How anti-corruption purges could backfire: evidence from China

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Abstract: A lot of corruption happens in the form of collusion within government. Stronger enforcement, however, could increase collusion within government, making anti-corruption purges backfire. This paper presents a game-theoretic model in which higher punishment in an anti-corruption purge results in a counterintuitive increase in collusion. This is because higher punishment during a purge raises the "stakes of the game", resulting in more collusion to curry favors and build connections that are helpful for survival. We provide empirical evidence for this in a case study of China's anti-corruption campaign since 2012, where most governmental collusion happens alongside alcohol banquets. We find an increase in alcohol consumption of Chinese public sector employees, relative to private sector ones, after the start of the anti-corruption campaign. We present evidence that the political mechanism from the model is behind the increase in drinking: the increase is almost entirely driven by *baijiu*, the most politically important drink in China. The effect on drinking is also more pronounced among junior, male, and urban employees.

I. Introduction

A lot of corruption happens in the form of collusion within government: government officials collude to cover up incidents, cope with inspections from higher levels of government, and so on (Zhou 2022). Such collusion within government differs from collusion between firms (or, for that matter, collusion between government and firms) in many aspects. One notable difference is that stronger enforcement of regulations tends to decrease collusion between firms, whereas stronger enforcement of political regulations or party discipline could actually backfire, resulting in *more* collusion within government. This paper provides theoretical and empirical evidence of anti-corruption purges backfiring in this way.

We first propose a game-theoretic model that incorporates the fact that collusion is distinguishable from other types of corruption-related activities such as embezzlement and bribes: instead of having a fixed material benefit of its own, collusion entails a bond-forming, trust-building exercise with which people may improve their chance of survival or promotion through back-channel dealings, such as currying favor with superiors or violating regulations together with colleagues. When the regime cracks down on corruption by increasing the severity of punishment through an authoritarian purge, it raises the "stakes" in the game, increasing the value of survival. As a response, people scramble for an increased chance of survival, resulting in more collusion. This provides us with one more mechanism through which "campaign-style governance" (*yundongshi zhili*), where the government implements policy through intermittent campaigns rather than enduring institutions, may backfire (Whyte 1973; Zhou 2022).

We then provide quantitative empirical evidence with a case study of Xi Jinping's anti-corruption campaign in China, which started in late 2012 when he came to power. Collusion within government is notoriously hard to observe, but this paper utilizes a proxy for collusion that is distinctive, if not unique, in the Chinese context: drinking. Alcohol is the lubricant of China's political connections, and collusion within government very often happens through

alcohol banquets, not unlike the role of golf in the United States. The Communist Party recongizes as much: the anti-corruption campaign included a crackdown on drinking. China's government issued "eight-point regulation" (*baxiang guiding*) in later 2012 that cracked down on the alcohol-fuelled lavish banquets and other extravagances that have been common among Chinese officials and other public sector employees. The aim is to rein in collusion, factionalism, and rent-seeking behavior, thereby reducing corruption in the public sector (See section III for more background).

We find that alcohol consumption of China's public sector employees *increased*, not decreased, relative to the private sector as a result of the anti-corruption campaign. This perverse increase stands in contrast to the other effects in the opposite direction known in the literature: the campaign has been found to have reduced embezzlement, decreased the consumption of luxury goods, and curtailed other forms of rent-seeking. We show that the political mechanism of anti-corruption purges backfiring is behind this increase in drinking. The effect on drinking is closely related with the political importance of each type of drink: the increase of alcohol consumption is overwhelmingly driven by *baijiu*, the most politically important drink in China and the go-to drink in Chinese officialdom. The increase in drinking is primarily associated with junior employees, who care more about evaluation and promotion, as well as urban residents, where the bulk of political and economic activities are seated. We also present evidence against alternative explanations: the increase in drinking is not due to an increase of mental stress, an improvement of physical health, or the change in liquor prices.

This paper speaks to three strands of literature. First, this paper is among the first to study the response of collusion to the level of enforcement. It is well-known in the theory of oligopoly that collusion between firms could be unstable because of the incentive of individual firms to cheat (Stigler 1964), and that even when collusion is sustained, effective enforcement of antitrust policy is a crucial determinant of cartel breakup (Levenstein and Suslow 2012).

Research on "regulatory capture" studies collusion between governments and firms (Stigler 1971; Shleifer and Vishny 1993; Faccio 2006). This paper is more concerned with collusion within an organization, such as "influence activities" in which subordinates waste valuable resources to curry favor with superiors with discretionary power. There is ample research on the theory of influence activities (Milgrom 1988; Milgrom and Roberts 1988; Powell 2015). More recently, empirical evidence has began to emerge regarding the existence and effect of influence activities (De Janvry et al. 2023). This paper as to this line of work by examining the variation in influence activities in response to enforcement of regulations and disciplines, especially in the context of autocratic government, where an outside option is not really available.

Second, this paper contributes to the theoretical literature on corruption and accountability in autocracies. In this literature, autocratic politics is often analyzed in the framework of informational principal-agent models, where the autocrat needs to incentivize agents to act in his interest while having limited information with which to evaluate his agents (see Egorov and Sonin 2024 for a review). In the autocrat's inner circle, this might be manifested in phenomena such as the loyalty-competence trade-off (Egorov and Sonin 2011; Zakharov 2016). To deal with the problem of top-down accountability with limited information, autocrats use a variety of remedies such as allowing partially free press to hold lower-level officials accountable (Egorov and Sonin 2011; Lorentzen 2014), holding local elections (Martinez-Bravo et al. 2022), or allowing small-scale, narrowly economic protests as an information-gathering tool (Lorentzen 2013). The above methods have all been used in China in varying degrees. Since Xi Jinping came to power, the Chinese Communist Party began to resort to mass purges to control subordinates. Montagnes and Wolton (2019) started the recent literature on formal models of mass purges in autocracy, where they study the strategic interaction between an autocrat and a mass of agents, and the autocrat decides whom to purge based on imperfect information about agents' congruence with the regime. They also investigate different equilibria as the level of the violence of purges changes.

This paper, in particular, builds on the model of Wang, Lützenrath, and Wolton (2022), which develops a formal model of anti-corruption mass purges in autocracies such as China. In their model, corruption is modeled as a binary choice of embezzlement which yields a fixed benefit for the corrupt agent. They look at how regime capacity to detect embezzlement, modeled as the probability that embezzlement is observed by the autocrat, affects equilibrium behavior. Unlike them, we model drinking as an activity whose benefit is not fixed but endogenous [1]. Combining the insights of Montagnes and Wolton (2019) and Wang, Lützenrath, and Wolton (2022), we look at the effect of both the regime capacity to detect drinking and the intensity of punishment from the purges.

Third, this paper adds to a growing empirical literature on the effects of China's anti-corruption campaign. Evidence suggests that the campaign changed behaviors and appeared to reduce graft. Chen and Kung (2019) finds that the anti-corruption campaign resulted in a more transparent land market, where firms with links to China's political elite had less advantage than before. Xu and Yano (2017) finds that the campaign boosted firms' financing and investment in innovation, arguing that the campaign better protected firms from government expropriation. Kong and Qin (2021) shows that the campaign had a sizeable positive effect on entrepreneurship, largely through better governance. The campaign is also associated with improvements in other aspects, such as the reduction of coal mine accidents and air pollution (Zhou, Wang, and Chen 2020; Xu, Wang, et al. 2021). A strand of recent research has focused on the campaign's effect on firms, such as the overall improvement in firm performance and total factor productivity (Giannetti et al. 2021; Kong, Tao, and Wang 2020) and the decrease in stock market returns of luxury-goods producers, state-owned enterprises, and politicaly connected firms (Ke, Liu, and Tang 2016; Shu and Cai 2017; Ding et al. 2020). On the other hand, the campaign has a number of detrimental impacts such as the reduction in firm entries (Chen, Jin, and Xu 2021), increasing bureaucratic slack (Wang

[1] Levy and Razin (2012) and Levy and Razin (2014) discuss increasing cohesion as a result of higher cost of rituals in religious organizations.

and Yan 2020; Wang 2022; Wang, Lützenrath, and Wolton 2022), and adverse selection into the bureaucracy (Jiang, Shao, and Zhang 2022).

There has been few research on the effect of China's anti-corruption campaign on alcohol consumption. Campante et al. (2023) finds that the anti-corruption campaign results in a decline in consumer demand for restaurants closer to government offices. Another notable paper is Li, Pan, and Xu (2024), which is the most similar to our paper in terms of methodolody. Li, Pan, and Xu (2024) finds that the campaign decreased the overweight rates of public sector employees, with reduced frequency of alcohol consumption as one possible mechanism. Our paper, in contrast, uses survey data that explicitly asks the amount of consumption of each type of alcoholic drink. In this sense, our paper contributes to the debate over the effect of the anti-corruption campaign on consumption behavior.

This paper is organized into six sections. Section II describes the setup of the theoretical model and its results. Section III introduces the institutional background of the anti-corruption campaign and drinking in China. Section IV describes the data. Section V presents empirical results. Section VI concludes.

II. Model

We study a two-period ($t \in \{1, 2\}$) model with an autocrat (A) and a unit mass $i \in [0, 1]$ of subordinates. Each subordinate has two types $\tau = \{h, c\}$: he is either honest ($\tau = h$) or corrupt ($\tau = c$). The subordinate's type is his private information; the autocrat cannot observe his type. But it is common knowledge that, at the start of period 1, a proportion λ of subordinates are honest: $Pr(\tau = h) = \lambda$.

Each period, agent i makes two decisions. He chooses to exert effort $e_t^i \in [0, 1]$ on an individual project at a cost $\frac{(e_t^i)^2}{2}$. The project might succeed ($\omega_t^i = S$) or fail ($\omega_t^i = F$). The probability that agent i's project succeeds is equal to his effort: $Pr(\omega_t^i = S) = e_t^i$. In the following, we denote α^S and α^F as the proportion of agents who succeeded and

failed respectively. Agents also choose whether to collude: $d_t^i \in \{0, 1\}$. The benefit of collusion depends on the agent's type. We assume that honest agents are inherently averse to collusion and do not benefit from it at all. So, in equilibrium, honest agents never choose to collude.[2] The benefit of collusion for corrupt agents is that, if the corrupt agent's project fails, there is a probability β that the colluding agent's failure is masked as success. When that happens, the agent still gets the payoff of failure, but the autocrat observes that the agent's project succeeds. Therefore, choosing to collude can be interpreted in the real world as joining a faction consisting of other colluders, or deciding to violate regulations together with colleagues, or currying favor with superiors in an extra-institutional setting. We assume that β is large enough such that collusion makes a meaningful difference[3].

The autocrat does not know each subordinate's type or effort. After subordinates take actions, the autocrat observes the perceived success or failure of their projects. That is to say, when the agent is not colluding, the autocrat observed the true success or failure; when the agent is colluding, she observes true successes, and has a probability β of observing success if the agent actually failed. In addition, she learns d_t^i with probability γ. Following Wang, Lützenrath, and Wolton (2022), we refer to γ as the autocrat's "detection capacity". After observing the information above, the autocrat decides to purge a proportion κ^d of agents with observed collusion decisions $d \in \{0, 1\}$, a proportion κ^F of agents who failed their projects, and κ^S of agents who succeeded in their projects. The overall breadth of purge is denoted as κ. Purging is costly, and it is captured in the cost function $C(\kappa)$ with $C(0) = 0$, $\frac{dC(\kappa)}{d\kappa} = C_1\kappa$, and $C_1 > 0$. When an agent is purged, he is replaced by a new agent drawn from a replacement pool, where the proportion of honest replacements is r (this could

[2]This assumption comes from previous literature including Wang, Lützenrath, and Wolton (2022), and is motivated by the fact that even in the most venal of regimes, there remains a non-negligible part of officials who are not corrupt. An alternative justification is that "not colluding" in our model may be interpreted in the real world as merely colluding less, or not seizing every single opportunity to huddle and collude with colleagues and superiors, whereas the choice of "colluding" may be interpreted as doing those activities more frequently and/or more proactively. In any case, what matters is the relative difference between the two choices, not their names.

[3]Specifically, $\beta > \frac{v(S,c)^2+v(S,c)-1+\sqrt{(1-v(S,c)-v(S,c)^2)^2+v(S,c)^2(2v(S,h)+v(S,h)^2-2v(S,c)-v(S,c)^2)}}{v(S,c)^2}$.

be either equal to or greater than λ).

When an agent survives a period (denoted as $k^i = 0$), he gets payoff $v(S, \tau)$ from a successful project. The payoff from a failed project $v(F, \tau)$ is normalized to 0. We assume that $v(S, h) > v(S, c)$: honest agents gain more from succeeding in the project than corrupt agents.[4] This makes substantive sense because corrupt agents tend to be less congruent with the regime, which gives an incentive for the autocrat to identify and purge corrupt agents: after all, corruption must be bad for some outcome for the autocrat to want to purge corrupt officials in the first place. In the particular context of the model, note that agents are free to do whatever they want in the second (and last) period (the use of a two-period model instead of an infinite-period one is justified shortly afterwards). First-order condition of equation (4) shows that corrupt agents will exert less effort, and succeed less, than honest ones in period 2. Therefore, the autocrat would like to have as few corrupt agents as possible in period 2, giving her an incentive to purge corrupt agents in period 1. Notice that, if the autocrat detects that an agent is colluding, she knows for sure that this agent is corrupt.

When an agent is purged ($k^i = 1$), he suffers a direct loss L from being purged, and he does not survive into period 2. L is another parameter of interest that we care about in the following analysis; we refer to it as the "intensity of punishment" of the purge. The discount factor is treated as 1. In period 1, the payoff of an agent assumes the following form:

$$u_1^i(e_1^i, d_1^i, \tau) = (1 - k^i)(v(\omega_1^i, \tau)) - k^i L - \frac{(e_1^i)^2}{2} \tag{1}$$

In period 2, there is no subsequent purge, and agent i's payoff is given by:

$$u_2^i(e_2^i, d_2^i, \tau) = v(\omega_2^i, \tau) - \frac{(e_2^i)^2}{2} \tag{2}$$

[4]Alternatively, the two types of agents may differ in terms of the cost of effort or the probability of project success given the same level of effort. It can be shown that our main results stays the same with these alternative definitions.

A remark about the length of the game is in order. We model the purge as a two-period game instead of multiple or infinite periods because no purges last forever: even Stalin's Great Terror had to subside by late 1938, when "[a]t the rate arrests were going, practically all the urban population would have been implicated within a few months" (Conquest 1990). China's government is often said to engage in "campaign-style governance", in which the everyday implementation of a policy can be weak, but for short periods of time the government briefly mobilizes the bureaucracy and increases incentives/punishments so that the policy is implemented more rigorously in a "campaign" mode. These campaigns do not go on indefinitely, since the mobilization of resources is costly and the government has multiple objectives apart from the policy that a campaign is focusing on. In this sense, period 2 in our model can be thought of as "the long run", after the campaign concludes.

The autocrat cares about the success of his subordinates' projects: he gets a payoff of 1 for every successful project. The autocrat's payoff in each of the two periods is given by:

$$u_1^A(\kappa) = \alpha_1^S - C(\kappa) \tag{3}$$

$$u_2^A = \alpha_2^S \tag{4}$$

The timing of the game is as follows:

Period 1:

1. Each agent i observes his type $\tau^i \in \{h, c\}$, and chooses effort $e_1^i \in [0, 1]$ and whether to collude $d_1^i \in \{0, 1\}$.

2. Nature determines the outcome of the projects $\omega_1^i \in \{S, F\}$, which is observed by the autocrat (imperfectly if the agent colludes). He also observes collusion with probability γ. The autocrat then decides to purge a proportion κ^1 of agents who are known to have colluded, κ^0 of agents who are known not to have colluded, κ^S of agents who succeeded in their projects, and κ^F of agents who failed.

3. Purged agents are removed and replaced, and first-period payoffs are realized.

Period 2:

1. Each (new and surviving) agent chooses effort e_2^i and whether to collude d_2^i.

2. Nature determines the outcome of the projects $\omega_2^i \in \{S, F\}$.

3. The game ends, and payoffs are realized.

The solution concept is Perfect Bayesian Equilibrium (PBE).

Whereas the framework of the model is based on and justified in Wang, Lützenrath, and Wolton (2022), the modelling of collusion is novel. Here, we stipulate that the benefit of collusion is that it can mask agents' failures as successes. Collusion is stylized as an activity that helps corrupt agents to improve their chance of survival through behind-the scene machinations, such as violating regulations together with colleagues or carrying out influence activities towards superiors. They have a chance of getting their way even inside a highly disciplined organization such as the Chinese Communist Party. In fact, even the most personalist of dictators such as Mao would fail to fully enforce his will when he tried to take on the entire bureaucracy (Yang 2021). Therefore, our modelling of collusion, though highly stylized and simplified, still captures crucial features of collusion activities in Chinese political life.

Two parameters are of interest regarding the intensity of the anti-corruption campaign: the detection capacity γ, and the intensity of punishment L. An escalation of the campaign could be manifested in either an increase in γ or an increase in L. The increase in these two parameters elicits very different responses from agents. First consider an increase in γ. This results in nothing but an increase in the cost of collusion, as denoted by the $-\gamma L$ term in a corrupt agent's utility function. Nothing else is changed by the increase in γ. In this case, we can rely on the simple intuition that when something becomes more costly, people do less of it. Collusion, therefore, tend to decline when authorities are more effective at uncovering

it, that is to say, when γ increases.

However, when L increases, the effect is more nuanced. On the one hand, this also increases the cost of collusion, raising L in the $-\gamma L$ disutility term. But it has another, more indirect, effect as well: it increases the cost of being purged due to a failed project. The cost is not a result of colluding. Instead, collusion can actually reduce the risk of failing and, in turn, reduce the risk of being purged due to a failure. The latter effect tend to increase collusion. Therefore, the effect on collusion of an increase in L is subtle. In fact, when γ is low, the latter effect dominates: an increase in L can lead to more collusion.

The discussion above are collected in the following propositions:

Proposition 1. *There exists $\gamma_1 \in (0,1)$ such that:*

1. *No corrupt agent colludes in equilibrium if $\gamma \geq \gamma_1$;*
2. *An equilibrium where all corrupt agents collude exists if $\gamma < \gamma_1$.*

Proposition 2. *There exists $\gamma_2 \in (0,1)$ and $\underline{L} > 0$ such that if $\gamma \leq \gamma_2$:*

1. *There is an equilibrium where all corrupt agents collude if $L \geq \underline{L}$;*
2. *There is a mixed-strategy equilibrium where only some corrupt agents collude if $L < \underline{L}$.*

Proof. All proofs are in Appendix A. □

The propositions show that in a low γ environment, when L increases, it is possible for agents to go from an equilibrium where only some corrupt agents collude to an equilibrium where all corrupt agents collude. It is worth stressing that this is a highly stylized setting that is open to realistic interpretations. For example, to accommodate the fact that people did collude before the anti-corruption campaign, the choice of "not colluding" in our model could be interpreted as colluding little, or, in the context of Chinese politics discussed below, attending alcohol banquets unenthusiastically and drinking little, whereas the choice of "colluding" can be interpreted as going to more alcohol banquets and drinking more heavily there. The key

is that it is possible for collusion to *increase* as a result of a purge in this model. In the real world, of course, an anti-corruption campaign may result in an increase of both γ and L. But notice that it is generally easier to ramp up punishment than to increase detection of collusion, since collusion is largely a clandestine activity whose nature means that it is hard to detect in the first place, and even harder to increase detection. The level of punishment, on the other hand, is a stipulation that could be changed by the autocrat at will. Therefore, anti-corruption campaigns are likely to translate into a modest increase in γ (if at all) and a big increase in L, which leaves a fair chance that γ stays below γ_2 but L increases from below $\underline{L}$ to above. What matters here is that the above analysis shows a mechanism in which an anti-corruption campaign could result in an increase in collusion in the real world.

Why is this happening? L can be interpreted as the "stakes" in the game. When L is high, the stakes of survival is high, and being purged incurs a catastrophic loss. Corrupt agents, then, have an incentive to employ whatever informal means at his disposal in order to minimize the risk of failure. In our model, these "informal means" is stylized as choosing to collude. In contrast, when L is low, the stakes of survival is low, and corrupt agents have less of an incentive to mask their failures as successes by colluding. In fact, colluding might make the corrupt agent appear too conspicuous. Since standing out can be dangerous, corrupt agents cut back their collusion, resulting in a mixed strategy equilibrium. Zhou (2022) provides an organizational perspective for this: collusion is rampant within China's local governments, where local officials and agencies collude to withstand inspections from higher levels of government. The higher levels, knowing that collusion is taking place, attempt to crack down on it by ramping up pressure. But the higher the pressure from above, the more uncertainty lower-level agents face. Then, they have more incentive to rely on personal connections and networks instead of institutions, resulting in *more* collusion. In short, cracking down on collusion by increasing punishment can backfire. Our paper provides formal and empirical evidence for this in the context of drinking in Chinese politics, which is an activity of a similar nature.

III. Policy Background

In the following, we present a case study of a backfiring crackdown on collusion: Xi Jinping's anti-corruption campaign in China. We show that Xi's crackdown increased the alcohol consumption, which is a proxy for collusion activities, of public sector employees reltaive to private sector employees. In this section, we first introduce background information on the drinking culture of the Chinese state as well as China's anti-corruption campaign.

The drinking culture in China

Drinking is an important pillar of the culture of Chinese officialdom. The alcohol banquet culture, ("*jiuzhuo wenhua*" in Chinese), is woven into the fabric of everyday social life (Oxfeld 2019). It is long known that alcohol banquets can be a form of corruption in China. To put it more precisely, these alcohol banquets serve the following three purposes: as a form of extravagance, as a way of greasing the wheels of power, and as a reinforcement of hierarchical power and control.

First, alcohol banquets themselves are a form of extravagance, financed by (often corruptly obtained) public funds. These are lavish banquets fuelled by high-end liquor and luxury dishes, costing thousands or even tens of thousands of dollars per dinner. The banquets are held for celebrations, hosting distinguished visitors, impress others via a class distinction, or just for the participants to indulge themselves. It was revealed in 2009 that up to 500 billion *yuan* ($73 billion) of public money was spent on such banquets per year, accounting for as much as one third of China's consumer spending on dining out (Cui 2009).

Second, alcohol greases the wheels of power, making it easier to form bonds and build trust among participants of the banquet. It is well known that one of the guiding principles in Chinese society is *guanxi*, an individual's informal social networks, relationships, and personal connections (Yang 1994; Chen, Chen, and Huang 2013). A personal bond is often required before any transactions are realized or any formal relationships are formed, espe-

cially in the public sector (Osburg 2013; Steinmüller 2013). Here, banquets are often held as a platform to establish or deepen *guanxi*, where drinking much is a symbol of taking one's counterpart seriously and willing to deepen the relationship. These alcohol banquets are a vehicle for colluding with each other, cultivating connections, and negotiating back-channel deals, especially those that are illegal or at least frowned upon.

Third, drinking is also a way to cement hierarchical power and control. People routinely give banquets and invite superiors or local officials in order to curry favor (Oxfeld 2017). Besides, a lot of banquets involving superiors and their subordinates have no particular agenda. In such occasions, there is an elaborate set of rules of etiquette governing seating arrangements, the order of toasting, and what to say at a toast (Cooper 1986; Mason 2013; Mao, Tian, and Wang 2021). Junior participants are sometimes supposed to "block" incoming toasts for their superiors ("dangjiu") and drink in their stead. Alcohol banquets, therefore, are a vehicle for the exercise of power according to seniority, age, or gender.

China's anti-corruption campaign

Xi Jinping, China's president, launched the anti-corruption campaign when he came into power in late 2012. Whereas China has had brief periods of anti-corruption drives before, the current campaign has lasted more than a decade and is still ongoing, making it the "most ferocious and sustained" anti-corruption campaign in the history of modern China (Pei 2018). China's anti-corruption campaign is a mass purge in nature, reaching right down to the lowest ladder of the bureaucratic hierarchy. As of April 2022, a total of 4.39 million public sector employees has been punished under the campaign, including 61 members of the Communist Party's powerful central committee.[5] The scope of the campaign is encompassing, with crackdowns not only on graft, but also on extravagance, extramarital affairs, political factionalism, and other behaviors deemed incongruent with the regime. Therefore,

[5]Detailed data on the number of people punished is available here (in Chinese).

what is commonly called "the anti-corruption campaign" may be better understood as an umbrella term for a crackdown on all kinds of violations of party discipline. The Central Commission for Discipline Inspection (CCDI), the party's top enforcement body, has been given unprecedented powers to keep tabs on, and investigate, every aspect of public sector employees' life. The overwhelming focus of the campaign is on the public sector, though some in the private sector have been jailed for giving large amounts of bribes.

As such, alcohol banquets became a focus of the anti-corruption campaign at the very start. In December 2022, weeks after Xi came to power, the party issued the "eight-point regulations" (*baxiang guiding*), cracking down on extravagance in officialdom. As of October 2022, a decade after the start of the campaign, more than 1 million people have been disciplined according to the eight-point regulations. Specifically, with regard to alcohol, China's military also issued an "alcohol ban" shortly thereafter. Many local governments have issued regulations banning alcohol during official activities. But it appears that drinking in the public sector remained a persistent problem for the party even after years of enforcement. As late as April 2023, the CCDI still had to make an example of 6 high-level officials in the western Qinghai province who drank seven bottles of liquor in a banquet, one of whom later died of alcohol overdose.

IV. Data

We use data from the China Health and Nutrition Survey (CHNS), a longitudinal survey of Chinese households designed to examine the effect of health policies and investigate how socioeconomic changes affect the health and nutrition status of the country's population. The survey spans 7,200 households with more than 30,000 individuals in 15 provinces, which is around half of China's provinces. The places covered includes the capital Beijing, rich provinces such as Jiangsu, and poor and far-flung provinces such as Heilongjiang and Guizhou, so it is a resonably representative sample of the Chinese population. The survey

is conducted in waves, with an interval of 2-4 years between two consecutive waves. For our purposes, we use data from 4 consecutive waves in 2006, 2009, 2011 and 2015, with the 2015 wave being after the start of the anti-corruption campaign. Therefore, treatment is working in the public sector in 2015. The survey asks about respondents' demographics, jobs, income, healthcare, physical activity, food and nutrition.

To distinguish between public and private sector employees, we utilize a survey question asking the type of employer from one's primary occupation. We define government, state services and institutes ("*shiye danwei*"), state-owned enterprises (SOE), and collective-owned enterprise as the public sector, and the rest as the private sector.

For alcohol consumption, the survey asks how much of *baijiu* (a Chinese liquor), wine, and how many bottles of beer the respondent drinks each week. This can be combined into a composite index of alcohol consumption, measured in grams of alcohol[6]. The survey also asks for the frequency of drinking through a multiple-choice question. We convert this into a dummy variable for whether the respondent drinks ≥ 3 times per week. Table 1 presents the summary statistics of key variables, both of the whole sample and of the public and private sector subsamples.

There could be concerns about whether respondents have an incentive to truthfully report their drinking behavior, especially in light of the ongoing anti-corruption campaign. There are several reasons why this is unlikely to be a major concern. First, the survey aims for a representative sample of the population, not specifically targeting public sector employees. Second, the survey is intended to gather information on the health status of the population, and drinking is a natural part of health status, which is unlikely to arouse suspicion from public sector employees. Third, if anything, public sector employees would have an incentive to *underreport* their drinking for fear to be investigated, which further corroborates our

[6]To construct this variable, we use the typical ABV of the three different types of drinks: 53% for *baijiu*, 10% for wine, and 4% for beer.

Table 1: Summary statistics

Variable	Full Sample		Public		Private	
	mean	std	mean	std	mean	std
public sector	0.197	0.398				
alcohol(grams)	214.9	320.1	197.7	298.8	219.1	325
baijiu(grams)	160.1	284.8	131.8	233.9	167	295.5
beer(grams)	49.57	129.7	58.6	133.1	47.35	128.7
wine(grams)	5.249	28.2	7.242	32.02	4.761	27.17
frequency	0.416	0.493	0.342	0.474	0.434	0.496
age	48.66	14.4	43.96	10.03	49.82	15.06
education	8.957	3.907	12.05	3.042	8.201	3.718
urban	0.359	0.48	0.634	0.482	0.292	0.455
income (yuan)	27,073	46,044	37,596	46,588	23,768	45,374
married	0.87	0.337	0.897	0.304	0.863	0.344
divorced	0.014	0.116	0.023	0.15	0.012	0.107
widowed	0.037	0.188	0.008	0.09	0.044	0.204
separated	0.005	0.07	0.002	0.05	0.006	0.074
high bld prsr	0.151	0.599	0.133	0.438	0.155	0.632
diabetes	0.058	0.547	0.051	0.388	0.06	0.58

Note: This table summarizes the main variables used in our estimation within the sample of drinkers. "Public" columns refer to the sumsample of public sector employees, and "Private" refers to private sector employees. Some variables have lower number of observations due to nonresponse to certain survey questions.

findings because the real effect could only be even higher.

V. Results

V.1 Main results

For our baseline estimation, we use a simple difference-in-difference equation:

$$Y_{it} = \alpha + \beta Treatment_{it} + X_{it}\gamma + u_i + v_t + \epsilon_{it} \tag{5}$$

Where Y_{it} is the outcome variable, $Treatment_{it}$ is a dummy variable that equals to 1 if the person is a public sector employee in 2015, i.e. after the start of the anti-corruption campaign. X_{it} is a set of controls, including age, education, and marital status. u_i and v_t are individual and year fixed effects, respectively, and ϵ_{it} is the error term. Standard errors are clustered at the individual level.

Results of the estimation of this equation is presented in Table 2, where the outcome variable is different measures of alcohol consumption. Columns (1)-(2) shows a clear increase of nearly 40 grams in the overall alcohol consumption of public sector employees as a result of the anti-corruption campaign, which is significant at the 5% level with controls. This translates into a relative increase of 19%. The effect on the drinking frequency of public sector employees, on the other hand, is negative but not at all significant: the campaign had little effect on whether public sector employees drink more than twice a week. Li, Pan, and Xu (2024), instead, finds a significant negative effect on the frequency of drinking. Whereas their coefficients on frequency is statistically more significant, they are similar in magnitude to our coefficients in Columns (3)-(4). This suggest that the difference most likely stems from different sources of data. But the failure to find an increasing drinking frequency actually does not undermine our central message. This could be interpreted in our theoretical model as an attempt of public sector employees to reduce γ, the probability that drinking is detected, since drinking more alcohol is not necessarily more visible if people are not going to parties or alcohol banquets more often. As a result of the anti-corruption campaign, public sector employees are drinking more, but are not drinking more often. This suggests that the increase in drinking is in the intensive margin.

Since the alcohol consumption variable is just a linear combination of the consumption of three different types of alcoholic drinks, the natural next step is to investigate the potentially different effect of the anti-corruption campaign on those alcoholic drinks. The differing effects on those drinks also constitute strong evidence that the rise of drinking is driven

Table 2: Main results

	(1) Alcohol	(2) Alcohol	(3) Frequency	(4) Frequency	(5) *Baijiu*	(6) Beer	(7) Wine
Treatment	37.372	39.297	-0.022	-0.019	37.605	1.368	-1.600
	(19.723)	(19.813)	(0.027)	(0.027)	(14.457)	(11.842)	(1.863)
Controls	No	Yes	No	Yes	No	No	No
Observations	9,754	9,735	9,543	9,526	9,754	9,754	9,754
R^2	0.545	0.546	0.623	0.624	0.586	0.435	0.590
Control mean	197.49	197.61	0.426	0.426	122.89	69.369	5.236

Note: This table present the baseline results of the estimation of Equation (5). Columns (1)-(2) uses overall alcohol consumption as dependent variable, columns (3)-(4) uses a dummy for whether the person drinks ≥ 3 time a week, and columns (5)-(7) uses the consumption of three different alcoholic drinks. Control variables include age, education, and marital status. Standard errors in parenthesis.

by the political mechanisms outlined in our theoretical analysis. Since Chinese politics is notoriously opaque, we do not attempt to determine parameter values in China's political setting or to estimate the model structurally. What we show below is suggestive evidence that politics was behind the rise in drinking following the anti-corruption campaign.

We first utilize the fact that different types of alcoholic drinks have differing political importance in China. The most prominent drink in the Chinese officialdom is *baijiu* (literally "white liquor"), a colorless Chinese liquor typically coming in around 50% ABV. *Baijiu* is the designated drink when people cultivate political or otherwise state-related connections in China, to such an extent that Kweichou Moutai, maker of the quintessential brand of *baijiu*, is the most valuable Chinese firm by market capitalisation, with a valuation of $292 billion as of early January 2024, comfortably beating big tech, banking and fossil fuel firms in China by a large margin. Liquor produced by Moutai has long been held in special regard in the history of Communist China: when Richard Nixon visited China in 1972, he was toasted with Moutai. Today, the official retail price most famous variety of Moutai is 1,499 yuan ($210) per bottle. Even so, persistently high demand means that the market price is often at least twice higher. Beer is also occasionally drank in officialdom if participants' health or the need for sobriety dictates. But it is considered too light, and those who choose beer over

baijiu at a banquet might be frowned upon as not being sincere enough. The modern wine is considered a Western import, and is even less consumed during banquets in the public sector.

To summarize, *baijiu* has overwhelming political importance in China's public sector. The CHNS survey asks how much *baijiu*, beer and wine respondents drink each week, which we use to investigate the effect of the anti-corruption campaign on those three types of drinks. Columns (5)-(7) of Table 2 shows the results when we estimate Equation (5) replacing the dependent variable with grams of *baijiu*, beer, and wine respectively, instead of merging them into a single composite index of alcohol consumption. The results suggest that the increase in overall consumption, as shown in column (1), is almost entirely driven by *baijiu* (Column 5): the coefficient on *baijiu* is positive, strong, and significant at the 1% level, and its magnitude is nearly equal to the coefficient on overall alcohol consumption in column (1). The increase of 37 grams of *baijiu* consumption is equivalent to a relative increase of 31%. The effect on beer or wine, on the other hand, is negligible and not at all significant. We also bundle beer and wine consumption together into a variable for "drinks other than *baijiu*", and the test that the effect on *baijiu* and other drinks are equal can be rejected at the 1% level. The single most political important drink happens to be responsible for the entire increase in drinking following the anti-corruption campaign, corroborating our previous analysis that the crackdown on drinking backfired through political channels. Since we have shown that *baijiu* is the driving force of the increase in alcohol consumption, in the following sections we use the consumption of *baijiu* as the dependent variable.

V.2 Parallel trends assumption

For the difference-in-differences methodology to be valid, a crucial assumption is needed that the trends in alcohol consumption of public and private sector employees are parallel absent treatment. To test the validity of the parallel trends assumption, we perform an event study, whose results are shown graphically in Figure 1. The coefficients for the time periods before

the anti-corruption campaign is smaller in magnitude and statistically indistinguishable from zero, whereas the coefficient for 2015, the period after the campaign, is larger and also statistically significant. These results show that there is no differing pretrends between public and private sector employees, suggesting that the parallel trends assumption holds in our analysis.

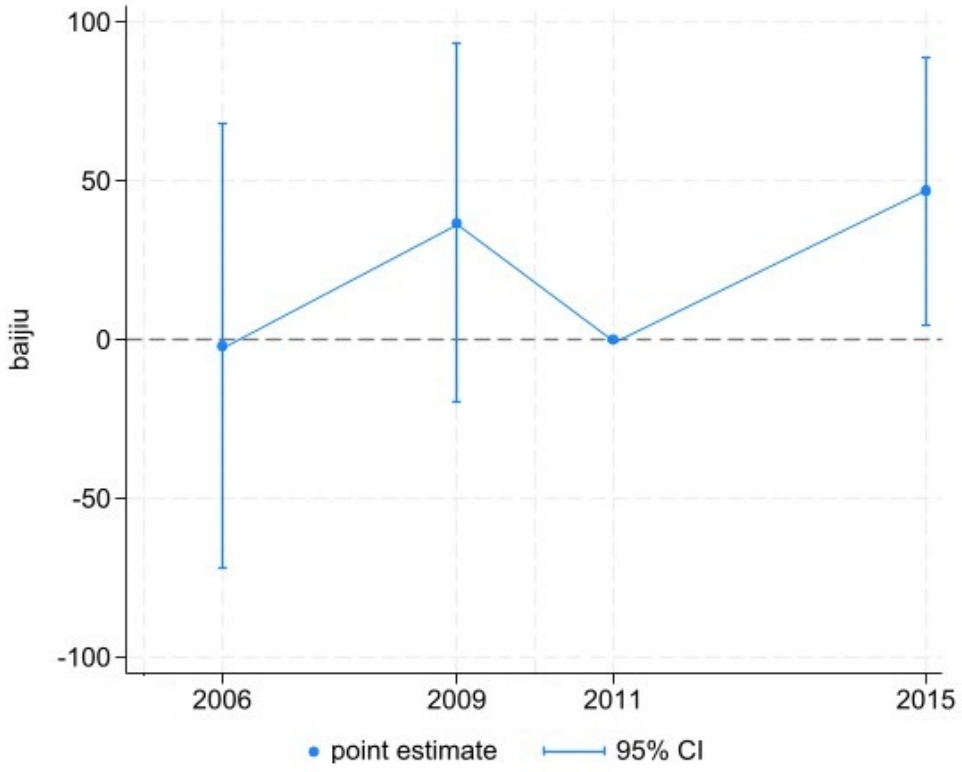


Figure 1: The effect of the anti-corruption campaign on *baijiu* consumption

V.3 Heterogeneous exposure to the political mechanism

We now explore the effect on alcohol consumption of different subgroups of the population, according to their exposure to the anti-corruption campaign and the political mechanisms governing alcohol consumption that we discussed in section III.

Recall that public sector employees drink more despite (or, rather, because of) the anti-corruption campaign because, when the regime cracks down on corruption through authori-

tarian purges, it creates the paradoxical effect that drinking is increasingly needed to curry favors and cultivate connections that are crucial to survival or promotion. As a result, drinking becomes endogenously more beneficial. This gives rise to the following predictions. First, employees in junior positions in the public sector have more incentive to increase drinking than senior employees, because juniors employees face more pressure of evaluation and/or promotion. Second, male employees are more likely to increase drinking than female employees. China's political and bureaucratic system is male-dominated, where female representation decreases as they climb the ladder of bureaucratic hierarchy (Janik, Morgret, and Blaugher 2023). Women represent close to 50% of China's population, 42.5% of civil servants, 30% of Communist Party members, 9% of its Central Committee members, and 0% of Politburo members. Therefore, we expect male employees to be predominately active in promotion and survival in China's public sector, and thus to be the main drivers of within-government collusion. Third, urban residents in the public sector are more likely to increase drinking than rural residents, because most government departments and SOEs, as well as the bulk of political and economic activities, are seated in urban areas. Zhou (2012), among other scholars, has noted that China's rural local government has been in a "floating" state since agricultural taxes were abolished in 2006: meaningful fiscal revenue and authority, and indeed much of government activity, has shifted away from village governments to upper-level county governments. Village administration, as a result, has become much "detached" from local residents. This, and many more such examples, suggest that collusion within government happens predominantly in urban areas.

We have straightforward data from the CHNS survey for gender and place of residence. For seniority, the survey asks respondents for their primary occupation, with 13 choices. These can be divided into subsamples of junior and senior positions. For example, "senior professional/technical worker" and "administrator/executive/manager" count as senior positions, whereas "junior professional/technical worker" and "office staff" count as junior positions.

Table 3 presents the results of estimation using these different subsamples. In columns (1)-(2), we focus on senior employees versus junior employees. The results suggest that the anti-corruption campaign has a positive and large effect on the drinking of junior employees significant at the 10% level, but not for senior ones. A test between the two coefficients can reject with 1% significance that they are equal. Columns (3)-(4) divides the survey sample according to gender. The anti-corruption campaign has a significant positive effect on the drinking of male public sector employees, but the effect is muted for female workers. We can reject that the two coefficients are equal with 10% significance. Columns (5)-(6) shows that urban workers in the public sector are greatly affected. The coefficient for rural workers is nontrivial, but not significant at the 10% level. A test cannot reject that the two are equal, but this constitutes at least suggestive evidence of urban-rural difference. These results confirm our predictions from the political mechanism above, that the increase in drinking is driven by those who have more incentive to drink to curry favors and manage connections under an anti-corruption purge.

Table 3: Heterogeneous exposure to political mechanism

baijiu	(1) Senior	(2) Junior	(3) Female	(4) Male	(5) Rural	(6) Urban
Treatment	-9.605	48.598	-3.308	37.582	25.583	43.220
	(34.350)	(27.130)	(23.098)	(15.559)	(20.213)	(19.770)
Observations	1,011	4,386	757	9,052	6,175	3,634
R^2	0.663	0.603	0.597	0.581	0.574	0.602
Control mean	101.3	127.94	42.407	166.79	146.93	80.259

Note: This table present the estimation of Equation (5) using different subsamples. Columns (1)-(2) uses the subsamples of senior and junior employees, respectively. Senior employees are defined as "senior professional/technical worker", "administrator/executive/manager", "skilled worker", and "army officer/police officer", with the rest classified as junior workers. Columns (3)-(4) uses the subsamples of female and male workers, respectively. Columns (5)-(6) uses the subsamples of rural and urban residents, respectively. Standard errors in parenthesis.

V.4 Alternative explanations

We have shown above that drinking in the public sector increased due to the anti-corruption campaign. Does the same pattern hold for the consumption of goods of a similar nature? It turns out that this is not the case. Concurrently with the anti-corruption campaign, the Communist Party issued directives that crack down on smoking in the public sector. One such directive published in December 2013 prohibited officials from smoking in public places and banned smoking in government buildings and during official activities. The CHNS survey asks respondents whether they smoke and how many cigarettes they smoke per day. Columns (1)-(2) of Table 4 presents the results for smoking: there is suggestive evidence that the anti-smoking campaign led some public sector employees to quit smoking, which is significant at the 10% level, though for smokers the number of cigarettes smoked per day did not change. As for the consumption of luxury goods, evidence from Qian and Wen (2015) shows a 55% decrease in the import of conspicuous luxury goods following the anti-corruption campaign. These results conform with the more general impression that when the Communist Party cracks down on something, people do less of it, which stands in stark contrast to the rise in alcohol consumption of public sector employees following the anti-corruption campaign.

This suggests that drinking is indeed special. It strongly indicate that the relative increase of alcohol consumption in the public sector is motivated by politics. In the following, we discuss several alternative explanations for the increase in drinking in the public sector. First is stress and mental health. It could be that public sector employees drink more because the anti-corruption campaign has made them more stressful, more worried, and less mentally healthy in general, because they're now under a greater threat of punishment or purge[7]. Evidence against this explanation could be found in Columns (1)-(2) of Table 4: if declining mental health was the driver for more alcohol consumption, public sector employees would

[7]There are signs that life in the Chinese public sector became less bearable in recent years. See here for a typical news coverage.

have also smoked more. But that is not what happened. Moreover, the CHNS survey asks directly about respondents' state of mental health and view of life. The effect of the anti-corruption campaign on these measures is shown in columns (3)-(6) of Table 4. Respondents are asked, on a scale of 1-5 where 5 is the best, how they rate their quality of life at present (Column 3), and whether they agree with the following statements: "I have as much energy as I had in the last year"(Column 4), "I am as happy now as I was younger"(Column 5), and "As I get older, things are better than I thought they would be"(Column 6).[8] The results confirm that decreased mental health is not what drives the increase in drinking. If anything, the mental health of public sector employees improved. This rules out the conjecture that public sector employees are drinking more due to increased stress from the purge.

Table 4: Alternative explanations

	Smoking		Mental health				Physical health	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Smoking	# of cigarettes	Life quality	Energy	Happiness	Optimism	High bld prsr	Diabetes
Treatment	-0.057	-0.171	0.158	0.115	0.153	0.211	-0.007	-0.009
	(0.035)	(0.673)	(0.051)	(0.077)	(0.077)	(0.079)	(0.032)	(0.029)
Observations	9,735	5,862	7,667	5,109	5,096	5,058	9,754	9,754
R^2	0.679	0.701	0.580	0.483	0.476	0.528	0.487	0.441
Control mean	0.267	13.643	3.709	3.123	3.165	3.282	0.181	0.08

Note: This table present the results for alternative explanations of the increase in alcohol consumption following the anti-corruption campaign. Columns (1)-(2) estimates the effect on smoking. Columns (3)-(6) estimates the effect on mental health and view of life. Columns (7)-(8) estimates the effect on physical health. "High bld prsr" stands for high blood pressure. All estimates in this table are without covariates. Standard errors in parenthesis.

Another alternative explanation concerns physical health. It could be that public sector employees used to be too physically unhealthy to indulge in heavy drinking. Since the anti-corruption campaign, their health has somehow improved and could afford to drink more. Columns (7)-(8) of Table 4 shows the effect of the anti-corruption campaign on public sector employees' incidences of high blood pressure and diabetes. The campaign had no significant

[8]Running OLS on ordinal outcome variables is not ideal, but otherwise more solid methods such as maximum likelihood brings additional complications when fixed effects need to be incorporate. So, in Table 4 we use those ordinal variables in the simple difference-in-difference specification. This is common in the literature, see e.g. Martinez-Bravo et al. (2022).

effect on these health measures: although the coefficients on incidences of high blood pressure and diabetes are slightly negative, they are not statistically significant at all.

There might also be concerns that the effect is driven by the price of *baijiu* , which would affect its demand in different time periods. Indeed, the price of *baijiu* is volatile, with large increases in 2008-12 and large decreases in 2012-15, for example. However, a price decrease would likely result in an across-the-board increase in alcohol consumption, regardless of whether consumers are in the public or the private sector. And even if prices affect the public and private sector differently, Figure 1 shows that there were no differing trends in *baijiu* consumption in the period before the campaign, when *baijiu* prices were just as volatile.

V.5 Robustness checks

In this section, we perform a series of robustness checks for the main result about the effect of the anti-corruption campaign on the consumption of *baijiu*.

First, we look at whether survey attrition is an issue. Column (1) of Table 5 performs a simple OLS regression of a dummy variable for whether the person responded to the survey in 2015 on a dummy for working in the public sector, as well as a set of controls. The resulting coefficient is small but significant at the 5% level. Since around one-third of both public and private sector employees did not respond in 2015, which is typical of such kind of surveys, the relatively small magnitude (0.048) on the public sector dummy means that attrition is unlikely to be an issue. To further alleviate concerns regarding survey attrition, we notice in Column (2) that the attrition problem is considerably attenuated if we drop all observations from Henan, a province in central China which accounts for less than one-tenth of our total sample size. Without Henan province, the OLS coefficient on the attrition dummy is much smaller, and is not significant at the 10% level. We then estimate the effect of the anti-corruption campaign on the *baijiu* consumption of people outside of Henan province. The result, as is shown in Column (3), is very similar to our baseline results in Table 2. This

provides further evidence that survey attrition is not a concern.

We then investigate whether the anti-corruption campaign results in selection into or out of the public sector. The political science literature, most notably Jiang, Shao, and Zhang (2022), offers some evidence that the anti-corruption campaign has changed who becomes a civil servant. They find that the anti-corruption campaign has lowered the average ability of new bureaucrats, and "discourages the entry of lower-class individuals in favor of those who are affluent and well-connected". We test whether selection bias is an issue in our results. In column (4) of Table 5, we estimate the effect of the anti-corruption campaign on *baijiu* for the subsample that did not switch into or out of the public sector throughout 2011-15. The result, although somewhat smaller than our baseline result in column (5) of Table 2, is still meaningfully large and significant at the 5% level. In Column (5) of Table 5, we define an alternative measure of treatment that deals with the selection problem: an observation is treated if (i) the year is 2015, and (ii) the person had been working in the public sector in 2011. The resulting coefficient is smaller than Column (4) while still significant at the 5% level. In column (6) , we define an alternative measure of treatment such that an observation is treated if (i) the year is 2015, and (ii) the person had been working in the public sector in both 2011 and 2015. The resulting coefficient becomes yet a bit smaller, and is significant at the 10% level. This suggests that selection may be biasing our estimates somewhat upwards, but our key result is not considerably affected.

Table 6 shows the results of additional robustness checks, which we discuss below. First, we address the issue that some control variables, especially education, may be endogenous to the anti-corruption campaign. Since education may affect drinking behavior, its endogeneity might be of concern. But it is highly unlikely that education is endogenous in our setting, because the anti-corruption campaign started at the end of 2012. Even if someone immediately decides to obtain more education as a result of the campaign, he would have to apply for admission to any education program in Fall 2013, and enroll in the program in

Table 5: Robuestness checks: attrition and selection

	Attrition			Selection		
	(1) attrition	(2) attrition w/o Henan	(3) *baijiu* w/o Henan	(4) sample w/o selection	(5) alt. treatment	(6) alt. treatment
Coefficient	0.048	0.023	41.427	29.734	28.579	27.461
	(0.016)	(0.016)	(14.762)	(14.982)	(14.101)	(14.977)
Observations	4,429	4,049	8,795	8,948	9,809	9,735
R-squared	0.018	0.015	0.588	0.588	0.585	0.587

Note: This table present the results for additional robustness checks. Column (1) estimates a simple OLS regression of attrition on a public sector dummy and control variables including age, education, and marital status. Column (2) estimates the same regression of attrition using the subsample without observations in Henan province. Column (3) estimates the effect of anti-corruption campaign on *baijiu* consumption using the subsample without Henan province. Column (4) estimates the effect on *baijiu* using the subsample that did not select into or out of the public sector during 2011-15. Column (5) estimates the effect using an alternative definition of treatment as (i) being in the year 2015 and (ii) had been working in the public sector in the year 2011. Column (6) estimates the effect using an alternative definition of treatment as (i) being in the year 2015 and (ii) had been working in the public sector in both 2011 and 2015. Standard errors in parenthesis.

Fall 2014. By the time the next wave of the survey is conducted in early 2015, he would not have had enough time to accrue 1 year of additional education. In columns (1)-(3) in Table 6, we run the difference-in-difference regression using education as the outcome variable. Column (1) uses the same definition of treatment as in our main results tables. It might seem that the anti-corruption campaign had resulted in an increase of 0.25 years of education for public sector employees, but columns (2)-(3) uses 2011 and 2009 respectively as "treatment" cutoff instead of 2015, and the coefficients are also significant, which suggests that the positive change in public sector employees' education is not solely the result of the anti-corruption campaign. What's more, the relative magnitude of the coefficients is roughly in proportion with the length of the interval between waves: the effect of being in the public sector on education has consistently been around 0.05-0.07 additional years of education per year since 2006. Therefore, it is not the anti-corruption campaign that has changed public sector employees' educational attainment, and we have reasonable confidence that education is exogenous to the campaign.[9]

[9]It could be that a higher degree is conducive to evaluation and promotion within the Chinese civil service and state-owned enterprises. In response, public sector employees obtain part-time or self-study degrees in higher education.

In columns (4)-(5), we run the regression on *baijiu* consumption with standard errors clustered at the household and county level respectively, in order to account for potential correlation of *baijiu* consumption within a household or a county. The standard errors, as expected, increases with the level of cluster, but the coefficient is still significant at the 5% level when clustered at the household, and significant at the 10% level when clustered at the county level. Column (6) controls for county-year fixed effects, and the result is still large and significant. Column (7) constructs an alternative measure of drinking frequency, which exploit the fact that the survey question about frequency is a multiple-choice question. Instead of drinking ≥ 3 times a week, we now look at the effect on whether people drink $\geq$ once a week. The result is again negative but insignificant, suggesting that there is no heterogeneous change in drinking frequency. Column (8) estimates the effect on *baijiu* consumption, using a "placebo" treatment with cutoff at 2011, instead of 2015. The result is much smaller and insignificant.

Table 6: Additional robustness checks

	Exogeneity of education			SD clustered at		Other checks		
	(1) education, 2015	(2) education, 2011	(3) education, 2009	(4) Household	(5) County	(6) County-year FE	(7) Alt. frequency	(8) Placebo cutoff
Coefficient	0.245	0.158	0.157	36.676	36.676	17.785	-0.022	12.342
	(0.106)	(0.087)	(0.079)	(18.610)	(20.196)	(10.605)	(0.027)	(12.097)
Observations	7,297	7,297	7,297	9,788	9,788	14,461	9,543	9,809
R-squared	0.906	0.906	0.906	0.586	0.586	0.114	0.623	0.585

Note: Columns (1)-(3) runs regression with equation (5) using education as outcome variable, using 2015, 2011, 2009 as cutoff for treatment respectively. Columns (4)-(5) clusters standard errors at the household and county level, respectively. Column (6) uses county-year fixed effects. Column (7) uses the alternative measurement of drinking frequency, i.e. whether the person drinks $\geq$ once a week. Column (8) uses a placebo treatment of being in the public sector in 2011. Standard errors in parenthesis.

VI. Conclusion

China's anti-corruption campaign has been the subject of much debate. This paper is among the first attempts to quantitatively investigate the unintended consequences of the campaign on individual behavior, specifically on drinking as a way to facilitate collusion and cultivate non-institutional connections. We develop a formal model showing that a crackdown on

collusion may backfire because, in a more violent regime, people increasingly rely on connections to survive. We then present empirical evidence that China's anti-corruption campaign resulted in an increase in the alcohol consumption of public sector employees, which is almost entirely accounted for by the increasing consumption of *baijiu*, the liquor with paramount political importance in China. The effect is concentrated in junior, male, and urban employees, who are more exposed to the political mechanism we propose.

This study has the potential to offer a fresh perspective about corruption and anti-corruption in autocracies. Whereas alcohol banquets are well known in China as a form of corruption, it might well bring us more insight to think of drinking as, first and foremost, an exercise of power: alcohol corrupts, but it is power that makes people drink in the first place. When an intensifying chokehold of power comes concurrently with a crackdown on corruption, the effect of power is likely to dominate. This could have implications for the viability of using mass purges to fight corruption in the long run.

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Appendix A: Proof of Propositions

In the following, we define $V_2(h)$ as the second-period payoff of an honest agent conditional on surviving, and $V_2(c)$ as the equivalent for the corrupt agent. From the first-order conditions of second-period utility functions, we know that an honest agent exert $e_2^i(h) = v(S,h)$ of effort in the second period, and a corrupt agent exerts $e_2^i(c) = v(S,c)$ of effort. Then, we have $V_2(h) = \frac{v(S,h)^2}{2}$, $V_2(c) = \frac{v(S,c)^2}{2}$, and $V_2(h) > V_2(c)$.

Lemma 1. *An honest agent, anticipating probabilities κ^S and κ^F of being purged as a result of success and failure, exerts effort $e_1^i(h) = (1-\kappa^S)v(S,h)+(\kappa^F-\kappa^S)(V_2(h)+L)$. A corrupt agent who does not drink exerts effort $e_1^i(c;0) = (1-\kappa^S)v(S,c) + (\kappa^F-\kappa^S)(V_2(c)+L)$. A corrupt agent who drinks exerts effort $e_1^i(c;1) = (1-\kappa^S)v(S,c)+(1-\beta)(\kappa^F-\kappa^S)(V_2(c)+L)$.*

Proof. The expected payoff, at the start of period 1, of an honest agent is given by:

$$e_1\left(\kappa^S(-L) + (1-\kappa^S)(v(S,h)+V_2(h))\right) + (1-e_1)\left(\kappa^F(-L) + (1-\kappa^F)V_2(h)\right) - \frac{(e_1)^2}{2}$$

Taking the first-order condition with regard to e_1, we have:

$$e_1^i(h) = (1-\kappa^S)v(S,h) + (\kappa^F-\kappa^S)(V_2(h)+L)$$

The effort of a corrupt agent who does not drink is derived similarly. For a corrupt agent who does drink, the expected payoff is:

$$\begin{aligned} &e_1\left(\kappa^S(-L) + (1-\kappa^S)(v(S,c)+V_2(c)\right) + \beta(1-e_1)\left(\kappa^S(-L) + (1-\kappa^S)V_2(c)\right) \\ &+ (1-\beta)(1-e_1)\left(\kappa^F(-L) + (1-\kappa^F)V_2(c)\right) - \frac{(e_1)^2}{2} \end{aligned}$$

Taking first-order condition, we have:

$$e_1^i(c;1) = (1-\kappa^S)v(S,c) + (1-\beta)(\kappa^F - \kappa^S)(V_2(c)+L)$$

□

Lemma 2. *Let $\mu^F(\kappa^F,\kappa^S)$ and $\mu^S(\kappa^F,\kappa^S)$ be the autocrat's posterior belief that an agent is honest after observing failure and success, respectively. When the autocrat expects honest agents to exert effort $e_1^i(h)$ and corrupt ones to exert effort $e_1^i(c;0)$, his posterior is:*

$$\mu^F(\kappa^F,\kappa^S) = \frac{\lambda(1-e_1^i(h))}{\lambda(1-e_1^i(h)) + (1-\lambda)(1-e_1^i(c))}$$
$$\mu^S(\kappa^F,\kappa^S) = \frac{\lambda e_1^i(h)}{\lambda e_1^i(h) + (1-\lambda)e_1^i(c)}$$

Proof. This follows immediately from Bayes' rule. □

Proof of Proposition 1

If $\mu^F = \mu^S$, then we have $\mu^F = \mu^S = \lambda$. The autocrat does not purge anyone, because success and failure cease to be a signal of honesty/corruptness, and purging is costly. But then, absent any purge, corrupt agents would exert less effort (similar to period 2), distinguishing themselves from honest ones. Therefore, it must be that either $\mu^F < \lambda < \mu^S$ or $\mu^S < \lambda < \mu^F$. In the former case, failure is a signal of being corrupt, and the autocrat sets $\kappa^F > 0$ and $\kappa^S = 0$. In the latter case, similarly, the autocrat sets $\kappa^F = 0$ and $\kappa^S > 0$. Notice that if $\mu^S < \mu^F$, success becomes a signal of being corrupt, and the autocrat purges from successes. A corrupt agent has no incentive to further increase his chance of being observed as a success by choosing to drink. So, corrupt agents never drink if $\mu^S < \mu^F$.

We now turn to the case of $\mu^F < \mu^S$. Denote $V(d_1,\gamma)$ as the expected two-period payoff of a corrupt agent when he chooses drinking decision d_1, anticipates that no one else drinks,

and expects equilibrium purging decision κ^F. We have:

$$V(0,\gamma) = e_1(c,0)\left(v(S,c) + V_2(c)\right) + \left(1 - e_1(c,0)\right)\left(\kappa^F(-L) + (1-\kappa^F)V_2(c)\right) - \frac{(e_1(c,0))^2}{2}$$

$$\begin{aligned} V(1,\gamma) = {} & \gamma(-L) + (1-\gamma)(e_1(c,1)\left(v(S,c) + V_2(c)\right) + \beta(1 - e_1(c,1))V_2(c) \\ & + (1-\beta)(1-e_1(c,1))\left(\kappa^F(-L) + (1 - \kappa^F V_2(c))\right)) - \frac{(e_1(c,1))^2}{2} \end{aligned}$$

Since none of the terms on the right-hand side of $V(0,\gamma)$ depends on γ, we have that $V(0,\gamma)$ itself also does not depend on γ. It is clear that the derivative of $V(1,\gamma)$ is negative, i.e. $V(1,\gamma)$ is decreasing with γ. It is also clear that $V(0,1) > V(1,1)$, since $V(1,1)$ is negative. What is left is to compare $V(0,0)$ and $V(1,0)$. To do this, it helps to write out the $e_1(\cdot)$ in their formula, since effort depends on equilibrium purge breadth κ^F:

$$\begin{aligned} V(0,0) = {} & (v(S,c) + \kappa^F(V_2(c) + L))(v(S,c) + V_2(c)) \\ & + (1 - v(S,c) - \kappa^F(V_2(c) + L))(-\kappa^F L + (1-\kappa^F)V_2(c)) \\ & - \frac{(v(S,c) + \kappa^F(V_2(c) + L))^2}{2} \end{aligned}$$

$$\begin{aligned} V(1,0) = {} & (v(S,c) + (1-\beta)\kappa^F(V_2(c) + L))(v(S,c) + V_2(c)) \\ & + (1 - v(S,c) - (1-\beta)\kappa^F(V_2(c) + L))(-(1\beta)\kappa^F L + (1 - (1-\beta)\kappa^F)V_2(c)) \\ & - \frac{(v(S,c) + (1-\beta)\kappa^F(V_2(c) + L))^2}{2} \end{aligned}$$

Inspection of these two formulas tells us that, when we multiply every κ^F in the expression for $V(0,0)$ by $(1-\beta)$, we get $V(1,0)$. The effect of drinking for the $V(\cdot,0)$ expression is as if κ^F were reduced. So, to compare $V(0,0)$ and $V(1,0)$, it suffices to compute the derivative

of $V(\cdot, 0)$ with respect to κ^F:

$$\begin{aligned}
\frac{\partial V(\cdot,0)}{\partial \kappa^F} &= (V_2(c)+L)(v(S,c)+V_2(c)) - (V_2(c)+L)(-\kappa^F L + (1-\kappa^F)V_2(c)) \\
&\quad - (1 - v(S,c) - \kappa^F(V_2(c)+L))(V_2(c)+L) - (v(S,c)+\kappa^F(V_2(c)+L))(V_2(c)+L) \\
&= (v(S,c)+\kappa^F(V_2(c)+L)-1)(V_2(c)+L) \\
&= -(1-e_1(c,\cdot))(V_2(c)+L) \\
&< 0
\end{aligned}$$

Since $\kappa^F > (1-\beta)\kappa^F$, we have $V(0,0) < V(1,0)$. Then, there is a unique γ_1 such that $V(0,\gamma) \geq V(1,\gamma)$ if and only if $\gamma \geq \gamma_1$. This shows that no corrupt agents embezzle in equilibrium if $\gamma \geq \gamma_1$. By contrast, if $\gamma < \gamma_1$, then $V(0,0) < V(1,0)$, and there exists an equilibrium where corrupt agents drink. □

Proof of Proposition 2

First, suppose that the parameters other than γ are such that an equilibrium in which all corrupt agents drink is possible. Similar to the proof of Proposition 1, we define $W(d_1,\gamma)$ as the expected two-period payoff of a corrupt agent when he chooses drinking decision d_1, anticipates that all other corrupt agents drink. Again, we have $W(0,0) < W(1,0)$, $W(0,1) > W(1,1)$, and $W(0,\gamma)$ does not depend on γ, and $W(1,\gamma)$ is decreasing in γ. So, there exists a unique γ_2 such that $W(0,\gamma) \leq W(1,\gamma)$ if $\gamma \leq \gamma_2$, which allows an equilibrium where all corrupt agents drink. (Notice that γ_1 and γ_2 might not be comparable.)

Now, suppose that $\gamma \leq \gamma_2$ as in the previous paragraph. we now show that if $L < \underline{L}$, corrupt agents has a higher probability of success than honest agents when they all drink, thereby ruling out an equilibrium where all corrupt agents drink.

Suppose all agents, like in Proposition 1, are working under the expectation that the autocrat purges from failures: $\kappa^F > 0$ and $\kappa^S = 0$. The probability of success of an honest agent,

herein denoted as $P^S(h)$, is:

$$P^S(h) = v(S,h) + \kappa^F(V_2(h) + L)$$

The probability of success of a drinking corrupt agent, herein denoted as $P^S(c)$, is:

$$P^S(c) = (1-\beta)\left(v(S,c) + (1-\beta)\kappa^F(V_2(c) + L)\right) + \beta$$

Notice that both $P^S(h)$ and $P^S(c)$ are linearly increasing in L.

When $L = 0$, we can show that corrupt agents have a larger probability of success than honest agents if corrupt agents all drink:

$$\begin{aligned}
P^S(c) - P^S(h) &= (1-\beta)\left(v(S,c) + (1-\beta)\kappa^F(V_2(c) + L)\right) + \beta - v(S,h) - \kappa^F(V_2(h) + L) \\
&\geq (1-\beta)\left(v(S,c) + (1-\beta)(V_2(c) + L)\right) + \beta - v(S,h) - (V_2(h) + L) \\
&= \frac{v(S,c)^2}{2}\beta^2 + \left(1 - v(S,c) - v(S,c)^2\right)\beta - \left(v(S,h) + \frac{v(S,h)^2}{2} - v(S,c) - \frac{v(S,c)^2}{2}\right) \\
&> 0
\end{aligned}$$

Where the first inequality is obtained by replacing κ^F with 1, the most extreme scenario. The last line of inequality follows from footnote 3 of the paper, which imposes the assumption that $\beta > \frac{v(S,c)^2+v(S,c)-1+\sqrt{(1-v(S,c)-v(S,c)^2)^2+v(S,c)^2(2v(S,h)+v(S,h)^2-2v(S,c)-v(S,c)^2)}}{v(S,c)^2}$.

When L is large, for example when $L = \bar{L}$ is so large that $P^S(h) = 1$, We have:

$$\begin{aligned}
P^S(c) - P^S(h) &= (1-\beta)\left(v(S,c) + (1-\beta)\kappa^F(V_2(c) + L)\right) + \beta - v(S,h) - \kappa^F(V_2(h) + L) \\
&= (1-\beta)\left(v(S,c) + (1-\beta)\kappa^F(V_2(c) + L)\right) + \beta - 1 \\
&< (1-\beta) + \beta - 1 = 0
\end{aligned}$$

Since $P^S(c)$ and $P^S(h)$ are both linearly increasing in L, there exists a $\underline{L} \in (0, \bar{L})$ such

that $P^S(c) = P^S(h)$. Hence, an equilibrium where all corrupt agents drink exists if $L \geq \underline{L}$. Such an equilibrium does not exist if $L < \underline{L}$, because when corrupt agents have a higher probability of success than honest ones, the autocrat would like to purge from successful agents rather than failed ones. Anticipating this, drinking makes a corrupt agent worse off, since it increases the probability of being caught drinking (from γ) as well as the probability of being purged (from a positive κ^S).

Now we look at what happens when $L < \underline{L}$. We know from the proof of Proposition 1 that, if corrupt agents decide to drink with probability 0, any corrupt agent would have an incentive to deviate from not drinking to drinking, i.e. the payoff from drinking is higher than not drinking. We also know from our analysis immediately above that, if corrupt agents decide to drink with probability 1, any corrupt agent would have an incentive to deviate to not drinking, i.e. the payoff from drinking is lower than not drinking. Since corrupt agents' payoff from drinking or not drinking is continuous, there exists a $p \in (0, 1)$ such that corrupt agents' payoff from drinking and not drinking is the same, and they choose to drink with probability p in equilibrium. □

γ_1 and γ_2 in these two propositions are not immediately comparable. Therefore, it is conceivable that, when $\gamma_1 < \gamma_2$, the region of $\gamma \in [\gamma_1, \gamma_2]$ features multiple equilibria, one in which no agent drinks and one which involves corrupt agents drinking. But it can be shown that equilibrium is unique when $\gamma \geq \max\{\gamma_1, \gamma_2\}$ or $\gamma \leq \min\{\gamma_1, \gamma_2\}$, which insulates our main results, to a large degree, from complications arising from multiple equilibria.