How Corruption Investigations Undermine Regime Support
Evidence from China

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Abstract

Authoritarian leaders around the world often fight against corruption in an effort to win public support. Conventional wisdom holds that this strategy works because leaders can signal their benevolent intentions by removing corrupt officials. We argue that fighting against corruption can undermine regime support. By revealing scandals of corrupt officials, corruption investigations can alter citizens' beliefs about public officials and lead to disenchantment about political institutions. We test this argument by examining how China's current anti-corruption campaign has changed citizens' public support for the government and the Communist Party. We analyze the results of two original surveys conducted before and during the campaign, and employ a difference-in-differences strategy to show that corruption investigations, at the margin, suppress respondents' support for the central government and party. We also examine our respondents' prior and posterior beliefs, and the results support our updating mechanism.

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Corruption is the world's most frequently discussed problem.[3] Authoritarian leaders, from Venezuela's Hugo Chávez's to China's Xi Jinping, have launched intensive corruption investigations in order to win public support. But do corruption investigations actually score points with the public?

A distinguished literature shows that citizens in democracies are antagonistic to government corruption: the more corrupt the citizens perceive the incumbents to be, the more likely they are to punish the incumbent government in elections (Ferraz and Finan 2008; Chang, Golden, and Hill 2010; Winters and Weitz-Shapiro 2013; Chong et al. 2015; Schwindt-Bayer and Tavits 2016).[4] Cross-national studies also show that political corruption erodes trust in political institutions, increases anti-government protest, and undermines the regime's long-term legitimacy (Seligson 2002; Anderson and Tverdova 2003; Chang and Chu 2006; Gingerich 2009; Morris and Klesner 2010).

When leaders fight corruption, as they fight poverty and unemployment, they hope to signal their responsiveness and benevolent intentions to the public, and therefore to garner more public support. As Chinese President Xi Jinping said in a speech in 2014 to justify his anti-corruption drive: "People hate corruption the most, so we must be determined to fight against corruption to win support from the people."[5]

There is, however, very little research on the effects of corruption investigations on public support in authoritarian regimes. We do not know how citizens react to information disclosed during corruption investigations. Do they perceive the anti-corruption drive as its leaders intend—as a genuine effort by the regime to curb corruption? Or are they shocked by the excessive

[3] BBC, "Global Poll: Corruption is world's most talked about problem," December 9, 2010. See shorturl.at/vBIMY (accessed July 25, 2017).
[4] For a null effect of corruption revelation on voting behavior, see Boas, Hidalgo, and André Melo (2019).
[5] See shorturl.at/civwM (accessed July 25, 2017).

corruption revealed in the investigations and become disenchanted with the regime? Empirically, it is challenging to estimate the causal effects of corruption investigations, because they are usually not randomized.[6]

In this article, we argue that corruption investigations may undermine regime support. We start with the assumption that citizens have *prior beliefs* about the integrity of government officials, which affects their degree of support for the regime. When political leaders launch an anti-corruption drive, scandals of politicians' corrupt activities are revealed to the public. Citizens use this new information to update their level of regime support. If the revelations of corrupt behavior exceed citizens' expectations, they are surprised by the excessive government corruption. They then start to question the integrity of public officials in general, and reevaluate their support for the regime. As a result, excessive corruption investigations may lead to citizens' "informed disenchantment" and undermine regime support.[7]

We substantiate our arguments by examining one of the most intensive anti-corruption drives in the world—the on-going anti-corruption campaign in China. We use a difference-in-differences (DID) strategy to analyze the results of two original surveys that we conducted before and during the campaign. Comparing respondents who are exposed to more investigations and respondents who are exposed to fewer investigations, we demonstrate strong and highly robust evidence that corruption investigations have a negative marginal effect on citizens' regime support.

Using our fine-grained survey data, we also explicitly test the updating mechanism. Employing a DID framework, we demonstrate that the respondents who were exposed to more

[6] There have been efforts to randomize the information of incumbent malfeasance or social corruption, see Chong et al. (2015), de Figueiredo et al. (2014), Larreguy, Marshall, and Snyder (2017), Corbacho et al. (2016), Boas, Hidalgo, and André Melo (2019), and Dunning et al. (2019).

[7] Gallagher (2006) coined the term "informed disenchantment" to describe litigants' disenchantment with the legal system after having direct contact with the system.

corruption investigations updated their beliefs to exhibit lower *posterior beliefs* about officials' integrity, relative to those who were exposed to fewer corruption investigations. Consistent with our updating theory, we find that the impact of corruption investigations on people's public support depends on how the investigations relate to their prior beliefs. Interacting respondents' prior beliefs with the intensity of corruption investigations, we show that investigations only have a significantly negative impact on people's public support when their priors are high; the effect is precisely zero when their priors are low. This indicates that corruption investigations provided new information that shocked respondents who had strong prior beliefs about officials' integrity. We also provide evidence that the respondents' media exposure conditions how much they are affected by the investigations: their public support is more negatively affected by the investigations when they are more exposed to the media. As a result, corruption investigations, at the margin, have suppressed citizens' regime support in China.[8] More specifically, citizens in provinces with high numbers of corruption investigations have lower levels of regime support than in provinces with fewer cases. The higher volume of corruption investigations causes them to update their priors about the prevalence of corruption in China, which in turn suppresses their regime support.

We are not arguing that China's anti-corruption campaign *as a whole* has a negative impact on regime support. Estimating such an effect would require a counterfactual where the regime has not carried out an anti-corruption drive. Our research design allows us to estimate the *marginal* effect of corruption investigations, that is, *compared with a few investigations*, how would additional investigations affect citizens' regime support. We also focus on the short- and medium-

[8] It is also possible that at least part of the goal was to eliminate potential rivals to Xi Jinping, as suggested by Murong (2015) and Zhu and Zhang (2017). In that case, reduced public support may be an acceptable price to pay.

term because our follow-up survey was conducted two years after the campaign started.[9] We leave studying the long-term effects to future research.

Our key contribution is to provide the first, direct quasi-experimental evidence of citizen updating during an anti-corruption campaign in an autocracy. Our findings contribute to the recent literature on information and accountability, which has focused on how information about incumbent performance affects electoral outcomes. For example, Ferraz and Finan (2008) show that incumbents in Brazil were severely punished in elections if their corruption violations were revealed to the public. Chong et al. (2015) find that incumbent corruption information decreases incumbent party support in local elections in Mexico and erodes partisan attachments. Arias et al. (2018) explicitly test a Bayesian model of learning using a field experiment in Mexico. Boas, Hidalgo, and André Melo (2019) conduct a field experiment in Brazil and find that voters sanction malfeasant mayors when presented with hypothetical scenarios. Dunning et al. (2019) use common informational interventions to assess the impact of providing voters with information about politician performance in several developing democracies. While our results are largely consistent with this literature's main finding that revealing malfeasance decreases political support, we examine a naturalistic observational setting for a sample covering a substantial fraction of the world's population and add an interesting twist: when an autocratic government reveals its own corruption, it can suppress citizens' regime support. Most existing work focuses on democracies; we highlight the impact of revealing corruption information in an autocracy, joining a recent literature that shows the surprising consequences of transparency or "the adverse effects of sunshine" in authoritarian regimes (Malesky, Schuler, and Tran 2012; Hollyer, Rosendorff, and Vreeland 2015).

[9] Researchers using field experiments consider their effects to be short-term if the effects disappear in a week or two (e.g., Gerber et al. 2011, 135).

We also contribute to the extensive line of research on perceptions of corruption. Theoretical works demonstrate that perceived level of corruption can influence the actual level of corruption (Fisman and Golden 2017). Empirical studies show that there are large cross-national (Schwindt-Bayer and Tavits 2016) and individual-level (Truex 2011) variations in perceived corruption levels, and one's belief about others' corruptibility will determine willingness to engage in corruption (Corbacho et al. 2016). A central question in the literature is whether the public views corruption investigations as a reflection of true corruption or the efficacy of law enforcement (see, e.g., Zhu 2017). Our findings are consistent with the former view that citizens perceive a high number of corruption investigations as a manifestation of prevalent corruption.

We believe our findings are applicable to other countries that rely on campaigns (intensive and periodic drives rather than institutional routines) to tackle corruption, and to those that have a low-information environment. Anti-corruption campaigns usually involve a series of intensive political operations within a short period of time, so a large amount of information on corrupt activities is disclosed to the public, which is more likely to constitute a shock. Another key contextual condition that is necessary for our updating mechanism to work is citizens' incomplete or inaccurate prior beliefs about public officials. Survey research has shown that developing countries, especially authoritarian regimes, tend to have a low-information environment due to the opacity of the political system (Zhu, Lü, and Shi 2012; Larreguy, Marshall, and Snyder 2017; Huang 2017). As we discuss in our concluding remarks, such regimes are likely to face this dilemma: the more the regime publicly punishes corrupt officials, the more the public punishes the regime.

THEORY AND BACKGROUND

In this section, we elaborate on our theory, which is based on a learning model of the citizens, introduce China's current anti-corruption campaign, and derive several testable hypotheses.

Information about Corruption and Public Support

We start with the premise that citizens' support for the regime is in part a function of their perceptions of the degree of corruption in the political system. They prefer (receive higher expressive utility) to support a government with less corrupt officials. This is consistent with the empirical literature that shows a negative association between perceived corruption and public support (Seligson 2002; Chang and Chu 2006; Ferraz and Finan 2008; Chang, Golden, and Hill 2010; Winters and Weitz-Shapiro 2013; Chong et al. 2015).

Since citizens have *incomplete information* about how corrupt government officials are, they develop *prior beliefs* based on officials' *revealed corrupt behavior* (corruption scandals, personal experience, rumors, etc.). A recent strand of research shows that citizens usually have misinformation about specific sociopolitical events and misperceptions about socioeconomic facts in autocracies (Huang 2017). Because of the covert nature of corruption, citizens usually have imperfect knowledge about how corrupt their public officials are. This is consistent with much survey research in countries with a low-information environment (Zhu, Lü, and Shi 2012; Corbacho et al. 2016; Larreguy, Marshall, and Snyder 2017).

Anti-corruption campaigns involve investigating corrupt officials and revealing corrupt activities. Leaders of the campaign, in order to justify their actions, publicize the details of the corrupt activities of the arrested individuals. Authoritarian leaders, in particular, can use propaganda to shape people's perceptions of the government's effort to combat corruption (Zhu, Lü, and Shi 2012, 937). The more the leaders reveal the corrupt activities of the investigated

officials, the more they can justify their anti-corruption drive. Citizens then update their *posterior beliefs* about the integrity of officials in the regime based on informational signals in a Bayesian fashion. If the investigations reveal new information that causes citizens to believe that public officials are more corrupt than they previously thought (informational signals more negative than citizens' mean prior belief), the investigations can lead citizens to suppress their support for the regime.[10]

The key insight is that the effect of anti-corruption depends on how the new information relates to citizens' prior beliefs. If they hold low priors on officials' integrity (e.g., they already thought most officials were dishonest), new revelations of corrupt behavior will not change their level of support. In order to update their priors, citizens must receive signals that are different from their priors.

An intensive anti-corruption drive that reveals that many public officials are corrupt is likely to alter citizens' prior beliefs about officials' integrity and suppress their regime support. When citizens are "shocked" by the information revealed in corruption investigations, they start to wonder why there is so much corruption in the system and question the integrity of the whole body of government officials.[11]

So although authoritarian leaders intend to garner more public support by arresting corrupt officials and publicizing corrupt activities, corruption investigations, on the margin, may suppress public support when the investigations reveal a surprisingly high number of cases. While such

[10] Exposed to new information that officials in the incumbent government are corrupt, citizens will not only punish the incumbents with lower support, they may even lose trust in the opposition and withdraw from the political process altogether or be more inclined to engage in political protest (Chong et al. 2015; Gingerich 2009).

[11] Our simple theoretical framework is consistent with emerging empirical evidence on how new information changes citizens' support for the incumbent government (Humphreys and Weinstein 2012; Larreguy, Marshall, and Snyder 2017) and is based on more formalized models on corruption information and citizen updating (Kendall, Nannicini, and Trebbi 2015; Arias et al. 2018).

investigations may help them achieve other goals—such as eliminating rivals, signaling strength, and consolidating power—they do so at the expense of the legitimacy of their regime.

China's Anti-Corruption Campaign

Consistent with the cross-national evidence, corrupt officials, especially at the very local level, are Chinese citizens' top concern (ahead of inequality, crime, food safety, and pollution).[12] Scholars have pointed to the weak institutional design of corruption investigations as one explanation for China's endemic corruption (Manion 2004, 2016; Sun 2004; Gong 2015).

Starting in 2012, after Xi Jinping took power, the Chinese Communist Party (CCP) launched an anti-corruption campaign with the stated goal of eliminating "tigers" (high-ranking corrupt officials) and "flies" (low-ranking corrupt officials). By October 2017, a total of 350,000 officials had been investigated for corruption.[13] Many believe that Xi's anti-corruption campaign is the most intensive and protracted in the People's Republic's history (e.g., Wedeman 2016). Appendix Figure A1.1 shows the number of corruption investigations in each province over the period of our study, indicating a clear increase after 2012.

There is speculation that the current campaign is less a genuine effort to reduce corruption than a politically motivated effort by Xi to weaken his opponents.[14] Emerging empirical evidence, however, suggests that the effort has been largely genuine and has significantly changed the structure of Party and government incentives so as to reduce bureaucratic opportunities for corruption and structural obstacles to anti-corruption enforcement (Manion 2016; Lü and Lorentzen 2016). While examining the motives of the campaign is beyond the scope of this article,

[12] See shorturl.at/npuB4 (accessed July 25, 2017).
[13] See shorturl.at/kEFZ3 (accessed November 29, 2017).
[14] E.g., Murong (2015). Zhu and Zhang (2017) using data before the current wave of corruption investigations, show that Chinese leaders employ anticorruption campaigns to target rivals' power networks.

our results lend more support to the latter interpretation, as citizens view investigated officials as genuinely corrupt, even shockingly so.

The CCP has gone to great lengths to collect and publicize the corrupt activities of investigated officials during the campaign (Chen and Hong Forthcoming). Many high-ranking officials' trials were made public or broadcast live on TV (such as Bo Xilai's). Although the CCP launched an extensive propaganda campaign in the official media to give a positive spin to its anti-corruption investigations, propaganda alone could not offset the shocking revelations of wide-spread corruption at all levels of the political hierarchy. Many details of official corruption, such as bribery, business deals, kickbacks, mansions, and mistresses, have been disclosed to the public. Scandals involving high-ranking officials and aggregate numbers of corruption investigations are circulated and updated on a daily basis. People can easily find the most up-to-date information about the latest corruption investigations and how many officials have been investigated in their provinces through Internet searches or on social media apps, such as WeChat.[15]

These informational signals are expected to change people's beliefs about public officials and their support for the regime. We do no argue that the anti-corruption campaign as a whole reduced regime support among all Chinese; we expect corruption investigations to have a negative marginal effect on people's public support: respondents who are exposed to more corruption investigations should, on average, exhibit lower public support for the regime.

> **H1**: Corruption investigations, on the margin, suppress citizens' support for the central government and Party, *ceteris paribus*.

We argue that citizen updating is the main mechanism driving the results. Specifically, we expect that the revelations of endemic corruption at all levels of the party, government, and military

[15] For example, Tencent has made available a searchable online database since 2016 for people to search how many officials have been investigated in their hometowns. The link to the database has been widely circulated on Tencent's social media app—WeChat.

cause the public to update its beliefs about officials' integrity: people exposed to more investigations are less likely to believe in the integrity of public officials, which suppresses their public support.

> **H2 (Updating Beliefs)**: Corruption investigations, on the margin, weaken citizens' beliefs about the integrity of public officials, *ceteris paribus*.

Our theory also predicts that the investigations have heterogeneous effects: corruption investigations should have no effect on people's regime support if they already believe officials' integrity is low; corruption investigations should suppress people's regime support when their prior beliefs about officials' integrity are high.

> **H3 (Heterogeneous Effects)**: The marginal effects of corruption investigations depend on citizens' prior beliefs. Such investigations should have no effect on people's regime support if their prior beliefs about officials' integrity are low, while investigations should suppress people's regime support when their prior beliefs about officials' integrity are high.

Our prediction hinges on the assumption that citizens have received the signal, so they are aware of corruption investigations that have been publicized. Empirical works show that media coverage of political events can significantly increase citizens' political knowledge (Snyder and Strömberg 2010) and effectively convey the government's message (Stockmann and Gallagher 2011). Hence how much corruption investigations affect citizens' public support is also conditional on the extent to which people are exposed to the media.

> **H4 (Media Exposure)**: The marginal effects of corruption investigations depend on citizens' exposure to the media. The more people are exposed to the media, the more likely their public support will be negatively affected by corruption investigations.

In addition to our proposed *updating mechanism*, an *economic mechanism* might also be at work. Removing a large number of officials might disrupt government activities and bring political uncertainty, which harms economic growth (Alesina et al. 1996). If the CCP's legitimacy has primarily been based on its effectiveness in promoting economic growth (Zhao 2009), the lower

economic performance might decrease regime support. We test this alternative mechanism and show that our evidence is consistent with only the *updating mechanism*.

RESEARCH DESIGN

In this section, we discuss our identification strategy and show that our data meet the key identification assumption that is required to make causal inference.

Data

In 2010 and 2014, respectively, we designed and conducted two original surveys in China. The two surveys used the same sampling design (spatial sampling with the same primary sampling units, see Landry and Shen [2005]) and questionnaire, and both were implemented by the Research Center for Contemporary China (RCCC) at Peking University. Both surveys conducted face-to-face interviews of adult citizens in the same 49 prefecture-level cities, provincial capitals, and districts of provincial-level municipalities (Beijing, Shanghai, Tianjin, and Chongqing).[16] The 2010 baseline survey drew a sample of 6,293 and interviewed 3,874 respondents (61.6% completion rate), and the 2014 follow-up survey drew a sample of 6,503 and interviewed 4,128 respondents (63.5% complete rate).[17] The completion rates are within the normal range for face-to-face surveys. We will show in the robustness checks that we can replicate our main results considering survey design characteristics, such as sampling weights and stratification.

[16] Provinces not surveyed include Inner Mongolia, Hainan, Guizhou, and Ningxia. These provinces were not included in the sample because the surveys used the probability proportionate to size method, meaning that localities with large populations had a higher probability of being selected than smaller localities, and these provinces have relatively small populations. Tibet and Xinjiang were also not part of the survey because of recent political tensions.

[17] Section I in the Appendix provides more information about the two surveys, including their sampling designs and implementation.

Our key outcome variable is regime support, which we define in terms of what Easton (1975, 436-7) refers to as "diffuse support"—citizens' support for the regime's political institutions rather than for the incumbents or their policies. Regime support is a worthy subject for research because it is associated with a wide range of political outcomes, such as political behavior (Tang 2016), policy implementation (Levi 1997), and regime stability (Dimitrov 2013). We were equally interested in their support for political leaders—Xi Jinping, in particular. Although anecdotal evidence suggests that Xi is popular in China, there are no approval ratings of Chinese leaders because direct questions about individual leaders are not allowed in Chinese surveys.

Instead, we focus on citizens' support for the regime. We asked respondents about their levels of *support* and *trust* in the most important political institutions (the central government and party) on a scale from 0 (no support/trust) to 10 (high level of support/trust). We therefore have four variables: *Trust Central Government*, *Trust Central Party*, *Support Central Government*, and *Support Central Party*.[18] In our main regression analysis, we use ***Support Central Party—***the most relevant indicator of the CCP's legitimacy—to make our presentation parsimonious, but as we show in the Appendix, our results are consistent using the other three measures or a scale that aggregates information from all four measures.

We make a research design decision to focus on citizens' support for the central government and party for two reasons. First, China's unitary political system gives the central party the prerogative to manage personnel affairs down to the vice-provincial level. Under Xi Jinping's political centralization, the center has gained more power in influencing personnel decisions at lower levels (Manion 2016). When corruption scandals are revealed, citizens update

[18] These measures are widely used in the study of public support in China. See Shi (2015), Dickson (2016), and Dickson, Shen, and Yan (2017) for a discussion of the concept of regime support and its measurement. Other scholars have used different measures of regime support (see, e.g., Chen 2013; Tang 2016). However, Lü and Dickson (Forthcoming) show that these different measures are essentially similar empirically.

their beliefs not only about local corruption but also about corruption in the political system in general, which affects their support for the central organizations. So citizens' support for the national party and government reflects their *overall* support for the regime*, beyond* their support for political organizations at a particular level (i.e., the center). Second, previous work shows that Chinese citizens in general have a high level of trust (high priors) in central organizations but a lower level of trust (low priors) in local organizations (Li 2013; Lü 2014). So corruption investigations are more likely to alter their beliefs in central organizations because corruption among lower-level officials is largely "old news." When we use support for *local* party and government as outcome variables, the effect (still negative) is less significant (Appendix Table 2.3). This finding is consistent with our theory that corruption scandals need to be an informational shock to alter citizens' beliefs. If most Chinese citizens already consider local governments highly corrupt, new local corruption scandals would not constitute a shock.

Although previous research on regime support in China has frequently found evidence of hierarchical trust—higher trust in central leaders and institutions than their local counterparts, some studies have questioned whether survey respondents reported political trust is a reliable indicator of regime support (e.g., Li 2013, 2016). It may well be that Chinese citizens have an idealized view of the central party and government that is not based on personal experience (as are their views on the local party and government) and that causes them to have more trust and support in the center. If that is the case, then our updating mechanism suggests that citizens with high prior trust will reassess that trust in light of the revelation of corruption cases: the more cases, the more likely they are to update their priors with this new information, resulting in a lower level of trust in the center.

There is minor missingness in the dependent variables due to item non-response (1.9-3.5%). As we show in Appendix Table A1.3, the missingness is balanced in most provinces before and after the beginning of the campaign, indicating that the campaign did not incentivize people to choose "Don't Know" or "No Response." We acknowledge that there might be social desirability bias in the answers, and we will discuss in more detail how we address this concern in the robustness checks. We use listwise deletion in the main analyses and will use multiple imputation in the robustness checks to show that the results are similar.

Our key independent variable is the number of corruption investigations during the period between the two surveys. We collected the data from Tencent—the largest Internet company in China. During the campaign, Tencent launched a searchable online database of all corruption investigations across China since 2011.[19] Based on information provided by Party disciplinary committees, courts, and procuratorates from the central to local levels, Tencent's database includes each official's name, position, locality, rank, and reason for investigation. In August 2016, we used Python to scrape Tencent's website and organized the database in an analysis-ready format. To verify this database and ensure that every investigation was made public, we ran an Internet search on every name to find its original source and record the date of the announcement.

The Tencent database has two advantages. First, it is the most comprehensive, public database on China's corruption investigations. It synthesizes information from official statistics at all levels of government and from all branches. Second, Tencent has provided this online database for Internet users to search how many officials in their hometowns have been investigated for corruption. By clicking on their hometowns on a drop-down list, this online interface reports the total number of investigations. This is the only place Chinese citizens can find out this number in

[19] See http://news.qq.com/zt2016/fanfu_ccdi/index.htm (accessed February 7, 2017).

a single click, and the database is widely circulated via Tencent's app—WeChat—China's most popular social network app, which has over 800 million users.

While we believe information on corruption investigations is widely circulated, we nevertheless cannot directly observe the extent to which our respondents received the information. In our analysis, we use an indicator on whether our respondents read political news on social media to proxy for their exposure to media reports on corruption investigations. But the proxy is imperfect because our survey did not ask whether they specifically read news about the anti-corruption campaign. Our analysis, therefore, focuses on estimating intention-to-treat (ITT) effects, which are the quantity of interest in some recent studies (e.g., Arias et al. 2018) and the most policy relevant.

Theoretically, every citizen's exposure to corruption investigations consists of two components. The first component is the investigations that involve *central* officials. Between the two surveys, there were 64 central investigations. The second component is the *local* investigations in the respondent's province.

To measure each respondent's exposure to corruption investigations, we therefore need to calculate the number of both types of investigations. Mathematically, however, unless central investigations exert differential effects on people in different provinces, the number of central investigations will be "netted out" in our DID framework because all respondents are exposed to the same number of central investigations of "tigers."[20] There are two possible ways in which central investigations can have differential effects on different provinces. First, citizens in an official's hometown province may be more sensitive to news about that official's corruption. Second, most central officials worked in local government before being promoted to the center, so

[20] To see this, respondent *i* in province *j* is exposed to X_{ij} investigations, and $X_{ij}=X_c+X_j$, where X_c is the number of central investigations and X_j is the number of local investigations. Similarly, respondent *h* in province *k* is exposed to X_{hk} investigations, and $X_{hk}=X_c+X_k$. So the difference in exposure between these two respondents is $X_{ij}-X_{hk}=(X_c+X_j)-(X_c+X_k)=X_j-X_k$.

citizens may pay more attention to central officials who used to work in their own province. We test these two possibilities by coding the biographies of corrupt central officials, but find no evidence to support either (Appendix Table A1.6). Regardless of whether we use the sheer number of central investigations or weight the number by corrupt officials' rank,[21] central investigations have no differential effects on citizen perceptions in different provinces.

Given that central investigations do not have differential effects on different provinces, the number of *local* investigations drives local variation in exposure to the campaign. Here, we make a research design decision to focus on investigations within the respondent's province (rather than lower administrative units, such as prefectures or counties). Our reason is that the province is the only feasible level at which numbers can be aggregated, reported, and compared by the national media (including social media apps, such as WeChat). China has 31 provincial-level units and about 300 prefectures and 3,000 counties. Media outlets that have national coverage usually focus on reporting on the number of investigations in each province and frequently rank the provinces according to their numbers.[22] The national media outlets do not report and rank all 300 prefectures or 3,000 counties. While local media outlets might report on local numbers, their coverage is less extensive than the national media and could reach only a small proportion of the population. The number of investigations in a province therefore provides the most straightforward shortcut for ordinary citizens to understand the intensity of the campaign in their localities. Our results using numbers at different levels support this reasoning (Appendix Table A2.2).

Our main independent variable is therefore ***Number of Corruption Investigations***, which is the total number of corruption investigations *in a province* between January 2011 (after our

[21] Officials' rank is coded using China's civil service code, which ranks from 1 (state level) to 9 (deputy office level). *Number of Corrupt Central Officials (Weighted*) is calculated using the following formula: $\sum \frac{1}{\text{rank}_i}$, which is the sum of the inverted rank of each official. This number is higher when corrupt officials have higher ranks.
[22] This is one example: shorturl.at/ovEPR (accessed July 24, 2017).

baseline survey) and July 2014 (before our follow-up survey). This number includes all the investigations within a province across all administrative levels (from province to village). We employ this simple measure because it is the most intuitive number that could create an impression in people's minds without requiring much cognitive burden. In the robustness checks, we also use ***Number of Corruption Investigations (Weighted)*** (which takes into account the varying bureaucratic ranks of corrupt officials), ***Numbers of Tigers and Flies*** (which separates high- and low-ranking officials), and ***Number of Corruption Investigations Per Million*** (which considers population size in each province[23]). Ideally, we would also like to examine the amount of embezzlement or bribery involved in each case, but such information was not released for most officials when they were investigated.[24] In the main analysis, we focus on corruption investigations in the province where the respondents live, assuming that citizens pay more attention to corruption in their home provinces.[25] But corruption investigations in other, especially neighboring, provinces might also affect citizens' regime support, which creates a spill-over effect. In the robustness checks, we examine this spill-over effect by calculating the spatial lag of corruption investigations. Table A1.1 shows the distribution of the independent variables across provinces.

Our analysis therefore examines how respondents' exposure to corruption investigations, the variation of which is driven by corruption investigations in the respondent's province, affects their overall regime support, proxied by their support for the national party and government. Theoretically, we care about the total number of corruption investigations a respondent is exposed to, including central and local investigations. But our DID framework "nets out" the central

[23] Ideally, we would want to normalize the number of investigations by the total number of bureaucrats in each province, but such statistics are not available.
[24] The government usually releases information on the amount of embezzlement or bribery in court verdicts, which happen much later than the initial investigation.
[25] Research on media consumption in China shows that people pay more attention to news about their own provinces than news about other provinces, see Stockmann (2013, 116).

investigations because they do not vary at the provincial level, so what goes into the regressions is only the local investigations.

We also consider several ***Demographic Controls*** that can influence regime support, including ***Male***, ***Age***, ***Years of Education***, ***Urban,***[26] ***Han***, ***Party Member***, and ***Per Capita Family Income (log)***. Appendix Table A1.2 presents these variables' measures and summary statistics.

Identification Strategy

Because our two surveys used the same sampling design and questionnaire and were implemented by the same survey institute, we can treat them as *repeated cross-sections* (Abadie 2005, 2). Repeated cross-sectional designs give researchers many benefits of traditional panel designs, such as the ability to examine dynamics, while problems of attrition and response bias are avoided and sample sizes can be held steady. Repeated cross-sectional surveys are increasingly prevalent in the social sciences, as seen in the National Annenberg Election Study and Michigan's Survey of Consumers (Lebo and Weber 2015).

We check whether there are compositional changes in the sample between the two periods and present the *t*-tests of key demographic variables in Appendix Table A1.3. While most demographic variables are balanced between the two periods in most provinces, there are significant differences in several covariates, such as ***Years of Education***, ***Urban***, and ***Per Capita Family Income (log)*** in provinces like Heilongjiang, Shandong, Hubei, Guangdong, and Guangxi. We hence control for these demographics in our analyses and conduct *conditional* DID estimators. We conduct an additional test (Appendix Table A1.4), using these demographic variables as

[26] This refers to the official household (*hukou*) registration of respondents. Rural migrants living in cities typically do not have an urban hukou. This variable is included to capture a potentially important subset of the urban population.

outcomes, and show that there is no differential composition effect of corruption investigations—an assumption for identification. We also in the robustness checks conduct a formal sensitivity analysis to estimate how strong the influence of unobservables would have to be, *relative to the influence of observables*, in order to overturn our results (Altonji, Elder, and Taber 2005). We find that unobservables need to be at least six times stronger than existing observables to invalidate our results.

Employing a DID strategy, we can then estimate how corruption investigations occurring in different provinces from 2011 to 2014 changed citizens' regime support. Specifically, the *first difference* is the temporal difference: the extent to which respondents changed their level of regime support from 2010 to 2014. The *second difference* is the regional difference: the extent to which respondents changed their level of regime support due to exposure to different numbers of corruption investigations in their provinces. The DID design, therefore, can identify *differential effects of corruption investigations across provinces*. The DID design, however, cannot identify the overall effects of the anti-corruption campaign across provinces—which cannot be credibly separated from any other common period effects, for example, effects due to common shocks to all provinces, such as political centralization and China's changing status in the international system.

The identification assumption is that, in the absence of the anti-corruption campaign, the difference in average regime support between provinces is constant over time. One possible violation of this common trends assumption is that the provinces that experienced many corruption investigations were systematically different from those that had few. The campaign might have targeted certain provinces *because* they have low levels of public support or slow economic growth.

So although we might find an association between corruption investigations and lower levels of public support, the results might suffer from reverse causality or omitted variable bias.

To rule out this possibility, we correlate a province's *pre-treatment* levels of public support and economic development with the number of corruption investigations. As Appendix Figure A1.2 shows, a province's average level of public support (measured by *Trust Central Government*, *Trust Central Party*, *Support Central Government*, and *Support Central Party*) and economic development (measured by *Per Capita GDP* and *GDP Growth Rate*) in 2010 are not significantly correlated with the number of corruption investigations they experienced during 2011–2014. Regression results further confirm these results (Appendix Table A1.5).[27]

The common trends assumption cannot be directly tested with data from only two periods. But if we have more than one *pre-treatment* period for which data are available, pre-existing differences in the trends of the outcome variable can be detected by applying the DID estimator to pre-treatment data (Abadie 2005, 2). To test the common trends assumption directly, we compare our 2010 baseline survey with another *pre-treatment* survey—*Attitudes Towards Citizenship in China*—which was conducted in 2008, used the same sampling design (spatial sampling), and was also implemented by RCCC.[28] If the DID assumption holds, provinces with different numbers of investigations should follow a common trend from 2008 to 2010. Specifically, the DID estimator should be zero for the two pre-treatment periods. Appendix Table A1.7 shows the details of this test. The coefficient on the interaction term (the DID estimator) is very small and indistinguishable from zero, which supports the common trends assumption.

[27] Lü and Lorentzen (2016, 9) report a positive correlation between business managers' perception of greater business obstacles and the severity of the subsequent crackdown at the city level.
[28] The survey data is publicly available at Peking University's dataverse. For more information about the survey, please see https://goo.gl/jiKF7J (accessed February 13, 2017).

EMPIRICAL RESULTS

In this section, we present our main empirical results and show that they are highly robust. We then provide evidence to show that people update their beliefs based on new information disclosed in the campaign, and that the effects of corruption investigations depend on people's prior beliefs. We also examine how people's media exposure conditions the effect, and test an alternative mechanism: worse economic performance resulting from the campaign.

Average ITT Effects

We use ordinary least squares (OLS) to fit the following equation to the repeated cross-section data file that combines the 2010 and 2014 surveys:

$$\begin{aligned} &Support\ Central\ Party_{ijt} \\ &\quad = \alpha + \beta_1 Year2014_t \times Number\ of\ Corruption\ Investigations_{jt} \\ &\quad + \beta_2 Year2014_t + \beta_3 Number\ of\ Corruption\ Investigations_{jt} + X\mathrm{B} + \mu_j \\ &\quad + \varepsilon_{ijt} \end{aligned} \qquad (\mathbf{1})$$

where ***Support Central Party***$_{ijt}$ is province *j*'s respondent *i*'s level of support for the central Party in year *t*, ***Year2014***$_t$ is an indicator for the respondents in the 2014 follow-up survey (2010 is the baseline), and ***Number of Corruption Investigations***$_{jt}$ (omitted when provincial fixed effects are included) is the total number of corruption investigations in province *j* from January 2011 to July 2014. β_1 is the DID estimator, which is expected to be negative. In some specifications, we also control for several ***Demographic Controls***, including ***Male***, ***Age***, ***Years of Education***, ***Urban***, ***Han***, and ***Party Member*** in ***X*** and provincial fixed effects μ_j. We exclude ***Per Capita Family Income (log)*** for now because of the large amount of missing data, but will include it in the robustness

checks.[29] We use clustered bootstrap standard errors at the treatment level (provincial level) to deal with the potential downward bias caused by the small number (25) of clusters.

Table 1 presents the estimates. We first present the most parsimonious specification in Column (1), add provincial fixed effects in Column (2),[30] and then include ***Demographic Controls*** (potentially post-treatment) in Column (3). Regardless of which specification we use, the coefficient on the interaction term is consistently negative and significant. Holding everything else constant, every 200 corruption investigations (the average number of investigations in the sample provinces is 199.8) reduce citizen support by 0.4 on a 0–10 scale (5% of the mean). In our sample, 9 of the 25 provinces had conducted more than 200 investigations by 2014. These provinces had over twice of the population in the United States and constituted more than half of China's population. Many provinces, including Jiangsu, Guangdong, Shandong, and Sichuan, had conducted nearly 400 investigations before July 2014, and more investigations occurred after that.

[29] About one-third of our respondents did not report their family income.
[30] Adding provincial fixed effects will absorb the constituent term *N of Corruption Investigations*, which will be omitted in Columns (2)-(3).

Table 1: DID Estimates of the Average ITT of Corruption Investigations on Regime Support (OLS Regressions)

	(1)	(2)	(3)
Outcome Variable		**Support Central Party**	
	Coefficient (Bootstrap C.S.E.)	**Coefficient (Bootstrap C.S.E.)**	**Coefficient (Bootstrap C.S.E.)**
Year 2014*N of Corruption Investigations	-0.002**	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)
Year 2014	Yes	Yes	Yes
N of Corruption Investigations	Yes	No	No
Demographic Controls	No	No	Yes
Province FE	No	Yes	Yes
Outcome Mean	8.006	8.006	8.011
Outcome S.D.	1.833	1.833	1.830
N of Investigations Mean	199.824	199.824	199.824
N of Investigations S.D.	110.272	110.272	110.272
Observations	7773	7773	7274
N of Clusters	25	25	25
R^2	0.010	0.097	0.121

Notes: This table presents the benchmark results. Appendix Table A2.1 shows the full results. Clustered bootstrap standard errors at the provincial level in parentheses. *p*-values are based on a two-tailed test*: * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.*

Our results are highly robust, as shown in a wide range of robustness checks. For example, one concern regarding survey research in authoritarian regimes is that the respondents might over-report their regime support due to political fears (Kuran 1991). Jiang and Yang (2016) show that after the removal of a powerful local politician, Chinese respondents become more willing to express their criticism of the regime. It is therefore possible that the lower public support that we detect is a result of decreased political fear. In our surveys, we asked respondents how much they feared the central government when discussing politics (***Political Fear***). Obviously, this measure is imperfect because respondents with political fear might be too afraid to say so. Thus we also examine whether they responded to this question (***Response to Political Fear***). As survey methodologists show, respondents usually avoid a sensitive question by selecting "Don't Know"

or "No Response" (Presser et al. 2004). In one of the robustness checks, we first use the DID framework to examine whether the campaign changes respondents' political fear (measured by ***Political Fear*** and ***Response to Political Fear***) but find no evidence. We then control for ***Political Fear*** or ***Response to Political Fear*** and obtain the same estimates (Appendix Tables A3.7–A3.8).

In thirteen other robustness checks, we use alternative measures of the outcome variable (*Trust Central Government*, *Trust Central Party*, *Support Central Government,* a scale that aggregates all four measures, and dichotomous coding of these variables[31]), alternative measures of the independent variables (*Number of Corruption Investigations (Weighted), Number of Corruption Investigations Per Million*, and separating "tigers" and "flies"), control for *Per Capita Family Income (log)*, drop new migrants, conduct placebo tests by creating 100 "fake" anti-corruption campaigns in which the number of corruption investigations in each province is drawn randomly from a uniform distribution, drop one province at a time, consider survey design effects, use multiple imputation to deal with missing data, include a spatial lag to examine spill-over effects, and conduct a sensitivity analysis to assess the influence of unobservables. None of these tests significantly changes or challenges our original results (Appendix Section III).

Evidence on Updating

So far, we have established a negative relationship between corruption investigations and citizens' regime support. Now we provide direct evidence on our updating mechanism that new information disclosed during the campaign has updated citizens' beliefs about public officials.

Our theory predicts that respondents who are exposed to more investigations start to doubt the integrity of public officials. To measure citizens' beliefs about the integrity of public officials

[31] The dichotomous coding follows Lü and Dickson (Forthcoming).

(***Beliefs in Officials' Integrity***), we use a question in the surveys asking the respondents' opinion on the statement "In general, public officials are honest," which is scaled from 1 (Strongly Disagree) to 4 (Strongly Agree).[32] *Beliefs in Officials' Integrity* is estimated to have a strong positive effect on people's regime support (Appendix Table A4.1).

Using the same DID framework, Table 2 presents the ITT of corruption investigations on *Beliefs in Officials' Integrity*. Consistent with H2, respondents living in provinces that had more corruption investigations have lower posterior beliefs about officials' integrity. For every 200 investigations, respondents' *Beliefs in Officials' Integrity* decreases by 0.16 on a 1–4 scale (6.8% of the mean).

Heterogeneous Effects

The core insight of our theory is that the effects of corruption investigations should be conditional on people's prior beliefs. If they already have a low opinion of officials' integrity, the revealed corruption during the campaign should not surprise them; if their baseline belief is that officials are largely honest, they should be surprised by the rampant corruption revealed during the campaign and reduce their regime support accordingly. Almost half of our respondents had high priors: in our baseline survey, 43.11% of the respondents "strongly agree" or "agree" with the statement "In general, public officials are honest." To test the heterogenous effects, we specify a model with a triple interaction term among *Year2014*, *Number of Corruption Investigations,* and people's prior beliefs.

[32] We structured the questionnaire where this question was asked directly after a battery of questions about national political institutions, such as national party and governmental organizations, in the hope that the respondents were primed to think about central official.

Table 2: Difference-in-Differences Estimates of the Average ITT of Corruption Investigations on *Beliefs in Officials' Integrity* (OLS Regressions)

	(1)	(2)	(3)
Outcome Variable	**Beliefs in Officials' Integrity**		
	Coefficient (Bootstrap C.S.E.)	**Coefficient (Bootstrap C.S.E.)**	**Coefficient (Bootstrap C.S.E.)**
Year 2014*N of Corruption Investigations	-0.001**	-0.001*	-0.001*
	(0.000)	(0.000)	(0.000)
Year 2014	Yes	Yes	Yes
N of Corruption Investigations	Yes	No	No
Demographic Controls	No	No	Yes
Province FE	No	Yes	Yes
Outcome Mean	2.347	2.347	2.344
Outcome S.D.	0.818	0.818	0.815
N of Investigations Mean	199.824	199.824	199.824
N of Investigations S.D.	110.272	110.272	110.272
Observations	7204	7204	6754
N of Clusters	25	25	25
R^2	0.012	0.045	0.067

Notes: This table tests the updating mechanism. Clustered bootstrap standard errors at the provincial level in parentheses. *p*-values are based on a two-tailed test*: * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.*

We use the provincial mean of *Beliefs in Officials' Integrity* in the 2010 baseline survey to measure average prior beliefs in each province. This strategy is imperfect, because ideally we want to use an individual-level measure, but we do not have a panel to measure respondents' priors at the individual level. This aggregate measure, which still exhibits significant variations,[33] will enable us to retain our DID framework. The coefficient on the triple interaction (difference in difference in differences estimator) is then the marginal effect of corruption investigations in provinces with different levels of prior beliefs.

[33] The variable ranges from 1.758 to 2.855 with a mean of 2.366.

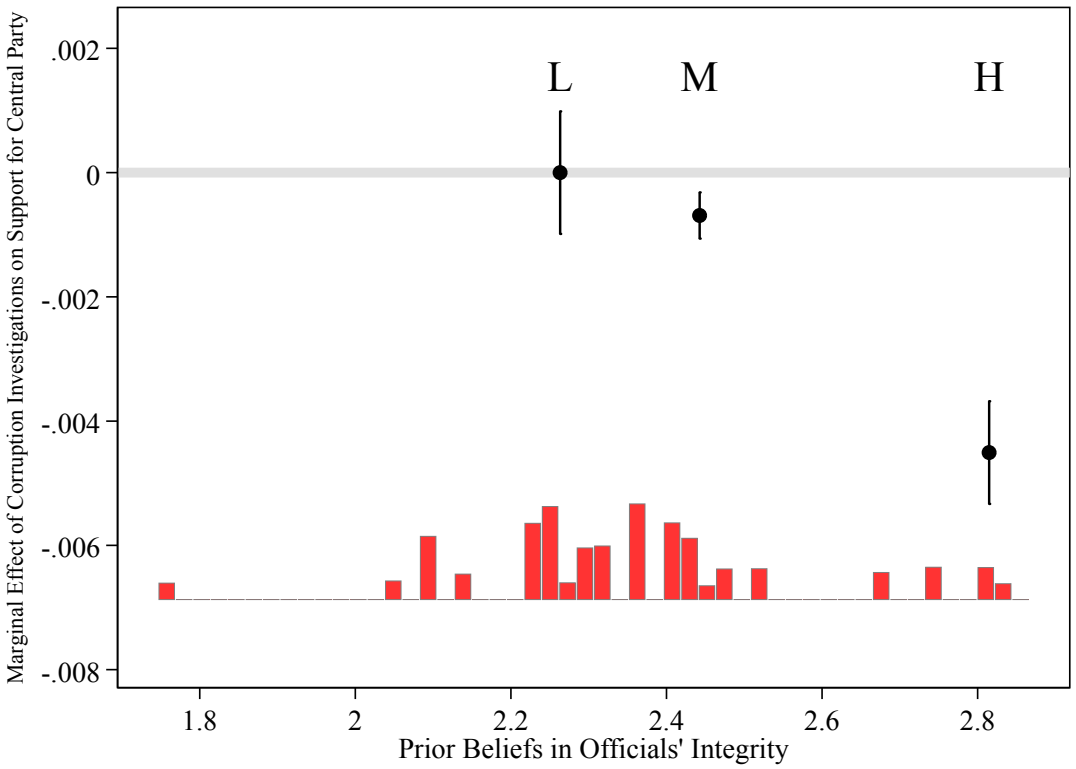

Figure 1: Marginal Effect of Corruption Investigations at Different Levels of Prior Beliefs in Officials' Integrity

Notes: This graph plots the marginal effects (with 95% confidence intervals) of corruption investigations on *Support Central Party* at three (low, medium, and high) different levels of prior beliefs. The bars refer to the distribution of the moderator. We use the current best-practice method proposed by Hainmueller, Mummolo, and Xu (2019) and a binning estimator to divide the provinces into three groups (low, medium, and high) based on their average prior beliefs.

Figure 1 shows the estimates of the marginal effect of corruption investigations on *Support Central Party* at different levels of prior beliefs. Consistent with H3, corruption investigations have precisely zero effect for respondents who already had a low opinion of officials' integrity, but as people's prior beliefs in officials' integrity become stronger, the marginal effect of corruption investigations becomes statistically significant and negative. At the medium level of priors, the marginal effect of corruption investigations is -0.001 ($p<0.01$); at the high level it is -0.005 ($p<0.01$). We also use a bootstrapping approach, which produces similar results. Appendix

Table A4.2 shows the full estimates. In short, the effect of corruption investigations on regime support is conditional on respondents' prior beliefs about the integrity of public officials.

Media Exposure

Another assumption we have made throughout the discussion is that our respondents are aware of the number of corruption investigations. As discussed earlier, these numbers have been constantly publicized and widely circulated on social media. Moreover, our measures of corruption investigations are from a database circulated on social media. The more our respondents are exposed to social media, the more we should expect their public support to be more negatively affected by the campaign. We discuss the details of this test in Appendix Section V. Consistent with H4, as people are more exposed to news on social media, the marginal effect of corruption investigations becomes steadily more negative. As Appendix Figure A5.2 shows, in provinces in which the average social media news consumption is below 30%, corruption investigations have an insignificant effect on people's support for the Party. In provinces in which 40% of the respondents read news on social media, the marginal effect is negative (-0.005) and significant. Appendix Table A5.2 shows the full estimates.

An Alternative Mechanism

Above we have provided evidence supporting all four hypotheses. Here we examine an alternative (economic) explanation to provide further support for our theory. During the anti-corruption campaign, a large number of officials were removed from office. This political instability might have led to lower economic performance because of frequent government turnovers and high political uncertainties. However, we find no evidence that the campaign affected economic

performance, at least by 2014 when the second wave of our survey was conducted.[34] Using a DID strategy and provincial-level indicators of economic performance, including GDP, per capita GDP, GDP growth rate, and per capita GDP growth rate, we find no evidence that the provinces that experienced more corruption investigations had lower economic performance (Appendix Table A6.1).

DISCUSSION AND CONCLUSION

Corruption is a global disease: it impedes economic growth, increases inequality, and erodes political legitimacy (Bardhan 1997; Seligson 2002). While some countries establish independent institutions, such as anti-corruption agencies or a judiciary, to control corruption, many resort to periodic campaigns to crack down on corruption.

Intensive corruption investigations, however, might undermine regime support. To convince the public that the investigations are legitimate, they need to publicize details of the investigations, including corrupt officials' personal properties, bribery records, and corruption networks. But in places where the investigations are extensive, this publicity may *de*legitimize the regime by revealing too much corruption to the public, at least in the short run, especially for those who did not already know how extensive the corruption was. The leaders of the campaign, however, can still benefit, for example by eliminating their enemies and consolidating their power, but the institutions they lead have to pay a public opinion cost. (Although observers frequently state that the anti-corruption campaign made Xi Jinping popular, there are no approval ratings for individual leaders in China, so we cannot determine what the public actually thinks of Xi.)

[34] A recent study by Wang (2019), using data from 2012 to 2017, shows that China's anti-corruption has negatively affected land development projects, revenue collection, and environmental regulation.

Using the case of China's current anti-corruption campaign, we show that citizens update their beliefs about public officials based on new information revealed during such campaigns. The more corruption the campaign reveals, the more it suppresses citizen support for the regime. We substantiate our arguments by applying a DID strategy to two national surveys. We find that provinces "treated" with higher numbers of corruption investigations had lower levels of regime support compared to levels in provinces with lower numbers of investigations.

To our knowledge, this is the first quasi-experimental evidence of how anti-corruption campaigns affect public support in an authoritarian regime. Our study makes three contributions to the literatures on information, public goods provision, and corruption.

First, there is emerging empirical evidence that information about incumbent malfeasance can change electoral results. Media revelations of incumbent corruption reduce the likelihood of re-election and suppress turnout (Ferraz and Finan 2008; Chang, Golden, and Hill 2010; Chong et al. 2015; Larreguy, Marshall, and Snyder 2017; Boas, Hidalgo, and André Melo 2019; Dunning et al. 2019). Our study explicitly takes into account the role of prior beliefs and shows that the way in which information changes regime support depends on citizens' prior beliefs. Our results indicate that an anti-corruption campaign may suppress regime support if the revealed corruption exceeds people's prior beliefs. We join a new line of research that examines how prior assumptions condition the effect of new information (Kendall, Nannicini, and Trebbi 2015; Arias et al. 2018) and present direct evidence of citizen updating using a baseline survey and a follow-up survey.

Second, much research has established a positive association between public goods provision and political support (Bueno de Mesquita et al. 2005; Zhao 2009; Dickson, Shen, and Yan 2017). If we consider clean government to be a public good, by removing corrupt officials, leaders of anti-corruption campaigns are providing a public good to the whole society. But as we

have shown, the provision of this type of public good does not necessarily translate into higher levels of regime support. Our study points to the importance of examining what the regime reveals in the process of providing such a public good. If the provision of clean government entails disclosing previously hidden corruption, attempts to increase political support will backfire. Our findings are consistent with other research that shows how public goods provision can have the unintended consequence of raising expectations in ways that can be detrimental to the regime (e.g., Lü 2014).

Last, there is a large literature on the political economy of corruption, but most studies focus on the causes of corruption (Rose-Ackerman 1999; Treisman 2000; Montinola and Jackman 2002; Malesky, Gueorguiev, and Jensen 2015; Zhu 2017). Research on the consequences of corruption primarily examines its effect on economic development and other socio-economic outcomes (Bardhan 1997; Mauro 1998). We join recent efforts to causally assess the effects of corruption or anti-corruption on political attitudes and behavior (Gingerich 2009; Chong et al. 2015; Corbacho et al. 2016). But we differ from most recent research in that our evidence is from an authoritarian regime where the leaders have an urgent and frequent need to legitimize their rule by publicly fighting corruption.

Our findings reveal a bitter irony: corruption negatively impacts regime support, but fighting corruption is no panacea. In terms of public opinion, the cure may be as bad as the disease.

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