment, the value destruction associated with poor management in SOEs was significant and a priori would be the main suspect behind the link between corruption and borrowing costs. Despite the

fact that Navalny exposed companies like Gazprom and Rosneft - #2 and 15 biggest oil&gas companies in the world in 2012[3] - the corresponding response of sovereign spreads was not different from the other episodes. The result is particularly striking if one takes into account the fact that more than half of their revenues were going to the federal budget and constituted more than 5% of the total *each*. The important implication is that the sovereign's willingness to pay concerned the lenders more than its fiscal capacity to do so.

Related Literature

Our paper contributes to the broader discussion of the effects of corruption on the economy. It was shown that corruption in state-owned firms has implications for foreign direct investments [Wei, 2000], bank lending [Khwaja and Mian, 2005], government aid [Faccio et al., 2006], and stock market valuations Enikolopov et al. [2018] mostly in application to emerging markets. We develop an argument about the linkage between corruption and sovereign reputation driven by political economy frictions. In doing so, we are also drawing limits on the benefits of information manipulation and opacity inherent to autocratic regimes as discussed in Guriev and Treisman [2022] and documented in Andersen et al. [2017, 2022], Martínez [2022]. Unlike in some other studies [Alamgir et al., 2023], we treat corruption not as a tax but as one of the benefits of the sovereign, which links our paper to the literature in development economics [Jayachandran and Kremer, 2006].

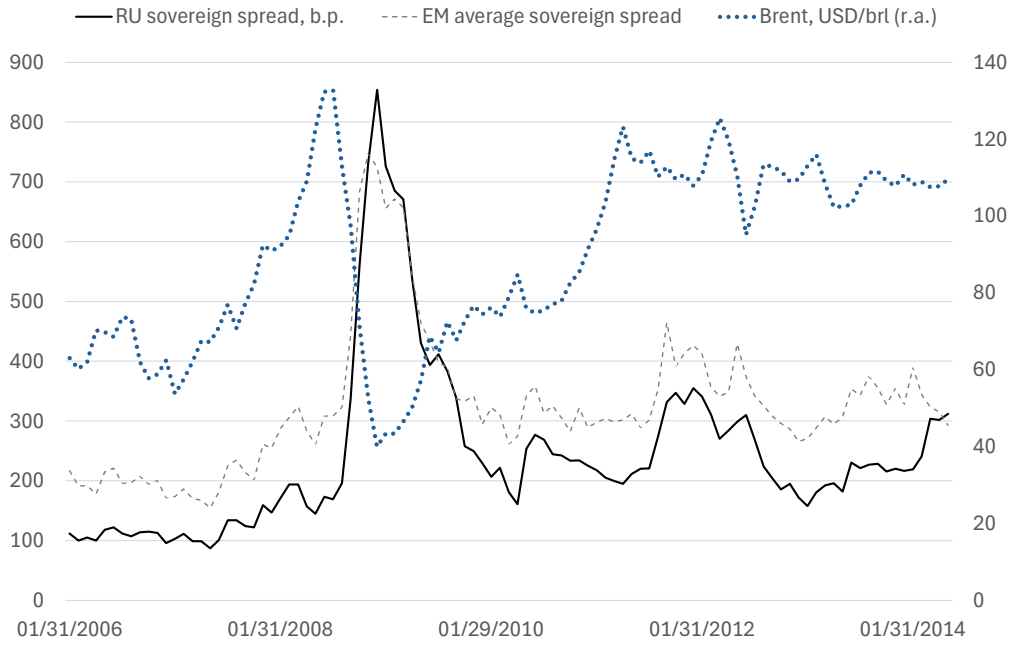
This work is related to a vast amount of literature on the determinants of sovereign borrowing costs. Many studies have focused on the role of reputation both theoretically [Cole and Kehoe, 1998] and empirically [Tomz, 2007]. A recent study Morelli and Moretti [2023] underscores the long-lasting effects of reputation on sovereign spreads in the context of emerging markets. In general, political economy frictions [Alesina and Tabellini, 1990] seem to play an important role in sovereign borrowing [Aguiar and Amador, 2011, Chatterjee and Eyigungor, 2019, Aguiar et al., 2020, Acharya et al., 2024] along with the purely economic factors, such as natural resource wealth [Hamann et al., 2023, Esquivel, 2024]. We contribute to this research by showing how political economy frictions constitute themselves in poor public management of resources, which is informative about the type of government. Usage of daily data complements historical research on the role of reputation covered in Tomz and Wright [2013]. Given the large costs of default and macroeconomic significance of sovereign risk Almeida et al. [2017], Hébert and Schreger [2017], Bianchi et al. [2023], Arellano et al. [2024], it is important to understand how political economy frictions are related to *willingness* and *ability* to pay.

Finally, our empirical analysis relates to the literature studying market reaction to news, including political news. Acemoglu et al. [2018] studied the effect of protests on the stock market values of politically connected firms, while others stressed the role of sentiment [García, 2013], sensational news [Peress and Schmidt, 2020] for the financial markets. The most closely related work is Morelli and Moretti [2023] which focuses on the effects of inflation misreports in Argentina on market perceptions of sovereign risk and Enikolopov et al. [2018] on whose data we built upon. Compared to the former paper, we exploit a longer time series, have richer cross-sectional variation (different SOEs) and uncertain timing, allowing us to study evolving effect of news on sovereign spreads in time.

The rest of the paper is structured as follows. Section 2 provides background information on the case study of Russia. Section 3 describes the empirical analysis. Section 4 presents the sovereign default model with sequential noisy signals and quantitative analysis of the corruption news. Section 5 concludes.

[3]https://www.forbes.com/pictures/mef45glfe/not-just-the-usual-suspects-2/ (accessed October 28, 2024)

Figure 1. Russian sovereign spreads and global oil prices.



Note: Emerging Market Bond Index (EMBI) for Russia, Emerging Markets average, and Brent crude oil price (right y-axis) in 2006-2014. EMBI stands for US dollar-denominated 10-year sovereign spreads, the extra yield of US dollar-denominated bonds over similar bonds issued by the US government. *Sources*: JP Morgan, EIA.

2 Background

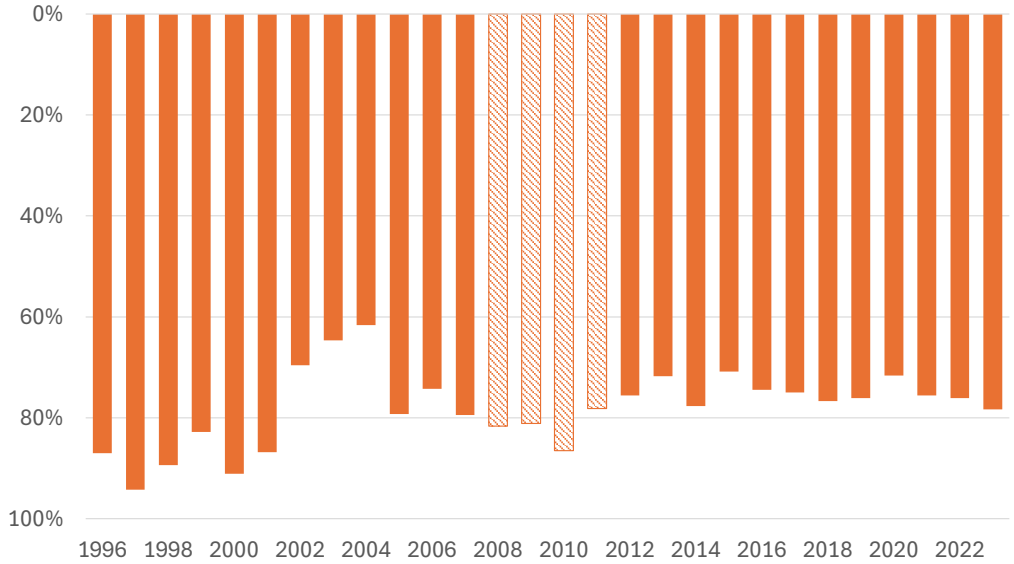
We first provide a glimpse into the institutional background for the subsequent analysis. We focus on Russia of 2008-2011 because this is a period during which there was a significant deterioration across numerous institutional quality indicators accompanied, as we argue, by deteriorating image abroad. This was also the period when the future opposition leader Alexei Navalny was actively exposing corruption in state-owned enterprises (SOEs) via social media.

The turbulent period following the collapse of the USSR, marked by the emergence of a market economy and inflow of foreign investments, in 1998 culminated in a sovereign default. The early 2000s, in contrast, was a time of prosperity brought about by further private business development and increasing revenues from commodity exports, most importantly oil and gas. Right before the start of the period we focus on, in 2006, Russia repaid its overdue debts to the Paris Club of Creditor Nations ahead of schedule[4] and has not missed any payment since then. The economy faced the global financial crisis, having abundant national reserves, low external sovereign debt, and low sovereign spreads (the latter depicted together with a benchmark global oil price in Figure 1). Yet, the sovereign spreads spiked way above the emerging markets benchmark in 2009.

Figure 2 illustrates that by the time the GFC unfolded, the perceptions of corruption in Russia deteriorated, and the institutional quality progress of the 2000-s was reversed. The country's image abroad was affected by numerous domestic human and property rights violations. The case of Sergei Magnitsky — a lawyer for the largest foreign investment fund in Russia who was jailed on bogus charges in 2008 and died in prison one year later while the fund's activity was put on halt — was one of the many. These developments culminated in the enactment of the 2012 Magnitsky Act in the US. The Russian government seemed to be aware of the changing attitudes towards investing in Russia: improving positions in some busi-

[4]This included the USSR-era debts of 42 billion USD.

Figure 2. Russia's corruption perceptions rankings.



Note: The percentile position of Russia in the Corruption Perceptions Index database. The period of analysis, 2008-2011, is highlighted. *Source*: Transparency International.

ness rankings became one of the national development goals. Notably, in December 2012, the Russian government decided to hire a global investment bank to improve the country's image abroad.

While it is difficult to study the effect of unobservable and slow-moving changes in the institutional environment of an economy, we focus on the series of corruption news that received broad attention domestically and abroad. The future Russian opposition leader Alexei Navalny started his political career as a minority shareholder activist who shared his private investigations of publicly traded SOEs on his social media, which attracted considerable public interest.[5] Enikolopov et al. [2018] provides a detailed account of how his blog posts exposing corruption led to decline in the share prices of the SOEs he targeted in 2008-2011. His posts, almost exclusively negative, triggered an average 33 basis points decline in the stock returns of the companies Navalny mentioned. Most of his posts were revealing information about excess costs: for example, some posts covered how SOE managers purchased materials through one of the managers' shell companies or invested by paying unreasonably high prices, which covered kickbacks or outright stealing. We interpret these episodes as noisy signals about deteriorating institutional quality.

If his stories were powerful enough and had a wide public outreach, they might have led to the change in market perceptions about the degree of political economy frictions, and government incentives.[6] This information could have been relevant for a country that just finished repaying its debts from the previous default because it signaled the weakness of checks and balances on the current political incumbents. While we will not argue that there is a causal link from Navalny posts to sovereign spread spikes, we do argue that we can use these dates as focal points when the markets might have re-evaluated their view on the Russian government.[7]

[5]https://www.newyorker.com/magazine/2011/04/04/net-impact, https://www.washingtonpost.com/obituaries/2024/02/16/alexei-navalny-dead-russian-opposition/ (accessed June 25, 2024)

[6]A case study on the ex-president Medvedev in [Guriev et al., 2021, p. 2606-2607] illustrates how impactful Navalny's activity was on individual politicians' reputation.

[7]The Economist 1870 article summarised the argument neatly: "Do we know what all the various bodies and persons having power in that polity may think of paying money to foreigners? ... Are we sure that this new nation can be trusted with the greatest of pecuniary temptations — that of borrowing from persons they

First, the SOEs Navalny targeted were national champions which shares were traded in the stock markets, e.g., Gazprom (#1 natural gas producer in the world), Rosneft (#2 oil producer in the world), Sberbank (#1 commercial bank), Transneft (#1 oil transporter in Russia), and VTB (#2 commercial bank in Russia). Second, the IMF estimates show that 26 major SOEs produced 28% of the Russian GDP in 2012 [Hughes et al., 2014], so a reputational spillover effect, in which investors extrapolate what they learn about management in one state-owned company to the government in general, could have been significant. In an interview with a business radio, Navalny himself summed up the broader effects of his media activity in the following way:

> I sued corporations for corruption, wrote criminal complaints. The police, the prosecutor's office gave me constant rebuffs. And I simply posted these rather dry legal documents on the Internet, and I continue to post them. And to my surprise, a significant number of people found it interesting, it became *an online show how justice and the judicial system actually work.*

To the extent that stories compete with statistics in shaping beliefs [Graeber et al., 2024], Alexei Navalny's blog posts could have profoundly affected the markets beyond the firm cases he publicised.

3 Empirical Analysis

In this Section, we provide details of our empirical analysis. First, we present the data we use to identify the effect of Navalny's blog posts about state-owned enterprises (SOEs) on the financial markets. We argue that the main channel linking corruption news with financial market prices is investors' perceptions of the sovereign's willingness to repay, and not his ability to do so.

3.1 Data

The data on the blog posts of Alexei Navalny was produced and systemised in Enikolopov et al. [2018]. The dataset contains detailed information on the timing of blog posts on the social platform LiveJournal and their content. We construct dummy variables for each date in our sample that take a value of 1 if Navalny posted about a SOE on that date. These correspond to 105 dates in the period starting from February 2008 to July 2011. While Navalny posted more frequently than this, we limited our sample to the same set of posts that Enikolopov et al. [2018] showed to have triggered the decline in the share prices of the SOEs except for we added Sberbank of Russia to the sample.[8] The effect on individual share prices as documented in this prior study was statistically significant both at 5-minute and daily data. By exploiting these episodes, we ensure that the sequence of news we consider was market-relevant in that it triggered a sizable price response for the exposed companies' share prices.

We use cross-sectional variation in the posts to understand the mechanism behind the correlations in the data. Each post mentions at least one of the following five SOEs: Gazprom, Rosneft, Sberbank, Transneft, and VTB. The first three ("Large SOE") are the largest gas and oil producers and a commercial bank, respectively, and the most important assets of the Russian government. In 2008-2011, they constituted 15, 8, and 14 % of one of the main Russian stock market index.[9] Even more importantly for our analysis, these three SOEs were among the largest taxpayers: for example, Rosneft alone contributed with 6% of the total government

have never seen?", cited as in [Tomz, 2007, pp. 68-69]

[8]The company was in their dataset, but it was discarded because of a relatively low number of observations. Our analysis is not focused on the companies, so we include the corresponding observations into our sample.

[9]Companies' average shares in the RTS index are reported in Table A1.

revenues over 2008-2011. The other two companies in the sample ("Small SOE"), Transneft and VTB, are still very large, but they accounted for 1 and 3 % of the benchmark stock market index, accordingly, and contributed significantly less to the federal budget tax revenues. We will use the heterogeneity in the companies' total fiscal contributions to discern the effect of corruption on the sovereign's ability *and* willingness to pay channels.

Our data contains 909 trading days, with 105 dates with blog posts mentioning at least one of the five SOEs above (summarized in Table 1). If on a given blog post date, Navalny mentioned at least one of the three Large SOEs, we classify it as a Large SOE post; the rest are classified as Small SOE posts. The posts are evenly distributed between the beginning (2008-2009) and end of the period (2010-2011). Appendix features additional data on the content and timing of posts (Figures A1, A2, and A3).

Table 1. Navalny's posts publication days

	N days
Total	909
Days with:	
SOE blog posts	105
Small SOE blog posts	42
Large SOE blog posts	63

The choice of variables for financial market analysis is motivated by our focus on the economy-wide effects of corruption. We use daily data: the most commonly used measure of the sovereign borrowing costs, EMBI Russia sovereign spreads (basis points, SS); US dollar-denominated Russian stock market index RTS (index, SM), and RUBUSD exchange rate (rubles per US dollar, FX). The first differences are computed for natural logarithms of all the variables and then multiplied by 10,000 (except for sovereign spreads which are already measured in basis point changes). Combined, these three indicators provide us with information about the reaction of sovereign debt, stock, and foreign exchange markets to corruption news.

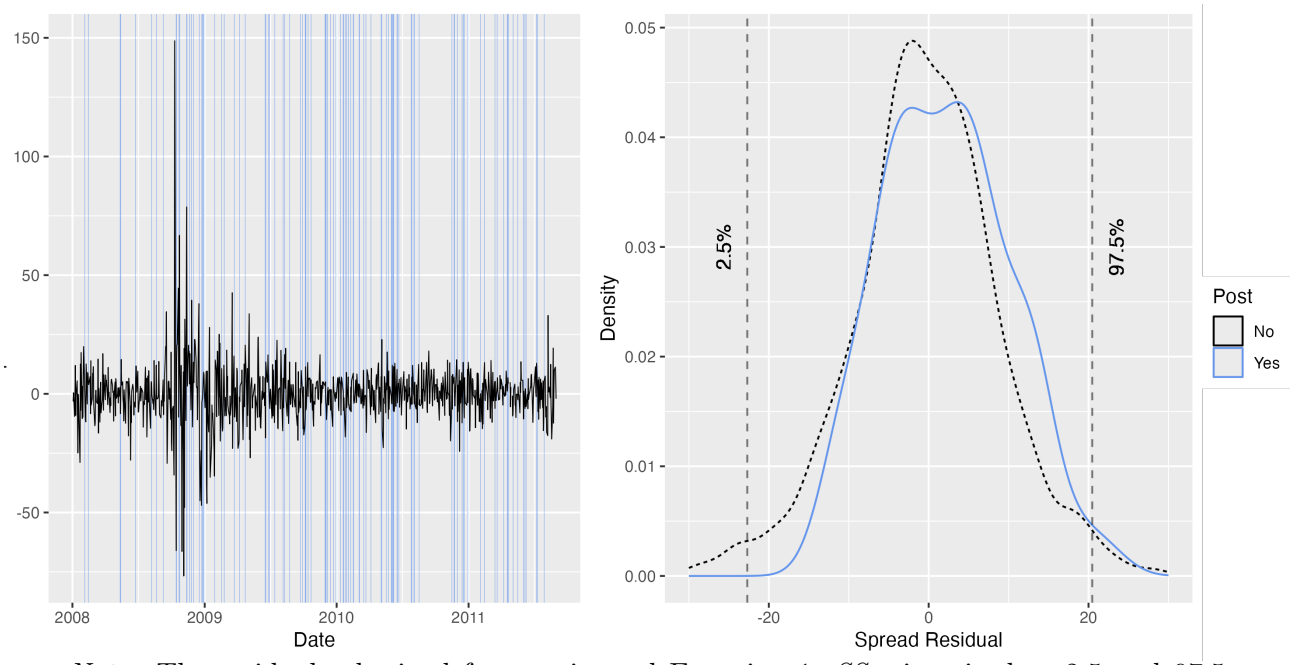
To increase precision and control for the effect of external developments on the local economy, we use a set of global factors. Following Hébert and Schreger [2017] and Morelli and Moretti [2023], at the first stage of our analysis, we control for i) advanced economies market returns proxied by Standard and Poor's ($S\&P$) 500 index, ii) risk aversion — the S&P 500 Volatility Index (VIX), iii) emerging economies market returns — Morgan Stanley Capital International ($MSCI$) Emerging Markets exchange-traded fund (ETF) index, and iv) export markets developments — Brent crude oil (Oil). This step is meant to reduce the variance of the estimates and exclude alternative explanations for our results.

To calculate our variables of interest, what we call *domestically-driven* changes in financial market prices, we estimate the following model using daily first differences:

$$Y = \{SS \text{ (sovereign spread)}, SM \text{ (stock market)}, FX \text{ (foreign exchange rate)}\}:$$
$$\Delta(\text{b.p.})Y_t = \beta_0 + \beta_1 \Delta \log S\&P500_t + \beta_2 \Delta \log VIX_t + \beta_3 \Delta \log MSCI_t + \beta_4 \Delta \log Brent_t + \epsilon_t; \quad (1)$$

We then compute the domestically driven daily changes in the three variables as the residuals from the estimated models in Equations 1. We winsorise these residuals at 2.5 and 97.5% to eliminate outliers. It is important to do so, for the period under consideration covers not only significant global, GFC-related events but also domestic ones, such as the invasion of Georgia in August 2008; however, our main results are robust to exclusion of this step. We then check for time series properties of the variables: the Dickey-Fuller test ($\tau = -10.23, p < 0.01$) rejects the non-stationarity while the Jarque-Bera test does not reject normality of the winsorized series.

Figure 3. EMBI Russia domestically driven daily changes in sovereign spreads.



Note: The residuals obtained from estimated Equation 1, SS winsorized at 2.5 and 97.5 percentiles. The left chart plots the residuals against time; vertical blue lines correspond to the dates of Navalny's blog posts. Outliers are truncated for better readability. The right chart depicts the corresponding histogram, basis points change on the X-axis; the blue line corresponds to the SS residuals on the dates of posts.

Figure 3, left reports the dynamics of our main variable of interest, SS residuals, together with the dates of Navalny blog posts. Anticipating our results from the next section, Figure 3, right reports the distribution of the domestically driven changes on the days of blog posting which is shifted to the right along the X-axis , compared to other days in the sample.

3.2 Empirical Findings

We use the series of over one hundred dates with Alexei Navalny blog posts to study the financial market's response to the corruption news. Our departing point is the stock market valuation effect documented in Enikolopov et al. [2018]: an average post in our dataset led to a 33 b.p. decline of an individual share price at a daily horizon measured through the response of abnormal returns. The paper posits that the information contained in the posts led to markets' revision of the individual firm management's characteristics and, consequently, a downward revision of expected profits.[10] Given that the companies exposed were connected to the government through their ownership and management, we are interested in whether market perceptions were affected by this sequence of news more broadly and how.

Our identification strategy is based on the assumption that the precise timing of when Navalny published his posts was as good as random. We find no evidence of the posts being timed to follow adverse global economic developments,[11] while the time between consequential posts follows a geometric distribution, i.e. can be described as a "memoryless" process; both

[10]Online Appendix of Enikolopov et al. [2018] refers to this unobservable characteristic as "propensity to steal".

[11]Table A2 shows that the timing of Navalny's post is not predicted by global factors. Specifically, the results outline that the probability of Navalny posting on a given day is not correlated with daily changes, moving averages and levels of S&P 500, VIX, MSCI, RUBUSD foreign exchange or BRENT Crude oil prices.

Table 2. The effect of Navalny's posts

	Δ EMBI$_{Russia}$ (1)	SM Return (2)	Δ FX (3)
Post SOE	2.539	-23.95	7.210
	(0.8879)	(16.31)	(6.009)
	[0.8457]	[16.6533]	[5.5717]
Observations	909	855	909
R^2	0.00909	0.00923	0.00493

Note: The dependent variable is specified at the top of the table and is calculated as a first difference in a respective indicator winsorised at 2.5 and 97.5 percentiles. *Post* is a binary variable equal to one if Navalny posted about a SOE on a given day. Robust standard errors adjusted for serial auto-correlation with a 9-day window in parentheses. Bootstrapped standard errors in brackets. The estimation includes day-of-week fixed effects.

these facts support our assumption.[12] We show below that the posts did not seem to follow adverse market events: in particular, we do not observe any consistent "reaction" predating his posts.

We first test for the presence of the economy-wide effects of the sequence of corruption news. We use an event-study methodology to measure its average effect on the domestically-driven changes in sovereign spreads (SS), stock market index (SM), and foreign exchange rate (FX) represented by residuals ($resid$) from estimated equation 1. Our empirical specification is:

$$Yresid_t = \gamma_0 + \sum_{\tau=t-k}^{t} \gamma_{1\tau} post_\tau + \gamma_2 X_t + \nu_t, \tag{2}$$

where $Yresid$ stands for residuals with dependant variable $Y = SS, SM, FX$ and X - for day of the week fixed effects. The key parameters of interest are $\gamma_{1\tau}, \tau = t-k, ..., t$. For $k \geq 0$, their sum corresponds to the cumulative effect of a single blog post in the period $[t-k, ..., t]$ on the variable Y by the date t. For $k < 0$, this sum corresponds to a "reaction" predating a post (during period $[t+1, ..., t-k]$), which we would expect to be non-zero if Navalny timed his posts.

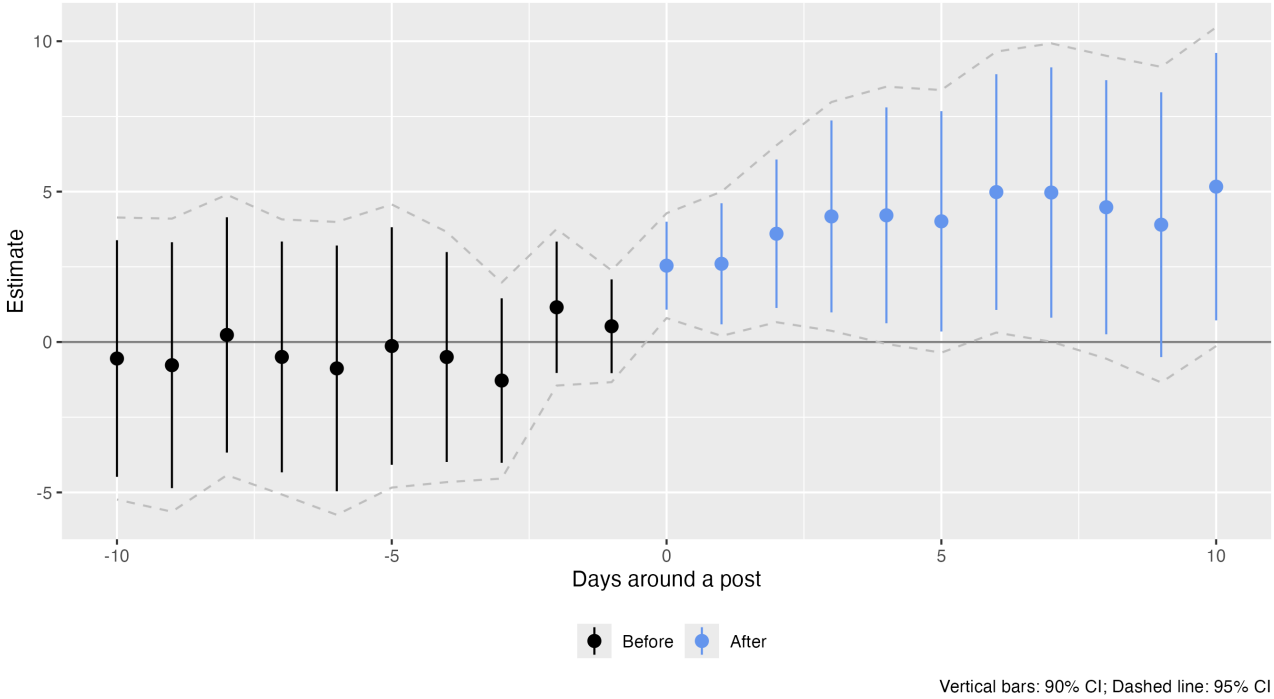
We estimate Equation 2 and find that the sequence of news was associated with a statistically significant effect on sovereign spreads. Table 2, column 1 shows the baseline results, $k = 0$: on the publication date, an average change in sovereign spreads was 2.5 b.p. higher than on other days. Now we consider the effect of news on the spread residuals in the days after the post. The results are reported in Figure 4. We find that posts have a positive effect on sovereign spreads, increasing the cost of borrowing for the Russian government, and the effect persists on a horizon of up to five days.[13] The blog posts, therefore, have had a relatively long-lived effect on the prices compared the non-financial news that distract attention of noise traders [Peress and Schmidt, 2020]. There is no significant change before posts were made public ($k < 0$), substantiating our assumption that posts were not timed to macro-conditions.

The results for stock market and foreign exchange rate are supportive of the main hypothesis. For example, we find limited negative response of the stock market on the days of the posts. Column 3 of Table 2 provides the estimates for Equation 2 using estimates of 1 ($Y = SM, k = 0$).

[12] Enikolopov et al. [2018] showed that his posts were not timed to follow events concerning his targets.

[13] To alleviate the concern that the effect we document might be driven by dynamics common to other emerging economies, we replicate the analysis with a different measure based on the spread between EMBI Russia and EMBI Emerging Markets. Figure A7 in Appendix reports the results which qualitatively stay the same.

Figure 4. The cumulative effect of Navalny's posts on sovereign spreads.



Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

As in the case of the sovereign spreads, there is no evidence of posts being timed to follow some negative developments at the market level (Figure A5 in Appendix). While the effect is not significant in the daily data, we do find evidence of it using intra-day data. In paricular, we estimate a version of Equation 2 for the cumulative returns of ruble-denominated stock market index while controlling for day of week and hour fixed effects.[14] In this higher frequency data, the response is statistically significant during a two-hour window after the publication (Figure A10 in Appendix). As with the daily data, we do not detect any evidence for Navalny timing the publications to the stock market performance. We further elaborate on this evidence in the next subsection.

Looking into daily changes in the foreign exchange, we do not find robust evidence for news affecting the foreign exchange rate on the same day(Table 2, column 3), but we document a slight depreciation in Russian currency in 3 days around the publication (Figure A4 in Appendix). A muted response should not come as a surprise because the foreign exchange rate was under managed float regime during the period of 2008 to 2011 and remained until 2014. Central bank policy at that time explicitly aimed at reducing the volatility of the ruble.

In sum, the results of this subsection provide evidence for the significance of the sequence of news for financial markets beyond the individual share price response found in Enikolopov et al. [2018]. The sovereign spreads exhibited a particularly robust response to news about state-owned enterprises. In the next subsection we explore empirically the potential sources of this link.

[14]Note that we do not have 5-minute trading data for global factors to control for them and we use a different stock market index (*MICEX*) based from the dataset compiled in Enikolopov et al. [2018].

Table 3. Ability-to-pay channel: does the targeted company size matter?

	Δ EMBI$_{Russia}$			
	(1)	(2)	(3)	(4)
Post SOE	2.539	2.464	2.703	2.484
	(0.8879)	(0.9909)	(1.604)	(1.128)
Post SOE × Smaller SOE		0.1869		
		(1.651)		
Post SOE × RTSI weight			-0.0202	
			(0.1368)	
Post SOE × Weighted $\sum$ Stock AR				-0.9044
				(9.645)
R^2	0.00909	0.00910	0.00910	0.00910
Observations	909	909	909	909

Note: *Post* is a binary variable equal to one if Navalny posted about a SOE on a day [Enikolopov et al., 2018]. Robust standard errors adjusted for serial auto-correlation with a 9-day window in parentheses. Column 1 reports baseline results. Column 2 reports results for posts about small SOEs (days with posts about large SOEs are excluded from the sample). Column 3 reports results for posts about large SOEs (days with posts about small SOEs are excluded from the sample). Column 4 reports the interaction between post dummy and a binary variable equal to one if only small SOEs were mentioned. Column 5 provides estimation results for the interaction between post dummy and a company's weight in the RTS index. The estimation includes day-of-week fixed effects.

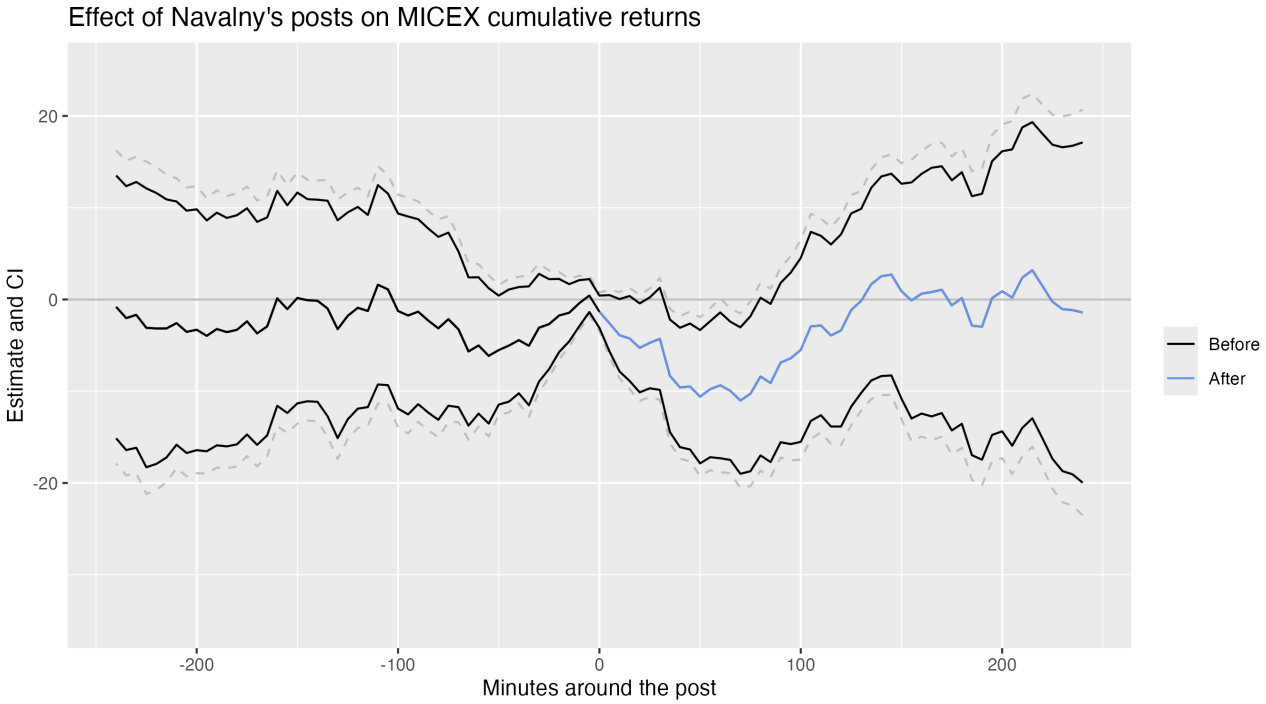
3.3 Mechanism: Ability vs. Willingness to Pay

We first explore whether the corruption news affected the sovereign's ability to pay. Intuitively, the fact that the valuation of a company such as Gazprom — then one of the largest natural oil&gas producers in the world — declined by 33 b.p. could have triggered a 2.5 b.p. increase in sovereign spreads (our baseline estimate) on its own. As a consequence of the share price decline, the investors could have revised their view of the Russia's fiscal capacity and, hence, likelihood of a sovereign default in the future. This reasoning implies that the revelation of corruption in a Large SOE (Gazprom, Rosneft, or Sberbank) should have had a more pronounced effect on the sovereign risk assessment than corruption news in a Small SOE (Transneft or VTB).

Cross-sectional variation in our data allows us to examine the relevance of the **ability-to-pay** explanation. We first test whether the effect of the posts varies by the size of an exposed SOE. Results in Table 3 suggest that there was no difference between the estimates for small and large SOEs (column 2; $\beta_{Large\ SOE} - \beta_{Small\ SOE} = -0.1869, SD = 1.651$): the effect of news was statistically the same when corruption was exposed in smaller or larger companies. Using a more precise measures of a company size, share in the stock market index (column 3) and impact of the posts on the exposed companies relative valuation (column 4), we find no evidence that the effect is contingent on the materialized losses. Instead, what seems to be important for the sovereign spread reaction is that the sovereign's willingness to pay its creditors and investors was exposed and not the effective amount of resources under their control.

To discard the ability-to-pay explanation, we test for the possibility of a spillover effect to other state-owned companies. Indeed, the news about one company's management could be relevant for forming expectations about management and degree of misallocation of resources in other SOEs. If investors learned about the extent of value destruction in the SOEs as a *group*, this must have been reflected in lower share prices compared to the market average. To test

Figure 5. Stock market returns around the time of Navalny's posts about Small SOEs.



Note: The chart depicts the cumulative returns of ruble-denominated stock market index MICEX on the days of Navalny's posts about Small SOEs, b.p. Weekday and hour FE. The sample is based on the data compiled in Enikolopov et al. [2018] for 2008-2011.

the presence of this spillover effect in the set of state-owned companies, we re-run the analysis of Enikolopov et al. [2018] but use news about other companies as treatment. In Appendix, we provide intra-day evidence that the share prices of non-exposed state-owned companies did not respond significantly to news about other SOEs.[15] Thus, we eliminate the ability-to-pay explanation from consideration.

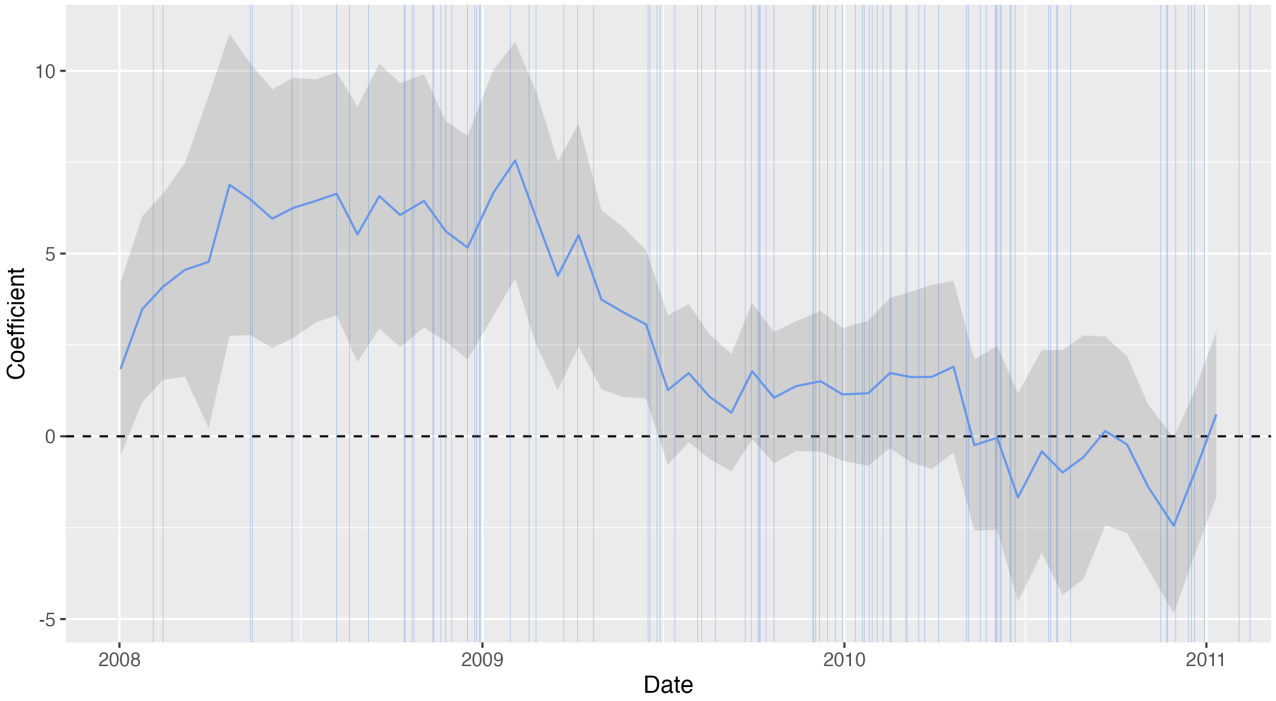
Corruption-related news may affect market reactions through another channel: by altering investors' perceptions of the government's **willingness to pay** its debts. The same political economy frictions that enable corruption could also create moral hazard in debt repayment. This mechanism aligns with the reputational spillover effects described by Cole and Kehoe [1998], where events in one domain of government operation influence its reputation abroad. Specifically, exposed corruption could signal information about the government's potential cost of default. Since both corruption levels and default costs are imperfectly observable, shifts in market perceptions of these factors could drive changes in borrowing costs.

If corruption news affected Russia's sovereign risk assessment, did it translate into lower stock market valuations? To enforce our claim that the size of the exposed companies did not matter, in Figure 5 we present the results of the estimation limited to blog posts about Small SOEs. The negative response of the stock market index is statistically significant and reaches a 10 b.p. decline level in around 50 minutes after a blog post publication. As with the sovereign spreads, there is no evidence that this decline was larger when the Large SOEs are included in the sample (Figure A10 in Appendix).

Learning about the government's willingness to pay implies that the sequential revelations of corruption should have had a evolving effect on the markets. In order to approximate the effect of different pieces of news on the sovereign spreads, we restrict the sample to a 6-month window and roll it by 10-day steps, repeating the analysis from equation 2 for every iteration.

[15] We report the estimation results for GAZP in the Appendix, Figures A11 and A12, as an example.

Figure 6. The effect of Navalny's posts on sovereign spreads — fading out in time.



Note: The figure shows estimates for the effect (in b.p.) of corruption news on sovereign spreads (as in Table 2, column 1) based on 6-month rolling windows. The X-axis depicts dates as the starting point of the rolling windows. Vertical blue lines correspond to the dates of the posts.

Figure 6 presents the results which indicate that the impact of Navalny's posts on sovereign spreads was positive in 2008, reached its peak in 2009, and gradually declined to zero since then. The findings of the rolling window estimation are similar to the empirical findings of Morelli and Moretti [2023] and reminiscent of how Argentinian households learned from manipulated inflation statistics Cavallo et al. [2016]. They suggest that the state of the lenders beliefs about the government at a given date affected how markets processed arrival or absence of news.

3.4 Discussion

This section has documented that the sequence of corruption news from Alexey Navalny blog posts had a significant effect on the financial markets, especially sovereign spreads. Notably, the size of the exposed companies did not matter for the markets as evidenced by daily and intradaily data. What seemed to matter is whether the news transmitted "new" information (stronger effect in 2008-2009) or were compatible with expectations (2010-2011). In the next section, we build a stylized model in order to rationalize the empirical link between corruption and sovereign spreads and better understand the process of learning from news.

4 A Model with Learning

This section presents a stylised model of sovereign debt and default with private information. The model is similar to the one developed in Tomz and Wright [2010] but features an imperfectly observable type of government. In our setting, the cost of default is not known to the lenders for certain but they can infer its value by observing sequential noisy signals about corruption (news). This model explains the link between market perceptions of the government corruption and sovereign spreads.

4.1 Environment

The model features three periods. In period 0, the sovereign borrows from international financial markets to invest and consume. The investment is risky as it is subject to stochastic productivity. The sovereign has a limited commitment to repaying the debts because he retains a share of production if he defaults.

There is an intransparent political process behind economic decisions. At the start of period 1, the sovereign randomly draws the government type, or "delegates" the subsequent decisions to one of his subordinates. The selected government then makes an *investment* decision. If the *government* type drawn in period 1 is *benevolent* (B), they internalise the potential default costs and maximise the expected utility of a representative agent. If the type drawn is *corrupt* (C), the government faces lower cost of default (retain higher share of output compared to B), which can distort the investment and default decisions compared to the benevolent type. The information about the types drawn in period 1 is private to the sovereign and his governments, which introduces an independent source of uncertainty into the decision-making problem of the foreign lenders.

The lenders are risk-neutral and operate within a competitive environment. They lend funds in period 0 with the expectation of being repaid in period 2, following the realisation of production outcomes. They demand $q(b, \tilde{\pi})$ for a bond that pays 1 unit of a good in period 2, where b is the total amount borrowed and $\tilde{\pi}$ is a common market belief about the government type being *benevolent* in period 1. Correspondingly, $1 - \tilde{\pi}$ is the perceived probability of the government type being *corrupt*. The lenders can observe the production outcomes in period 2 and the total amount borrowed in period 0, but they do not know for certain the government type or its **investment** until the default decision in period 2. The only thing they observe is a sequence of noisy signals (news) about the government type at the end of period 1, after the investment took place.

By assumption, the sequence of corruption news is informative of the type of the active government type. Each piece of news is priced by the secondary markets, i.e., immediately reflected in the expected recovery value, because it informs the lenders about incentives to default. However, no trading or any other decisions are made then, and the corruption news does not affect the real outcomes, so the news itself does not affect the actual, unobserved probability of default.

Finally, in period 2, the *production* outcomes are realised followed by the sovereign's **repayment** or **default** decision. By assumption, two government types suffer different consequences from the default, so the type - additionally to the capital stock, debt volume, and productivity - is the relevant variable for the default realisation.

4.2 Sovereign Borrowing Problem

We now formalise the sovereign's optimisation problem. We proceed backwards, starting from the choices of the *benevolent* government (B type) in period 1. Their optimisation problem is

given by:

$$W_1^B(q,b) = \max_k \left[u(qb-k) + \beta \mathbb{E}_A \max \left(\underbrace{u(Af(k)-b)}_{\text{repay}}, \underbrace{u(Af(k)\times\gamma^B)}_{\text{default}} \right) \right] \tag{3}$$

where q represents the price of the sovereign bond and b is the total amount borrowed in period 0. These are taken as given by the B type. A denotes the stochastic productivity of capital, where A $\log N(\mu,\sigma)$, which can be thought of the oil price. A capital of size k produces $Af(k) = Ak^\alpha$ in period 2. The capital completely depreciates after production in period 2. Finally, γ^B represents the share of production that is **retained** in the event of a default.

The optimization problem of *corrupt* government (C type) in period 1 is given by:

$$W_1^C(q,b) = \max_k \left[u(qb-k) + \beta \mathbb{E}_A \max \left(\underbrace{u(Af(k)-b)}_{\text{repay}}, \underbrace{u(Af(k)\times\gamma^C)}_{\text{default}} \right) \right] \tag{4}$$

Because of the lower commitment, the default penalty is lower for the C-type: $\gamma^C > \gamma^B$. Note here that the difference between γ^C and γ^B might also introduce a wedge between investment decisions of two types. In this case, learning about the type is also learning about the actual amount of investment.

Finally, the sovereign's problem in period 0 is expressed as follows:

$$W_0^S(\tilde{\pi}) = \max_{b,\pi} \left[\pi W_B(q(b,\tilde{\pi}),b) + (1-\pi) W_C(q(b,\tilde{\pi}),b) \right], \tag{5}$$

where π is the probability with which he chooses the B type for period 1. From now on, we assume that the probability of delegation to C type, π, coincides with the market beliefs that C is an actual government type in period 1. This assumption guarantees that lenders' beliefs about the government type are consistent, and the sovereign cannot mislead them. More technically, it guarantees that the borrowing is uninformative about the government type ([Morelli and Moretti, 2023]). This simplifies the whole model to a standard dynamic programming problem of the sovereign with $\tilde{\pi}$ being a parameter, which becomes:

$$W_0^S(\tilde{\pi}) = \max_{b} \left[\tilde{\pi} W_B(q(b,\tilde{\pi}),b) + (1-\tilde{\pi}) W_C(q(b,\tilde{\pi}),b) \right]. \tag{6}$$

The term $q(b,\tilde{\pi})$ represents the lending price function, which is derived based on the competitive equilibrium condition of zero expected profit from the total lending volume b, given the market prior $\tilde{\pi}$.[16]

This formulation of the sovereign's value function also reflects that he benefits from delegating to both kinds of subordinates. On the one hand, the B type acts as a benevolent planner who invests, taking into account the costs of potential default. This is in the interests of a sovereign who at least partly cares about the citizens. On the other hand, the sovereign might also find a way to decrease his default costs and, therefore, prefer the C type consumption-savings plan. This is contrary to the idea of modelling of corruption as a tax collected by bureaucrats [Alamgir et al., 2023] and highlights instead the tradeoff between incumbency gains [Andersen et al., 2017] and perks of international cooperation faced by the sovereign.

The model generates a positive link between the sovereign spreads ($1/q$) and the lenders' beliefs ($\tilde{\pi}$). Lower cost of default of C type guarantees excessive risk-taking of the government and higher cost of borrowing charges by the lenders. Under an additional assumption on the risk aversion ($\sigma > 1$), optimal strategies of two types of governments imply lower capital

[16] Of course, the problem could be more rich as in Pei [2024].

investment by type C: $k_B^* > k_C^*$. In this case, lower commitment is a source of discrepancy between expected and realized capital investments.

4.3 Corruption Signals and Sovereign Spreads

Although our model is not infinite horizon, we provide a model counterpart to study the evolution of the effect of news on sovereign spreads in time. We do so by imposing structure on the learning process guiding the beliefs of the lenders regarding the B-type, $\tilde{\pi}$. First, we assume the arrival time of signals follow a geometric distribution with the probability of arrival P_i, $i = B, C$ and that $P_C > P_B$. It seems natural that corruption is revealed more frequently if the *corrupt* government makes an investment decision. Second, we assume relatively high market perceptions of the sovereign in period 0 ($\tilde{\pi}_0 \geq 0.5$).

The learning process should match several empirical facts. First, in our sample, the link between news and sovereign spreads is tight in 2008-2009 but dissipates by the end of our sample. In the model, it should be that $\tilde{\pi} \approx 0$ by period 2. Secondly, Figure 4 shows that the effect on sovereign spreads fades out at the ten days horizon. Hence, the difference between P_C and P_B should be such to match the average time it took the value of $\tilde{\pi}$ to recover after a signal.

Formally, the lenders update their beliefs of the government type using the Bayesian rule. There are T dates at the end of period 1. Whether corruption is revealed at date t, $t = 1, ..., T$ or not, the perceived government type $\tilde{\pi}_t$ depends on the period $t-1$ belief, $\tilde{\pi}_{t-1}$:

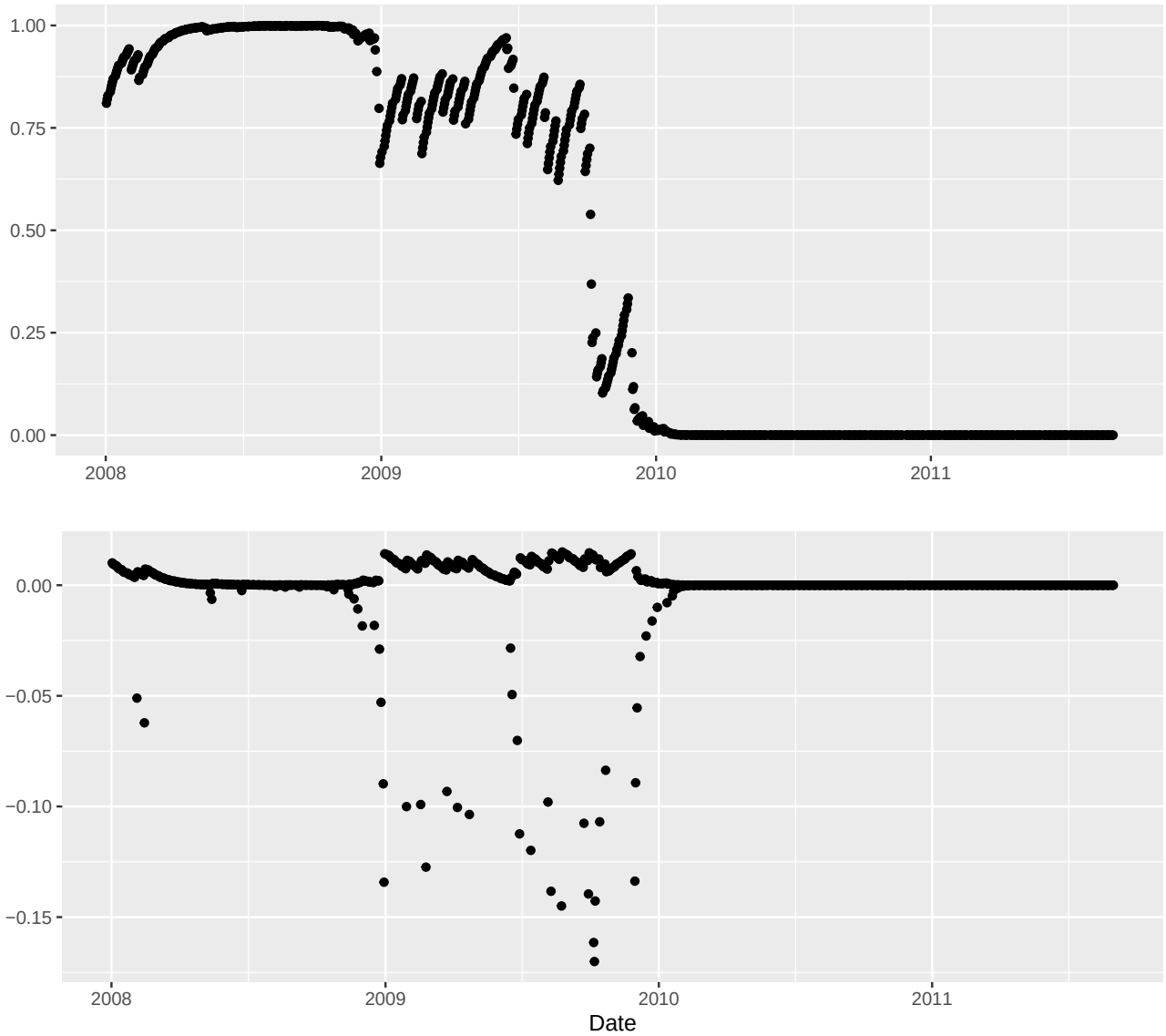
$$\underbrace{\tilde{\pi}_t = \frac{\tilde{\pi}_{t-1}}{(1-\tilde{\pi}_{t-1})\frac{P_C}{P_B} + \tilde{\pi}_{t-1}}}_{\text{corruption news}} < \tilde{\pi}_{t-1} \quad \text{or} \quad \underbrace{\tilde{\pi}_t = \frac{\tilde{\pi}_{t-1}}{(1-\tilde{\pi}_{t-1})\frac{1-P_C}{1-P_B} + \tilde{\pi}_{t-1}}}_{\text{no news}} > \tilde{\pi}_{t-1}. \tag{7}$$

An ex-post perceived probability of the active type being B, $\tilde{\pi}_t$, is lower than ex-ante probability, $\tilde{\pi}_{t-1}$, if $P_C > P_B$, i.e., if corruption scandals are more likely when C type was drawn. The absolute difference between ex-post and ex-ante perceived probabilities at date t, $|\tilde{\pi}_t - \tilde{\pi}_{t-1}|$, is relatively larger on the news dates compared to other dates, because news are rare but informative events. Also, the absolute difference is not monotonous in $\tilde{\pi}_{t-1}$. The largest response to news is attained when $\tilde{\pi}_{t-1}$ is around 0.5; the lowest - when $\tilde{\pi}_{t-1} \approx 0$ or 1. Intuitively, the news are most relevant when the beliefs are not firm.

We take the actual dates of Navalny blog posts to predict the dynamics of $\tilde{\pi}_t$. There are 105 news during 909 (trading) days in our sample: we therefore assume $P_C = \frac{105}{909} \approx 0.12$. Assuming $\tilde{\pi} = 0.8$ and $P_B = 0.5P_C$, we get negligent response in spreads starting from 2010 and the average fade-out effect of the news of around 10 days, matching the data. We then sequentially calculate $\tilde{\pi}_t$ using expressions in Equation 7 and present the results in Figure 7. The upper panel depicts the dynamics of $\tilde{\pi}$: note that the lenders' beliefs fell and then recovered to and beyond the past levels for several times during 2008-2009. The lower panel demonstrates first differences $\Delta\tilde{\pi}_t = \tilde{\pi}_t - \tilde{\pi}_{t-1}$: the effect of news varied significantly, which depended on $\tilde{\pi}_{t-1}$, while no-news days were associated with positive but overall moderate increases – making the variable distribution highly asymmetric.

Finally, we use model-implied lenders' beliefs to study the effect of the image abroad on the financial markets. Table 4, column 1 presents the regression estimates for the effect of changes in beliefs ($\Delta\tilde{\pi}$) on the domestically-driven changes in sovereign spreads. One unit *increase* in beliefs, i.e., complete recovery from zero to one, implies a 39 b.p. *decrease* in the sovereign spreads. That is, the difference in borrowing costs between the *B*enevolent and *C*orrupt governments amounts to around 40 b.p. Columns 2 and 3 present the estimates for the stock market index and foreign exchange rates. Although the coefficients are less statistically significant, the signs correspond to the idea of image abroad being a form of capital that boosts

Figure 7. Evolution of the model implied lenders' beliefs over time.



Note: Two charts depict the dynamics of the lenders' beliefs $\tilde{\pi}$ about the government type being *B*enevolent. P_C is assumed to be equal to ≈ 0.12, the empirical frequency of appearance of Navalny posts; $P_B = P_C/2$. The starting belief $\tilde{\pi}_0$ equals 0.8. The realisation of events reflects actual dates of the posts in data. The upper chart depicts levels, the lower chart - changes on a given date.

Table 4. Lenders' belief and sovereign spreads.

	Δ EMBI$_{Russia}$ (1)	Δ SM (2)	Δ FX (3)
Δ Posterior	-37.00	60.19	-59.14
	(15.16)	(382.3)	(111.5)
R^2	0.00783	0.00686	0.00343
Observations	909	855	909

Note: $\Delta\tilde{\pi}$ is a continuous variable presented in the lower panel of Figure 7. Columns 1, 2, and 3 report results of a linear regression analysis for domestically-driven changes in sovereign spreads, stock market, and foreign exchange rate, respectively. Robust standard errors adjusted for serial auto-correlation with a 9-day window in parentheses. The estimation includes day-of-week fixed effects.

stock market and appreciate the exchange rate. These estimates are based not only on the difference between "news" and "no-news" dates as in Section 3, but also on the variability of the intensity measure at *each* date.

4.4 Discussion

This stylised model allows us to rationalise the findings from Section 3. The link between corruption scandals and sovereign spreads is driven by government's commitment to repay the debts. Formally, the effect that exposeés of the smaller companies triggered can be explained by different costs of default in our model ($\gamma^B < \gamma^C$). Under an extra assumption on risk-aversion, the model generates underinvestment: if $\sigma > 1$, the Corrupt government consumes more than the lenders expected - which aligns neatly with a typical content of Alexey Navalny investigations. We, therefore, can interpret lower commitment as one of the corruption factors.

Our theoretical analysis stresses that an image abroad can be a form of capital. In the model, noisy signals about the government type inform the lenders about the probability of future default stemming from the news the government's commitment to repay. Using model-implied evolution of lenders' beliefs about the government type, we show that the borrowing costs could have increased over the period of 2008-2011 by 40 b.p. on average. Was this premium reflected in the prices by the end of 2011? In Appendix Section A.4 we present an extension of our model with news about productivity. We show that the pressures to default are lower when the economic situation is good, so the sovereign bond prices are less sensitive to corruptions news *and* might even neglect the "corruption" premium whatsoever. This implies that image abroad is a substitute for traditional capital, especially helpful when the latter is scarce or not productive — that is, in times when defaults tend to happen [Panizza, 2022]. Starting from 2010, Russia faced record-high oil price levels which might be an explanation for apparent lack of premium during this period.

The mechanism linking corruption with sovereign spreads is also compatible with findings in other papers. For example, our mechanism can explain the overstatement of gross domestic product statistics (GDP) in autocracies found in Martínez [2022]. In his empirical findings, investment and government spending, GDP subcomponents that are reliant on government-provided information the most, drive the discrepancy between official and alternative estimates of economic growth. In our model, news about corruption implies that the overstatement is more significant than it was expected; our paper also draws limits on how long a dictator can trick outsiders and what the associated costs are.

5 Conclusion

This paper has examined the impact of corruption on sovereign spreads, focusing on the case of Russia between 2008 and 2011. By analysing the market reactions to revelations of corruption in Russian state-owned enterprises (SOEs) exposed by Alexei Navalny's blog [Enikolopov et al., 2018], this study found a positive and statistically significant impact of such news on sovereign spreads and stock market index. While Morelli and Moretti [2023] focused on Argentina's misreporting of inflation, this paper shows that corruption scandals can function as a distinct type of "noisy signal" that negatively affects lender perceptions of sovereign creditworthiness, ultimately leading to higher borrowing costs. Our findings suggest that political economy frictions, particularly those leading to corruption, can considerably affect a country's borrowing costs in international markets.

Furthermore, this study found that the spread increase was statistically similar regardless of the size of the SOE involved, indicating that the reputational damage caused by corruption revelations extends beyond the immediate financial implications of the exposed schemes for its shareholders. This finding suggests a broader negative signalling effect, whereby corruption news raises concerns about the government's commitment to honouring its debt obligations in the future. Our findings stress the role of general reputation in the sovereign debt markets [Cole and Kehoe, 1998, Tomz, 2007]. Additionally, our explanation for the link between overstatement of investment, or stealing from company expenses, and the sovereign's image abroad allows us to understand better the limits of this and other opaque activities [Andersen et al., 2017, 2022, Martínez, 2022].

Finally, the stylized model we developed allows us to study the learning process by market participants and predict the evolution of their beliefs. Using model-implied response to news, we quantify the total effect of lost image abroad which amounts to 40 b.p. in our baseline specification. Our model explains why this premium is not visible during the period of good external conditions, high oil price in case of Russia. Future research could explore potential mitigating factors, such as institutional reforms or increased transparency initiatives, that might help countries counter the negative economic consequences of corruption.

References

D. Acemoglu, T. A. Hassan, and A. Tahoun. The Power of the Street: Evidence from Egypt's Arab Spring. *The Review of Financial Studies*, 31(1):1–42, Jan. 2018. ISSN 0893-9454, 1465-7368. doi: 10.1093/rfs/hhx086.

V. V. Acharya, R. G. Rajan, and J. B. Shim. Sovereign debt and economic growth when government is myopic and self-interested. *Journal of International Economics*, 150:103906, July 2024. ISSN 00221996. doi: 10.1016/j.jinteco.2024.103906.

M. Aguiar and M. Amador. Growth in the Shadow of Expropriation. *The Quarterly Journal of Economics*, 126(2):651–697, May 2011. ISSN 0033-5533. doi: 10.1093/qje/qjr015.

M. Aguiar, M. Amador, and S. Fourakis. On the Welfare Losses from External Sovereign Borrowing. *IMF Economic Review*, 68(1):163–194, Mar. 2020. ISSN 2041-417X. doi: 10.1057/s41308-019-00103-2.

F. Alamgir, J. Cotoc, and A. Johri. The bribe rate and long run differences in sovereign borrowing costs. *Journal of Economic Dynamics and Control*, 151:104662, June 2023. ISSN 01651889. doi: 10.1016/j.jedc.2023.104662.

A. Alesina and G. Tabellini. A Positive Theory of Fiscal Deficits and Government Debt. *The Review of Economic Studies*, 57(3):403–414, 1990. ISSN 0034-6527. doi: 10.2307/2298021.

H. Almeida, I. Cunha, M. A. Ferreira, and F. Restrepo. The Real Effects of Credit Ratings: The Sovereign Ceiling Channel. *The Journal of Finance*, 72(1):249–290, 2017. ISSN 1540-6261. doi: 10.1111/jofi.12434.

J. J. Andersen, N. Johannesen, D. D. Lassen, and E. Paltseva. Petro Rents, Political Institutions, and Hidden Wealth: Evidence from Offshore Bank Accounts. *Journal of the European Economic Association*, 15(4):818–860, Aug. 2017. ISSN 1542-4766. doi: 10.1093/jeea/jvw019.

J. J. Andersen, N. Johannesen, and B. Rijkers. Elite Capture of Foreign Aid: Evidence from Offshore Bank Accounts. *Journal of Political Economy*, 130(2):388–425, Feb. 2022. ISSN 0022-3808, 1537-534X. doi: 10.1086/717455.

C. Arellano, Y. Bai, and L. Bocola. Sovereign Default Risk and Firm Heterogeneity, Feb. 2024.

J. Bianchi, P. Ottonello, and I. Presno. Fiscal Stimulus under Sovereign Risk. *Journal of Political Economy*, 131(9):2328–2369, Sept. 2023. ISSN 0022-3808. doi: 10.1086/724317.

A. Cavallo, G. Cruces, and R. Perez-Truglia. Learning from Potentially Biased Statistics. *Brookings Papers on Economic Activity*, 2016(1):59–108, 2016. ISSN 1533-4465. doi: 10.1353/eca.2016.0013.

S. Chatterjee and B. Eyigungor. Endogenous political turnover and fluctuations in sovereign default risk. *Journal of International Economics*, 117:37–50, Mar. 2019. ISSN 00221996. doi: 10.1016/j.jinteco.2018.12.006.

H. L. Cole and P. J. Kehoe. Models of Sovereign Debt: Partial Versus General Reputations. *International Economic Review*, 39(1):55, Feb. 1998. ISSN 00206598. doi: 10.2307/2527230.

B. R. Enikolopov, M. Petrova, and K. Sonin. Social Media and Corruption. *American Economic Journal: Applied Economics*, 10(1):150–174, 2018. doi: 10.1257/app.20160089.

C. Esquivel. The sovereign default risk of giant oil discoveries. Working Paper 2024-04, Working Paper, 2024.

M. Faccio, R. W. Masulis, and J. J. McConnell. Political Connections and Corporate Bailouts. *The Journal of Finance*, 61(6):2597–2635, Dec. 2006. ISSN 00221082. doi: 10.1111/j.1540-6261.2006.01000.x.

D. García. Sentiment during Recessions. *The Journal of Finance*, 68(3):1267–1300, June 2013. ISSN 0022-1082, 1540-6261. doi: 10.1111/jofi.12027.

T. Graeber, C. Roth, and F. Zimmermann. Stories, Statistics, and Memory. *The Quarterly Journal of Economics*, page qjae020, June 2024. ISSN 0033-5533, 1531-4650. doi: 10.1093/qje/qjae020.

S. Guriev, N. Melnikov, and E. Zhuravskaya. 3G Internet and Confidence in Government. *The Quarterly Journal of Economics*, 136(4):2533–2613, Nov. 2021. ISSN 0033-5533. doi: 10.1093/qje/qjaa040.

S. M. Guriev and D. Treisman. *Spin Dictators: The Changing Face of Tyranny in the 21st Century*. Princeton university press, Princeton, 2022. ISBN 978-0-691-21141-1.

F. Hamann, J. C. Mendez-Vizcaino, E. G. Mendoza, and P. Restrepo-Echavarria. Natural Resources and Sovereign Risk in Emerging Economies: A Curse and a Blessing, Mar. 2023.

B. Hébert and J. Schreger. The Costs of Sovereign Default: Evidence from Argentina. *American Economic Review*, 107(10):3119–3145, Oct. 2017. ISSN 0002-8282. doi: 10.1257/aer.20151667.

R. Hughes, T. Josephs, V. Karolova, V. Krivenkov, and G. Ljungman. Russian Federation: Fiscal Transparency Evaluation. Technical Report 2014/134, IMF, May 2014.

S. Jayachandran and M. Kremer. Odious Debt. *American Economic Review*, 96(1):82–92, Mar. 2006. ISSN 0002-8282. doi: 10.1257/000282806776157696.

A. I. Khwaja and A. Mian. Do Lenders Favor Politically Connected Firms? Rent Provision in an Emerging Financial Market. *The Quarterly Journal of Economics*, 120(4):1371–1411, Nov. 2005. ISSN 0033-5533. doi: 10.1162/003355305775097524.

L. R. Martínez. How Much Should We Trust the Dictator's GDP Growth Estimates? *Journal of Political Economy*, 130(10):2731–2769, Oct. 2022. ISSN 0022-3808, 1537-534X. doi: 10.1086/720458.

J. M. Morelli and M. Moretti. Information Frictions, Reputation, and Sovereign Spreads. *Journal of Political Economy*, 131(11):3066–3102, Nov. 2023. ISSN 0022-3808. doi: 10.1086/724855.

U. Panizza. Do Countries Default in Bad Times? The Role of Alternative Detrending Techniques, Apr. 2022.

H. Pei. Reputation Effects under Short Memories. *Journal of Political Economy*, pages 000–000, Feb. 2024. ISSN 0022-3808. doi: 10.1086/730203.

J. Peress and D. Schmidt. Glued to the TV: Distracted Noise Traders and Stock Market Liquidity. *The Journal of Finance*, 75(2):1083–1133, Apr. 2020. ISSN 0022-1082, 1540-6261. doi: 10.1111/jofi.12863.

M. Tomz. *Reputation and International Cooperation: Sovereign Debt across Three Centuries*. Princeton Univ. Press, Princeton, NJ, 2007. ISBN 978-0-691-13469-7 978-0-691-12930-3.

M. Tomz and M. L. J. Wright. Sovereign Theft: Theory and Evidence about Sovereign Default and Expropriation. In W. Hogan and F. Sturzenegger, editors, *The Natural Resources Trap*, pages 69–110. The MIT Press, June 2010. ISBN 978-0-262-01379-6. doi: 10.7551/mitpress/9780262013796.003.0004.

M. Tomz and M. L. J. Wright. Empirical Research on Sovereign Debt and Default. *Annual Review of Economics*, 5(Volume 5, 2013):247–272, Aug. 2013. ISSN 1941-1383, 1941-1391. doi: 10.1146/annurev-economics-061109-080443.

S.-J. Wei. How Taxing is Corruption on International Investors? *The Review of Economics and Statistics*, 82(1):1–11, Feb. 2000. ISSN 0034-6535. doi: 10.1162/003465300558533.

A Appendix

A.1 Descriptive Statistics

Table A1. RTSI weights of the companies in the sample

Ticker	2008-2011 average % in RTSI
GAZP	14.67
ROSN	8.03
TRNFP	1.04
VTBR	2.80
SBER	14.02

Figure A1. Distribution of blog posts across days of the week

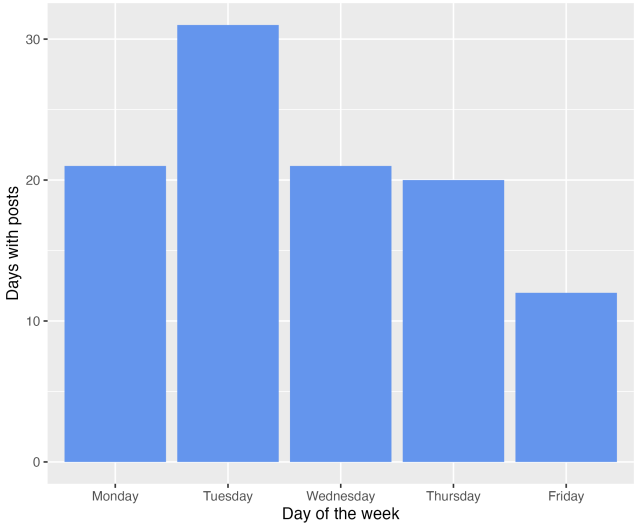


Figure A2. Days SOE mentioned

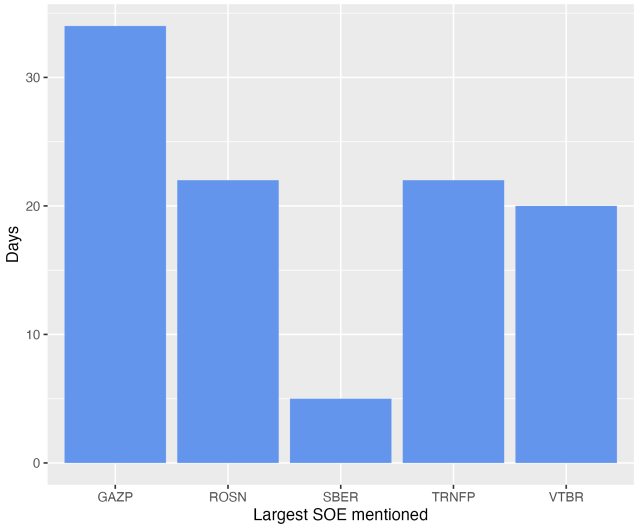
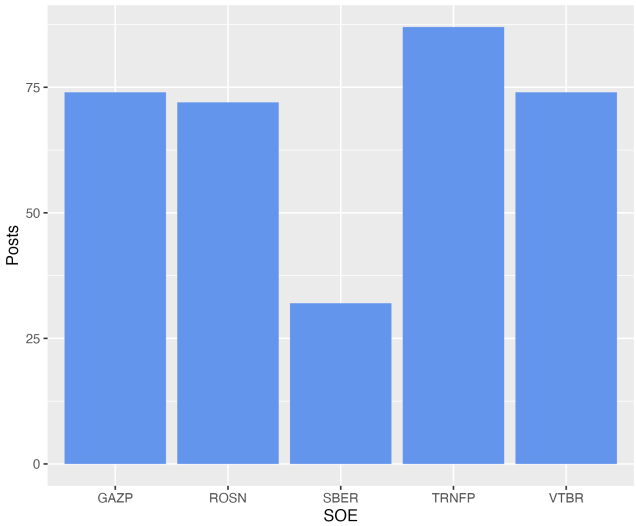


Figure A3. Times SOE mentioned



A.2 Daily Results

Table A2. Global factors and Navalny's posting behavior

	Post SOE			
		First difference	MA30	Level
	(1)	(2)	(3)	(4)
Constant	0.1151			
	(0.0106)			
SP500		-1.449	0.0003	-0.1660
		(1.089)	(0.0004)	(0.4950)
VIX		-0.0641	-0.0034	-0.0950
		(0.2549)	(0.0043)	(0.0847)
MSCI		0.7890	-0.0006	-0.0800
		(0.8876)	(0.0003)	(0.1988)
Δ log Oil		-0.4355		
		(0.4255)		
RUBUSD		2.171	-0.0097	-0.4582
		(1.687)	(0.0133)	(0.4800)
Oil			-0.0015	-0.1498
			(0.0019)	(0.1788)
Standard-Errors	IID		L=9	
R^2		0.05404	0.05075	0.05209
Observations	912	909	891	910

Note: The explanatory variable form is specified at the top of the table. The dependent variable is *Post* binary variable equal to one if Navalny posted about a SOE on a day. [Enikolopov et al., 2018]. Robust standard errors adjusted for serial auto-correlation with a 9-day window in parentheses in columns 2-4. Regressions in columns 2-4 include day of the week, month, and year fixed effects.

Table A3. Average effect of Navalny's posts in 2-day window

	Δ EMBI$_{RU}$ (1)	Δ log EMBI$_{RU}$ (2)	Δ EMBI$_{RU-EMG}$ (3)	Δ log EMBI$_{RU-EMG}$ (4)	SM Return (5)	Δ FX (6)
Post SOE (2-day window)	1.379	0.0024	1.085	0.0023	-16.35	10.80
	(0.7446)	(0.0022)	(0.4344)	(0.0013)	(13.57)	(5.781)
	[0.7558]	[0.0025]	[0.424]	[0.0013]	[13.4561]	[4.4308]
R^2	0.02800	0.00996	0.01147	0.01322	0.00857	0.01023
Observations	909	909	907	907	855	909

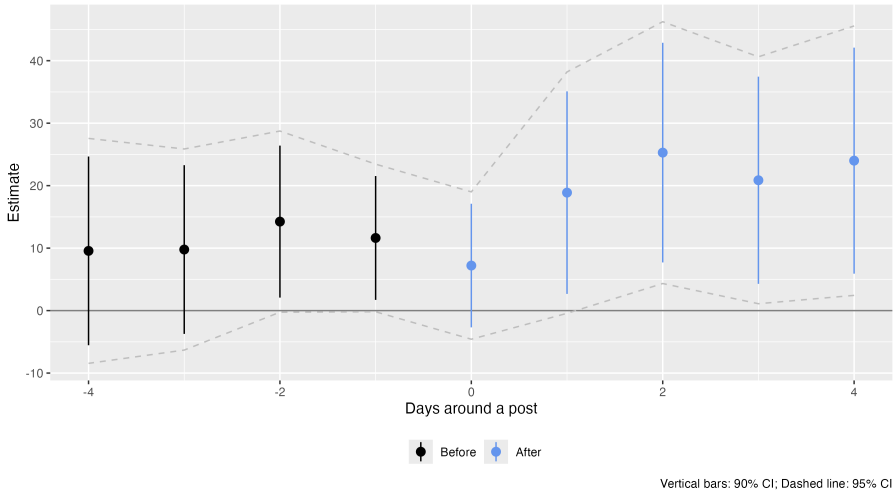
Note: The dependent variable is specified at the top of the table and is calculated as a first difference in a respective indicator winsorised at 2.5 and 97.5 percentiles. *Post* is a binary variable equal to one if Navalny posted about a SOE in a given 2-day window. [Enikolopov et al., 2018]. Robust standard errors adjusted for serial auto-correlation with a 9-day window in parentheses. Bootstrapped standard errors in brackets.

Table A4. Cumulative effect of Navalny's posts in 2-day window

	Δ EMBI$_{RU}$ (1)	Δ log EMBI$_{RU}$ (2)	Δ EMBI$_{RU-EMG}$ (3)	Δ log EMBI$_{RU-EMG}$ (4)	SM Return (5)	Δ FX (6)
Post SOE (2-day window)	2.523	0.0042	1.902	0.0042	-28.80	18.88
90% CI	(0.516, 4.53)	(-0.002, 0.01)	(0.737, 3.067)	(0.001, 0.008)	(-68.149, 10.556)	(2.676, 35.092)
R^2	0.03174	0.01032	0.01226	0.01440	0.00934	0.01139
Observations	909	909	907	907	855	909

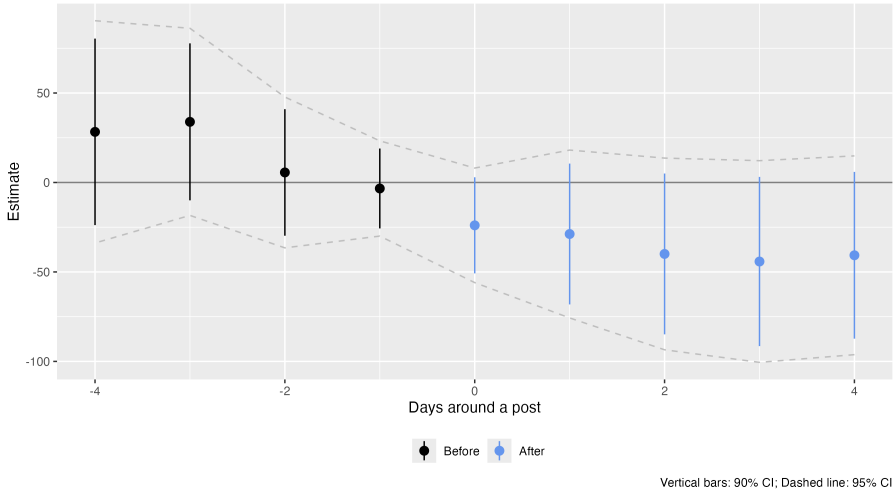
Note: The dependent variable is specified at the top of the table and is calculated as a first difference in a respective indicator winsorised at 2.5 and 97.5 percentiles. *Post* is a binary variable equal to one if Navalny posted about a SOE in a given 2-day window. Coefficients report the cumulative effect in the first two days after the publication. [Enikolopov et al., 2018]. 90% Confidence Interval in parentheses. Robust standard errors adjusted for serial auto-correlation with a 9-day window.

Figure A4. The cumulative effect of Navalny's posts on foreign exchange rate (in b.p.).



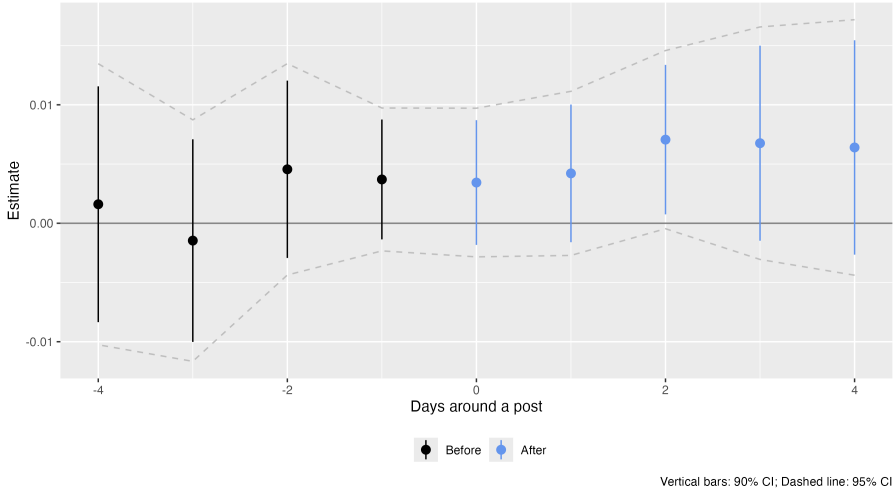
Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

Figure A5. The cumulative effect of Navalny's posts on stock market returns (in b.p.).



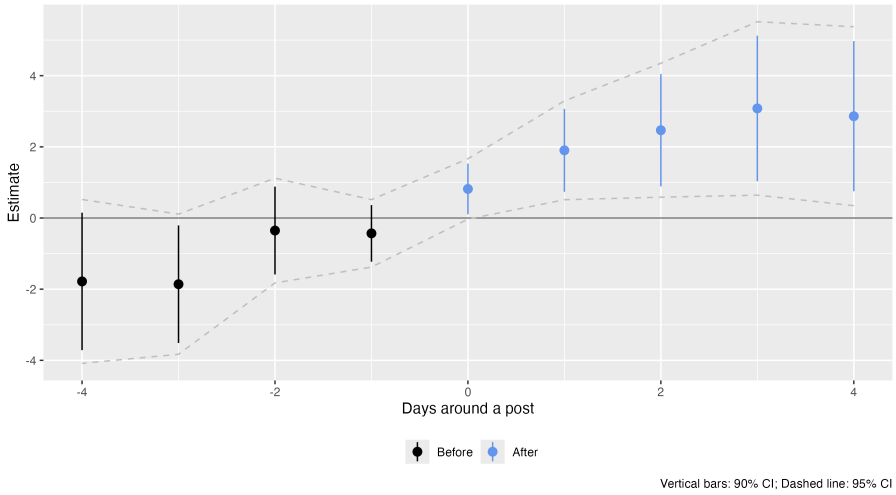
Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

Figure A6. The cumulative effect of Navalny's posts on log sovereign spreads.



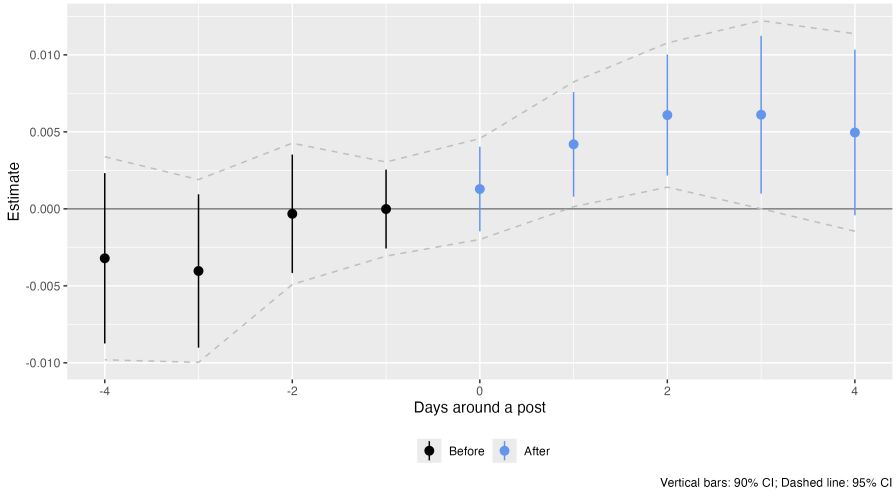
Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

Figure A7. The cumulative effect of Navalny's posts on Δ EMBI$_{Russia-EMG}$



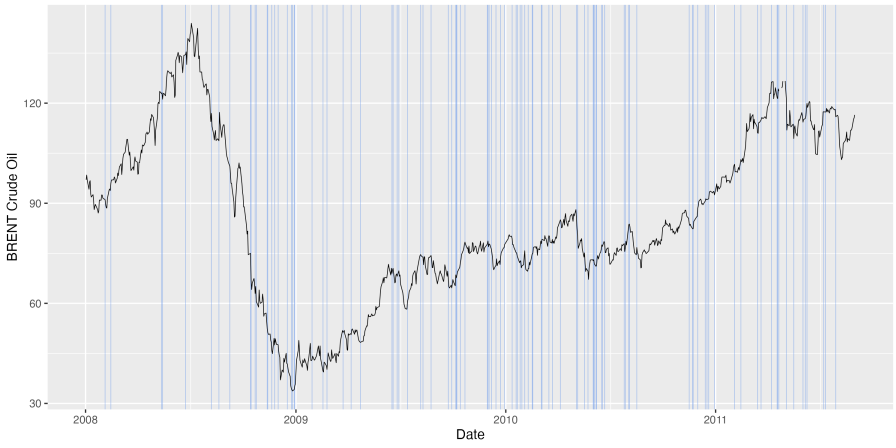
Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

Figure A8. The cumulative effect of Navalny's posts on Δ log EMBI$_{Russia-EMG}$



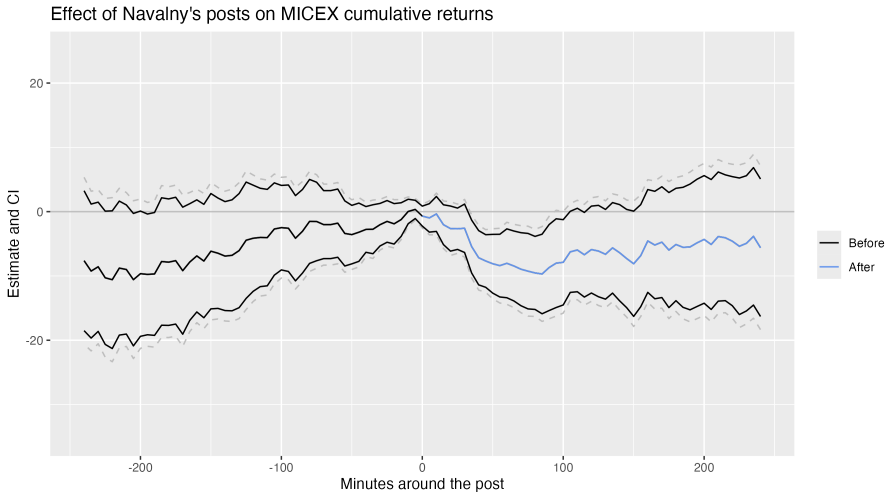
Note: Event study around the days of the posts. Dots report the cumulative effect of a post. The dependent variable is the residuals obtained from estimated Equation 1, winsorised at 2.5 and 97.5 percentiles.

Figure A9. Oil price dynamics



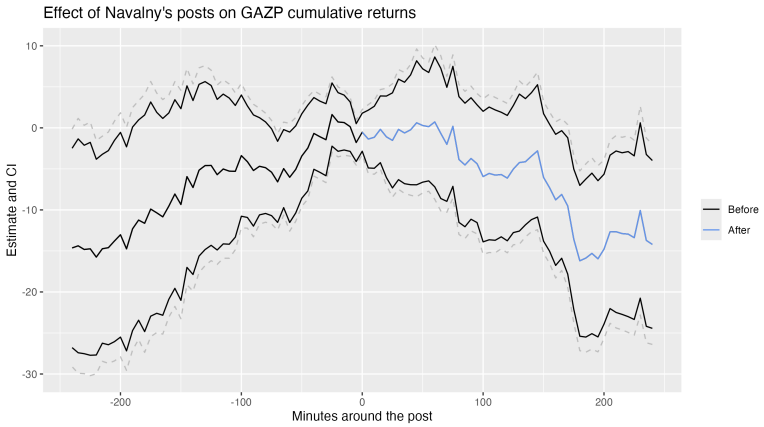
A.3 Intraday Results

Figure A10. Stock market returns around the time of Navalny's posts



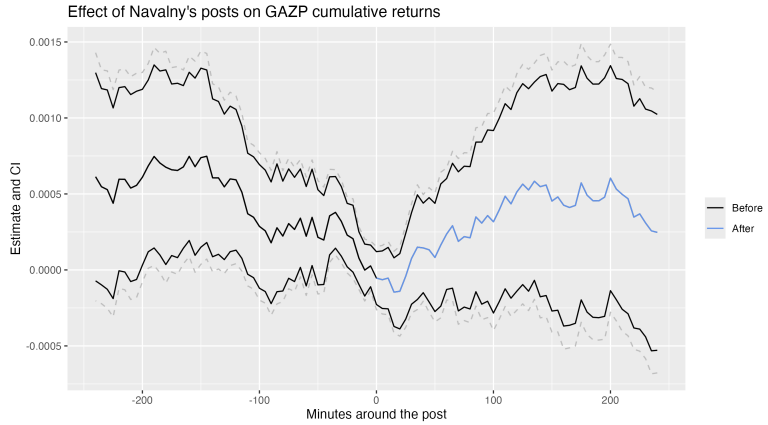
The chart depicts the cumulative returns of ruble-denominated stock market index MICEX on the days of Navalny's posts on ALL SOEs.The sample is based on the data compiled in Enikolopov et al. [2018] for 2008-2011.

Figure A11. GAZP returns around the time of Navalny's posts mentioning GAZP



The chart depicts the cumulative returns of GAZP on the days of Navalny posts about GAZP. The sample is based on the data compiled in Enikolopov et al. [2018] for 2008-2011.

Figure A12. GAZP returns around the time of Navalny's posts *not* mentioning GAZP



The chart depicts the cumulative returns of GAZP on the days of Navalny posts not mentioning GAZP. The sample is based on the data compiled in Enikolopov et al. [2018] for 2008-2011.

A.4 Corruption and Productivity News

How does news about the government type interact with initial priors and productivity? We provide numerical simulations to answer this question. We consider two priors (initial market perceptions), low and high, to study how the response in sovereign bond prices depends on whether the lenders considered the sovereign creditworthy in period 0. Also, we consider two types of productivity news that arrive before the corruption scandal (if it happens at all). In the first case, the productivity news is bad or good, with productivity below or above the median $med(A)$, respectively. We compare the following three cases:

#	Description
1	High prior, Bad news
2	High prior, Good news
3	Low prior, Bad news

Table A5. Description of scenarios

We focus on the equilibrium values of the lending supply curve. The supply curve reflects the combinations of the lending price q and volumes b that make the competitive lenders break even. Figure A13 presents the lending curves under different cases along with the optimal borrowing decision of the sovereign.

A.4.1 Creditworthy sovereign in distress

We depict the first case in Figure A13a. The sovereign is considered creditworthy ($\tilde{\pi}$ is high) in period 0. The blue line corresponds to the supply curve that the sovereign faces when borrowing. The offered price declines with the amount borrowed while the associated spread (excess return compared to a safe asset) increases, reflecting an increasing risk that lenders take. The vertical black line corresponds to the optimal choice of the sovereign, b^*. The equilibrium borrowing is fixed at this level when productivity and corruption news arrive.

The productivity news arrives first. In this case, the news is bad: the investments are made, and the lenders learn that the productivity is going to be below its median value ($A < med(A)$). This pushes the lending curve downwards: for any lending volume b, the lenders would be asking for a higher return on their investment. The corresponding lending curve is depicted in red. No new lending occurs in period 1, and there is only the secondary market where the new information is priced: the distance between the blue and red lines at point b^* reflects the losses the lenders suffer when bad productivity news arrives.

If a corruption scandal happens ($CS = 1$), the bondholders suffer even more losses. The corruption scandal implies that it is now more likely that the sovereign has a lower stock of capital and that future pressures to default are stronger; both reputational and resource channels are in play here. The yellow line corresponds to the lending curve with two pieces of information (productivity and corruption scandal) incorporated into the lenders' expectations of repayment in period 2 and, therefore, the prices in period 1.

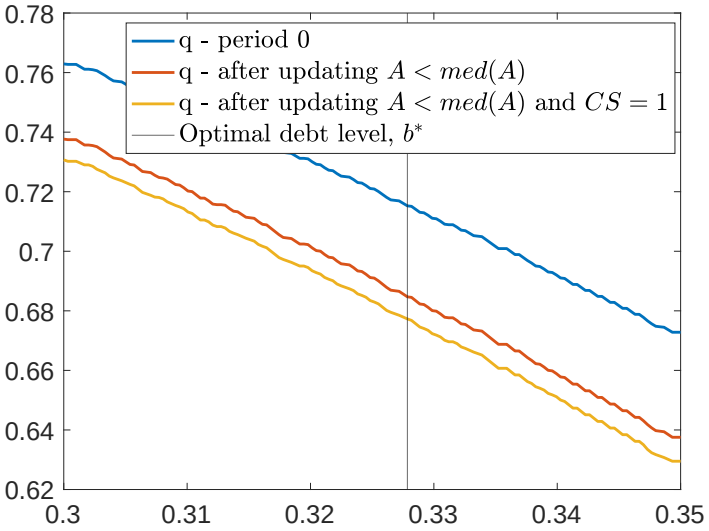
A.4.2 Uncreditworthy sovereign in distress

What if the sovereign was not considered creditworthy, to begin with? We depict this second case in Figure A13b. Once again, the blue line corresponds to the initial supply curve. Note that this supply curve is below the one depicted in Figure A13a: the lenders realise the incentives of the sovereign are biased towards immediate consumption and, thus, are not willing to lend as much as in the first case.[17] The vertical black line corresponding to the optimal choice of

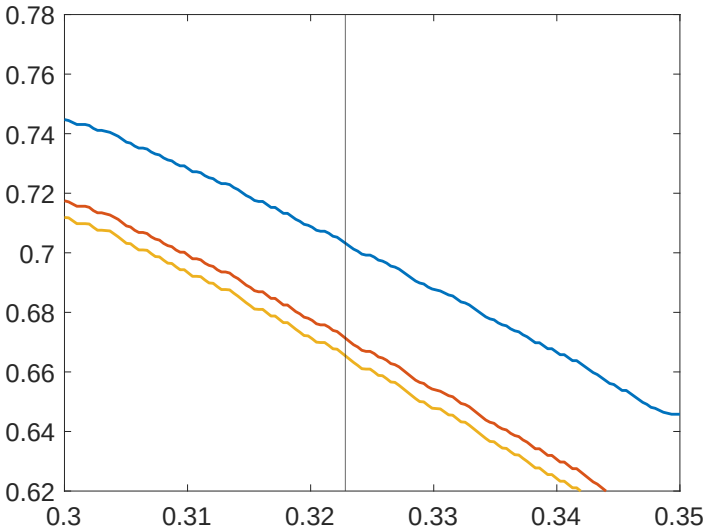
[17]This is an example of the mechanism studied in Aguiar and Amador [2011] but with private information.

Figure A13. Response of sovereign bond prices to corruption news.

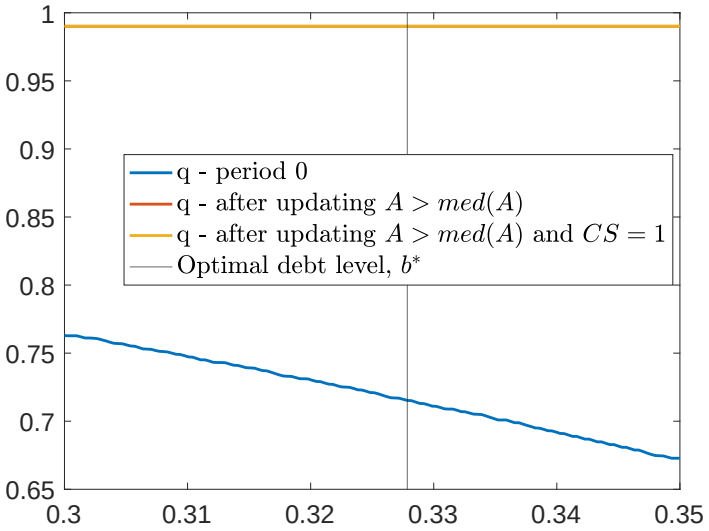
Y-axis: bond price q, x-axis: lending volume b.



(a) Case 1: high prior $\tilde{\pi}$, bad productivity news.



(b) Case 2: low prior $\tilde{\pi}$, bad productivity news.



(c) Case 3: high prior $\tilde{\pi}$, good productivity news.

the sovereign is located to the left of the one in the previous case. The sovereign is forced to reduce his borrowing as a result of his poor image abroad.

The productivity news has the same significantly negative effect on the bond prices as reflected in the position of the red line. The corruption scandal added to this adverse effect, as demonstrated by the yellow line position, but it is relatively lower than in the first case. This is a manifestation of the Bayesian rule: the lenders were not surprised when a scandal happened because that coincided mostly with their expectations. The effect is not null because we assumed that $\tilde{\pi} > 0$ in this simulation.

Note that the lower amount of borrowing further reduced the corruption scandal's effect on the sovereign bond price. If the amount borrowed was higher, as in case 1, the default would be closer, and the sovereign bonds would respond more. However, in this case, the market perceptions forced the sovereign to partly internalise this risk. In sum, the sovereign spreads respond less in this case because i) the sovereign internalised the uncertainty about his type through prices and ii) the lenders were aware of the heightened corruption risk ex-ante.

A.4.3 Creditworthy sovereign in good times

The final case studies how the bond market responds to corruption when productivity is high. The initial lending curve and the optimal borrowing choice are the same as in case 1 and are depicted in Figure A13c. When the lenders receive news that productivity will be above its median, the bonds become safe because any realised productivity A will not trigger a default. The corresponding red line is horizontal for all values of b, which means that the default would not happen not only with the optimal debt level b^* but, in fact, for any other level on the x-axis.

The corruption news turns out to be irrelevant to the secondary market in this case. When the economy is booming, no government has incentives to default, and the corresponding lending curve in yellow coincides with the lending curve upon arrival of productivity news. From a sovereign's perspective, delegating the investment to the C type would have no consequences if the investment technology was productive enough.

In the three cases above, we have not focused on what happens to bond prices when no corruption signal arrives. Apparently, as this is more probable under the B type, the ex-post lenders' perceptions improve, and the value of the bonds goes up. This model insight is important because the simple comparison between the sovereign bond response to the signal and no-signal in regression implied by Equation 2 *over*states the effect of the information revelation on the sovereign bonds, compared to the one presented in Figure A13. One needs to compare the sovereign spreads to a status-quo (and not to "no news" days) to elicit the effect of corruption scandals.