1984 or the Brave New World?
Evidence from a Field Experiment on Media Censorship in China

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— VERY PRELIMINARY —
— PLEASE DO NOT CIRCULATE —

Abstract

Media censorship is considered as the hallmark of authoritarian regimes, but cost to access uncensored information is typically low. Why don't citizens acquire uncensored information? What is the impact if they become exposed to uncensored information? We conduct a field experiment among 1,800 university students in China, cross-randomizing the provision of: *(i)* tools to bypass censorship over the course of 18 months for free; and *(ii)* temporary incentives that encourage students to consume uncensored information. We measure and trace students' media consumption, beliefs regarding media, as well as a broad range of economic beliefs, political attitudes and behaviors. We find that censorship successfully prevents information consumption not only by restricting supply of information, but also by suppressing demand as students underestimate the value of uncensored information. A period of exposure to uncensored information can persistently change students beliefs regarding media, resulting in a lasting increase in their exposure. Exposure makes students more informed, more pessimistic of the economy, more critical of the government, and less likely to invest in the Chinese stock market. Despite the large impact, the current censorship apparatus in China would remain robust, given the low demand for information, and the moderate rate of social transmission of information that we estimate.

Keywords: censorship, information, media, authoritarian regime, belief
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> What Orwell feared were those who would ban books. What Huxley feared was that there would be no reason to ban a book, for there would be no one who would want to read one.
>
> Neil Postman, *Amusing Ourselves to Death*

1 Introduction

Media censorship is considered as the hallmark of authoritarian regimes.[1] The political stability and even popular support one often observes in these regimes have long been attributed to the repressive censorship apparatus (Ford, 1935).

Nonetheless, censorship practices are usually not watertight. A prominent example is China, home to the world's most sophisticated and prevalent internet censorship apparatus. For less than US$ 25 per month, internet users can purchase tools to bypass censorship (e.g. virtual proxy network, or VPN), which allow them to access all of the blocked foreign websites, and to obtain uncensored and potentially regime-threatening information. These tools are not illegal to use, and there is little evidence of fear of usage among Chinese citizens (Roberts, 2016). However, less than 3% of internet users purchase such tools, and as a result, 95% of China's internet traffic has been retained to domestic websites.[2] It is puzzling that such porous censorship can be effective, and this project aims to understand what makes it so.

We first investigate why don't most citizens acquire uncensored information: is it because the cost to access — although not infinitely high — still too high a financial burden? Or because citizens inherently do not value uncensored information even if it had been made free? Or because they underestimate the value of uncensored information? We next examine what is the impact if citizens become exposed to uncensored information, and to what extent does the impact spill over to their friends? Crucially, the rate of social transmission of information determines whether the small fraction of citizens who have access to uncensored information are sufficient to spread politically sensitive knowledge to majority of the population.

To answer these questions, we conduct a field experiment with 1,800 university students in Beijing, China, who are the forefront of the state's effort to control information and shape ideology.[3] We randomly subscribe students with tools to bypass censorship for free for 18 months, and

[1] Freedom House's *Freedom of the Press Report* shows that states with "unfree" media are concentrated among regimes that are undemocratic and respect limited political rights of their citizens. Full report can be found here: `freedomhouse.org/report/freedom-press/2016/china`, last accessed on December 11, 2016.

[2] See, among others, Roberts et al. (2010). This is a much higher rate of domestic internet traffic comparing to neighboring countries such as Japan and South Korea. Contents on domestic websites are censored by the government or self-censored by the outlets themselves. The usage rate of tools to bypass censorship is not substantially higher among young and educated population (Roberts, 2016).

[3] University students are the core participants of anti-authoritarian movements to challenge the incumbent regime, not only in China but around the globe. In addition, internet is Chinese university students' dominant source of media consumption, as TV is typically not allowed in university dorms. Hence we do not have to consider traditional media platforms. We discuss external validity of our findings in Section 6.

we random provide small monetary incentives to encourage students to visit foreign news websites.[4] Throughout the course of the experiment, we track students' online activities to investigate their exposure to uncensored information, and we repeatedly measure a wide range of knowledge, attitudes towards media, economic beliefs, political attitudes, and behaviors to examine the impact of such exposure.

The two-by-two experimental design allows us to disentangle why students do not acquire uncensored information. First, we find that the cost to access is *not* the only factor that prevents students from consuming uncensored information: when access is made free because our random provision of the premium tool to bypass censorship, more than half of the students do not use the tool at all, and among those who use, almost none spend time browsing foreign news websites that are otherwise blocked. Second, the low demand for uncensored information plays an important role. Among a cross-randomized subsample of students whom we *in addition* encourage to visit the *New York Times* China edition by providing small monetary incentives for 4 months, they are not only more likely to adopt the tool, but also spend on average 150% more time on foreign news websites (predominantly the *New York Times*). In other words, when the value of uncensored information is boosted, students respond and consume such information. Third, we find that students' low demand is *not* because they inherently do not value uncensored information: the increase in consumption of uncensored information persists long after the temporary encouragement has ended.

In particular, ample evidence supports that a crucial — although need not be the exclusive — reason for students to exhibit low demand for uncensored information is that they underestimate its value due to lack of exposure.[5] For example, students who choose not to consume uncensored information are more likely to believe that foreign news outlets do not have much value added once they have already read about the same news event from the domestic news outlets, and accordingly these students reveal significantly lower level of willingness to pay for tools to bypass censorship. After a period of exposure, students persistently upwardly upward their beliefs regarding the value added of foreign media, raise their willingness to pay for the access, and converge toward students who have purchased similar tools on their own prior to our study. The increased demand potentially accounts for the lasting increase in consumption of uncensored information among the newly-exposed students.

Students' lack of exposure to uncensored information has broad and substantial consequences. We find that newly-exposed students become: *(i)* more knowledgeable of current events and notable figures censored on domestic media, as well as politically sensitive events in the past; *(ii)* more pessimistic of the Chinese economic growth and stock market performance in the near fu-

[4]The experiment is approved by Stanford IRB (Protocol ID 34318), and is registered at AEA RCT registry (ID 0001412).

[5]This is consistent with a simple framework that considers students' choices to consume foreign media outlets as a one-armed bandit problem, where the foreign media outlet is the risky arm, and the domestic media outlet is the safe arm. We outline the framework in details in Appendix B.

ture, revealed in a private and incentivized manner; *(iii)* more skeptical of the Chinese government, less satisfied with its performance, and more likely to demand changes in Chinese institutions; *(iv)* more critical of several controversial socioeconomic issues (e.g. the one-child policy); and *(v)* more willing to act for changes, more likely to plan to leave China through graduate school, and more likely to pull out of their investment in the Chinese stock market (among a small fraction of students who were investing prior to the experiment).[6] Along most dimensions, newly-exposed students converge toward students already bypassed censorship prior to the experiment, and the impact of exposure is the largest among those who have limited access to alternative source of uncensored information (e.g. those from disadvantaged background).

Finally, we find that exposure to uncensored information affects students who do not have access themselves. Exploiting variations in treatment saturation across university dorms,[7] we estimate a stylized social learning model to quantify the social spillover of knowledge. Three key patterns emerge: *(i)* on average, if a student with direct access to uncensored information is informed of a particular sensitive news event, he transmits such knowledge to his roommate with 15% probability; *(ii)* the rate of transmission is higher among high-profiled sensitive news events (those that exhibit higher rate of direct learning); and *(iii)* the rate of transmission doubles if the recipient does not have direct access himself. The estimated model performs well in out-of-sample tests of its predictions on the level of knowledge among students who reside in dorms with two roommates who become exposed to uncensored information due to the experiment. Importantly, while exposure to uncensored information exhibits positive externality, the rate of social transmission of information is moderate. A simple calibration exercise suggests that such rate of social transmission cannot induce the entire students population to become informed, given the proportion of students who had access to uncensored information prior to our experiment.

Taken together, our findings indicate that although uncensored information can generate large impact that undermines the Chinese regime, the censorship apparatus would remain robust even among the young and educated population, given their currently low level of demand for uncensored information as well as the moderate rate of social transmission of information. What makes censorship effective may not be as straightforward as the supply-driven story as illustrated by George Orwell's *1984*, where citizens do not (or rather, cannot) acquire information because the government bans "books." Instead, the current Chinese censorship apparatus may be more closely resemble the scenario painted by Aldous Huxley's *Brave New World*, where citizens do not acquire information due to their lack of demand.[8] As a result, policies that "parachute drop" information to citizens in authoritarian regimes — a strategy undertaken by organizations such as the *Voice of*

[6] We show that these results are robust to statistical inference adjustment due to concerns of multiple hypotheses testing. In addition, we present evidence in Section 3.3 showing that students' self-censoring and fear of revealing politically sensitive beliefs and attitudes are not a particularly salient concern in the context of our experimental study.

[7] For example, some experimental subjects reside in dorms with no other student who is randomly assigned with the supply treatment, while some have one or two such roommates.

[8] As Huxley once wrote: "A really efficient totalitarian state would be one in which the all-powerful executive of political bosses and their army of managers control a population of slaves who do not have to be coerced."

America for the past several decades — are unlikely to be as effective as one envisions. In fact, the Chinese government does not need to bear the extremely high cost to fully "seal" its internet as it can afford to leave some holes open — neither would the masses begin to respond to major news shocks that are censored, nor would the information-demanding elites become irritated and the business interests of those who hinge on global internet connection be sacrificed.

Nevertheless, what the *Brave New World* fails to capture is that the censorship apparatus can also be fragile, precisely because it hinges on citizens' demand for uncensored information. When citizens raise their demand (presumably through some period of exposure as we have demonstrated), the increased demand is likely to persist, and this would destabilize the censorship apparatus and impose substantial pressure on the regime to tighten its grip. It is important to note that this does *not* imply that at the current level of demand for uncensored information, the Chinese government can safely eliminate the *Great Firewall* completely. The current cost to circumvent censorship, although small for each individual citizen, imposes a huge campaign cost for foreign news outlets since they would need to purchase such tool for each of the potential costumers they wish to reach out to. Without such cost, one would expect foreign news outlets such as the *New York Times* to begin campaigning and effectively raise demand among Chinese readers.

Our findings contribute to the large body of literature on the political economy of mass media. The overall impact of media censorship identified in this study adds to our broad understanding of how mass media influences citizens' political preferences and shapes aggregate outcomes (for example, DellaVigna and Kaplan (2007) on the US; Yanagizawa-Drott (2014) on Rwanda Genocide; Adena et al. (2015) on Nazi Germany; and Enikolopov, Petrova, and Zhuravskaya (2011), Enikolopov, Petrova, and Sonin (2016), and Enikolopov, Makarin, and Petrova (2016) on contemporary Russia).[9] Our study adds an important data point to this literature by: *(i)* investigating the case of China, the largest country that engages in state-led information control; and *(ii)* providing the first causal evidence via field experiment to identify the impact of media censorship on shaping citizens' knowledge, economic beliefs, political attitudes, and behaviors.

In particular, our project relates to the small strand of literature on mass media that emphasizes the importance of demand-side factors in explaining media landscape that we observe in the United States, Europe, and other parts of the world. Mullainathan and Shleifer (2005) provide a theoretical framework demonstrating that reader biases can generate slant in media, despite forces of market competition.[10] Empirically, Gentzkow and Shapiro (2010) show that newspaper slant in the United States can be largely accounted for by firms catering to consumer preferences;[11]

[9] DellaVigna and Gentzkow (2010) review the empirical literature on persuasion across broader domains, and Prat and Strömberg (2013) provide a more recent survey of this literature particularly in the domain of politics.

[10] Relatedly, Gentzkow and Shapiro (2006) show that when Bayesian consumers infer news outlets as more trustworthy if the reports lay closer to their prior beliefs, the media outlet becomes more likely to slant towards readers' prior expectations if there are less feedbacks readers may receive regarding truth.

[11] Gerber, Karlan, and Bergan (2009) find that randomly distributing partisan newspapers to US citizens fails to lead to changes in their knowledge, political opinions, and behaviors related to voting. This suggests the importance to take into account of citizens' demand for information, as random subscription does not necessarily lead to exposure to new

Abramitzky and Sin (2011) document that the inflow of western knowledge into Eastern Europe after the collapse of Communism is much more pronounced in Satellite and Baltic countries than the Soviet ones, suggesting the crucial role played by underlying demand differences. Most relevant to our project, Roberts (2016) shows that the Chinese government deploys frictions (e.g. making connections slow) and flooding (e.g. generating large volumes of positive social media feeds to distract attention away from politically sensitive information) to restrict information flow on the internet — a strong indicator that the censorship apparatus leverages citizens' low demand for information to achieve the goal of information control. We use a simple economic framework and empirical evidence to show that media censorship is much more than a supply-side story. In fact, demand-side factors are crucial to our understanding of how and why censorship works. Specifically, we find that the under-exposure to foreign media resulted from access restrictions generates biased beliefs against foreign media outlets, making the censorship apparatus robust and effective.

These findings also contribute to the growing empirical literature on the endogenous formation of beliefs, attitudes, and preferences, especially those works that focus on the context of authoritarian regimes where the state has direct incentive to intervene. Among others, state indoctrination (Voigtlander and Voth, 2015; Cantoni et al., Forthcoming) and historical experiences (Alesina and Fuchs-Schündeln, 2007; Giuliano and Spilimbergo, 2014; Fuchs-Schündeln and Schündeln, 2015; Chen and Yang, 2015) have been identified to generate lasting impact on citizens political attitudes. We show that media censorship — an information control policy widely deployed in non-democratic regimes — can effectively manipulate citizens political and economic beliefs, attitudes, and preferences along the direction of the regimes' intention. In particular, we show that despite citizens' moderate level of awareness and sophistication regarding media censorship and the direction of biases in censored information content reported on domestic news outlets, they cannot fully de-bias themselves from the distorted information environment created by media censorship.[12]

Finally, we contribute to the literature on social learning and social externality of information. For example, Banerjee (1992) provides a theoretical framework demonstrating the aggregate and dynamic effect of learning from others' actions; Banerjee et al. (2013) studies how social learning and information diffusion occur in the context of Indian villagers decisions to take-up microfinance, highlighting the complementarity in the social network in terms of the adoption of new finance vehicle. Jackson and Yariv (2011), Goyal (2011), and Golub and Sadler (2016) provide excellent survey to this large body of literature. We provide one of the first pieces of empirical ev-

information.

[12]There have been some recent efforts to systematically study how people update beliefs based on censored (or truncated) information. In an abstract setting, Enke (2017) documents that people form biased beliefs by neglecting absence and non-occurrence, failed to take into account of the selection underlying the data generating process. In political context, Bai et al. (2015) show that Chinese citizens have difficulties interpreting information on air pollution when the government controlled media conflicts with uncensored sources.

idence on how social learning interact with direct media access — in particular, how information is acquired from media consumption and how it is subsequently spread across the social network.

In what follows, we provide a brief overview of internet censorship in China in Section 2. In Section 3, we describe the experimental design, our surveys of college students in Beijing, and other empirical setups of the field experiment. In Section 4 and 5, we present the results answering each of the two research questions that we raise, respectively. Finally, in Section 6, we discuss lessons from our experimental results, simulate the counterfactual scenarios of media censorship in China, and speculate the external validity of this study on other authoritarian regimes that deploy internet censorship.

2 Internet censorship in China

Media landscape in China is among the most regulated and restricted throughout the world, and China's media freedom level consistently is ranked towards the bottom of the world.[13] In particular, China's information control over the internet, primarily through censorship, seconds to none in terms of its scale and technological sophistication. In this section, we briefly describe the infrastructure of the *Great Firewall* that serves as the building block of censorship, and the market for censorship circumvention tools available in China today.

2.1 The *Great Firewall*

The administrative regulations and legal framework in China ensures that media outlets based domestically would incur severe business and political cost from publishing and circulating contents that the state deems threatening and objectionable. As a result, contents on domestic media outlets are routinely censored and filtered by the orders from the Propaganda Department (either *ex-ante* or *ex-post*), or self-censored during the editorial process.[14]

Since the Chinese government does not have the jurisdiction to directly control foreign media outlets, an important aspect of China's internet regulation is the effort to block internet users in China from accessing to specific foreign websites (or contents hosted on those websites). The *Great Firewall of China*, a major part of the umbrella *Golden Shield Project*, serves as the main infrastructure to achieve the access blockage of potentially unfavorable incoming data from foreign media outlets.[15]

The *Great Firewall* deploys several technical methods to block entire websites or specific web-

[13] Freedom House's *Freedom of the Press Report* in 2016 labels China's "Net Freedom Status" as *not free*, and rates its "Press Freedom Score" as 87 (out of 100, where 100 indicates the worst).

[14] We briefly outline the legal and administrative framework of internet censorship in China in Appendix A.

[15] The *Great Firewall* is operated by China's Ministry of Public Security, initiated in 1998 and began operation in 2003. The term of the *Great Firewall of China* is coined by an article published on the *Wired* in 1997. Source: `https://www.wired.com/1997/06/china-3/`, last accessed on December 11, 2016.

pages from being routed through by IP addresses located in China.[16] At the time when we began our field experiment (November 2015), 12 of the 100 most trafficked websites in the world (and 161 of the Alexa top 1000 global websites) are blocked by the *Great Firewall*.[17] Some prominent examples are: Google, YouTube, Facebook, Twitter, Instagram, Blogspot, Tumblr, Dropbox, Blogger, Vimeo, Soundcloud, and Flickr. In particular, 9 of the top 20 news websites ranked by Alexa are blocked by the *Great Firewall*: for example, *CNN*, *New York Times*, *the Guardian*, *BBC*, *Bloomberg*, *Wall Street Journal*, and *Reuters*.[18] The British newspaper the *Economist* is one of the newest addition to the list, first blocked in April 2016 during our study.[19]

Case of the Panama Papers To give a concret example of the type of uncensored information published by the foreign media outlets that are blocked by the *Great Firewall*, we focus on the episode of the Panama Papers during April 2016. The Panama Papers are 11.5 million leaked documents that reveal personal financial information about wealthy individuals and public officials: more than 140 politicians or their families from more than 50 countries are involved, including the Chinese president Xi Jinping.[20]

Immediately after the leakage of the Panama Papers, the Chinese Communist Party's Propaganda Department issued command to editors of domestic media outlets to apply strict censorship to the information on the Panama Papers:[21]

> Delete every post about the Panama Papers. [...] If articles about Panama Papers are found on any website, we [the Propaganda Department] will punish severely. Deliver this command orally to editors on duty, and implement immediately.

Perhaps not surprisingly, one can hardly find a trace of the Panama Papers from contents published on the domestic media outlets. However, among others, the *New York Times* and its China edition — both are blocked by the *Great Firewall* — provide extensive coverage on the Panama Papers incident. Some headlines appeared on the front page of the *New York Times* Chinese edition website include (translated from Chinese): "Regarding Panama Papers, What Do We Know So Far?", "Panama Papers Expose Hidden Wealth of the Politicians", "Three Chinese Communist Party Politburo Members Are Involved in the Panama Papers", "China Blocks Reports on the

[16] Some common technical methods used by the *Great Firewall* are: IP blocking, DNS filtering and redirection, URL filtering, packet filtering, man-in-the-middle attack, TCP connection reset, and VPN blocking.

[17] Estimates are provided by `greatfire.org`, an organization that monitors the activities of the *Great Firewall*.

[18] The full Alexa ranking of global news websites can be found at `http://www.alexa.com/topsites/category/News`, last accessed on December 11, 2016.

[19] Not all foreign websites are blocked by the *Great Firewall*, and not all blockage started at the same time. For example, while Microsoft Bing services remain unblocked by the *Great Firewall* as of today, almost all Google services (including Google search, Gmail, Google Scholar, etc.) have been blocked from accessing by IP addresses located in China since 2011.

[20] Source: "Panama Papers: The Power Players" by the *International Consortium of Investigative Journalists*, `https://panamapapers.icij.org/the_power_players/`, last accessed on December 11, 2016.

[21] Source: leaked directives from the Propaganda Department, collected by the *China Digital Times* hosted by the Berkeley Counter-Power Lab. These commands regarding the Panama Papers were issued on April 4th, 2016.

Panama Papers."

The tight control of information published on domestic media outlets suggests that those citizens who only have access to these outlets would have a difficult time even to realize that something was filtered from that day's online news contents. Nonetheless, once a citizen gains access to the uncensored information from the blocked foreign outlets, he would fairly easily notice not only these politically sensitive reports, but also the fact that these reports are censored or self-censored on the domestic media outlets.[22]

2.2 Tools to bypass censorship

Since the *Great Firewall* blocks access to foreign media outlets and content via destination IP addresses, in principle, this type of censorship can be bypassed through proxy servers or traffic data encryption (e.g. VPN). This technological loophole has led to the creation of a range of censorship circumvention tools and services to aid internet users in China gaining access to websites that are otherwise blocked by the *Great Firewall*.

There are more than a dozen of tools to bypass censorship that are available to Chinese internet users at the time when we started the experiment. Their prices range from free of charge to no more than US$ 25 per month, as of November 2015.[23] Generally, the more expensive a tool is, the faster and more stable is its connection, especially during periods such as the annual March meeting of the People's Congress when the Chinese government *temporarily* shuts off the connection channel of some VPN services.[24] Although no systematic estimates exist with respect to the total number of internet users in China who regularly purchase tools to bypass censorship, scholars have roughly calculate the national average usage rate in 2010 to be no more than 3%, if not much lower (Roberts et al., 2010).[25]

Legality of bypassing internet censorship As of January 2017 when this manuscript is written, there is *no* law in China explicitly concerns or regulates the usage of VPN and similar services in China. In fact, the officials at the Chinese Communist Party Propaganda Department and the Ministry of Public Security rarely officially recognize the existence of the *Golden Shield Project* and the *Great Firewall*, making legal discussion of usage of tools to bypass the *Great Firewall* impractical. In addition, many businesses (especially foreign ones) operated in China reply on VPN and similar

[22] In the case of the Panama Papers, the *New York Times* explicitly highlights the fact that similar reports one reads on the *New York Times* regarding the Panama Papers are strictly censored on domestic media outlets. Other cases are often not as explicit, but once the reader have simultaneous access to both the domestic and foreign media outlets, a simple comparison of headline contents can reveal what events are censor by the Chinese government.

[23] The "Circumvention Central" from `greatfire.org` provides reviews of some popular tools. Similar reviews can be found in "Leap Over the Firewall: A Review of Censorship Circumvention Tools" published by the *Freedom House*.

[24] This implies that while the Ministry of Public Security is technologically capable of fully disrupting the operation of tools to bypass censorship, it *chooses* not to do so during majority of the days throughout the year.

[25] The total number of internet users in China is estimated to be 460 million in 2010, and it grows to more than 721 million in 2016. Source: *Internet Live Stats*, which compiles data from the *International Telecommunication Union*, *World Bank*, and the *United Nations Population Division*, `www.InternetLiveStats.com`, last accessed on December 11, 2016.

tools to ensure security, confidentiality, and reliability of their online services, navigating in the legally grey zones.[26]

Importantly, existing evidence has shown that Chinese internet users, especially college students, exhibit little fear in using tools to bypass censorship (Roberts, 2016).[27] In fact, explicit censorship and blocked access to information can induce backlash and increase information consumption, similar to the so-called "forbidden fruit effect" (Hobbs and Roberts, 2016). We provide additional evidence from our data (see Section 4.3) to demonstrate that fear to use censorship circumvention tool is not particularly prevalent among university students in our experimental sample.

3 Experimental design

We now describe the design of the field experiment that we conduct among university students in Beijing. In Section 3.1, we outline the conceptual framework that motivates the design of the experimental structure; in Section 3.2, we describe the two-by-two experimental design and each of the treatment arms; in Section 3.3, we present the outcome variables of interests; and finally, in Section 3.4, we describe the logistics details of the field experiment, discussing the timeline, recruitment, treatment assignment, as well as panel survey and sample retention.

3.1 Conceptual framework

Why don't students acquire uncensored information In order to understand why porous censorship works effectively to restrict citizens from accessing information, we first consider media consumption choices using a simple framework of a one-armed bandit problem.[28] Students choose between two types of media outlets: *(i)* media outlet hosted domestically contains censored information (due to government's direct control), is free to access (as long as one has internet connection), and students are certain of its value (due to familiarity); and *(ii)* foreign media outlet, in contrast, contains uncensored information (since it is not subject to government's control), is costly to access (since one needs to purchase a censorship circumvention tool), and students are uncertain of its value (due to unfamiliarity as the outlet is not allowed to advertise in China).

[26] This is partially because the VPN services are regularly used to ensure data transmission anonymity and security over the internet, and bypassing the *Great Firewall* is only a byproduct of this technology.

[27] There has been no case of charges brought against Chinese internet users for browsing websites blocked by the *Great Firewall*. However, actively spreading contents blocked by the *Great Firewall* is directly subject to government's cybersecurity regulations. There have been judiciary actions brought against those cases, typically under the charges of "inciting social unrest and social turbulence" or "disrupting social order."

[28] We describe the framework more rigorously in Appendix B. Armed bandit problems have been used to study the technological adoption decisions in many development context, and they hightlight the process when people learn the value of the new and unfamiliar technology. See Foster and Rosenzweig (2010) for a survey of the literature. While the framework on media consumption that we present here is not conceptually novel *per se*, it is a simple yet powerful one which is able to account for many empirical patterns observed regarding media censorship.

There are 3 potential factors that prevent students from choosing foreign media outlet. Each of them generates testable prediction that allows us to distinguish whether it is relevant to explaining students' lack of exposure to uncensored information. First, foreign media outlet is costly — in other words, the supply of uncensored information is restricted. If this is the relevant factor, consumption of foreign media outlet would increase when we provide students with free access. Second, the objective payoff of foreign media outlet is low even when it reports uncensored information — in other words, students inherently do not value foreign media outlet. If this is the relevant factor, consumption of foreign media outlet would increase during the period when we boost the value from visiting the outlet. Importantly, consumption would revert back as soon as the boost in value is no longer in place. Third, students underestimate the probability that foreign media outlet would yield high payoff — in other words, students do not value foreign media outlet due to biased beliefs. If this is the relevant factor, consumption of foreign media outlet would increase *both* during and after the period when we boost the value from visiting the outlet. In particular, one would expect that exposure during the period of value boost allows students to upwardly update their beliefs regarding the value of foreign media outlet, which results in a persistent increase in consumption.

What is the impact if students are exposed to uncensored information? Exposure to uncensored information from the consumption of foreign media outlet can affect students both privately — among those who are directly exposed, and socially — among those who are connected but have not exposed themselves. If uncensored information carries signals regarding the government's trustworthiness, performance, etc., newly exposed students would update their beliefs in these dimensions, simultaneously as they update beliefs regarding foreign media.[29] Exposure to uncensored information that we have induced from experimental treatment can be then used as first stage variation, which allows us to estimate the impact of exposure as we map it to a broad range of second stage outcomes of interests such as knowledge, economic beliefs, political attitudes, and behaviors.

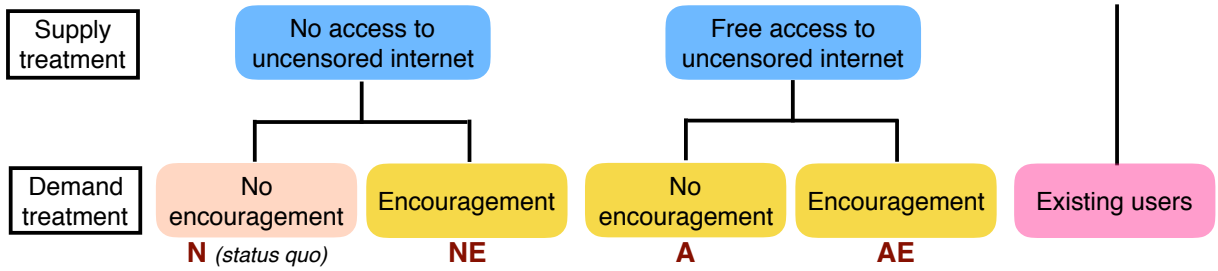
Estimation of the impact of direct exposure may be downwardly biased if there is social spillover of information. In other words, those students who do not have direct access to uncensored information themselves might also get informed if they are connected with friends who have access. The higher proportion of students in a tight social network — university dorm roommates, specifically — becomes exposed to uncensored information, the higher is the rate of social spillover. We quantify the rate of social spillover of information and benchmark it against the rate of learning due to direct access, taking advantage of the fact that the random variation in exposure to uncensored information induced from the experimental treatment is uniformly distributed across dorms. This creates exogenous variation in the proportion of students exposed to uncensored

[29] We derive the Bayesian updating process of the beliefs on government's type, media censorship, and the value of foreign media more formally in Appendix B.2.

information throughout the social network.

3.2 Two-by-two design

Motivated by the conceptual framework that we just describe, we design a two-by-two experiment, where we cross-randomize the assignment of the *supply treatment* (free access) and *demand treatment* (temporary encouragement) among study participants. The supply treatment relaxes the supply constraint to consume uncensored information, as it reduces the monetary cost to access to zero. The demand treatment relaxes the demand constraint, by temporarily encouraging students to consume uncensored information and boosting the value of visiting foreign news outlet. The temporary nature of the demand treatment creates another variation in the time dimension: periods when the value of visiting foreign news outlet is boosted, and when the value is no longer boosted. The experimental design can be summarized in the following figure:



At the baseline survey (prior to treatment assignment), we identify students who have already purchased and are currently using tools to bypass censorship — the *existing users*. We exclude them in our subsequent treatment assignment, but include them in our subject pool and follow them throughout the entire duration of our study, since they serve as useful benchmarks to interpret the treatment effects. For those who are not existing users of the censorship circumvention tools, we randomly assign them with the supply treatment, the demand treatment, neither, or both. For those who receive neither treatment, we label them as *Group-N*, who remain at the status quo. For those who receive only the supply treatment (access to uncensored internet), we label them as *Group-A*. For those who receive only the demand treatment (encouragement to consume news), we label them as *Group-E*. Last but not least, for those who receive both the demand and the supply treatment, we label them as *Group-AE*.

3.2.1 Supply treatment: free access to uncensored internet

The supply treatment provides students with a free subscription of a premium and customized tool to bypass censorship, which establishes fast and stable connection to the internet unrestricted by the *Great Firewall*.[30] This enables students to access websites that are otherwise blocked, and

[30] We choose one the most premium and expensive tools currently available, because we wish to identify the underlying demand for uncensored information without confounding it with concerns of the potentially unfavorable aspects

among others, to consume uncensored information.[31] We tailor the tool specifically for our study. It requires less than 1 minutes to set up, and students do *not* need to sign on each time they browse the internet — the tool is operating in each browsing session by default. Moreover, the tool works on both computers and mobile devices, although we limit each account to simultaneously operate on a maximum of 2 devices in order to prevents multiple students from sharing one account.[32] We describe additional features of the tool we provide in Appendix C.

The supply treatment is distributed to assigned students in the form of a bonus lottery after they have completed the baseline survey.[33] Each assigned student is given an individualized account for the tool, and they can activate the service and start the setup process right away, following detailed instructions on the service website.[34] In particular, we inform students that this tool, while provided for free, is of value US$ 25 per month and is a "professional and secure internet service that allows one to browse internet websites around the world without restrictions, access information in a speedy manner; and it is a service adopted by many business enterprises and professionals in China."[35]

3.2.2 Demand treatment: temporary encouragement to consume uncensored news

The demand treatment consists of a variety of materials mimicking advertisement campaigns to promote foreign news outlets, and they are distributed in the format of bi-weekly "newsletters" to students' E-mail accounts and WeChat App on their mobile devices.[36]

Two types of demand treatment Each student assigned with the demand treatment receives two types of encouragement newsletters, and there is no difference in the version we send to Group-

of the tools itself (e.g. difficult to use, or speed of connection is too slow). An individual account of this tool would cost US$ 25 per month if students were to purchase it themselves. No existing users of the censorship circumvention tool prior in our subject pool prior to the study is purchasing this particular tool. Instead, they choose cheaper tools that compromise either speed or stability.

[31] Many pornography websites are also blocked by the *Great Firewall*, and the censorship circumvention tools would allow students to access those websites as well.

[32] We cannot rule out, however, the possibility that students can lend or sell the entire account to another student.

[33] Simultaneously with the censorship circumvention tool distribution, we also draw 100 students to win the lottery prize of a one-year VIP-account of Youku, a video streaming service in China that is similar to Netflix. The Youku VIP-account subscription costs US$ 2.5 per month. We add it to the lottery package in order to alleviate concerns of the experimenter's demand effect, and also reduce the possibility of encountering additional political pressure and hurdles from the school administration.

[34] Students can track their usage status, and learn about the censorship circumvention tool itself, including its current retail price, from the service website.

[35] All communications with the participants of the study are done simultaneously through E-mail and WeChat (equivalent to WhatsApp) messages. We intentionally keep the language introducing the tool vague to avoid political pressure from the school administration. Almost all participants in our study understand what censorship circumvention tools are and what they are used for — according to our baseline survey, most of them have heard of the tools, or have people in their immediate social circle who are current users.

[36] Students are informed that these "newsletters" are an integral part of the study, and researchers from Stanford and Peking University have curated contents from the internet to help students take advantage of what's available online, stay updated and informed.

NE and Group-AE students.[37]

The first type of the demand treatment does not involve direct monetary incentives. It introduces students to a variety of foreign websites that are blocked by the *Great Firewall* that students may never hear of (among others, the *New York Times* China edition). Moreover, it highlights to students that politically sensitive news events are often reported differently between domestic news outlets and their foreign counterparts.

The second type of demand treatment involves news quizzes with monetary rewards. The goal of the quizzes is to encourage students to visit foreign news outlets blocked by the *Great Firewall* — the *New York Times* Chinese edition, in particular.[38] The quizzes are designed such that if and only if students visit the *New York Times* China edition front page, they can easily locate the answer within a couple of minutes.[39] If students earn US$ 2.5 if they can answer the quiz correctly, and the quiz is carried out for a total of 4 rounds.[40]

We describe each type of the demand treatment in greater details in Appendix D. Appendix Figure A.1, A.2, and A.3 present screenshots of the demand treatment.

Content coverage and domain of measurement The demand treatment newsletters cover many news contents. In order to capture students' broad informedness apart from the arguably mechanical effects due to reading the demand treatment newsletters, we measure students' knowledge in both the news events explicitly covered in the demand treatment, and those that are never mentioned. For example, content related to the Panama Papers were never covered in the demand treatment, and we explicitly measure students' knowledge on the episode of the Panama Papers.

Timeline and duration The demand treatment started in December 2015, simultaneous with the distribution of the supply treatment. It lasts until mid-March, 2016 (a total of 4 months). In particular, the demand treatment has terminated 6 weeks prior to the 1st follow-up survey, and it is never resumed since then. In other words, the demand treatment is temporary, and it creates two distinct periods during the experiment: *(i)* from December 2015 to mid-March 2016, when the demand treatment is in place and the value of visiting foreign news websites is mechanically boosted (especially during the second type of demand treatment); and *(ii)* from mid-March 2016

[37] In other words, the demand treatment features a within-person design, and we infer how students respond to different types of the demand treatment through changes in their behaviors over time. Since there is no across-person randomization in the order of which each type of the demand treatment is distributed, one potential confounding factor to this interpretation is the broad time trend affecting how students respond to the demand treatment that may precisely coincide with the time when we switch demand treatment types.

[38] We focus exclusively on the *New York Times* in order to maximize the power of this demand treatment in terms of leading to changes in students' news consumption, without diffusing students to multiple outlets.

[39] With the exception of the 1st round of the quiz, which covers news that is *not* strictly censored on the domestic media. We intentionally make this design choice, in order to minimize the political sensitivity upfront when students are paid by the researchers to consume particular news content.

[40] Topics covered in the quizzes include: wealth inequality, underground water pollution, censorship on key economic indicators, and labor unrest, all in the context of China.

until the end of the study, when demand treatment is no longer in place, but students who have been assigned with the treatment have experienced previous increase in the value of foreign news outlet.

3.3 Outcomes

We now describe the outcomes of interest, which fall under two main categories: *(i)* online media consumption, recorded directly through the censorship circumvention tool's server log of online activities; and *(ii)* measurement on knowledge, attitudes, beliefs, and behaviors through the panel survey.

3.3.1 Media consumption

For students who activate their account of the censorship circumvention tool,[41] we directly observe *every* activities they perform online so long as the traffic is routed towards destination websites hosted *outside* of China.[42]

Starting from the click-level online activity log recorded by the server, we match the account with the participants' identity and construct the following key outcome variables: *(i)* whether student has adopted the tool — if student assigned with the tool has activated the account, and our server has recorded at least one activity item from the account (namely, it indicators whether the student has used the tool at least once); *(ii)* whether the participants actively use the service after activation; *(iii)* total time spent browsing foreign websites each day[43]; and *(iv)* total time spent on each categories of websites each time: Big-4 (Google-related, Facebook, YouTube, Twitter), foreign news outlets, entertainment, etc.[44]

3.3.2 Knowledge, beliefs, attitudes, and behaviors

Our panel survey measures 5 broad groups of outcomes of interest, as well as a rich set of demographics and background characteristics that serve as both controls and criteria for heterogeneity

[41] We do not directly observe the online activities of participants who are not using the censorship circumvention tools that we offer (namely, the existing users, and students from Group-N and Group-NE. We rely on self-reported media consumption to proxy online activities for these participants.

[42] We observe all activities towards foreign websites, which include both websites blocked by the *Great Firewall* as well as those that are not. Since the censorship circumvention tool is activated only when traffic goes oversea, the server is not able to record online activities on domestic websites. Although this limits our ability to directly capture the crowd-out effects of access to uncensored internet on participants' consumption of contents on domestic media outlets, this still is, to the best of our knowledge, one of the most comprehensive and detailed information ever collected regarding internet users' online activities over a sustained period of time.

[43] We remove "passive" online activities such as those generated by automatic background refreshes, and we remove "inactive" browsing sessions where participants spend more than 30 minutes on a particular webpage without any additional activities.

[44] We use the Alexis categorization of domains names. We manually categorize domains that are not covered by the Alexis database. In particular, the category of foreign news outlets consists of top 20 news sites based on Alexis Top Websites rankings (source: `http://www.alexa.com/topsites/category/Top/News`, last accessed January 8th, 2017), exclude news portals such as Yahoo News and Google News.

analyses. We now briefly describe each group below. Appendix E provides more detailed descriptions category by category, and Table A.1 presents the original wording (translated) on *all* questions that we ask in the panel survey, with the category numbers labeled correspondingly.

Beliefs and attitudes regarding media (A) Given the critical role that beliefs regarding media outlets played in the framework we present in Section **??**, we explicitly measure participants' attitudes and beliefs regarding media and censorship across a wide range of domains.[45] Specifically, it covers the following categories: *(i)* valuation of access to foreign media outlets (including BDM-elicitation of willingness to pay); *(ii)* trust in media outlets; *(iii)* belief of actual level of media censorship and its drivers; *(iv)* calibration of news outlets' bias and level of censorship; and *(v)* justification of media censorship.

Knowledge (B) The next broad category of outcomes that we measure is students' knowledge, we we aim to cover a wide range of dimensions, both contemporary and historical, both politically sensitive and non-sensitive: *(i)* current news events covered explicitly in the demand treatment; *(ii)* current news events not covered in the demand treatment; *(iii)* awareness of notable figures; *(iv)* awareness of protests and independence movements; and *(v)* meta-knowledge.

Economic beliefs (C) We next elicit participants economic beliefs in an incentive compatible manner, and their corresponding confidence with respect to their beliefs.[46] Specifically, our survey measures: *(i)* belief on the economic performance in China (GDP growth rate and stock market performance); *(ii)* confidence on guesses regarding the economic performance in China; *(iii)* belief on the economic performance in the US (GDP growth rate and stock market performance); and *(iv)* confidence on guesses regarding the economic performance in the US.

Political attitudes (D) We then measure a wide range of attitudes that the study participants hold with respect to politics, broadly defined.[47] In particular, we group the questions into 11 categories: *(i)* demand for institutional change; *(ii)* trust in institutions; *(iii)* evaluation of government's performance; *(iv)* performance evaluation criteria; *(v)* evaluation of the severity of various socioeconomic issues; *(vi)* evaluation of democracy and human rights protection in China; *(vii)* justification of controversial policies and issues; *(viii)* willingness to act; *(ix)* interest in politics and economics; *(x)* national identity; and *(xi)* fear to criticize the government.

[45] To the best of our knowledge, this is the most comprehensive survey on media attitudes and beliefs ever conducted in China.

[46] Students are rewarded with additional bonus payment if their guesses are sufficiently close to the true economic performance indicators that will be published in the future. See Appendix E.3 for details on the elicitation procedures.

[47] We believe that this is one of the most comprehensive political attitudes survey module that is ever conducted among citizens in China.

Behaviors and planned behaviors (E) Next, we ask participants to self-report a range of behaviors and planned behaviors for the near future:[48] *(i)* information source and media consumption; *(ii)* social interaction on politics; *(iii)* investment in the Chinese stock market; *(iv)* plan after graduation; and *(v)* career preferences.

Demographics, background characteristics, and fundamental preferences (F) Finally, we collect a range of individual and household characteristics, and we elicit a full profile of students fundamental economic preferences. These questions are only included in the baseline survey, and are not repeated across other waves in the panel survey. In particular, we cover the following categories: *(i)* personal characteristics (e.g. gender, ethnicity, hometown); *(ii)* educational background; *(iii)* English ability and oversea travel experiences; *(iv)* household characteristics; and *(v)* fundamental preferences (e.g. risk preferences, time preferences, and social preferences).[49]

3.3.3 Interpretation of the outcomes

We now discuss several important issues regarding the interpretation and statistical inferences on the results from the media consumption records and survey elicited outcomes.

Concerns of consumption distortion due to monitoring One may be concerned that the online activities recorded by the server are systematically distorted due to participants' fear of being monitored by the researchers. We inform the study participants that as part of the standard practice of censorship circumvention tools, the account's online activities will be logged.[50] We ensure study participants that the recorded activities will remain anonymous: rather than students' real identity, they are only linked to the participants ID that we generated upon recruitment.

Two pieces of evidence suggest that fear of being monitored is *not* a particularly salient concern when interpreting students' recorded online activities. First, participants do not hide certain online browsing activities that may be considered as socially undesirable. Specifically, approximately 77% of the male participants and 62% of the female participants of the study who use censorship circumvention tool have browsed pornography at least once, where many pornographic websites are blocked by the *Great Firewall*. Second, participants do not shy away from browsing politically sensitive contents. For example, when they recognize that the *Economist* magazine became blocked by the *Great Firewall* in April 2016 due to its coverage on President Xi Jinping's repressive policies, students actually significantly *increased* their browsing time on the *Economist*.

[48] In a companion project, we analyze a set of observed behaviors with real stakes, in the form of incentivized laboratory games. See Chen and Yang (2017) for more details.

[49] Elicitation of these preferences is largely based on Falk et al. (2014).

[50] In addition, it is acknowledged that students in Beijing are typically aware that their online activities are routinely monitored by the school IT department as well.

Self-censorship in answering sensitive questions An important question regarding the interpretation of responses to direct survey questions about political attitudes and ideology is whether participants feel comfortable responding to them honestly, especially given that our survey covers some of the most politically sensitive questions ever asked in mainland China (e.g. level of human rights protection by the Chinese government). We promise participants of this study that we are committed to protect them with high level of security, anonymity, and confidentiality with respect to the data that we collect, to the best of our capacity. In particular, we emphasize to participants that we are academic researchers independent from the government, and we will erase all individual level data that we collect when we are faced with political pressure to share the data with the government or school officials.

We present two pieces of evidence suggesting this is in fact not as big a concern as one may speculate. First, we intentionally order the questions in the survey that that more politically sensitive modules appear towards the later half of the survey. We find that conditional on starting the survey and completing until the political sensitive module, less than 2% of the participants drop out of the study upon seeing these sensitive questions.

Second, we use a modified "list experiment" (or, "Item Count Technique"). to explicitly measure participants' degree of self-censorship in expressing distrust towards the central government of China, a potentially politically sensitive attitude. The list experiment provides "cover" for the expression of possibly sensitive and stigmatized attitude (by removing individual level identification of each answer), and allows one to estimate the prevalence of the attitude at the population level.[51] Hence, we are able to compare population estimates of adherence to such attitude from our list experiment elicitation (a randomly selected half of the study participants) to population estimates based on direction question (the other random half of the study participants) about the same attitude, in order to determine whether there exists any self-censorship (due to stigma, fear, or social desirability biases) with respect to expressing distrust towards the central government of China. When respondents were provided with "cover" for expressing their distrust, we estimate that 69.35% of the participants indicated that they do *not* trust the central government. When asked directly, 69.45% of the participants indicated such distrust — and this is *not* statistically significantly different from the list experiment estimates when "cover" was provided, indicating a minimum degree of self-censorship in this domain.

Concerns of multiple hypotheses testing Another natural concern given the large number of survey question outcomes we examine is the threats of multiple hypotheses testing and the possi-

[51] We adopt a modified version of the standard list experiment first introduced by Coffman, Coffman, and Ericson (2014), and subsequently adopted in Cantoni et. al. (2016, 2017). It appends "covered" elicitation with the traditional survey method (namely, direct question): the control group students in our list experiment setup (those who see N statements instead of $N+1$) are asked the politically sensitive questions *directly* in the form of "yes" or "no." The exact statement that we use to elicit attitude in the list experiment is: "I completely trust the central government of China," and we report percentage of "no" as indicators of those who do not trust the central government.

bility of false positives.[52] We do three things to address such concern.

First, we repeatedly ask *every single* questions from the baseline survey in the subsequent follow-up surveys, with only a few exceptions.[53] In other words, questions included in the follow-up survey, from which we estimate the effect of exposure to uncensored information, are not picked based on results in the baseline survey. In addition, for transparency, we report in the paper results on treatment effect estimated from *every* question asked in the follow-up survey.

Second, in order to dramatically reduce the number of hypotheses we test, we construct a z-score index variable for each of the sub-categories of outcomes we examine.[54] Following Anderson (2008) and Cantoni et al. (Forthcoming), we standardize each component of the index and sum respondents' standardized outcomes, weighting each item by the inverse of the covariance matrix of the standardized outcomes.[55] Finally, when we examine individual survey outcomes, we addresses concerns about multiple hypotheses testing by presenting p-values which are adjusted using the false discovery rate (FDR) procedure (see Anderson (2008) and Cantoni et al. (Forthcoming)).

3.4 Timing and logistics details

Recruitment & baseline survey *(November 2015)* We recruit the participants of the experiment from two universities in Beijing, one being one of the highest ranked universities in China, and one slightly lower ranked.[56] All recruitment efforts are implemented over E-mail and WeChat messages, and we end the recruitment process once the goal of 1,800 study participants is reached.[57]

[52] We acknowledge that the baseline survey is designed to cover participants' knowledge, economic beliefs, and political attitudes as comprehensive as possible, since we do not have precise hypotheses regarding which aspects would be affected by the consumption of uncensored information on foreign news outlets and which would be unaffected, and we wish to be flexible enough to capture effects of uncensored information irrespective of the idiosyncrasy of the time period and the news that take place. It is worth emphasizing that the dimentionality of affected outcomes may be an artifacts of the specific news that take place during the time of the study. For example, since the end of 2015 it has been a particularly turbulent period for the Chinese economy, and one would conjecture that other periods might not have a significant impact on participants' economic beliefs. However, this does not suggest there we have no traction on prior hypothesis regarding what may be affected by exposure to uncensored information. In particular, differences between participants who are existing users and those who are not at the baseline survey prior to treatment assignment serve as useful benchmark for us to construct hypotheses regarding which dimensions of knowledge, attitudes, beliefs and behaviors that one would expect to observe treatment effect due to exposure to uncensored information. Conversely, those dimensions where one does not observe differences at the baseline survey between existing users and non-existing users, one may also not expect to see a significant impact due to exposure.

[53] Apart from the demographics, background characteristics and fundamental preferences, which we do not expect to change throughout the duration of the study. We also exclude in the follow-up survey a small number of questions in the baseline survey that were too complicated or poorly worded, so that they were clearly misunderstood by a large number of participants.

[54] Except for the sub-categories of outcomes where all variables are constructed from a single survey questions (e.g. indicators of top ranks in a single ranking question, as in Category A.7).

[55] The index also captures broad changes that are only imperfectly measured by any single survey question.

[56] In order to protect the participants of this study, we intentionally conceal the identity of these two universities per IRB arrangement.

[57] Since campus-wide mass email was allowed for only administrative purposes, explicitly to prevent recruitment efforts that are not conducted by universities themselves, we deploy a combination of mass email at the department

At recruitment, potential participants are informed that this is an academic research project that involves repeated surveys over the course of at least one year, and it aims to understand Chinese college students' beliefs, attitudes, and behaviors under the age of globalization. Note that the provision of censorship circumvention tool (or, internet more broadly speaking) is never mentioned during the recruitment process, which assuages concerns of sample selection based on students' interest in uncensored information *a-priori*. Upon seeing the recruitment message, interested and eligible students can start the baseline survey right away, where they have a chance to formally consent to the study procedure for the entire panel survey.[58] The baseline survey takes 90 minutes to complete on average, and students are paid US$ 15 for participation fee, and an additional US$ 10 bonus payment on average, depending on their answers in the survey. In addition, students are awarded with cash lottery awards as well as other lottery prizes.

In total, we have successfully recruited 1,807 students to participate in the study (defined by completing the baseline survey). Among them, 1,490 are from the elite university (or 15% of the entire undergraduate population), and 317 are from the lower ranked university.[59]

Treatment assignment *(December 2015)* We assign and distribute the demand treatment and the supply treatment simultaneously, after we have concluded the baseline survey. We have identified 331 participants of the study who have already purchased and currently using (any) censorship circumvention tool at the time of the baseline survey. This suggests that 22.0% of the students at the elite university and 3.4% of the students at the lower ranked university are existing users. While we include these students and follow them throughout the entire study, we exclude these students from the treatment assignment stage. We randomly assign two-thirds of the 1,476 non-existing users with the supply treatment, and cross-randomize another two-thirds to be assigned with the demand treatment.[60]

End of last round of demand treatment *(mid-March 2016)* The demand treatment lasts for 8 rounds, and it terminates approximately 6 weeks prior to the 1st follow-up survey.

level and informal social recruitment via class heads. As a result, our sample is *not* representative of the university population by cohort and by major. This does not threaten the internal validity of our findings, but should be kept in mind nonetheless. In particular, all of our baseline findings are robust to re-weighting the sample to match the composition of actual university student body.

[58] We restrict the eligibility to participate in this study to students who are full-time registered undergraduate students at these two universities, and who are a citizen of the People's Republic of China. No further eligibility restriction is imposed.

[59] We face severer political pressure to implement the study at the lower ranked university. The school administration imposes much stronger logistical hurdles for our recruitment, and terminated the planned recruitment effort before it has been fully implemented, which explains the lower number of subjects recruited from this university.

[60] We stratify the randomization at the university-gender-cohort level. The one-to-two assignment rate is chosen for the following reason: *(i)* we wish to maximize the power of experimental design, accounting for the potential low take-up rate for either treatment; and *(ii)* we wish to reserve a group of students who have received both the supply and demand treatment for a future treatment arm that will be assigned towards the end of the 18-month panel study.

1st follow-up survey *(May 2016)* Six months after we distribute the treatment, we invited all participants who completed the baseline survey to participate in the 1st follow-up survey. The follow-up survey takes approximately 60 minutes to complete, and participants are rewarded US$ 20 for participation fee, and in addition US$ 10 bonus payment depending on their answers in various modules of the survey.

Overall, 1,618 participants complete the follow-up survey, implying a panel retention rate of 90.4%.[61] Table 1 presents the summary statistics for the overall sample who have completed both the baseline and 1st follow-up survey (columns 1 and 2), and those for the existing users (column 3) and each of the 4 treatment groups separately (columns 4-7), across all items in the demographics, background characteristics and fundamental preferences section of the survey *(Panel F)* described previously. We conduct an ANOVA test for the joint differences in means across the 4 experimental treatment groups, and we report the F-statistics and p-value in column 8 and 9, respectively. Members of 4 experimental treatment groups (conditional on having completed the 1st follow-up survey) are statistically indistinguishable from each other, in terms of these characteristics examined.

4 Why don't citizens acquire uncensored information?

As we have described above, even among students at one of China's highest ranked (and most liberal) universities, close to 80% of the study participants did *not* use tools to bypass censorship and access uncensored information. We now use how students respond to our experimental treatment to investigate whether this low usage rate is driven by foreign media being costly (lack of supply), or by students not valuing uncensored information (inherently low demand), or by students underestimating the value of uncensored information due to lack of exposure (endogenously low demand).

4.1 Is it because access is costly?

Tools to bypass censorship, in spite of the low cost, still often impose non-zero monetary burden on students each month, many of whom are under relatively tight budget constraint.[62] Indeed, existing users are from households significantly richer than those who have not purchased such tools prior to the treatment assignment (Table 1, column 3). To test whether the low albeit non-zero cost associated with access to uncensored information is the key driver for students' low usage, we examine whether the supply treatment — which reduces the monetary cost to access to zero

[61] Appendix Table A.2 presents formal tests on selection attrition across the panel survey waves. We find no evidence of selective attrition based on treatment group status.

[62] In addition to monetary cost, there may also exist non-monetary cost. For example, effort cost due to search frictions — students might not know where to look for tools to bypass censorship; costs associated with unwelcoming features of some of the tools as they may make internet connections slow. By offering students with a premium tool to bypass censorship, we effectively remove many of the non-monetary as well.

and eliminates several non-monetary costs — can increase students consumption of uncensored information.

The solid black line in Figure 1 plots Group-A students' cumulative adoption rate of the censorship circumvention tool, defined in Section 3.3.1. Around 25% of the Group-A students adopted the tool on the day we distributed the supply treatment. However, after 6 rounds of repeated reminders throughout the next 4 months, still more than 50% of them choose not to use the tool even once. This is a dramatically lower rate of adoption compared to that of the Youku VIP-account, which reaches 86% within 1 week without any further reminders.[63]

The remaining 50% of the Group-A students who have eventually adopted the censorship circumvention tool do not seem to have adopted the service for the purpose of accessing uncensored information. 30% of these adopters become non-active: they failed to use the tool for more than a fifth of the days since their initial adoption, indicating a deliberate choice to uninstall the tool and restore network setting back to its status quo. More importantly, while adopters of the censorship circumvention tool spend on average 86 minutes per day on websites that are not hosted in mainland China,[64], the time they spend on browsing foreign news outlets is *not* significantly different from 0 minute. Specifically, a median user of the censorship circumvention tool in Group-A spends 0.025 minute per day (std. dev. = 2.222) browsing foreign news websites, and only a very small fraction of these students spend any time on foreign news websites at all, as shown in the solid black line in Figure 2. Finally, as shown in the solid black line in Figure 3, there is no evidence that adopters among the Group-A students gradually start to browse foreign news websites, even months into their usage of the censorship circumvention tool.

Taken together the evidence presented here, we conclude that the supply-side constraint (namely, the cost that the government imposes on accessing foreign media outlets) cannot fully explain why students don't consume uncensored information.

4.2 Is it because students inherently don't value uncensored information?

Students' low demand for acquiring uncensored information may be a critical factor that explains their low usage rate of tools to bypass censorship. In fact, although existing users of these tools before treatment assignment are from more affluent households, even controlling for their household income, these students still exhibit a significantly higher level of willingness to pay for censorship circumvention tools elicited at the baseline level, compared to those who did not use such tools (p-value < 0.001). Is students' low consumption of uncensored information driven by them inherently not valuing such information? To test this hypothesis, we check whether the demand

[63]The high claim rate of the Youku VIP-account indicates that the adoption rate of censorship circumvention tool is not artificially low because of the non-face-to-face methods that we use to communicate with students.

[64]Not all of these websites are blocked by the *Great Firewall*. The top 4 websites that Group-A students spend time on are: Google and related services such as Gmail (31% of daily browsing time, on average), YouTube (16%), Facebook (12%), and Twitter (6%). Since these websites are encrypted, we observe neither the search terms students inquire on Google, nor the specific urls that students are actually clicking through.

treatment that temporarily encourage students to consume uncensored information can effectively raise their consumption, both during the periods when encouragement is in place and beyond.

Low demand is a binding constraint We first investigate whether the demand treatment induces changes in the extensive margin of censorship circumvention tool adoption when it is added on top of the supply treatment. Figure 1 plots the cumulative adoption rate of the censorship circumvention tool for Group-AE students alongside with that of the Group-A students. One can see that the first two types of demand treatment that does not involve monetary incentives fail to generate difference in adoption rate. However, starting from the third type of demand treatment that include monetary rewards (days of distribution are marked by the solid vertical lines), the adoption pattern of Group-AE students begins to diverge upward from that of the Group-A students. Over time, the incentivized news quizzes have increased the cumulative adoption rate by 9 percentage point, which is an approximately 20% increase from the baseline adoption rate of the Group-A students. This suggests that while the monetary incentives in the quizzes are small, they are effective in booting the value of uncensored information and creating demand for Group-AE students to install the censorship circumvention tool, in order to find the quiz answers on the *New York Times*.

We next explicitly examine students' consumption of foreign news websites and exposure to uncensored information. Figure 2 shows that the demand treatment induces increase in foreign news browsing time across the entire distribution of the Group-AE students relative to the Group-A students: the median student in Group-AE now spends non-zero minute on foreign news websites (mostly the *New York Times*). We plot, in Figure 3, the average daily browsing time on foreign news websites over time, where on can see a pattern similar to that of adoption decisions: the average daily browsing time on foreign news websites among the Group-AE students remains statistically indistinguishable from zero minute during the distribution of the first two types of the demand treatment. In contrast, the news quizzes with monetary rewards (days of distribution marked by solid vertical lines) leads to a significant and substantial increase in news consumption, particularly on those days when quizzes are distributed.

Therefore, students' low valuation for uncensored information plays a crucial role in preventing them from consuming such information. When we mechanically boost the value of uncensored information, students' consumption increases accordingly.

Increased consumption persists when value boosts are not in place While students exhibit low demand for uncensored information, that does not necessarily imply they inherently do not value such information. An important prediction that allows us to test whether that is the case is that foreign news consumption among new adopters would revert back to zero on the days when we do not distribute the quizzes and do not mechanically boost the value of uncensored information.

This is not what we observe. In fact, the temporary demand treatment has generated a per-

sistent and substantial increase in students' consumption of uncensored information. There is no direct monetary incentives for students in Group-AE to visit the *New York Times* even one day after they have participated in a particular round of the news quiz — and certainly so throughout the period after the demand treatment concluded in mid-March 2016. Nonetheless, in Figure 2, even if we remove the peaks on the days of the quiz distribution, we observe consistent patterns of them not only coming back to the *New York Times* website, but also to gradually increase the time they spent on the website over time. By April 2016, Group-AE adopters spend on average 1.885 more minutes per day, or an increase by 150% on foreign news websites compared to Group-A students (p-value = 0.002), and as shown in Figure A.4, the increase is unlikely to be driven by changes in the extensive margin where the treatment leads to *more* students to begin browsing foreign news for the first time.[65] Benchmarked against a US citizen who on average spend 13 minutes browsing online news every day as of 2010, this increase represents a non-negligible component of the overall news consumption portfolio.[66] In particular, such increase has made a typical Group-AE student closer to a regular *New York Times* reader in the US: among the 0.9 million paid subscribers of the *New York Times*, they spend on average 1.829 minutes per day on the *New York Times* website as of 2014.[67]

To further illustrate how the demand treatment effectively induces students to consume information on politically sensitive topics even weeks after the demand treatment was terminated, we exploit the out break of the Panama Papers as a major news shock.[68] In Figure 4, we compare the average daily browsing time on the *New York Times* between Group-A and Group-AE students around the time when the Panama Papers was first reported. We observe that Group-AE students, who by the time of the Panama Papers news shock has already become frequent and regular visitors of the *New York Times*, spent slightly more time (also not statistically significantly different from 0) on the first day of the news shock when foreign leaders involved were reported. Two days later (April 10th, 2016), as the first report featuring the profiles of the Chinese leaders involved in the Panama Papers was published on the *New York Times* China edition, Group-AE students spent almost 6 minutes more, or a 350% increase, on browsing the website, compared to the amount of

[65] Note that such increase is almost entirely driven by the rise in consumption on the *New York Times*, which is the exclusive focus of the news quizzes. The comparison of median student in each group demonstrates an even sharper difference: while the median student in Group-A spends on average 0.025 minute on the *New York Times* per day, his counterpart in the Group-AE spends 1.235 minutes, or an increase by 4,940%, on the *New York Times* per day, conditional on having browsed the website on that particular day.

[66] This is calculated based on self-reported time usage surveys, and it includes all online news sources including social media platform. Source: "Americans Spending More Time Following the News. Ideological News Sources: Who Watches and Why" by Pew Research Center 2010. `http://www.people-press.org/2010/09/12/americans-spending-more-time-following-the-news/`, last accessed on January 18th, 2017.

[67] Source: "Social, Search and Direct: Pathways to Digital News" by Pew Research Center 2014, which is based on data collected by ComScore. `http://www.journalism.org/2014/03/13/social-search-direct/`, last accessed on January 8th, 2017.

[68] Information related to the Panama Papers was never mentioned in any of the demand treatment that we sent to students — in fact, the last round of the demand treatment was sent out 2 weeks prior to the first news reporting of the Panama Papers.

time they spent on the website 5 days ago. In contrast, Group-A students, although have been given free access to the same information, fail to respond to the news shock at all.

It is worth emphasizing that he spontaneous behaviors among Group-AE students in response to the news shock indicates that when students in China know where to look for uncensored information and become familiar with a potentially reliable foreign news outlet, they are in fact politically engaged and not afraid of consuming information that is politically sensitive — quite to the contrary, they are willing to spend substantial amount of time browsing news articles on heavily censored events.

Demand is *not* permanently low Finally, we explicitly test whether students underlying demand for uncensored information persistently changes after the temporory encouragement and a period of exposure to foreign media. We plot, in Figure 5, the average level of willingness to pay for accessing (any kind of) censorship circumvention tool, elicited using a BDM method, among students in the four experimental treatment groups as well as those who were existing users, across the baseline and first follow-up survey. One can see that at the baseline (prior to treatment assignment), the existing users exhibits approximately 70% higher level of willingness to pay for censorship circumvention tool compared to students who are not existing users. By the time of the first follow-up survey, the existing users' level of willingness to pay remains stable compared to six months ago, and the students received neither (Group-N) or only one of the treatment (Group-NE and Group-A) remain indistinguishable from their levels of willingness to pay six months ago, and also indistinguishable from each other. However, the students who have received both the supply and demand treatment (Group-AE) demonstrate a significant increase in their willingness to pay by 40%, or US$ 1.2 per month, considerably closing the gap with that of the existing users. Note in particular that such increase is the *marginal* impact of the demand treatment when it is compounded with the supply treatment, since either treatment along failed to induce significant changes in students' willingness to pay. Newly-exposed students' increase in willingness to pay for access indicates that their low level of demand for uncensored information is unlikely to be a deep trait of theirs — rather, demand for uncensored information can be persistently raised after a period of exposure.

4.3 Is it because students underestimate the value of uncensored information?

As highlighted in the conceptual framework, an important factor that potentially results in students' low demand for uncensored information and hence unwillingness to purchase censorship circumvention tool in a dynamic setting is their beliefs that uncensored information is not valuable. The pattern that students persistently increase consumption even when the demand treatment is no longer in place is consistent with this hypothesis. We now present evidence explicitly examining students' beliefs regarding the value of uncensored information and regarding media in general, highlighting the important role they play in explaining students' low demand for un-

censored information. It is important to emphasize that evidence presented below does *not* rule out other potential hypotheses that explains this pattern of persistent increase in consumption.[69]

Beliefs regarding the value of uncensored information play a crucial role Specifically, a key dimension of such belief is students' assessment of the *difference* in value between foreign and domestic media outlets, and whether this "delta" justifies the cost of access. Among others, we ask students the following question regarding the value added of uncensored information hosted on foreign news outlets (corresponding to question A.1.2 in the survey, described in Table A.1):

Suppose you have already read about a particular piece of news from domestic news outlet that is privately owned (e.g. Xinjin Paper; Caijin; Southern Weekend). How much extra information will you learn if you read news stories from the foreign news outlet (e.g. New York Times; Wall Street Journal; Financial Times) in addition?

0 = no extra information will be learned;
10 = I will learn almost everything from the foreign news outlet.

Figure 6 presents the average level of this belief for students in all four experimental treatment groups as well as the existing users prior to we assign the treatment, across both the baseline and first follow-up survey. This belief strongly predicts the usage of censorship circumvention tool prior to the treatment assignment. At the baseline, existing uses believed that foreign media outlets carry much higher value added compared to non-existing users (p-value < 0.001).

Another testable predictions based on the conceptual framework is that if belief plays an important role in shaping students' demand for uncensored information, then randomly induced exposure to uncensored information by the experimental treatment should lead students to positively update their beliefs.[70] Indeed, 6 months after the treatment assignment, the Group-AE students who have been directly exposed to reputable foreign media outlets experience a significant increase in their assessment of the value added of foreign media, converging towards the level of the existing users, while the students in Group-N, Group-NE, and Group-A remain indistinguishable from each other. This update in belief suggests that the low demand for uncensored information is potentially resulted from students' under-exposure to, or lack of prior consumption of, foreign news outlets that are blocked by the *Great Firewall*.

Additional evidence on the role played by beliefs regarding media In order to more systematically examine how students' beliefs regarding media shape their demand for uncensored information, we elicit a variety of additional dimensions of such beliefs.[71] We compare the average level of these beliefs across the four treatment groups and the existing users prior to treatment

[69] We discuss alternative explainations in details in Section 6.
[70] Formal derivation of the prediction is shown in Appendix B.2.
[71] A comprehensive list of the survey questions on beliefs regarding media is shown in Table A.1, Panel A.

assignment, at the time of the first follow-up survey, one dimension at a time. The comparison results are presented first visually on standardized outcomes in Figure 7, and then in regression estimates on non-standardized outcomes in Table 2, Panel A, where we also provide summary statistics across various groups of students.

A pattern consistent with that observed with respect to students' assessment of value added emerges. Six months after the treatment assignment, students who received only the supply treatment (Group-A) or the demand treatment (Group-NE) hold beliefs and attitudes regarding media that remain indistinguishable from that of the students who received none (Group-N).[72] However, the students newly exposed to foreign media outlets (Group-AE) have experienced changes in a broad range of beliefs and attitudes regarding media. They become: more likely to distrust domestic media outlets in China (either state-owned or privately-owned), and more likely to trust foreign media outlets *(Category A.2)*; more likely to believe that contents on domestic media outlets are censored at a heavier degree, while contents on foreign media outlets are less censored *(Category A.3)*; more likely to believe that censorship is particularly severe when Chinese media reports on negative events occurred in China, and more likely to believe that Chinese media outlets are more biased when it reports news in China and abroad *(Category A.4 and A.5)*; more likely to believe that it is unjustified for Chinese media outlets to censor potentially sensitive economic news and political news *(Category A.6)*; and more likely to be believe that such censorship is driven by the Chinese government's policies, rather than media outlets' own interests or ideology *(Category A.7)*. While the existing users continue to hold beliefs regarding media that are significantly different from that of the students who haven't been using censorship circumvention tools yet, these newly exposed users in Group-AE begin to converge towards existing users — closing the gap (although not entirely) in many belief dimensions.

Rational addiction unlikely to account for the persistent increase in media consumption The framework of one-armed bandit model highlights the critical role played by beliefs and learning to explain the persistently increased consumption of uncensored information. Broadly speaking, this framework is nested in the generic model that features intertemporal complementarity in consumption (in particular, models on habit formation).

While it is conceptually difficult to explicitly separate the one-armed bandit framework from generic habit formation models, we provide suggestive evidence that the pattern we observe is unlikely to be driven by *rational* habit formation (or, *rational* addition) where agents anticipate benefits from habituation stocks and internalize the intertemporal complementarity when making decisions (Becker and Murphy, 1988; O'Donoghue and Rabin, 2001). A key prediction of such model is that when agents are made aware of future increase in cost of consumption on goods

[72]The fact that Group-NE and Group-A students report beliefs regarding media in levels that are indistinguishable from the Group-N students assuages concerns that the treatment effect is driven by experimenter's demand effect, since Group-NE and Group-A students are presented with (one of) the exactly same treatment as the students in Group-AE.

that embodies intertemporal complementarity, they would decrease initial consumption to avoid building habituation stocks anticipating that they may switch consumption behavior at the time when cost increases. When we distribute the supply treatment, we inform a random half of the Group-AE students that the service will expire in 18 months, while for the other random half we do not make the expiration date explicit.[73] For those students who are informed of the service expiration date, it may become salient to them that there will be a future increase in the cost of consuming uncensored information, as we will terminate the free account subsidy. We find no evidence that informing service expiration date makes students less likely to adopt or use the service when it was first assigned to them. In addition, we see no noticeable pattern of these students gradually decreasing their consumption of uncensored information as the explicitly stated service expiration date draws close.[74]

5 What is the impact if students become exposed?

So far, we have presented evidence showing that when free access to censorship circumvention tool is combined with encouragement treatment, we can effectively increase students' demand for uncensored information by shifting their beliefs regarding media, which result in students' regular consumption of uncensored information over time. What is at stake when students do not acquire uncensored information? Does exposure to uncensored information impact students who are directly exposed (*private impact*)? If so, does the impact spill over to others who are in their social network (*social impact*)?

5.1 Impact on students directly exposed

To measure the impact of access to uncensored information on students who are directly exposed, we take the variation in exposure to uncensored information induced by the experimental treatment as the first stage, and estimate the changes caused by such random exposure on students' knowledge, economic beliefs, political attitudes, and behaviors. In particular, we focus here on outcomes that are elicited in a private manner, removing various social incentives (such as signaling, coordinating, conforming) that may affect students' answers. For example, we ask students to "bet" on the stock market performance in China privately, and the accuracy of his guess is rewarded with a bonus payment that is completely determined by his private bet, unrelated to how

[73] The expiration date information is also saliently displayed at the students' online account management portal. One addition reason we made such design choice is that we want to have more flexibility in varying the supply treatment service ending time of a subsample of the Group-AE students to elicit to what extent are they willing to buy back the service on their own.

[74] We acknowledge that this is a weak test of rational addiction model, because we do not explicitly measure students' expectation of future cost of consumption of uncensored information, and there may be many reasons to speculate that the treatment of revealing service expiration date may not be able to induce changes in anticipated cost. For example, if students never expect to purchase the tool after the 18-month experiment anyways, the termination of service should not affect their anticipated cost at all.

other students participated in the study perform in terms of their guesses.

5.1.1 Impact of exposure to uncensored information

We compare the average level of the outcomes of interest, one at a time, across the 4 experimental treatment groups as well as the existing users prior to the treatment assignment, at the time of first follow-up survey. The comparison results are presented first visually on standardized outcomes in Figure 8, 9, 10, and 11, and then in regression estimates on non-standardized outcomes in Table 2, Panel B, C, D, and E, respectively.

Knowledge *(Panel B)* First, we examine whether the exposure to uncensored information leads to changes in students knowledge on news events that are explicitly covered in the demand treatment where we distribute news quizzes with monetary rewards *(Category B.1)*. Note that these are the *only* outcomes of interest that are explicitly covered in the demand treatment. Across all 4 news events that we have quizzed students in the demand treatment, we find that students in the Group-AE are significantly more likely to answer these questions correctly at the time of the followup survey,[75] comparing to Group-N, Group-NE, and Group-A students, who are statistically indistinguishable from each other.[76]

Moreover, we find that exposure has significantly increased Group-AE students' likelihood of being able to answer quizzes on other censored news events as well *(Category B.2)*, even if these events are not explicitly covered in our demand treatment.[77] This contrasts with the events that are *not* censored on the domestic media during the same period of time, regarding which the Group-AE students exhibit no noticeable difference in their likelihood to answer quizzes correctly. In other words, exposure leads to increased informedness in specifically defined knowledge domain that is otherwise unavailable on the domestic media outlets.[78]

[75]These quizzes in the 1st followup survey cover the same material as the ones in the demand treatment, but in different format.

[76]Notice that while the existing users of the censorship circumvention tools are significantly more likely to answer these quizzes correctly as well, here we observe one of the rare cases that the newly-exposed Group-AE students exhibit correction rate even higher than that of the existing users — presumably because we have directed Group-AE students' attention on this set of particular news events, while the existing users might have omitted them in their regular news consumption.

[77]Although it is likely that students in Group-AE can use Google to search for answers to the quizzes during the survey, we do not think this is what driving the differences in Group-AE students' level of knowledge. First, we intentionally do not reward students on their correctly answer in this module to mitigate their incentives to search for answers during the survey. Second, Group-A students have access to Google as well, yet one does not see an increase in knowledge among them. Third, throughout the knowledge module of the survey, the time students spent on the modules does *not* significantly predict their likelihood of answering quizzes correctly; on average students spent 6.7 seconds per question. We plot the distribution of time spent and number of clicks recorded in the knowledge module across treatment groups, first among all study participants in Figure A.5, then for those participants who answered more than half of the questions correctly in Figure A.6. One can see that there is no evidence that Group-AE students spent significantly longer time or submitted more clicks during the knowledge module, compared to other groups of students.

[78]In other words, among the university student population in our experimental sample, those students who remain unexposed (directly) to uncensored information are not ignorant or broadly uninformed about current affairs. In fact,

Apart from news events themselves, exposure also makes Group-AE students more knowledgeable in censored notable figures in China who are featured in recent politically sensitive events (*Category B.3*).[79] As two placebo tests, we show that exposure induces increase in knowledge on neither figures who are politically nonsensitive, nor a fake name that we created ("Lequn Jia").[80] Interestingly, notable figures who are politically censored and *not* featured in event events remain unheard of even among the Group-AE students. We speculate that this is because news outlets serve as crucial information portals, and the search cost of information particularly with respect to hundreds of names that are censored by the *Great Firewall*) becomes substantially higher if these names do not appear on the news outlets directly.[81]

This, however, does not imply that students never go beyond current news events covered on the *New York Times* to acquire uncensored information that is relatively more costly to search. As one can see from Figure 8, Category B.4, students in the Group-AE are significantly more likely to become aware of a range of protests and independence movements in the past, particularly those events that took place in the Greater China region (e.g. the Umbrella Revolution in 2014).[82] The increased knowledge on these events suggests that newly-exposed students may realize that if there are many current censored events whose existence they are unaware of, there probably exist many more events occurred in the past that are also censored and hence of which they are ignorant. As a result, we observe them beginning to explore additional websites blocked by the *Great Firewall* — in particular *Wikipedia*, which serves as the "information portal to the past."[83]

Lastly, we investigate the impact of exposure to uncensored information on students' meta-knowledge: their assessment of their own level of informedness of political events in China, and their assessment relative to other students at the school *(Category B.5)*. We find that while exposure has made Group-AE students more likely to consider themselves as better informed of the political issues in China in the absolute term, when they compare themselves with peers, they become more *pessimistic* of their own level of informedness, believing that other students are in general

they exhibit a fairly high level of informedness based on their correction rate in answering the news quizzes on uncensored events — however, they are noticeably under-informed in the specific domains where information is censored by the government and unavailable on the domestic news outlets.

[79]These figures are covered in news stories only available on uncensored foreign media outlet during the period between the baseline and the first follow-up survey. For example, when the *Great Firewall* began to censor Zhiqiang Ren in March 2016, the *New York Times* publishes an article "Critcicizing the media mouthpiece of the Chinese Communist Party, Zhiqiang Ren becomes censored", which explicitly describes the censorship decision and the speculated cause of Ren's becoming politically sensitive (source: `http://cn.nytimes.com/china/20160229/c29chinaren/`, last accessed on January 14th, 2017.)

[80]Additionally, the level of awareness of Lequn is the lowest (statistically indistinguishable from 0) across all 11 names that we measure, indicating that students are not randomly clicking during this part of the survey, and our simple binary measurement of knowledge indeed captures some meaningful variation across the students.

[81]Similar information portal effect is documented by Athey and Mobius (2012), in the context of Google News platform.

[82]These events are always considered highly politically sensitive and are treated with tight censorship by the *Great Firewall*. See, among others, King, Pan, and Roberts (2013) and Tai (2015).

[83]As a placebo, we ask students their awareness of a fake protest event that we created ("Tomorrow Revolution") — proportion of students who indicate that they have heard of this event is indistinguishable from zero, and we find no impact of the exposure to uncensored information in this dimension.

more informed than themselves.[84] This pattern of optimism of other students is a more general phenomenon that we observe. We explicitly study this optimism and its implications on students higher order beliefs and coordination outcomes in a companion paper (Chen and Yang, 2017).

Economic beliefs *(Panel C)* We find that students newly exposed to uncensored information lower their belief regarding China's GDP growth rate in 2016, elicited in an incenticized and private manner, by 1.3 percentage point (to 6.3%) where the actual growth rate is estimated to be 6.7%. This is a substantial decrease in optimism, since these students now hold growth rate belief that falls *below* the government's explicit target (6.5-7.0%), in contrast with the above-target beliefs held by the unexposed students. Moreover, exposure also results in Group-AE students to lower their beliefs on the Shanghai Stock Composite Index at the end of 2016 by 369 index points (to 2,879), where the actual closing level of the index on December 31st, 2016 is 3,104. Opposite to the increased pessimism on China, exposure has made the Group-AE students more optimistic about the economic performance in the US: comparing to students who remain unexposed to uncensored information, they believe a higher GDP growth rate in the US during 2016 by 1.0%, and a higher Dow Jones Index on December 31st, 2016 by 1,247 index points.[85]

In addition, we elicit and examine how exposure affect students' confidence with respect to their guesses on the economic performance in China *(Category C.2)* and in the US *(Category C.4)*, which is conceptually similar to meta-knowledge as in Category B.5 described above. One can see that while exposure to uncensored information has significantly affected students' elicited beliefs, it barely changes their levels of confidence regarding the guesses as compared to those of the unexposed students.[86]

Political attitudes *(Panel D)* Next, we measure a comprehensive set (a total of 11 categories) of students' political attitudes, and we examine to what extent these attitudes are reshaped after students have been exposed to uncensored information.

We find that comparing to the unexposed students in Group-N, Group-NE, and Group-AE, the newly exposed students become: more likely to believe that both the economic and political sys-

[84] In particular, students who are not exposed to uncensored information (and hence are less knowledgeable in censored events) are *more* optimistic about their relative level of informedness as comparing to the newly exposed students. This suggests a degree of over-confidence among the non-exposed students, potentially also accounting for their low demand for uncensored information — since they believe that they are already fairly informed and hence no need to obtain information from more accurate sources.

[85] We observe a pattern of anchoring when students guess the GDP growth rate in the US: since most students have no prior knowledge on the scale of GDP growth rate in the US, many halved their guess of the Chinese GDP growth rate to form their guess on the US growth rate — making the average guess on the US GDP growth rate to be 3.2% among our study subjects. This implies that students while being more optimistic, they are uniformly moving away from truth growth rate, since their anchoring point on the US GDP growth rate is considerably higher than historical growth rate, which is 1.4% in 2015.

[86] This is yet another piece of evidence suggesting that students unexposed to uncensored information may be overconfident regarding themselves, failed to realize their need for more accurate information sources, and hence resulting in their low demand for foreign media outlets and uncensored information.

tem in China need fundamental changes *(Category D.1)*; more likely to state distrust towards the central, provincial and local government of China, China's domestic financial institutions, while more likely to state a higher trust towards the government of Japan and the US, as well as NGOs in general *(Category D.2)*; more likely to be unsatisfied with the Chinese government's performance in economic development and domestic politics (while unchanged in their level of satisfaction in the domain of diplomatic affairs) *(Category D.3)*; not significantly different in terms of the criteria that they use to evaluate government's performance *(Category D.4)*; more likely to consider socioeconomic issues ranging from welfare to employment, to environmental pollution, to inequality, to government corruption, to discrimination against minority groups to be more severe a problem in China today *(Category D.5)*; more likely to downgrade their rating on the level of democracy and human rights protection in China, and more likely to believe that China is currently operating in manners that fail to care for the masses *(Category D.6)*; more likely to think that controversial polices, ranging from policies towards minorities, to internal migration restrictions, to one-child policy, to policies towards Hong Kong and Taiwan, to government's use of violence to maintain social stability, to the decision to refuse admission of refugees from the North Korea, to be unjustified; and more likely to believe that liberal issues, ranging from legalizing homosexual marriage, to legalizing prostitution, to abortion, to be justified *(Category D.7)*; more likely to state that they are willing to battle illegal actions conducted by the government, and willing to stand up to fight for the weak (although unchanged in terms of their willingness to report government's misconduct) *(Category D.8)*; and more interested in political and economic issues in general *(Category D.9)*.[87] We find that exposure does not lead Group-AE students to hold a weaker national identity, as measured by students' pride in being Chinese *(Category D.10)*.

Importantly, we find that exposure to uncensored information has made students slightly more fearful of expressing critical attitudes toward the government *(Category D.11)*, presumably because they are now informed of many political persecution cases and pressure that the government is exerting on political dissidents. It is worth highlighting that the average level of self-reported fear among our study participants is of scale 5.0, indicating "so-so" or only a slight level of fear, which is consistent with our list experiment results as described in Section 3. The marginally increase in fear induced by exposure suggests that the impact on other sensitive political attitudes is likely to be underestimated.

Behaviors and planned behaviors *(Panel E)* Finally, we investigate whether exposure to uncensored information changes students' (self-reported) behaviors and planned behaviors for the near

[87]The discussion of whether students become more informed of "truth" after consuming uncensored information from foreign media outlets requires us to take a stance on whether reports from the *New York Times* are closer to "truth" than the ones found on, say, the *People's Daily*. It is challenging to define "truth" in different news scenarios, particularly in domains beyond knowledge itself. News reports from the *New York Times* is liberally biased (Groseclose and Milyo (2005) and (Gentzkow and Shapiro, 2010)). However, we do believe that when students in our experiments are on average moving, for example, from rating China's level of human rights protection at 4.6 (fairly good) down to 3.4 (fairly unacceptable), students are indeed approaching an assessment more aligned with truth (or reality)

future. Echoing Group-AE students' increased consumption of foreign media and updated beliefs regarding media, we find that they have shifted away from domestic media outlets as important sources of information, and substituting them with foreign media outlets and foreign social media — although domestic social media remains as the most important source *(Category E.1)*.[88]

Moving beyond behaviors concerning media consumption, we find that exposure has made students: more likely to engage with other students to discuss political topics *(Category E.2)*; more likely to pull out their investment from the Chinese stock market, although the base rate stock market participation rate is only 5%) *(Category E.3)*; more likely to planning on leaving China in the near China by attending graduate school oversea *(Category E.4)*; and more likely to prefer foreign cities as location for future work and living, while stay unchanged in their sectorial preferences of their career had they stayed in China *(Category E.5)*.

5.1.2 Heterogeneity in marginal private impact of information

Is the private impact of uncensored information uniform across students? Who is more affected by the exposure to uncensored information, and hence may attach a higher value to the access to such information? To address these questions, we compare the exposure effect on students' valuation of foreign media outlets,[89] separately estimated on subsamples split according to 5 broad categories of criteria:[90] *(i)* personal characteristics (e.g. male vs. female; rural vs. urban); *(ii)* educational background (e.g. elite vs. 2nd tier university; science vs. humanities track); *(iii)* English ability and oversea travel experiences (e.g. passed at least English Level 4 vs. not; traveled to foreign countries during the past 3 years vs. not); *(iv)* fundamental preferences (e.g. risk preferences, time preferences, altruism, reciprocity); and *(v)* knowledge, beliefs and attitudes at the time of baseline survey (e.g. valuation of foreign media access; knowledge in censored news events; trust in the government).

Figure 12 presents the estimated exposure effect (regression coefficient on Group-AE indicator, relative to that of Group-N, Group-NE, and Group-AE students pooled together), first on the full sample, then on each of the split subsamples. We find that marginal private impact of uncensored information is the highest among students who lack alternative access to uncensored information — those who resided in non-coastal regions (less developed and less liberal) prior to coming to college in Beijing, from rural parts of the country, have not been to Hong Kong, Taiwan, or other

[88] Relatedly, they also report to visit foreign websites for the purpose of information more frequently.

[89] This is an z-score index summarizing students' willingness to pay for censorship circumvention tool, and their belief on the value added of foreign media outlets, elicited at the first follow-up survey. Due to space constraints, we would not be able to present heterogeneity analysis results on all outcome variables that we have examined so far. Those results are available upon requests from the authors.

[90] The dimensions we use to split the sample corresponds to all demographics, background characteristics, and fundamental preferences listed in Table 1 and Table A.1, Panel F, as long as they provide a split that is sufficiently statistically powerful. For example, we are unable to split the sample based on students' membership at the Chinese Communist Party, since only 6% of the students in our experimental sample are party members. In addition, we also split the sample based on a variety of baseline level of knowledge and attitudes that students report.

foreign countries during the past three years, growing up in poorer households, with parents who are not educated, did not work for the government related firms/organizations, and not members of the Chinese Communist Party (hence less politically connected). For these students who come from relatively more disadvantageous background, exposure to uncensored information can generate more dramatic shocks to their prior beliefs and knowledge of China today, leading them to experience the highest marginal gain in value from the uncensored information.

Moreover, marginal private impact of uncensored information is highest among those students who are more receptive and exhibiting the biggest gap in knowledge and attitudes comparing to existing users — those who started off with a high valuation of foreign media before treatment assignment, who are less informed about contemporary and historical political events, and who are more trusting of the Chinese government are more affected by the exposure to uncensored information, compared to their counterparts. Among these students, exposure to uncensored information has *actually* induced the biggest impact in terms of their knowledge, economic beliefs and political attitudes by the time of the first follow-up survey. Accordingly, these students come to appreciate the value of uncensored information and increase their valuation of access to uncensored information the most.[91]

It is worth noting that even for the subgroups of students who are from advantageous background, who may have alternative access to uncensored information, and who are already fairly informed prior to the treatment, we still identify a positive treatment effect of exposure. This indicates that while these factors investigated here can be substitutable for direct access to uncensored information during college, they rarely crowd out the direct exposure effect completely.

5.2 Social spillover of politically sensitive knowledge

Exposure to uncensored information can also generate social impact that affects students beyond those who are directly exposed. Quantifying the rate of social transmission of information is important for two reasons. First, estimation of the impact of direct exposure is downwardly biased if there is social spillover of information. The rate of social transmission can help us adjust and benchmark when we interpret the overall impact of exposure that we present in the previous section. Second, the rate of social transmission determines whether the small fraction of citizens who have access to uncensored information are sufficient to spread politically sensitive knowledge to majority of the population.

[91] Evidence presented here does not support the hypothesis that persistent change in newly-exposed students' consumption of uncensored information is driven by habit formation or rational addiction to the new information source. In other words, there does not seem to exist a "news junkie" type, who are "addicted to (any kind of) news" — highly informed in the censored domain prior to having access to uncensored information, and also become highly informed of the politically sensitive events once they are exposed to uncensored information, simply because they spend significant amount of time on (any kind of) news, and access to foreign media outlets simply induces them to shift the platform where they consume news information. In other words, it is *not* the case, at least in our experimental subject population, that previously uninformed and uninterested students prior to having access to uncensored information remain uninformed and uninterested after the exposure of uncensored information.

In particular, newly-exposed students become more likely to discuss political issues with one another (as we have shown using self-reported frequency of social interaction in Section 5.1). Does such increased communication result in social spillover of knowledge? Focusing on the social network of college dorm roommates, we estimate a simple social learning model to quantify the scale of social spillover of knowledge that is caused by a sub-group of the students population start to have access to uncensored information.

Model We consider a student's probability of getting to know a specific news event censored on domestic media as a combination of: *(i)* the probability of *direct learning* if one has access to foreign media outlets himself; and *(ii)* the probability of *social learning* from roommates who have access and have learned about the event.[92] Specifically, the probability that a student learns about a particular censored news event j is:

$$ProbKnowing_j\Big(I(own), N(roommate)\Big) = \alpha_j + I(own) \cdot p_j + q_j\Big(I(own), N(roommate)\Big)$$

where $I(own) \in \{0, 1\}$ indicates whether a student has access to uncensored information himself, and $N(roommate) \in \{0, 1, 2\}$ denotes the number of roommates who have received access to uncensored internet.

The rate of *direct learning* is captured by p_j, which is the marginal increase in the chance of learning a censored news event if a student has access to uncensored internet himself, compared to the counterfactual if he was to have no access. We allow p_j to vary across different news events to reflect the fact that some events are high profile and attract attention, while others are not.[93] In addition, we include a "base-rate" learning probability, α_j, to account for the fact that the probability of getting to know a specific news event is not zero even among students with neither direct access to uncensored information themselves nor roommates who have direct access.[94]

The key *social learning* term, $q_j(I(own), N(roommate))$, is defined as the marginal increase in a student's probability of getting to know a censored news event if his roommates have direct access to uncensored information. We specify it as the following:

$$q_j\Big(I(own), N(roommate)\Big) = 1 - \Big((\alpha_j + p_j)(1 - f_{I(own)}(p_j)) + (1 - \alpha_j - p_j)\Big)^{N(roommate)}$$

where $f_{I(own)}(p_j)$ is the "rate of social transmission": the chance of learning about a censored news

[92] College roommates are vital components of the social interaction and social network experienced by typical college students in China. An university dorm in our experimental setting consists of 4 students, assigned by the school administration. All students residing in each dorm belong to the same cohort and same major program (or department).

[93] We don't, however, allow p_j to differ between existing users and students who newly adopted the service, because empirically we find their estimated rate of direct learning to be statistically indistinguishable from each other.

[94] α_j may capture the fact that for the binary quiz questions that we use to measure knowledge, students have a 50% chance of answering the question correctly if they submit a random answer. In addition, α_j captures social learning beyond roommate network and other source of information.

event from roommate who has access to uncensored information and is already informed of the event himself. One can see that when $N(roommate) = 1$, the social learning term q equals the rate of social transmission times the probability that a roommate with direct access to uncensored information becomes informed of the censored event himself.[95] We allow $f_{I(own)}(p_j)$ to differ between students who have direct access themselves and those who don't. In order to reduce the degree of freedom of the model, we specify $f_{I(own)}(p_j)$ as a function of the rate of direct learning p_j, and for simplicity, we assume that $f_{I(own)}(p_j) = \gamma_{I(own)} p_j$. When $\gamma_{I(own)} > 0$, the news events that exhibit higher rate of direct learning would also have a higher rate of social transmission. Overall, the three parameters of α_j, p_j, and $\gamma_{I(own)}$ together pin down $q_j(I(own), N(roommate))$.

Identification We exploit the experimental variations in both $I(own)$ and $N(roommate)$ to identify the three key parameters. $I(own)$ indicates whether a student has access to uncensored information himself: $I(own) = 1$ for students in the Group-AE or who are existing users, and 0 otherwise;[96] and $N(roommate) \in \{0, 1, 2\}$ denotes the number of roommates who have received access to uncensored internet due to the experimental treatment.

We use the subsample of students who have zero or only one roommate assigned with the supply treatment of free censorship circumvention tool ($N(roommate) = 0$ or 1) to conduct the baseline model estimation. In addition, given that existing users are excluded from the subsequent treatment assignment, we restrict the estimation sample to those students who started off with zero roommate who is existing user prior to treatment assignment, so that the chance of having zero or one additional roommate being assigned with the supply treatment is uniform across the students in the estimation sample.[97] We then use the sample of students with $N(roommate) = 2$ to conduct out-of-sample tests of the model predictions.

We follow the following estimation procedure:

1. α_j equals the probability of getting to know censored news event j (namely, being able to answer the corresponding news quiz correctly), if the students do not have direct access to uncensored information themselves ($I(own) = 0$), and have no roommates who have direct

[95] Note that the structure of $q_j(I(own), N(roommate))$ implies that becoming informed of a censored news event is an absorbing state, and that learning from one roommate or more roommates exhibit the same empirical outcome – being able to answer the corresponding news quizzes correctly. Thus, when $N(roommate) = 2$, q equals 1 minus the probability of not having learned from any roommate who is informed of the censored event.

[96] We do not consider Group-A students as $I(own) = 1$ since we have shown that these students do not consume uncensored information and do not show a significant increase in their knowledge on censored news events, comparing to students who do not have access at all.

[97] A related reason we excluse students reside with existing users prior to treatment assignment is that we find high degree of clustering of existing users across the dorms. In particular, at the time of our baseline survey (hence prior to treatment assignment), 74.8% of the existing users of the censorship circumvention tools have at least 1 other roommate (31.1% have 2 or more) who are also currently using the tool. In contrast, among students who have not used censorship circumvention tools by the point, only 26.7% of them have at least 1 other roommate (and 9.3% with 2 or more) who are current users. Therefore, students who have not adopted censorship circumvention tool despite of living with multiple roommates who have done so are likely to be systematically different from their counterparts who live with no roommates who have adopted the tool.

access either ($N(roommate) = 0$);

2. p_j equals the increase in the probability of getting to know censored news event j among students who have no roommate with direct access to uncensored information ($N(roommate) = 0$), if these students now have direct access themselves ($I(own) = 1$);

3. $f_{I(own)}(p_j) \cdot (\alpha_j + p_j)$ equals the increase in the probability of getting to know censored event j if the students have 1 roommate with direct access to uncensored information ($N(roommate) = 1$), compared to those who do not have such roommate. We do so separately for those students with $I(own) = 0$ and $I(own) = 1$. Since we have estimated α_j and p_j already in the previous two steps, we can back out $\gamma_{I(own)}$ straightforwardly.

Estimation results The empirical moments used for estimation are shown in Figure 13, as well as Table 3, Panel A. The estimation results are presented in Panel B. Overall, we find that the baseline probability of learning censored news event (α_j) is ranges from 0.560 for the knowledge regarding the Panama Papers, to 0.450 for the knowledge regarding the censorship of the *Economist* magazine. The rate of direct learning from having access to uncensored information (p_j) is estimated to be as high as 0.333 for the Panama Papers, and as low as 0.106 for the censorship of the *Economist*. Note that based on the level of p_j, the 4 dimensions of censored news events are roughly divided into two groups: high-profiled events (the Panama Papers, and the cause of stock market crash) with direct learning rate close to 0.300, and low-profiled events (the film on Hong Kong independence, and the censorship of the *Economist*) with direct learning rate close to 0.100.

Three patterns emerge. First and foremost, we identify *positive* social spillover of knowledge among college roommates. Specifically, the γ is estimated to be 0.391 for students who have direct access themselves, and 0.659, or 70% higher, for those students who do not. Accordingly, the implied rate of social transmission of knowledge from a student who has directly learned of the censored event to a fellow roommate who also has direct access to uncensored information is 0.130 for the news of Panama Papers. Second, such rate doubles if the recipient is a fellow roommate who has no direct access himself. In the dimension of Panama Papers, for instance, the implied rate of social transmission to fellow roommates with no direct access is 0.220.[98]

Third, the social transmission rate is indeed lower among lower-profiled events. For example, we estimate that the transmission rates concerning the news of the censorship of the *Economist* magazine decrease to 0.041(toward a student who have direct access himself) and 0.070 (toward a student who have no direct access). While we have assumed that the transmission rate increases with the direct learning rate p_j, the γ_j's estimated are quite stable across news dimensions (j), suggesting that this linear structure that we assume is reasonable.

[98]Overall, the transmission rate from an informed student who has direct access to any roommate is 15%, across all 4 news dimensions.

Predictions and out-of-sample tests Given the social learning model that we have estimated, and given $I(own)$ and $N(roommate)$, we can predict students' rate of being able to correctly answer quizzes on various censored news events. In particular, using the α_j, p_j, and $\gamma_{I(own)}$ estimated from subsample of students with $N(roommate) = 0$ or 1, we predict the rate of learning among students with $N(roommate) = 2$, and test the predictions against their actual rate of learning.

We present the model predictions on the percentage of students who can answer news quizzes correctly across the 4 news events in Table 3, Panel C, where we also show the actual percentage in the corresponding group. Similarly, we plot the predicted (dotted horizontal lines) and actual (vertical bars) rate of correct answers among students with $N(roommate) = 2$ in Figure 13. One can see that our model performs fairly well in this out-of-sample prediction exercise, with the prediction errors remain smaller than 0.015 across all 4 dimensions of the censored news events.

Another important implication of the model is that depending on the overall percentage of students who have direct access to uncensored information, the level of informedness across the entire student population on high-profiled censored news events (namely, those with high rates of direct learning) can become close to fully saturated due to social spillover, despite of the information control via censorship. In contrast, low-profiled censored news events whose rates of direct learning fail to surpass certain threshold can remain under-informed across the population, as the momentum of social spillover is not strong enough to saturate the entire social network. We observe such separation of the level of informedness across student population that corresponds to the two types of censored news event based on their rates of direct learning. Students who have direct access to uncensored information and reside with 2 other roommates with direct access become informed of the high-profiled censored events (the Panama Papers, and the stock market crash) with probability close to 1. Getting informed of the low-profiled events (the Hong Kong independence film, and the censorship of the *Economist*), on the other hand, is far from certain: the chance does not exceed 60%.

Simulation of knowledge on politically sensitive events Given the rate of social spillover that we have estimated, and the social networks of university dorms that we observe, we conduct a simple simulation exercise to predict the population level knowledge on politically sensitive events among the students across the entire domain of the rate of students' directly learning such event from having access to uncensored information. The simulation results are shown in Figure A.7. The presence of social transmission of knowledge shifts up the population learning schedule However, one can see that the schedule given the proportion of students having direct access prior to the experiment falls below the 45-degree line, indicating that the social transmission rate is modest such that the schedule does not cross the threshold of a tipping point where the entire population becomes informed.[99] The experiment substantially shifts the population learning

[99]This schedule is likely to be upward biased, since the simple social learning model that we focus on does not include students' incentive to free-ride on other students' access, which decreases the likelihood that students purchase access

schedule upward, but given the relatively small scale of the experiment, it is still unable to make the entire student population fully saturated in terms of knowledge.

6 Conclusion

Media censorship is prevalent in authoritarian regimes, many of which spend tremendous amount of resources to make ensure that citizens have no access to regime-destabilizing information. Little is known, nonetheless, regarding how and why censorship works, especially in this age of internet and global connectedness where the blockage of access becomes increasingly costly and technologically challenging.

In this project, we conduct a field experiment among college students in China to test whether censorship effectively restrict citizens' information consumption through imposing demand-side constraint, or through inducing supply-side constraint where citizens do not demand uncensored information in the first place. We find that even among the highly educated students in one of China's most elite and liberal university, cost of access is not the entire story: their low demand for uncensored information is a crucial reason why they don't acquire such information. Heterogeneity analyses suggest that demand constraint may play an even more prominent role among the less prevailed masses of Chinese citizens. Importantly, beliefs that uncensored information is not valuable and foreign media outlets are not trustworthy play contribute to the low demand, but such beliefs can be updated after a sustained period of exposure to foreign media outlets. In addition, we find that uncensored information is indeed valuable, both privately and socially, to students in non-democratic regimes who may not be able to react to such information through political participation, and newly exposed students to internalize at least some of the value as they raise their willingness to pay for censorship circumvention tools.

Our findings suggest that one cannot ignore the demand-side factors in order to comprehend how internet censorship works in China today, as it is potentially more dynamically complex than the world pained by Orwell's *1984*. In particular, this implies that the censorship apparatus in China can be both robust and fragile, depending on the level of demand for uncensored information among the citizens. We simulate entire student population's level of knowledge and belief on government corruption across these counterfactual scenarios in Figure 14. At the current level of demand (and coupled with a moderate rate of social transmission of knowledge), the regime seems incredibly robust, and the Chinese government does not need to bear the extremely high cost to fully "seal" its internet as it can afford leaving some holes open — neither would the masses begin to respond to negative news shocks, nor would the information-demanding elites become irritated and the business interests of those who hinge on global internet connection be sacrificed. Nevertheless, when citizens raise their demand for uncensored information (presumably through

to uncensored information in the presence of social transmission.

some dose of exposure), the increased demand is likely to persist, and this would impose substantial pressure on the censorship apparatus to tighten its grip.

This demand-driven censorship is likely to be a story not unique to contemporary China, and many are trying to immiate the censorship practice of the Chinese regime.[100] The current Russian regime enforces firm censorship over the TV media, while leaving the internet and in particular the social media landscape largely uncensored; the East German government during the Cold War employed heavy propaganda and censorship campaign, while simultaneously *de facto* allowing its citizens to purchase antenna to access West German TV if they are sufficiently interested. Would such censorship strategy work effectively even for small countries where there lack domestic media outlets that can substitute their foreign counterparts and fully satisfy the demand of domestic audience (e.g. Pan (2016))? If media company's business model to serve exclusively the small domestic market is not viable, would authoritarian regime subsidize these outlets in order to sustain the demand-driven censorship strategy? These are fascinating questions for future research.

[100]China is actively "exporting" its internet censorship technology to other countries. For example, regimes such as Cuba, Zimbabwe, and Belarus have received censorship technological assistance from China, according to the *Reporters Without Boarders*. More recently, it was reported that China is in close touch with Russia to aid its internet censorship capacity (*The Guardian*, November 29, 2016).

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Figures and tables

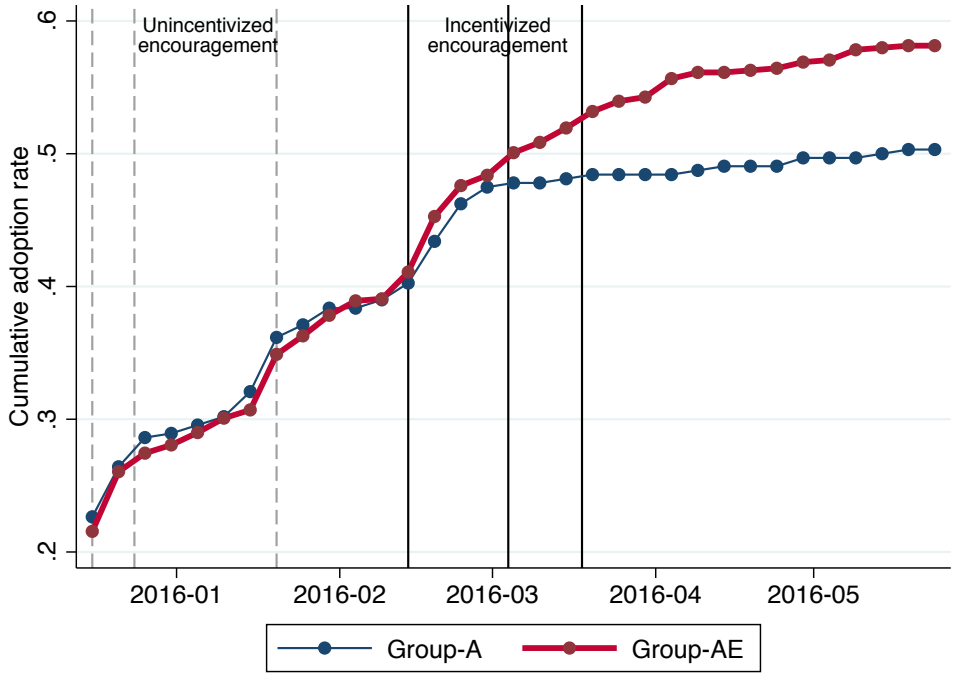


Figure 1: Cumulative adoption rate of censorship circumvention tool over time, among Group-A and Group-AE students. Adoption is an indicator equals 1 if students install the tool and use it at least once. For Group-A students, dotted and solid verticle lines indicate the dates of reminder sent to students. For Group-AE students, dotted vertical lines indicate the dates of unincentivized newsletters; and solid vertical lines indicate the dates of incentivized news quizzes.

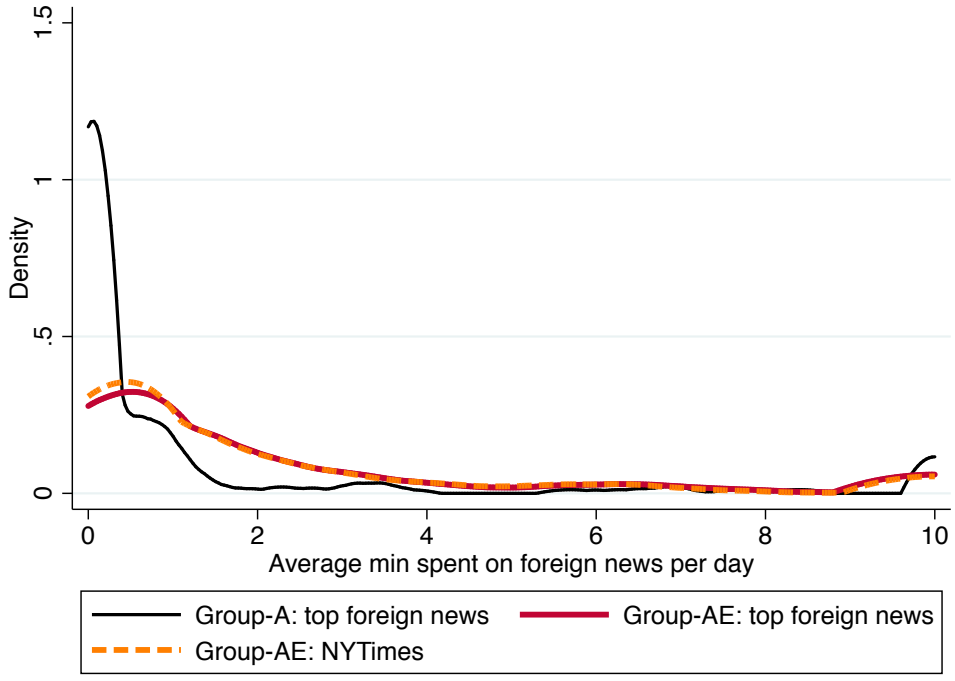


Figure 2: Density plot of daily average browsing time on foreign news websites (min) among Group-A and Group-AE students who have adopted the censorship circumvention tool. usage Browsing time is calculated conditional on adopting the service. Foreign news websites consist of top 20 news sites based on *Alexis Top Websites*. *NYTimes* browsing time includes both its English and Chinese websites.

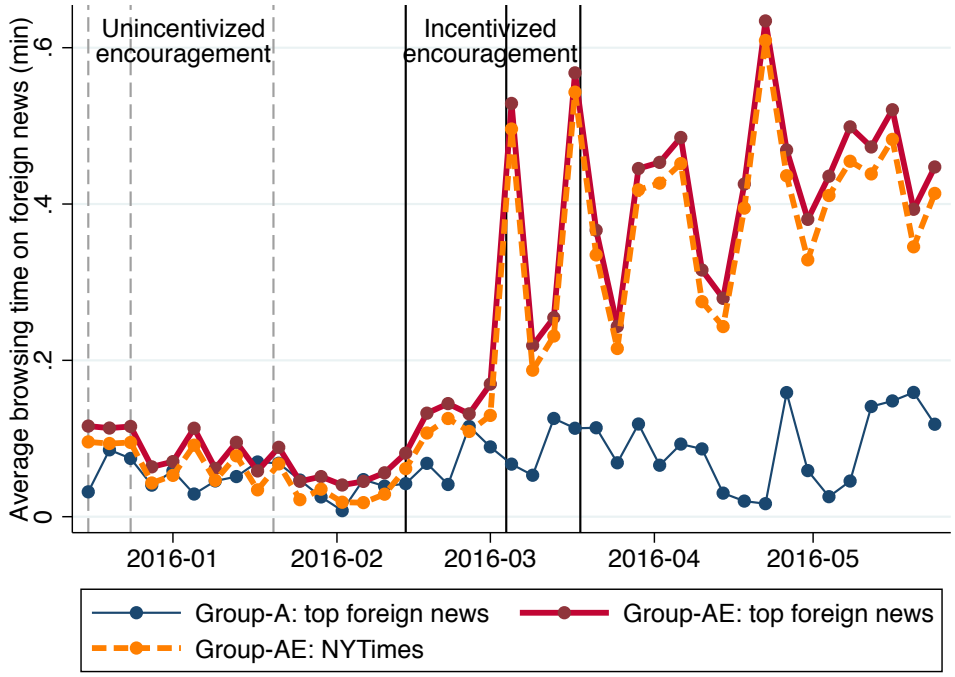


Figure 3: Average browsing time on foreign news websites (min) over time, among Group-A and Group-AE students. Foreign news websites consist of top 20 news sites based on *Alexis Top Websites*. *NYTimes* browsing time include both its English and Chinese websites. Dotted vertical lines indicate dates of newsletters without monetary incentives; solid lines indicate dates of newsletters with monetary incentives (quizzes).

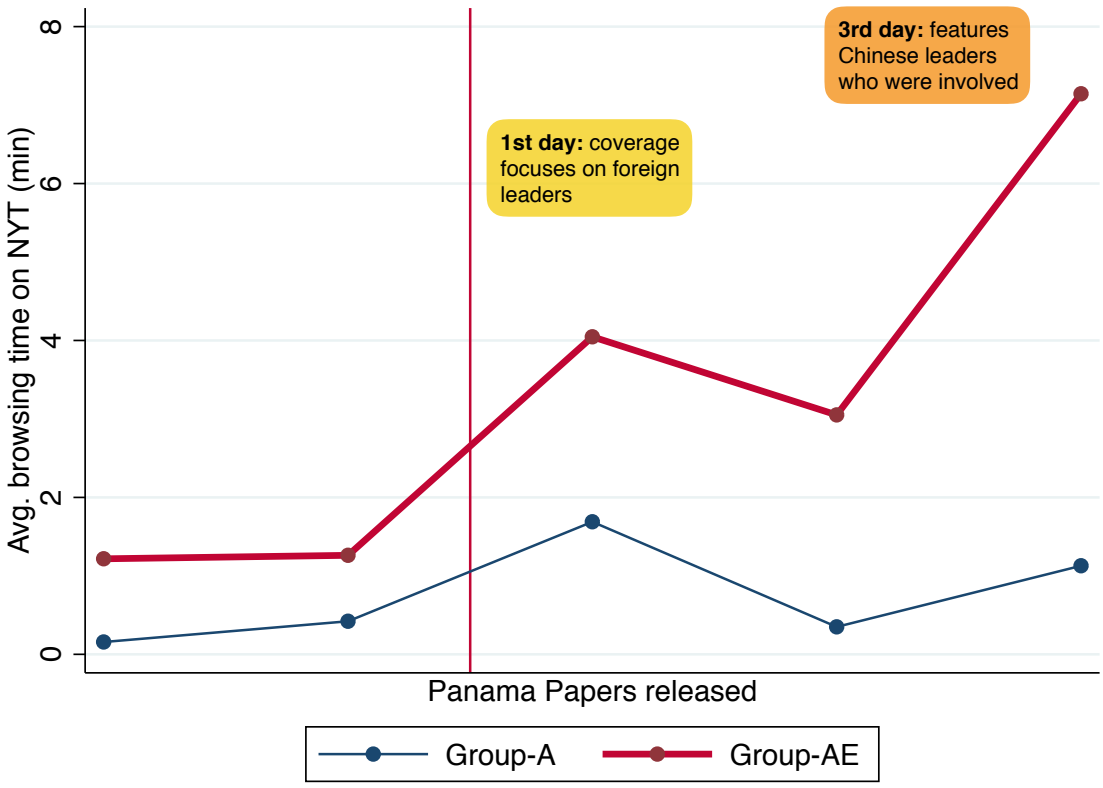


Figure 4: Browsing time (in minutes) on the *New York Times* around the time when the news of Panama Papers was reported (April 2016), for both Group-A and Group-AE students. The publication of the first Panama Papers news story is marked by the vertical red line.

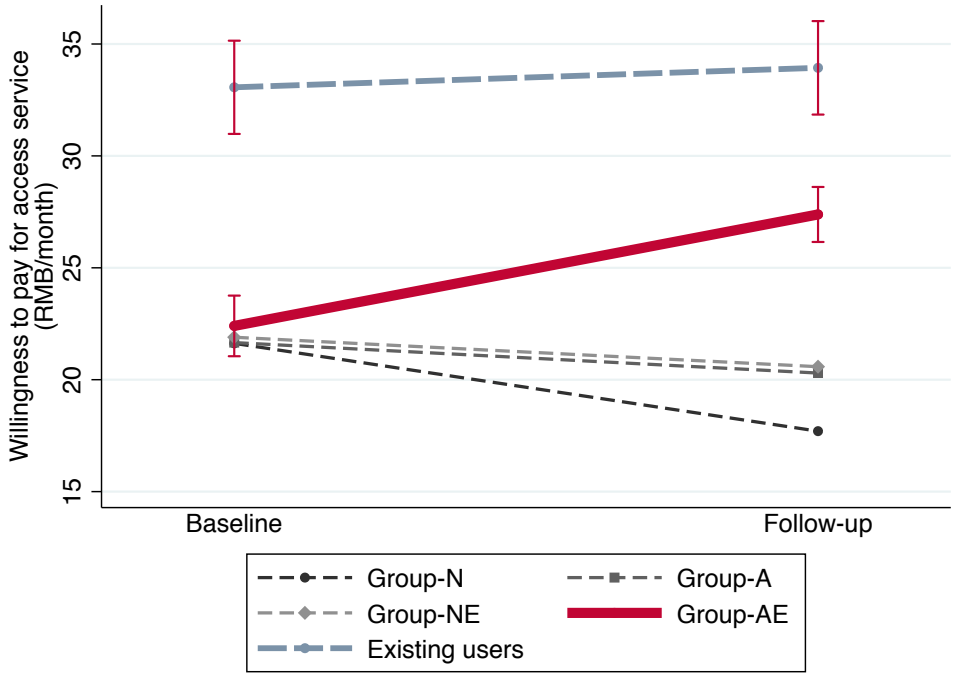


Figure 5: Average level of willingness to pay for accessing censorship circumvention tools (RMB per month), elicted using a BDM method, for students in all four experimental treatment groups and existing users, across the baseline and first follow-up survey.

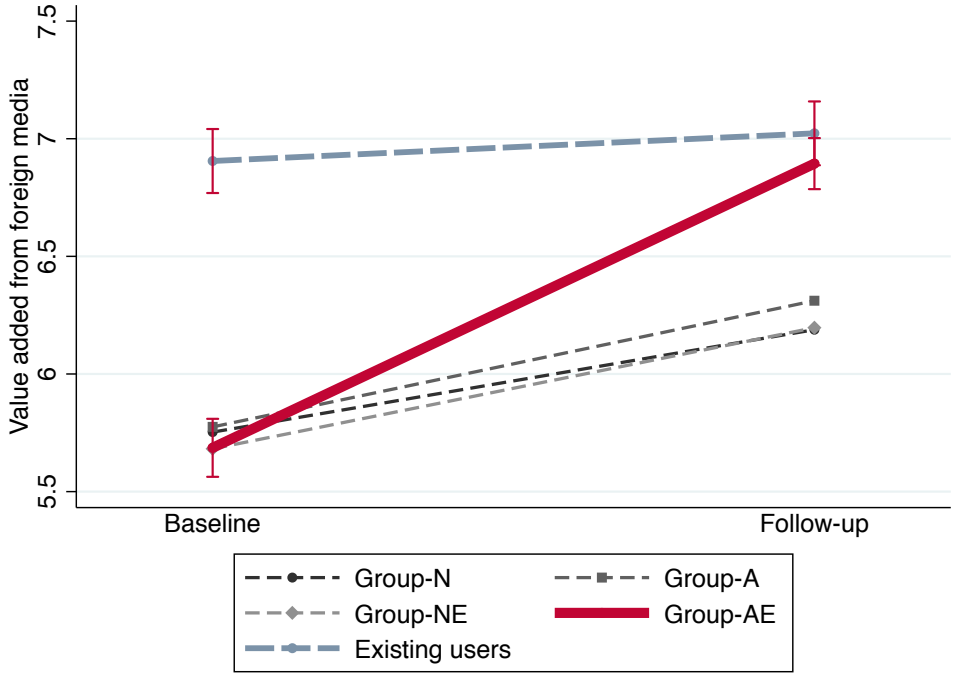


Figure 6: Average level of assessment of value added from uncensored information obtained from foreign media outlets, for students in all four experimental treatment groups and existing users, across the baseline and first follow-up survey.

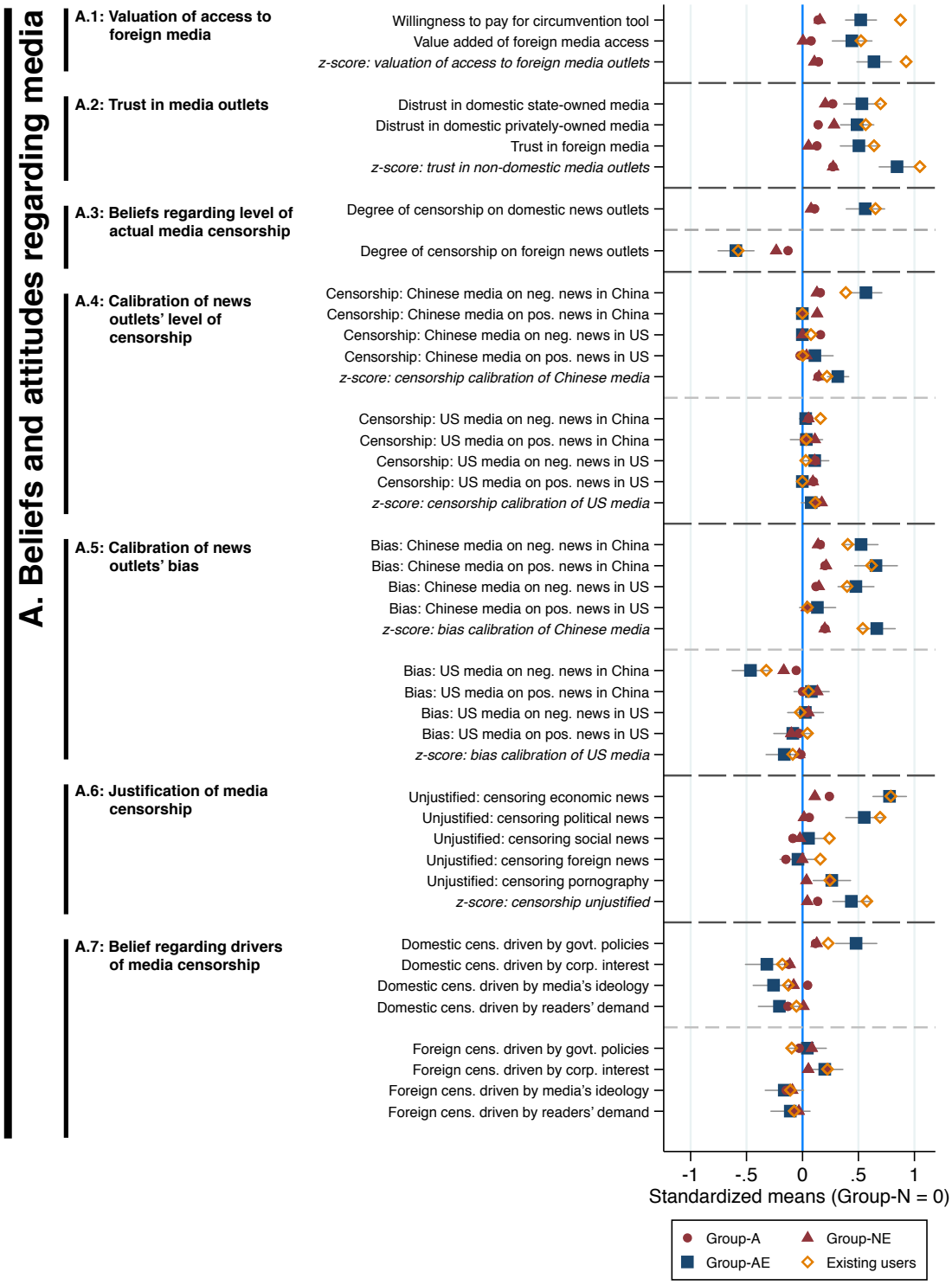


Figure 7: Dot plot showing comparison of (standardized) means across students in Group-N, Group-NE, Group-A, Group-AE, and existing users, where mean level of Group-N is normalized as 0. Figure also shows 95 percent confidence intervals calculated using robust standard error for Group-AE subjects.

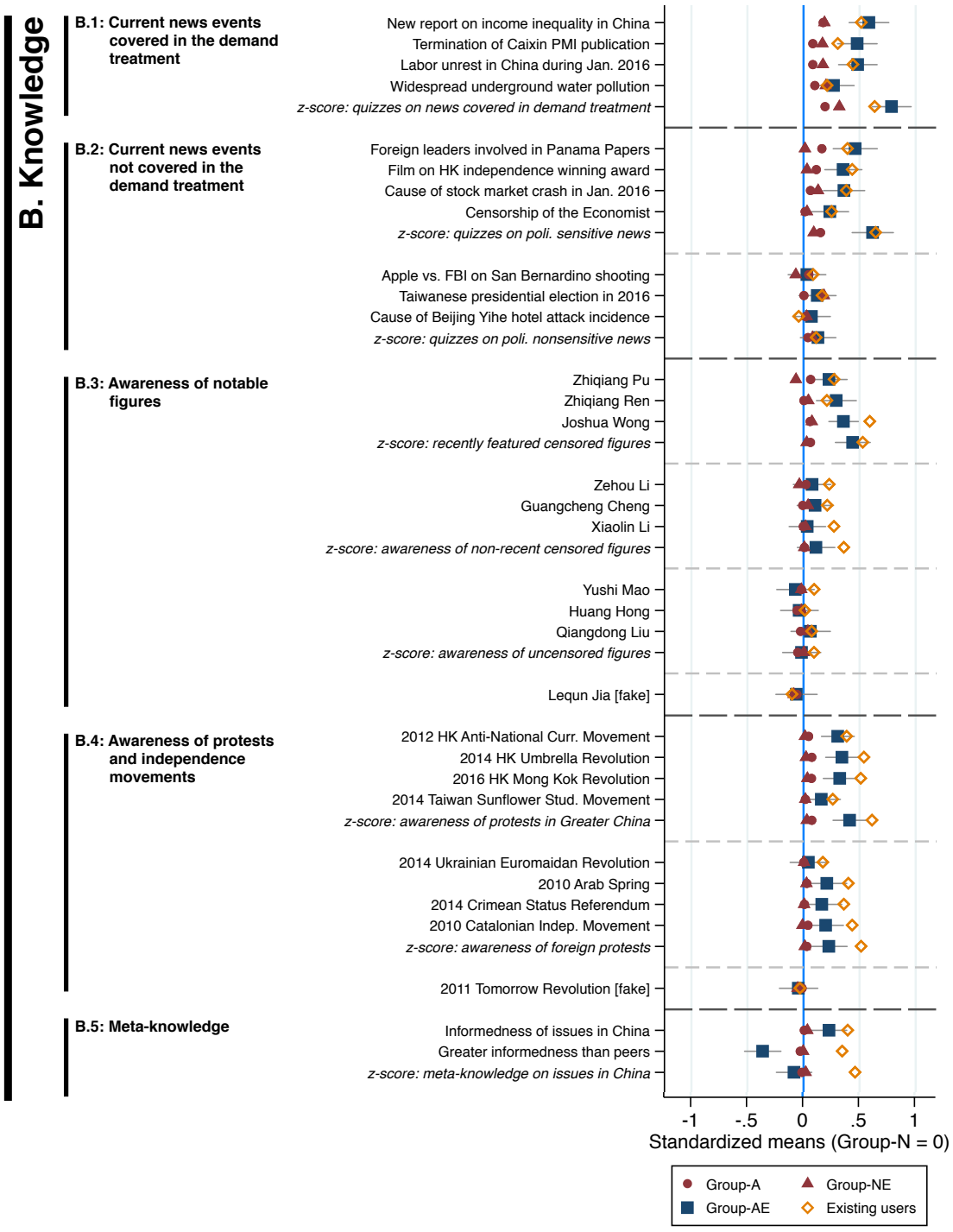


Figure 8: Dot plot (continued) showing comparison of (standardized) means across students in Group-N, Group-NE, Group-A, Group-AE, and existing users, where mean level of Group-N is normalized as 0. Figure also shows 95 percent confidence intervals calculated using robust standard error for Group-AE subjects.

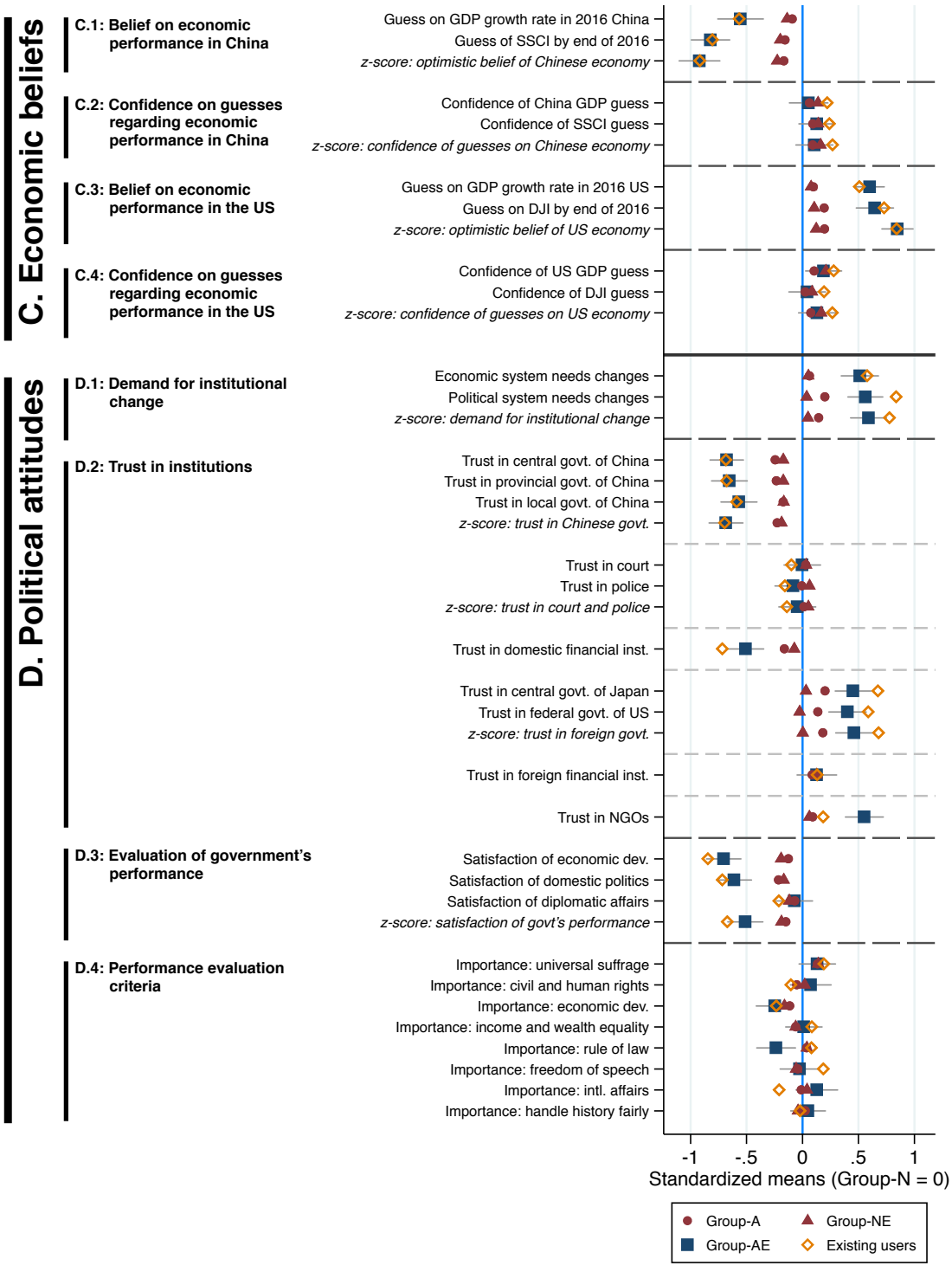


Figure 9: Dot plot (continued) showing comparison of (standardized) means across students in Group-N, Group-NE, Group-A, Group-AE, and existing users, where mean level of Group-N is normalized as 0. Figure also shows 95 percent confidence intervals calculated using robust standard error for Group-AE subjects.

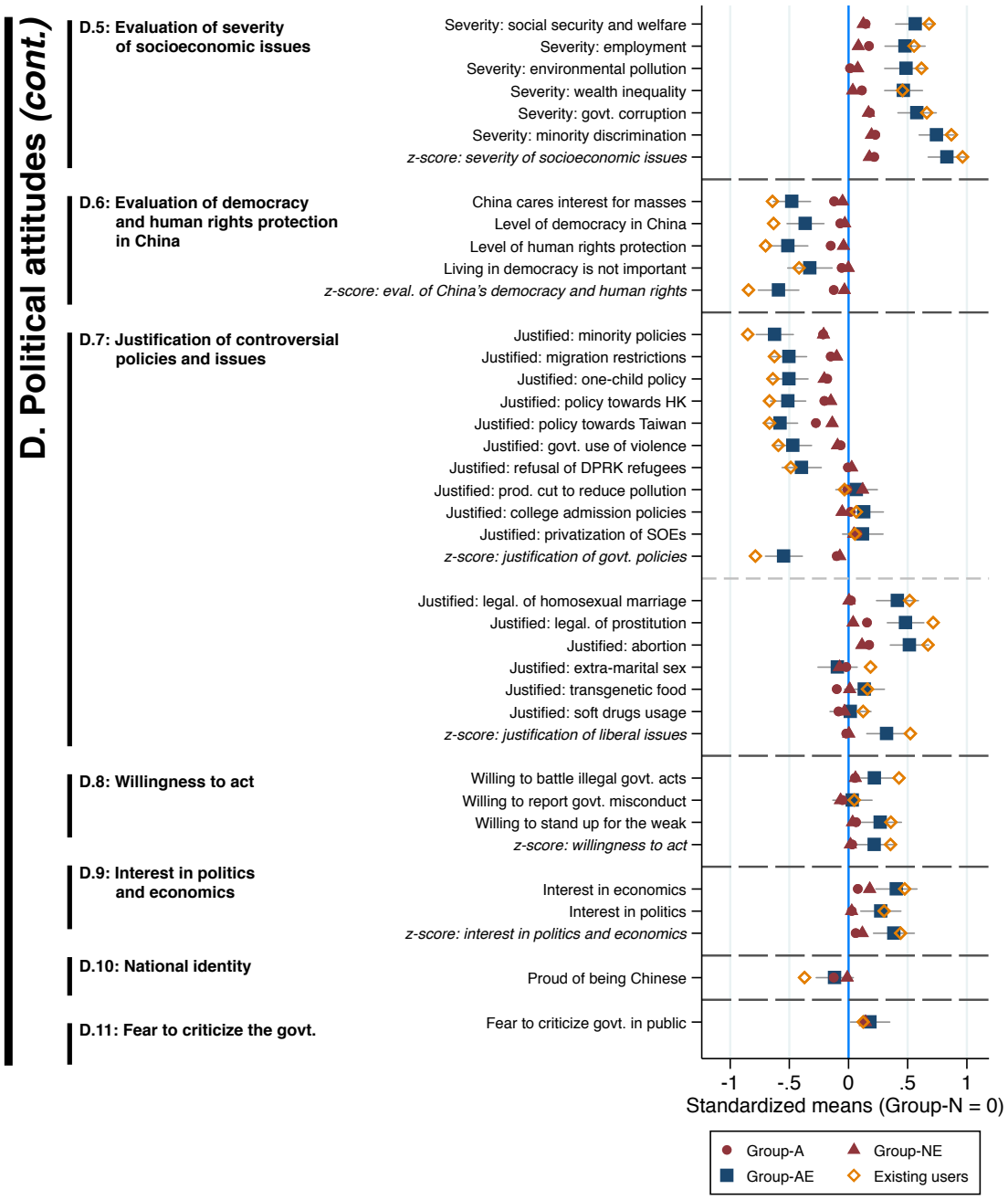


Figure 10: Dot plot (continued) showing comparison of (standardized) means across students in Group-N, Group-NE, Group-A, Group-AE, and existing users, where mean level of Group-N is normalized as 0. Figure also shows 95 percent confidence intervals calculated using robust standard error for Group-AE subjects.

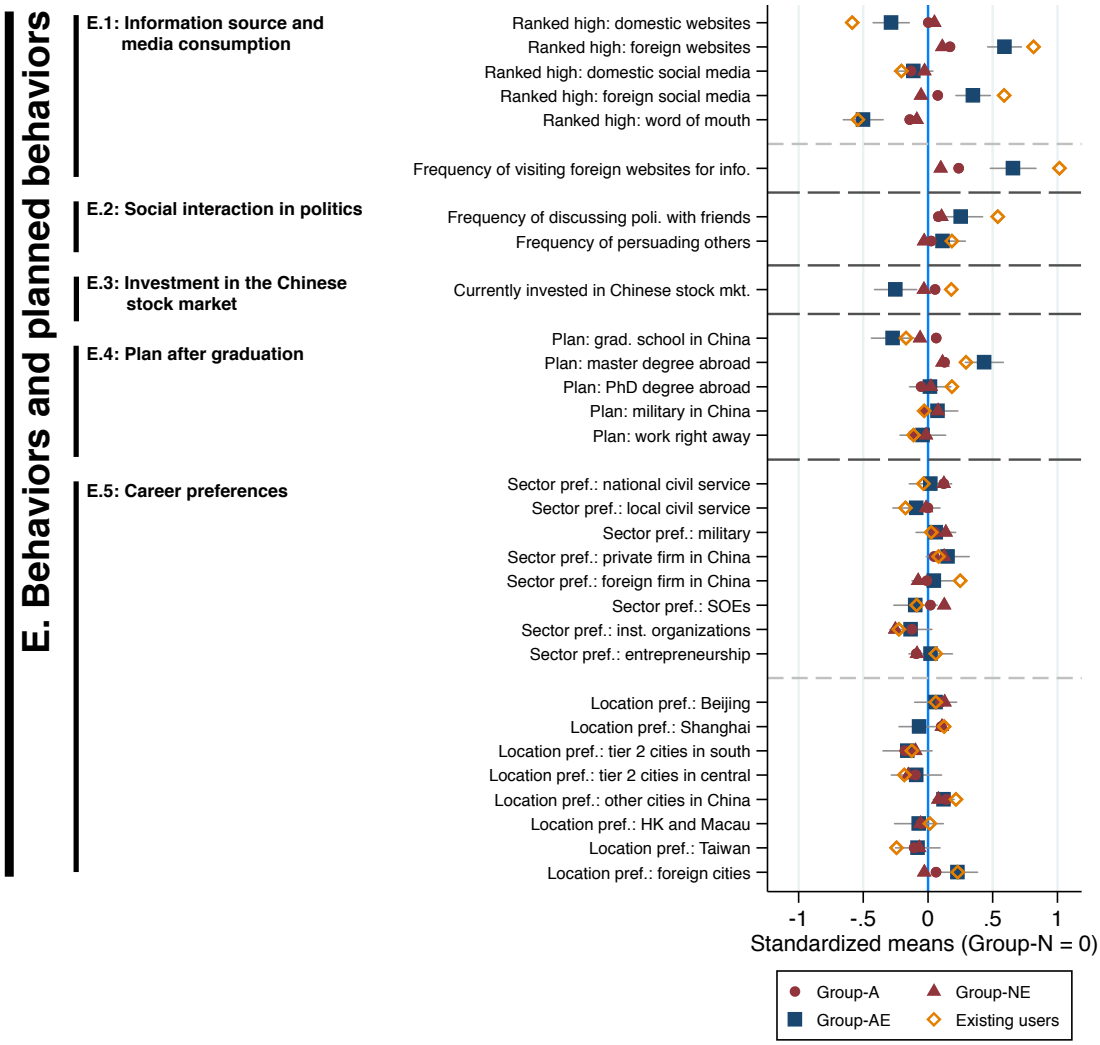


Figure 11: Dot plot (continued) showing comparison of (standardized) means across students in Group-N, Group-NE, Group-A, Group-AE, and existing users, where mean level of Group-N is normalized as 0. Figure also shows 95 percent confidence intervals calculated using robust standard error for Group-AE subjects.

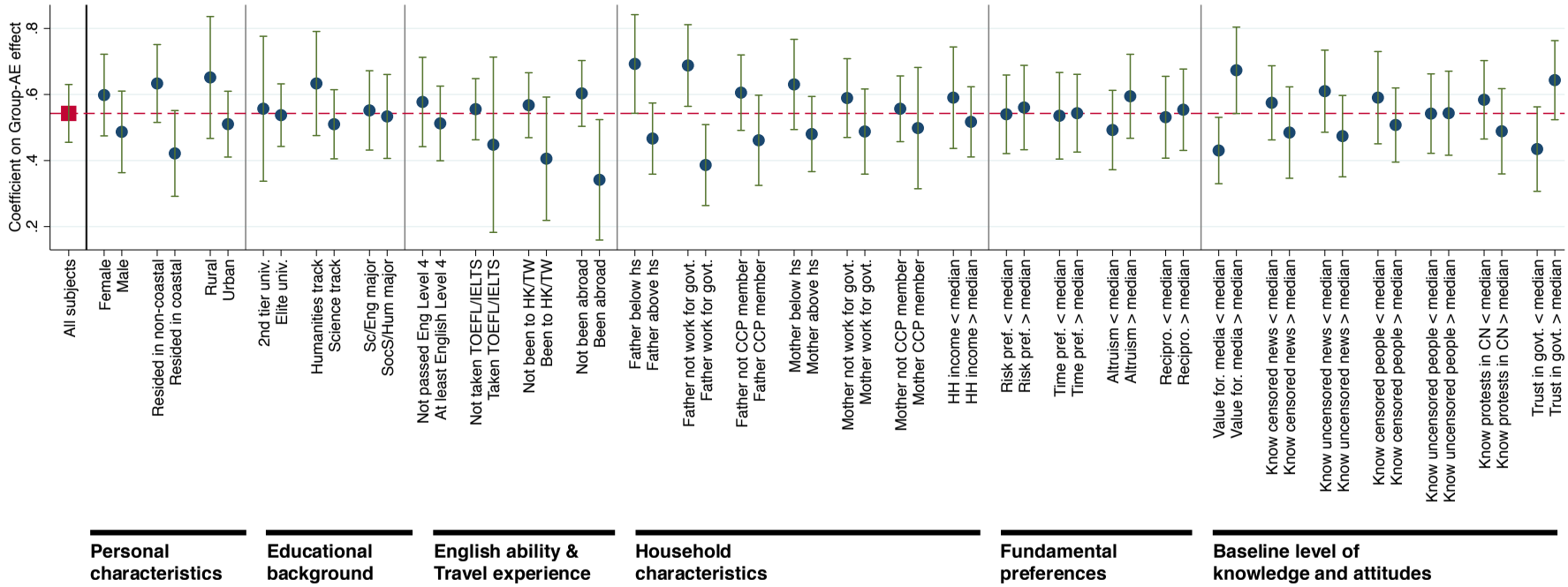


Figure 12: Treatment effect of Group-AE on the z-score index of students' valuation of access to foreign media (summarizing students' willingness to pay for censorship circumvention tool and their belief on the value added of foreign media outlets elicited at the first follow-up survey), estimated on all subjects and various sub-samples. Corresponding regression coefficients and the 95% confidence interval constructed from the robust standard error on the Group-AE indicator are shown, where Group-N, Group-NE, and Group-A students are pooled together as the omitted group to maximize the statistical power of heterogeneity analyses. Coefficients are estimated using 1,312 completed surveys from students who have not been using censorship circumvention product at the time of baseline survey (November 2015). The z-score index (weighting by the inverse covariance of the standardized variables) is computed following Anderson (2008).

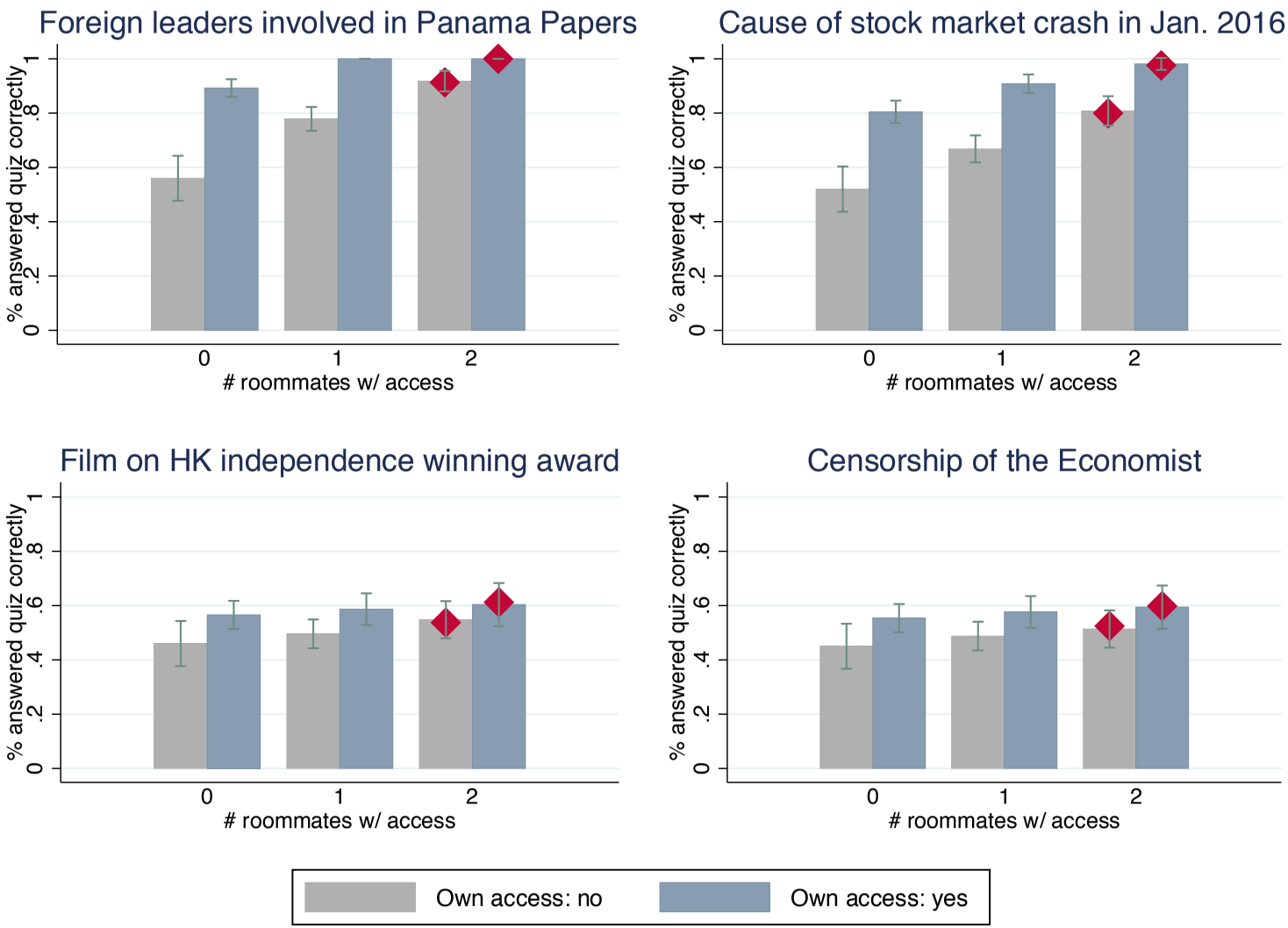


Figure 13: Blue dotted line indicates the model predicted proportion of students who can answer quiz correctly, if they do not have access themselves, and reside in dorms with 2 roommates who received access tresatment; red dotted line indicates the model predicted proportion of students who can answer quiz correctly, if they have access themselves, and reside in dorms with 2 roommates who received access tresatment.

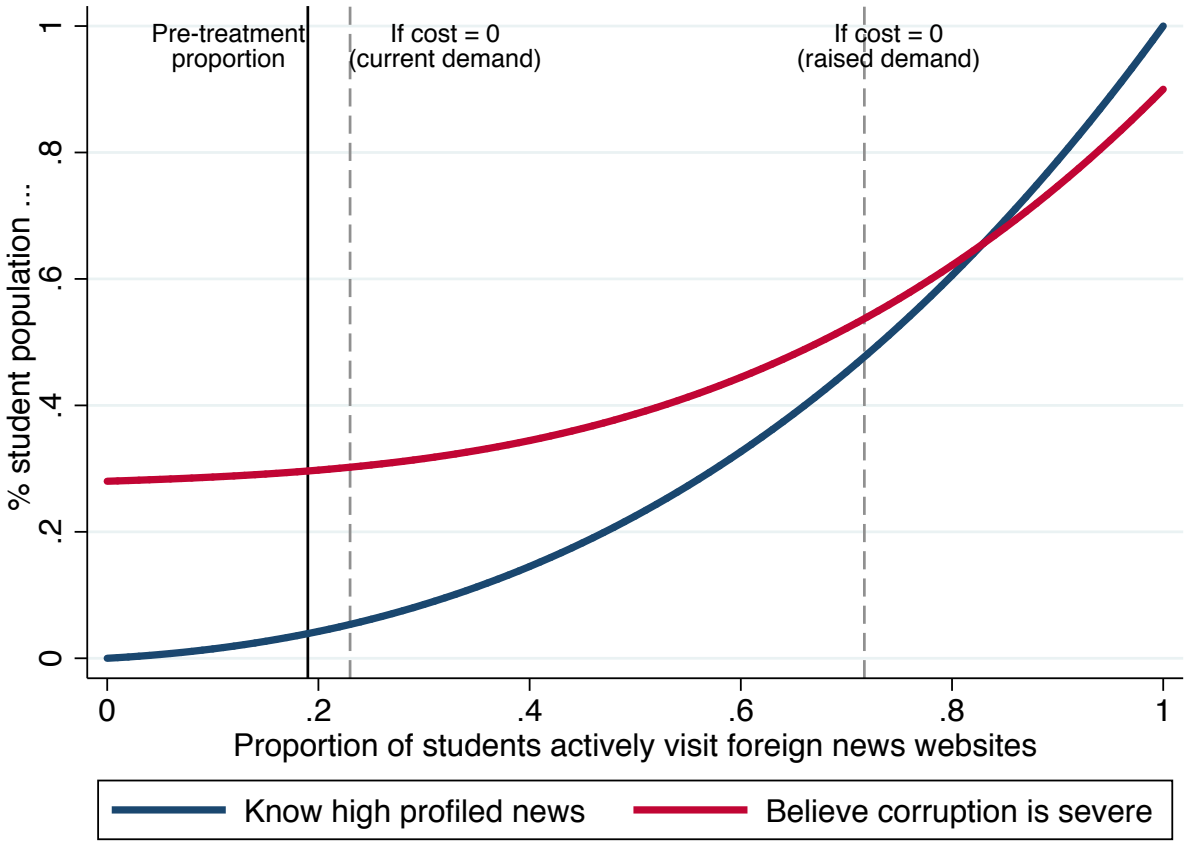


Figure 14: Simulation of the rate of learning of high profiled politically sensitive event (imputed rate of direct learning = 0.70) and the percentage of students believing that government corruption is a severe problem among the entire student population, as a function of the proportion of students who actively visit foreign news websites to consume uncensored information. The simulation takes into account of the cluster structure of the university dorm network as observed, as well as the differential social transmission rate towards students who have direct access themselves and those who don't. The solid vertical line indicates the proportion of students who actively visit blocked foreign news websites prior to experiment starts, at the status quo level of cost to access. First dotted vertical line indicates the counterfactual proportion of students who actively visit blocked foreign news websites if cost to access is reduced to zero, holding fixed students' demand for uncensored information at the status quo; the second dotted verticle line indicates the counterfactual if cost to access is reduced to zero, and the students' demand for uncensored information has been raised to the average level observed among Group-AE students.

Table 1: Summary statistics & balance tests

	All		Existing users	Group-N	Group-A	Group-NE	Group-AE	ANOVA test	
	Mean	Std.Dev.	Mean	Mean	Mean	Mean	Mean	F-stat	p-value
Variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Category 1: *Personal characteristics*									
Male	0.560	0.496	0.602	0.522	0.579	0.589	0.524	1.571	0.195
Birth year	1995.8	1.261	1995.9	1995.9	1995.7	1995.8	1995.8	0.874	0.454
Height	170.0	9.406	170.8	168.6	170.3	170.1	169.8	1.186	0.314
Han ethnicity	0.910	0.287	0.925	0.894	0.913	0.895	0.912	0.392	0.759
Born in coastal province	0.412	0.492	0.441	0.412	0.450	0.377	0.396	1.204	0.307
Resided in coastal province	0.439	0.496	0.474	0.406	0.491	0.400	0.423	2.022	0.109
Urban hukou prior to college	0.782	0.413	0.856	0.753	0.720	0.757	0.796	2.130	0.095
Religious	0.069	0.253	0.046	0.059	0.080	0.089	0.068	0.665	0.574
Member of CCP *[at baseline]*	0.066	0.248	0.062	0.041	0.052	0.072	0.078	1.393	9.243
z-score: personal characteristics	0.024	1.023	0.129	-0.114	-0.030	0.020	0.038	1.001	0.391
Category 2: *Educational background*									
Elite university	0.835	0.371	0.971	0.835	0.803	0.774	0.810	0.983	0.400
Science track in high school	0.739	0.444	0.709	0.694	0.716	0.790	0.726	2.323	0.073
SoSc./Hum. major at college	0.448	0.497	0.468	0.470	0.437	0.468	0.426	0.643	0.588
z-score: educational background	0.117	0.976	0.226	0.066	0.032	0.241	0.048	3.004	0.029
Category 3: *English ability and oversea travel experiences [at baseline]*									
At least Level 4 certi. in English	0.512	0.500	0.526	0.488	0.519	0.482	0.524	0.590	0.621
Taken TOEFL or IELTS	0.130	0.336	0.180	0.100	0.128	0.121	0.117	0.282	0.839
z-score: English ability	0.048	1.039	0.166	-0.041	0.054	-0.006	0.037	0.433	0.729
Traveled to HK, Macau, Taiwan	0.182	0.386	0.281	0.135	0.159	0.154	0.170	0.411	0.745
Traveled to foreign countries	0.241	0.418	0.327	0.212	0.218	0.190	0.243	1.094	0.351
z-score: oversea travel experiences	0.049	1.026	0.336	-0.071	-0.023	-0.072	0.031	0.944	0.419
Category 4: *Household characteristics*									
Total # siblings	0.540	1.095	0.402	0.600	0.550	0.618	0.548	0.325	0.807
Father educ. above hs.	0.678	0.467	0.745	0.647	0.671	0.668	0.660	0.111	0.954

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	All		Existing users	Group-N	Group-A	Group-NE	Group-AE	ANOVA test	
	Mean	Std.Dev.	Mean	Mean	Mean	Mean	Mean	F-stat	p-value
Variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Father works related to govt.	0.486	0.500	0.510	0.482	0.464	0.495	0.482	0.197	0.898
Father member of CCP	0.427	0.495	0.418	0.376	0.377	0.452	0.460	2.641	0.048
Mother educ. above hs.	0.603	0.489	0.673	0.612	0.581	0.586	0.583	0.168	0.918
Mother works related to govt.	0.483	0.500	0536	0.471	0.467	0.498	0.458	0.434	0.729
Mother member of CCP	0.219	0.414	0.239	0.153	0.215	0.230	0.226	1.559	0.198
Total hh income	145658	184526	176806	147088	139247	134164	137600	0.195	0.900
z-score: household characteristics	0.044	0.974	0.089	0.004	-0.006	0.087	0.033	0.505	0.679
Category 5: *Fundamental preferences*									
Willingness to take risk	5.671	1.949	5.846	5.824	5.526	5.580	5.651	0.903	0.439
Cert. equiv. of lottery choices	11.33	5.936	11.95	10.18	12.01	11.65	10.80	4.619	0.003
Prefer risky lottery options	3.701	1.267	3.614	3.465	3.713	3.603	3.577	1.474	0.220
z-score: risk preferences	-0.024	0.982	0.071	-0.122	0.017	-0.018	-0.073	0.907	0.437
Willingness to wait for future	6.049	2.163	6.222	5.841	5.965	6.125	6.020	0.668	0.572
Tendency not to procrastinate	5.121	2.918	5.095	5.053	5.042	5.062	5.232	0.404	0.750
z-score: time preferences	0.049	0.984	0.100	-0.037	0.001	0.059	0.067	0.673	0.569
Willingness to give to good causes	6.930	2.259	6.804	7.000	6.886	7.000	6.964	0.156	0.926
Amount willing to donate	2596.6	2312.0	2469.4	2665.6	2582.5	2824.2	2527.1	1.086	0.354
z-score: altruism	-0.031	0.994	-0.087	0.006	-0.047	0.047	-0.040	0.656	0.579
Willingness to return favor	8.868	1.264	8.680	8.953	8.886	8.974	8.880	0.470	0.704
Belief that others are well-intended	5.821	2.667	5.435	6.171	5.758	5.725	6.015	1.615	0.184
Willingness to give thank-you gift	5.365	1.248	5.373	5.665	5.318	5.364	5.292	4.057	0.007
Punish who treat self unfairly	5.464	2.437	5.595	5.406	5.384	5.515	5.422	0.165	0.920
Punish who treat others unfairly	4.571	2.324	4.611	4.488	4.606	4.587	4.547	0.108	0.955
Willingness to take revenge	3.535	2.360	3.696	3.635	3.439	3.308	3.589	1.166	0.321
z-score: reciprocity	-0.017	0.994	-0.087	0.169	-0.060	-0.035	-0.002	2.035	0.107
# of obs.	1618		306	170	289	305	548	–	–

Notes: ANOVA tests are conducted against the null hypothesis that corresponding characteristics of Group-N, Group-A, Group-NE, and Group-AE are not different from each other.

Table 2: Effects of supply & demand treatment

		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Beliefs and attitudes regarding media								
Category A.1: *Valuation of access to foreign media outlets*								
A.1.1	Willingness to pay for circumvention tool	9.683***	[1.350]	0.001	22.99	16.95	17.70	33.94
A.1.2	Value added of foreign media access	0.706***	[0.148]	0.001	6.512	1.613	6.188	7.023
	z-score: valuation of access to foreign media outlets	0.640***	[0.081]	-	-0.114	0.961	-0.438	0.490
Category A.2: *Trust in media outlets*								
A.2.1	Distrust in domestic state-owned media	1.203***	[0.197]	0.001	5.103	2.239	4.359	5.935
A.2.2	Distrust in domestic privately-owned media	0.952***	[0.153]	0.001	4.621	1.936	4.035	5.137
A.2.3	Trust in foreign media	0.873***	[0.152]	0.001	6.212	1.748	5.776	6.882
	z-score: trust in non-domestic media outlets	0.846***	[0.085]	-	-0.108	1.001	-0.585	0.464
Category A.3: *Belief regarding level of actual media censorship*								
A.3.1	Degree of censorship on domestic news outlets	0.987***	[0.159]	-	7.644	1.803	7.159	8.307
A.3.2	Degree of censorship on foreign news outlets	-1.137***	[0.162]	-	5.761	1.908	6.394	5.294
Category A.4: *Calibration of news outlets' level of censorship*								
A.4.1	Censorship: Chinese media on neg. news in China	0.251***	[0.033]	0.001	0.257	0.437	0.124	0.294
A.4.2	Censorship: Chinese media on pos. news in China	-0.000	[0.000]	1.000	0.001	0.028	0.000	0.000
A.4.3	Censorship: Chinese media on neg. news in US	0.000	[0.000]	1.000	0.046	0.209	0.035	0.036
A.4.4	Censorship: Chinese media on pos. news in US	0.023	[0.017]	0.382	0.046	0.209	0.035	0.036
	z-score: censorship calibration of Chinese media	0.317***	[0.050]	-	-0.004	1.017	-0.202	0.018
A.4.5	Censorship: US media on neg. news in China	0.002	[0.002]	0.913	0.002	0.048	0.000	0.010
A.4.6	Censorship: US media on pos. news in China	0.005	[0.010]	1.000	0.018	0.131	0.012	0.016
A.4.7	Censorship: US media on neg. news in US	0.014*	[0.008]	0.573	0.018	0.134	0.006	0.010
A.4.8	Censorship: US media on pos. news in US	-0.000	[0.000]	1.000	0.002	0.039	0.000	0.000

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
	z-score: censorship calibration of US media	0.080	[0.049]	-	-0.002	0.984	-0.105	0.011
Category A.5: *Calibration of news outlets' bias*								
A.5.1	Bias: Chinese media on neg. news in China	0.500***	[0.074]	0.001	1.508	0.949	1.235	1.621
A.5.2	Bias: Chinese media on pos. news in China	0.388***	[0.059]	0.001	1.617	0.610	1.400	1.765
A.5.3	Bias: Chinese media on neg. news in US	0.376***	[0.066]	0.001	1.234	0.796	1.029	1.343
A.5.4	Bias: Chinese media on pos. news in US	0.101	[0.063]	0.029	0.687	0.749	0.629	0.663
	z-score: bias calibration of Chinese media	0.666***	[0.085]	-	-0.032	1.019	-0.401	0.139
A.5.5	Bias: US media on neg. news in China	-0.372***	[0.070]	0.001	1.004	0.804	1.200	0.941
A.5.6	Bias: US media on pos. news in China	0.053	[0.054]	0.544	0.831	0.658	0.788	0.824
A.5.7	Bias: US media on neg. news in US	0.019	[0.059]	0.885	0.753	0.698	0.729	0.716
A.5.8	Bias: US media on pos. news in US	-0.056	[0.060]	0.544	0.869	0.669	0.912	0.941
	z-score: bias calibration of US media	-0.162*	[0.086]	-	0.002	1.009	0.079	-0.008
Category A.6: *Justification of media censorship*								
A.6.1	Unjustified: censoring economic news	1.718***	[0.173]	0.001	4.638	2.178	3.747	5.487
A.6.2	Unjustified: censoring political news	1.490***	[0.238]	0.001	5.844	2.751	5.176	7.042
A.6.3	Unjustified: censoring social news	0.149	[0.222]	0.336	5.640	2.654	5.641	6.281
A.6.4	Unjustified: censoring foreign news	-0.100	[0.225]	0.358	5.573	2.602	5.700	6.118
A.6.5	Unjustified: censoring pornography	0.760***	[0.254]	0.004	4.274	2.899	3.776	4.487
	z-score: censorship unjustified	0.438***	[0.088]	-	-0.066	0.985	-0.290	0.285
Category A.7: *Belief regarding drivers of media censorship*								
A.7.1	Domestic cens. driven by govt. policies	0.170***	[0.034]	-	0.855	0.352	0.765	0.846
A.7.2	Domestic cens. driven by corp. interest	-0.081***	[0.026]	-	0.070	0.255	0.118	0.072
A.7.3	Domestic cens. driven by media's ideology	-0.056***	[0.021]	-	0.051	0.220	0.076	0.049
A.7.4	Domestic cens. driven by readers' demand	-0.032**	[0.016]	-	0.024	0.152	0.041	0.033
A.7.5	Foreign cens. driven by govt. policies	0.016	[0.031]	-	0.152	0.360	0.141	0.108
A.7.6	Foreign cens. driven by corp. interest	0.097**	[0.041]	-	0.376	0.485	0.306	0.415
A.7.7	Foreign cens. driven by media's ideology	-0.077*	[0.042]	-	0.337	0.473	0.394	0.343

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
A.7.8	Foreign cens. driven by readers' demand	-0.037	[0.031]	-	0.135	0.342	0.159	0.134
Panel B: Knowledge								
Category B.1: *Current news events covered in the demand treatment*								
B.1.1	New report on income inequality in China	0.257***	[0.041]	0.001	0.720	0.449	0.576	0.804
B.1.2	Termination of Caixin PMI publication	0.208***	[0.040]	0.001	0.747	0.435	0.635	0.768
B.1.3	Labor unrest in China during Jan. 2016	0.227***	[0.042]	0.001	0.658	0.475	0.535	0.742
B.1.4	Widespread underground water pollution	0.100***	[0.036]	0.002	0.832	0.374	0.765	0.843
	z-score: quizzes on news covered in demand treatment	0.786***	[0.091]	-	-0.036	1.024	-0.481	0.155
Category B.2: *Current news events not covered in the demand treatment*								
B.2.1	Foreign leaders involved in Panama Papers	0.132***	[0.029]	0.001	0.902	0.298	0.835	0.948
B.2.2	Film on HK independence winning award	0.177***	[0.043]	0.001	0.514	0.500	0.424	0.641
B.2.3	Cause of stock market crash in Jan. 2016	0.137***	[0.036]	0.001	0.815	0.389	0.741	0.886
B.2.4	Censorship of "Economist"	0.118***	[0.044]	0.002	0.508	0.500	0.453	0.578
	z-score: quizzes on poli. sensitive news	0.617***	[0.097]	-	-0.063	1.003	0.375	0.269
B.2.5	Apple vs. FBI on San Bernardino shooting	0.015	[0.042]	0.941	0.662	0.473	0.659	0.699
B.2.6	Taiwanese presidential election in 2016	0.062	[0.044]	0.880	0.471	0.499	0.424	0.507
B.2.7	Cause of Beijing Yihe hotel attack incidence	0.036	[0.043]	0.880	0.426	0.495	0.406	0.386
	z-score: quizzes on poli. nonsensitive news	0.130	[0.083]	-	-0.006	1.005	-0.088	0.026
Category B.3: *Awareness of notable figures*								
B.3.1	Zhiqiang Pu	0.103***	[0.038]	0.004	0.266	0.442	0.224	0.346
B.3.2	Zhiqiang Ren	0.106***	[0.034]	0.003	0.842	0.365	0.794	0.869
B.3.3	Joshua Wong	0.131***	[0.025]	0.001	0.130	0.337	0.065	0.281
	z-score: recently featured censored figures	0.440***	[0.082]	-	-0.062	0.974	-0.265	0.264
B.3.4	Zehou Li	0.038	[0.044]	1.000	0.567	0.496	0.553	0.667
B.3.5	Guangcheng Cheng	0.047	[0.038]	1.000	0.264	0.441	0.241	0.337

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
B.3.6	Xiaolin Li	0.016	[0.039]	1.000	0.279	0.449	0.271	0.395
	z-score: awareness of non-recent censored figures	0.232***	[0.084]	-	-0.078	0.964	-0.190	0.336
B.3.7	Yushi Mao	-0.036	[0.044]	1.000	0.498	0.500	0.518	0.565
B.3.8	Huang Hong	-0.017	[0.041]	1.000	0.309	0.462	0.324	0.330
B.3.9	Qiangdong Liu	0.012	[0.018]	1.000	0.959	0.199	0.953	0.967
	z-score: awareness of uncensored figures	-0.016	[0.089]	-	-0.021	1.008	-0.004	0.090
B.3.10	Lequn Jia [fake]	-0.014	[0.021]	-	0.052	0.222	0.065	0.042
Category B.4: *Awareness of protests and independence movements*								
B.4.1	2012 HK Anti-National Curr. Movement	0.115***	[0.029]	0.001	0.153	0.360	0.100	0.245
B.4.2	2014 HK Umbrella Revolution	0.147***	[0.033]	0.001	0.212	0.409	0.141	0.373
B.4.3	2016 HK Mong Kok Revolution	0.142***	[0.034]	0.001	0.229	0.420	0.159	0.382
B.4.4	2014 Taiwan Sunflower Stud. Movement	0.078*	[0.043]	0.002	0.595	0.491	0.559	0.686
	z-score: awareness of protests in Greater China	0.413***	[0.079]	-	-0.078	0.954	-0.275	0.336
B.4.5	2014 Ukrainian Euromaidan Revolution	0.022	[0.042]	0.177	0.351	0.478	0.341	0.425
B.4.6	2010 Arab Spring	0.088**	[0.039]	0.053	0.742	0.437	0.700	0.869
B.4.7	2014 Crimean Status Referendum	0.064*	[0.036]	0.057	0.793	0.406	0.765	0.905
B.4.8	2010 Catalonian Indep. Movement	0.090**	[0.038]	0.053	0.264	0.441	0.224	0.422
	z-score: awareness of foreign protests	0.228***	[0.085]	-	0.077	0.996	-0.182	0.332
B.4.9	2011 Tomorrow Revolution [fake]	-0.014	[0.028]	-	0.107	0.310	0.118	0.108
Category B.5: *Meta-knowledge*								
B.5.1	Informedness of issues in China	0.459***	[0.165]	0.004	4.329	1.970	4.118	4.908
B.5.2	Greater informedness than peers	-0.667***	[0.156]	0.001	3.909	1.814	4.200	4.833
	z-score: meta-knowledge on issues in China	-0.084	[0.083]	-	-0.093	0.968	-0.060	0.400
Panel C: Economic beliefs								

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Category C.1: *Belief on economic performance in China*								
C.1.1	Guess on GDP growth rate in 2016 China	-1.319***	[0.256]	0.001	6.973	2.519	7.648	6.305
C.1.2	Guess of SSCI by end of 2016	-369.0***	[40.58]	0.001	3058.2	451.9	3248.5	2887.4
	z-score: optimistic belief of Chinese economy	-0.920***	[0.096]	-	0.084	1.035	0.557	-0.359
Category C.2: *Confidence on guesses regarding economic performance in China*								
C.2.1	Confidence of China GDP guess	0.118	[0.197]	0.380	4.531	2.184	4.382	4.863
C.2.2	Confidence of SSCI guess	0.252	[0.166]	0.352	2.127	1.933	1.918	2.389
	z-score: confidence of guesses on Chinese economy	0.106	[0.088]	-	-0.031	0.998	-0.133	0.135
Category C.3: *Belief on economic performance in the US*								
C.3.1	Guess on GDP growth rate in 2016 US	0.952***	[0.109]	0.001	3.171	1.608	2.711	3.518
C.3.2	Guess on DJI by end of 2016	1247.1***	[169.1]	0.001	17268.9	1957.5	16618.4	18026.3
	z-score: optimistic belief of US economy	0.848***	[0.074]	-	-0.079	1.005	-0.505	0.337
Category C.4: *Confidence on guesses regarding economic performance in US*								
C.4.1	Confidence of US GDP guess	0.391**	[0.176]	0.058	2.759	2.076	2.447	3.026
C.4.2	Confidence of DJI guess	0.072	[0.147]	0.454	1.562	1.689	1.488	1.817
	z-score: confidence of guesses on US economy	0.131	[0.087]	-	-0.030	1.002	-0.140	0.128
Panel D: Political attitudes								
Category D.1: *Demand for institutional change*								
D.1.1	Economic system needs changes	1.024***	[0.175]	0.001	5.191	1.988	4.712	5.869
D.1.2	Political system needs changes	1.271***	[0.186]	0.001	5.274	2.456	4.624	6.516
	z-score: demand for institutional change	0.590***	[0.085]	-	-0.092	0.995	-0.382	0.396
Category D.2: *Trust in institutions*								
D.2.1	Trust in central govt. of China	-1.533***	[0.178]	0.001	6.460	2.230	7.312	5.768

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
D.2.2	Trust in provincial govt. of China	-1.409***	[0.181]	0.001	5.409	2.148	6.194	4.735
D.2.3	Trust in local govt. of China	-1.211***	[0.181]	0.001	4.354	2.118	5.024	3.771
	z-score: trust in Chinese govt.	-0.684***	[0.080]	-	0.060	0.986	0.439	-0.257
D.2.4	Trust in court	-0.004	[0.167]	1.000	6.720	1.922	6.694	6.503
D.2.5	Trust in police	-0.168	[0.172]	1.000	6.168	1.957	6.212	5.899
	z-score: trust in court and police	-0.047	[0.087]	-	0.025	0.985	0.030	-0.109
D.2.6	Trust in domestic financial inst.	-0.989***	[0.165]	-	6.249	1.886	6.765	5.369
D.2.7	Trust in central govt. of Japan	1.021***	[0.191]	0.001	3.761	2.204	3.218	4.742
D.2.8	Trust in federal govt. of US	0.847***	[0.186]	0.001	4.846	2.099	4.441	5.680
	z-score: trust in foreign govt.	0.460***	[0.087]	-	-0.085	0.984	-0.318	0.362
D.2.9	Trust in foreign financial inst.	0.239	[0.174]	-	5.379	1.856	5.188	5.435
D.2.10	Trust in NGOs	1.052***	[0.170]	-	5.670	1.924	5.165	5.520
Category D.3: *Evaluation of government's performance*								
D.3.1	Satisfaction of economic dev.	-1.353***	[0.156]	0.001	5.644	1.885	6.347	4.725
D.3.2	Satisfaction of domestic politics	-1.371***	[0.183]	0.001	5.275	2.230	6.041	4.435
D.3.3	Satisfaction of diplomatic affairs	-0.134	[0.159]	0.153	6.300	1.856	6.435	6.041
	z-score: satisfaction of govt's performance	-0.511***	[0.083]	-	0.072	0.991	0.362	-0.309
Category D.4: *Performance evaluation criteria*								
D.4.1	Importance: universal suffrage	0.006	[0.004]	-	0.090	0.043	0.086	0.094
D.4.2	Importance: civil and human rights	-0.005***	[0.002]	-	0.138	0.022	0.140	0.141
D.4.3	Importance: economic dev.	0.002	[0.002]	-	0.135	0.025	0.134	0.132
D.4.4	Importance: income and wealth equality	-0.007***	[0.003]	-	0.125	0.028	0.130	0.124
D.4.5	Importance: rule of law	0.000	[0.002]	-	0.143	0.022	0.144	0.145
D.4.6	Importance: freedom of speech	-0.001	[0.002]	-	0.124	0.024	0.125	0.130
D.4.7	Importance: intl. affairs	0.004	[0.003]	-	0.120	0.030	0.118	0.112
D.4.8	Importance: handle history fairly	0.001	[0.002]	-	0.124	0.026	0.123	0.123

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Category D.5: *Evaluation of severity of socioeconomic issues*								
D.5.1	Severity: social security and welfare	1.064***	[0.166]	0.001	6.848	1.901	6.288	7.572
D.5.2	Severity: employment	0.881***	[0.165]	0.001	6.798	1.864	6.324	7.346
D.5.3	Severity: environmental pollution	0.793***	[0.157]	0.001	7.925	1.668	7.559	8.562
D.5.4	Severity: wealth inequality	0.812***	[0.147]	0.001	7.715	1.764	7.318	8.118
D.5.5	Severity: govt. corruption	1.135***	[0.167]	0.001	6.693	1.995	6.335	7.634
D.5.6	Severity: minority discrimination	1.839***	[0.192]	0.001	3.827	2.407	2.824	4.971
	z-score: severity of socioeconomic issues	0.832***	[0.084]	-	-0.100	1.000	-0.537	0.427
Category D.6: *Evaluation of democracy and human rights protection in China*								
D.6.1	China cares interest for masses	-1.054***	[0.182]	0.001	5.128	2.192	5.653	4.242
D.6.2	Level of democracy in China	-0.696***	[0.157]	0.001	4.995	1.885	5.329	4.121
D.6.3	Level of human rights protection	-1.033***	[0.177]	0.001	5.353	1.990	5.871	4.458
D.6.4	Living in democracy is not important	-0.672***	[0.204]	0.001	3.022	2.092	3.329	2.471
	z-score: eval. of China's democracy and human rights	-0.591***	[0.090]	-	0.106	0.983	0.389	-0.456
Category D.7: *Justification of controversial policies and issues*								
D.7.1	Justified: minority policies	-1.464***	[0.194]	0.001	6.116	2.300	6.953	4.948
D.7.2	Justified: migration restrictions	-1.157***	[0.180]	0.001	5.152	2.296	5.765	4.327
D.7.3	Justified: one-child policy	-1.210***	[0.202]	0.001	5.261	2.383	5.976	4.438
D.7.4	Justified: policy towards HK	-1.016***	[0.156]	0.001	6.547	1.952	7.129	5.804
D.7.5	Justified: policy towards Taiwan	-1.144***	[0.153]	0.001	6.421	1.945	7.082	5.761
D.7.6	Justified: govt. use of violence	-1.240***	[0.219]	0.001	4.034	2.664	4.647	3.085
D.7.7	Justified: refusal of DPRK refugees	-0.869***	[0.192]	0.001	4.731	2.191	5.082	4.013
D.7.8	Justified: prod. cut to reduce pollution	0.119	[0.162]	0.162	7.377	1.767	7.282	7.225
D.7.9	Justified: college admission policies	0.240	[0.160]	0.053	6.938	1.840	6.853	6.977
D.7.10	Justified: privatization of SOEs	0.279	[0.209]	0.065	5.550	2.347	5.371	5.500
	z-score: justification of govt. policies	-0.546***	[0.082]	-	0.098	0.992	0.365	-0.421
D.7.11	Justified: legal. of homosexual marriage	1.164 ***	[0.263]	0.001	6.473	2.864	5.971	7.425
D.7.12	Justified: legal. of prostitution	1.409***	[0.238]	0.001	3.345	2.838	2.629	4.722

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
D.7.13	Justified: abortion	1.354***	[0.224]	0.001	5.260	2.629	4.524	6.291
D.7.14	Justified: extra-marital sex	-0.272	[0.256]	0.210	3.958	2.899	4.135	4.683
D.7.15	Justified: transgenetic food	0.295	[0.195]	0.109	5.963	2.176	5.882	6.235
D.7.16	Justified: soft drugs usage	0.039	[0.209]	0.398	2.320	2.284	2.365	2.650
	z-score: justification of liberal issues	0.323***	[0.089]	-	-0.074	0.997	-0.206	0.317
Category D.8: *Willingness to act*								
D.8.1	Willing to battle illegal govt. acts	0.518**	[0.213]	0.016	6.095	2.389	5.818	6.830
D.8.2	Willing to report govt. misconduct	0.080	[0.210]	0.308	4.898	2.387	4.929	5.048
D.8.3	Willing to stand up for the weak	0.554***	[0.192]	0.013	6.107	2.067	5.829	6.565
	z-score: willingness to act	0.219**	[0.091]	-	-0.048	1.007	-0.150	0.205
Category D.9: *Interest in politics and economics*								
D.9.1	Interest in economics	0.965***	[0.219]	0.001	5.762	2.393	5.218	6.353
D.9.2	Interest in politics	0.670***	[0.219]	0.001	5.040	2.454	4.729	2.530
	z-score: interest in politics and economics	0.384***	[0.091]	-	-0.034	1.002	-0.246	0.194
Category D.10: *National identity*								
D.10.1	Proud of being Chinese	-0.219	[0.155]	-	7.800	1.825	7.947	7.252
Category D.11: *Fear to criticize the government*								
D.11.1	Fear to criticize govt. in public	0.421**	[0.201]	-	5.040	2.282	4.718	5.003
Panel E: Behaviors and planned behaviors								
Category E.1: *Information source and media consumption*								
E.1.1	Ranked high: domestic websites	-0.332***	[0.086]	-	3.958	1.006	4.082	3.399
E.1.2	Ranked high: foreign websites	0.655***	[0.076]	-	2.162	1.036	1.818	2.722
E.1.3	Ranked high: domestic social media	-0.108	[0.075]	-	4.210	0.940	4.288	4.092
E.1.4	Ranked high: foreign social media	0.355***	[0.068]	-	1.603	0.898	1.459	2.026

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
E.1.5	Ranked high: word of mouth	-0.536***	[0.087]	-	3.062	1.031	3.341	2.761
E.1.6	Frequency of visiting foreign websites for info.	0.968***	[0.136]	-	4.268	1.530	3.753	5.248
Category E.2: *Social interaction in politics*								
E.2.1	Frequency of discussing poli. with friends	0.605***	[0.210]	-	4.441	2.360	4.088	5.373
E.2.2	Frequency of persuading others	0.269	[0.218]	-	5.386	2.404	5.276	5.716
Category E.3: *Investment in the Chinese stock market*								
E.3.1	Currently invested in Chinese stock mkt.	-0.062***	[0.021]	-	0.052	0.222	0.076	0.121
Category E.4: *Plan after graduation*								
E.4.1	Plan: grad. school in China	-0.136***	[0.044]	-	0.479	0.500	0.535	0.451
E.4.2	Plan: master degree abroad	0.186***	[0.033]	-	0.236	0.425	0.135	0.261
E.4.3	Plan: PhD degree abroad	0.005	[0.025]	-	0.088	0.284	0.088	0.144
E.4.4	Plan: military in China	0.007	[0.008]	-	0.010	0.099	0.007	0.003
E.4.5	Plan: work right away	-0.013	[0.029]	-	0.115	0.319	0.129	0.095
Category E.5: *Career preferences*								
E.5.1	Sector pref.: national civil service	0.008	[0.038]	-	0.275	0.447	0.247	0.232
E.5.2	Sector pref.: local civil service	-0.019	[0.020]	-	0.050	0.219	0.059	0.023
E.5.3	Sector pref.: military	0.016	[0.021]	-	0.077	0.267	0.059	0.065
E.5.4	Sector pref.: private firm in China	0.076*	[0.044]	-	0.481	0.500	0.429	0.471
E.5.5	Sector pref.: foreign firm in China	0.020	[0.040]	-	0.706	0.456	0.706	0.817
E.5.6	Sector pref.: SOEs	-0.047	[0.043]	-	0.385	0.487	0.388	0.346
E.5.7	Sector pref.: inst. organizations	-0.065	[0.042]	-	0.583	0.493	0.653	0.542
E.5.8	Sector pref.: entrepreneurship	0.010	[0.043]	-	0.367	0.482	0.382	0.412
E.5.9	Location pref.: Beijing	0.027	[0.038]	-	0.281	0.450	0.247	0.275
E.5.10	Location pref.: Shanghai	-0.023	[0.028]	-	0.124	0.330	0.118	0.160
E.5.11	Location pref.: tier 2 cities in south	-0.040	[0.025]	-	0.068	0.252	0.100	0.069

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		Group-AE effect			Groups-N,NE,A,AE		Group-N	Existing users
		beta	s.e.	FDR adj. p-value	mean ex.var.	std.dev. ex.var.	mean ex.var.	mean ex.var.
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
E.5.12	Location pref.: tier 2 cities in central	-0.020	[0.023]	-	0.056	0.229	0.076	0.036
E.5.13	Location pref.: other cities in China	-0.036	[0.041]	-	0.303	0.460	0.335	0.225
E.5.14	Location pref.: HK and Macau	0.015***	[0.005]	-	0.012	0.110	0.000	0.026
E.5.15	Location pref.: Taiwan	-0.006	[0.009]	-	0.007	0.083	0.012	0.013
E.5.16	Location pref.: foreign cities	0.083***	[0.030]	-	0.149	0.357	0.112	0.196

Notes: Regression coefficient estimates of the Group-AE indicator (regression include Group-N, Group-A, Group-AE indicators, where Group-N is the omitted group) are shown in column 1, robust standard errors shown in column 2, and FDR-adjusted p-values shown in column 3. For space constraint, we do not show coefficient estimates on Group-N and Group-A indicators. The z-score indices (weighting by the inverse covariance of the standardized variables) and the FDR-adjusted p-values are computed following Anderson (2008). Coefficients are estimated using 1,312 completed surveys from students who have not been using censorship circumvention product at the time of baseline survey (November 2015).

Table 3: Estimation of social learning model

Poli. sensitive news events:	Foreign leaders involved in Panama Papers	Cause of stock market crash in Jan. 2016	Film on HK independence winning award	Censorship of the Economist
	(1)	(2)	(3)	(4)
Panel A: *Empirical moments used for model estimation*				
% correct $[I(own) = 0, N(roommate) = 0]$	0.560	0.520	0.460	0.450
% correct $[I(own) = 1, N(roommate) = 0]$	0.893	0.806	0.563	0.556
% correct $[I(own) = 0, N(roommate) = 1]$	0.779	0.668	0.496	0.488
% correct $[I(own) = 1, N(roommate) = 1]$	1.000	0.908	0.587	0.577
Panel B: *Estimation of key parameters*				
α_j [base rate knowledge]	0.560	0.520	0.460	0.450
p_j [rate of direct learning]	0.333	0.286	0.103	0.106
$\gamma_j[I(own) = 0]$	0.736	0.644	0.616	0.643
$\gamma_j[I(own) = 1]$	0.361	0.446	0.399	0.358
$\bar{\gamma}[I(own) = 0]$	0.659	0.659	0.659	0.659
$\bar{\gamma}[I(own) = 1]$	0.391	0.391	0.391	0.391
Rate of social transmission $[I(own) = 0]$	0.220	0.188	0.068	0.070
Rate of social transmission $[I(own) = 1]$	0.130	0.112	0.040	0.041
Panel C: *Predictions and out-of-sample tests*				
Predicted: % correct $[I(own) = 0, N(roommate) = 2]$	0.913	0.799	0.537	0.524
Actual: % correct $[I(own) = 0, N(roommate) = 2]$	0.918	0.810	0.544	0.517
Predicted: % correct $[I(own) = 1, N(roommate) = 2]$	1.000	0.976	0.612	0.598
Actual: % correct $[I(own) = 1, N(roommate) = 2]$	1.000	0.981	0.604	0.584

Notes: $I(own)$ indicates whether student is an existing user of the censorship circumvention tool prior to treatment assignment, or is assigned with both the supply and demand treatment. $N(roommate)$ indicates the number of college dorm roommates who have received access to uncensored information due to the experimental treatment.

ONLINE APPENDIX, NOT FOR PUBLICATION

Appendix A Legal & administrative framework of internet censorship

Simultaneously with the internet's arrival in China in 1995, the State Council of China initiated the process of its regulation. The State Council issued the "Regulations of the People's Republic of China for Safety Protection of Computer Information Systems" in 1994, and Article 7 of this set of regulations stipulates:[1]

> No organization or individual may make use of computer information systems to engage in activities harmful to the interests of the State or collectives, or the legitimate rights of the citizens, nor endanger the safety of computer information systems.

The 1994 regulations laid the groundwork of information control over China's cyberspace, and delegated the administrative responsibility of internet censorship to the Ministry of Public Security, directly oversaw by the State Council and the Propaganda Department of the Chinese Communist Party. The Ministry of Public Security further amended the regulations by issuing the "Security Management Procedures in Internet Accessing" in 1997, specifying that "No unit or individual may use the Internet to create, replicate, retrieve, or transmit the following kinds of information: [...] *(ii)* inciting to overthrow the government or the socialist system; *(iii)* inciting division of the country, harming national unification; *(iv)* inciting hatred or discrimination among nationalities or harming the unity of the nationalities [...]"

In response to the beginning of foreign media outlets' operation in China and the upcoming WTO agreement, the "State Council Order No.292" issued in 2000 generated the first content restrictions for internet content providers, particularly with respect to domestic media outlets hosting contents from foreign media outlets. The order prevents the domestic media outlets from hosting links to foreign news outlets, or distributing news from foreign news outlets without separate approval from the internet regulatory bodies. Most recently, in late 2016 the People's Congress of China passed the new "Cybersecurity Law of the People's Republic of China," legalizing the state's control over information flows and technology equipment over China's cyberspace, further restricting the operation freedom of foreign media outlets' in China.

Overall, these administrative regulations and legal framework ensures that media outlets based in China would incur severe business and political cost from publishing and circulating contents that the state deems threatening and objectionable. As a result, contents on domestic media outlets are routinely censored and filtered by the orders from the Propaganda Department (either *ex-ante* or *ex-post*), or self-censored during the editorial process.

[1] Source: `http://lawinfochina.com/display.aspx?lib=law&id=12136&CGid=`, last accessed on December 11, 2016.

Appendix B Conceptual framework: details

To clarify the supply-side and demand-side factors that constrain students' consumption of uncensored information, and to frame our experimental design, we consider a simple one-armed bandit problem that captures citizens' dynamic choice of media consumption. The framework demonstrates how media consumption choices are affected by both the cost of accessing media outlets and students' beliefs regarding media outlets, and how media consumption affects students' subsequent beliefs.

B.1 Setup

Media consumption and media outlets Citizens consume media in each period (t), primarily aimed to find out about bad events occurring in China as signals of the incumbent quality. Citizens choose between two media outlets: domestic media outlet ($m_t = D$) that is directly controlled by the state, and foreign media outlet ($m_t = F$) that is not subject to the state control of China. We assume that media consumption generates per period direct payoff to the citizens, and the payoff is realized at the end of each period. Specifically, consuming domestic media outlet yields constant amount of earning λ^D. The consumption of foreign media outlet yields a binary earning that is either high (λ^b) if foreign media outlet reports bad event in that period, or low ($\lambda^\emptyset$) if foreign media outlet does not report bad event in that period, where $\lambda^b > \lambda^\emptyset$. The probability of foreign media reporting bad event is unknown to citizens. The cost of accessing domestic media outlets per period is 0 (conditional on having access to the internet already), and cost of accessing foreign media outlets per period is $C \geq 0$. If access to foreign media outlet is blocked by the Great Firewall, then $C > 0$.

The payoff structure of media consumption can be justified as the following. Media consumption generates direct payoff to the citizens in each period, capturing either the intrinsic or instrumental value from reading news report (in particular, reports on bad events). Intrinsically, citizens benefit from knowing the details of a bad event even if they are already certain of bad events occurring (hence consuming the report would not affect their beliefs of the underlying state of the world *per se*), and this can reflects curiosity and the entertainment value of news consumption. Instrumentally, citizens can benefit from knowing the "types" of bad events (e.g. economic corruption, political scandal, environmental pollution) that take place in a particular period, which can inform them to choose corresponding actions in response to the bad events. Assuming that the "type" of bad events is an independent realization in each period conditional on bad event occurring, then citizens need to consume the specific news report in order to learn about the type in that period (in addition to the overall knowledge that bad event takes place).

Specifically, we assume that consuming domestic media outlet yields constant amount of earning λ^D. The consumption of foreign media outlet yields a binary earning that is either high (λ^b) if foreign media outlet reports bad event in that period, or low ($\lambda^\emptyset$) if foreign media outlet does

not report bad event in that period, where $\lambda^b > \lambda^\varnothing$. This media outlet payoff structure can be justified as follows. First, this payoff structure reflects the fact that citizens are familiar with domestic media outlet and its payoff due to its continuous operation and availability in China. In contrast, citizens are unfamiliar with the foreign counterpart since it is not allowed to operate and campaign in the Chinese market. Citizens are hence uncertain about the reporting quality and the value of consuming foreign media outlet, which can be either high (e.g. when it reports valuable and sensitive information that is unavailable in domestic media outlet) or low (e.g. when it reports news stories that are irrelevant to a Chinese audience, or reports news that is heavily biased against China, or simply, reports and censors news in the same manner as domestic media outlet does). Second, domestic media outlet yielding constant payoffs implies that its payoff to citizens is independent of its report, an extreme case in which domestic media outlet is not informative at all, and citizens are aware of this feature of the domestic media outlet. We can relax this assumption and instead assume that domestic media outlet's payoff correlates with its actual report (hence complicating the model and turn it into a two-armed bandit game) — this would not change the main result of the model.[2]

Government's type, bad events, and reporting with censorship Suppose that the Chinese government can be either good ($g = G$) or bad ($g = B$). If $g = G$, bad events would occur in each period with probability $p^G \in (0,1)$, and no events would occur with probability $1 - P^G$. If $g = B$, bad events would occur in each period with probability $p^B \in (0,1)$, and $p^B > p^G$. When bad events occur, foreign media outlet may either report in an uncensored/informative manner – reporting the event with probability $\delta^{uc} \in (0,1]$, or report in a censored/uninformative manner – reporting the event with probability $\delta^c \in (0,1)$, where $\delta^c < \delta^{uc}$.[3]

Beliefs on government and censorship Citizens have prior belief over the government's type. Denote belief before making $t = 1$ decision as $\mu_0^B \in (0,1)$, such that the probability of the government being a bad type is μ_0^B, and the probability of the government being a good type is $1 - \mu_0^B$. Citizens also have prior belief over foreign media outlet's reporting scheme. Denote belief before making $t = 1$ decision as $\mu_0^{uc} \in (0,1)$, such that the probability of foreign media outlet reports bad events in an uncensored/informative manner is μ_0^{uc}, and the probability of foreign media outlet reports in a censored/uninformative manner is $1 - \mu_0^{uc}$.[4]

[2] In fact, according to Berry and Fristedt (1985), all two-armed bandit games are equivalent to a one-armed bandit game where the payoff of one of the arms is degenerate to the mean of original payoff distribution.

[3] Hence, given government's type and foreign media's reporting scheme, we can specify the probability of observing reports on bad events on foreign media outlet as the product of probability of bad event occurring (p), and the probability of foreign media reporting the event (δ).

[4] Note that the prior beliefs μ_0^B and μ_0^{uc} need not be accurate with respect to the true likelihood.

B.2 Bayesian updating of beliefs on the government and censorship

Assuming that citizens update their beliefs in a Bayesian manner. Then after the t'th time they consume foreign media outlet, their posterior beliefs μ_t^B and μ_t^{uc} can be specified as the following: conditional on observing k reports on bad events (hence experiencing the realization of high payoffs) and $t-k$ times when foreign media outlet does not report on bad events (hence experiencing the realization of low payoffs) out of the t draws,

$$\mu_t^B = \frac{\mu_0^B \mu_0^{uc} (p^B \delta^{uc})^k (1-p^B\delta^{uc})^{t-k} + \mu_0^B (1-\mu_0^{uc})(p^B\delta^c)^k (1-p^B\delta^c)^{t-k}}{\begin{array}{r}\mu_0^B \mu_0^{uc} (p^B \delta^{uc})^k (1-p^B\delta^{uc})^{t-k} + \mu_0^B (1-\mu_0^{uc})(p^B\delta^c)^k (1-p^B\delta^c)^{t-k} \\ + (1-\mu_0^B)\mu_0^{uc} (p^G \delta^{uc})^k (1-p^G\delta^{uc})^{t-k} + (1-\mu_0^B)(1-\mu_0^{uc})(p^G\delta^c)^k (1-p^G\delta^c)^{t-k}\end{array}}$$

$$\mu_t^{uc} = \frac{\mu_0^B \mu_0^{uc} (p^B \delta^{uc})^k (1-p^B\delta^{uc})^{t-k} + (1-\mu_0^B)\mu_0^{uc} (p^G \delta^{uc})^k (1-p^G\delta^{uc})^{t-k}}{\begin{array}{r}\mu_0^B \mu_0^{uc} (p^B \delta^{uc})^k (1-p^B\delta^{uc})^{t-k} + \mu_0^B (1-\mu_0^{uc})(p^B\delta^c)^k (1-p^B\delta^c)^{t-k} \\ + (1-\mu_0^B)\mu_0^{uc} (p^G \delta^{uc})^k (1-p^G\delta^{uc})^{t-k} + (1-\mu_0^B)(1-\mu_0^{uc})(p^G\delta^c)^k (1-p^G\delta^c)^{t-k}\end{array}}$$

Notice immediately that without consuming foreign media, citizens would not have the opportunity to update their beliefs regarding the foreign media outlet. In addition, consider the case when $t = k = 1$ (namely, after having observed the bad event reporting during the 1st period), $\mu_1^B(r_1 = b) > \mu_0^B$, and $\mu_1^{uc}(r_1 = b) > \mu_0^{uc}$ — beliefs in both dimensions are updated upward. Correspondingly, students shift up their beliefs on the value of foreign media.

Then, citizens' predicted probability of observing reports on bad events and hence receiving high payoff from foreign media outlet in period t at the beginning of the period is:

$$\begin{aligned}&q_{t-1}(\mu_{t-1}^B, mu_{t-1}^{uc}; p^B, p^G, \delta^{uc}, \delta^c) \\ =&\mu_{t-1}^B \mu_{t-1}^{uc} p^B \delta^{uc} + \mu_{t-1}^B (1-\mu_{t-1}^{uc}) p^B \delta^c + (1-\mu_{t-1}^B)\mu_{t-1}^{uc} p^G \delta^{uc} + (1-\mu_{t-1}^B)(1-\mu_{t-1}^{uc}) p^G \delta^c\end{aligned}$$

B.3 Media consumption choices

We consider the case of an infinite period game ($t = 1, 2, 3, ...$), and citizens discount each period's payoff by $\beta \in (0, 1)$. $u(m_t = F) \in \{u(\lambda^b - C), u(\lambda^\emptyset - C)\}$ is the per period utility from the consumption of foreign media outlet (net of cost to access C), and $u(m_t = D) = u(\lambda^D)$ is the per period utility from the consumption of domestic media outlet.

A decision rule of media consumption choices is a sequence $M = (m_1, m_2, ...)$ of functions adapted to the observations; that is, m_n may depend on past actions and observations (namely, past payoff realizations): $m_n(m_1, u(m_1), m_2, u(m_2), ..., m_{n-1}, u(m_{n-1}))$. To abuse the notation, we use m_n to denote both the function of past actions and observations, as well as the media consumption choices made at stage n.

For each citizen, he seeks to find a decision rule M to maximize his expected total discounted

return from media consumption $V(M)$:

$$\max_{M=(m_1,m_2,\ldots)} V(M) = \mathbb{E}_{\mu_0^B,\mu_0^{uc}} \sum_{t=1}^{\infty} \beta^{t-1} u(m_t)$$

We now present 2 propositions that are derived based on theorems regarding *k-armed bandit problem*, proved in Berry and Fristedt (1985).

Proposition 1 *If it is initially optimal to choose domestic media outlet in the sense that* $sup_M V(M) = V^* = sup\{V(M) : M \text{ such that } m_1 = D\}$, *then it is optimal to choose domestic media outlet always and* $V^* = \frac{\lambda^D}{1-\beta}$.

In other words, given the primitives and citizens prior beliefs μ_0^B and μ_0^{uc}, if at any period it becomes optimal for a citizen to consume domestic media outlet, then it is optimal for him to keep consuming domestic media outlet thereafter. This implies that if there exists an optimal rule $M*$ for the media consumption choice problem, then there exists an optimal rule with the property that every period of the consumption of domestic media outlet is followed by another period of domestic media outlet consumption. Thus, citizens only need to decide on the time to switch from foreign media outlet to domestic media outlet, which relates this decision rule to a stopping rule problem in which the stopping time is identified with the time of switching from foreign to domestic media outlet.

As a corollary, we show that there exists an optimal rule for this problem of media consumption choices. It is either the rule that chooses domestic media outlet at all stages, or the rule corresponding to the stopping rule $N \geq 1$ that is optimal for the stopping rule problem with payoff:

$$V_N = \sum_{t=1}^{N} \beta^{t-1} u(m_t = F) + u(\lambda^D) \sum_{t=N+1}^{\infty} \beta^{t-1}$$

Proposition 2 *Let* Ω *denote the optimal rate of return for consuming foreign media outlet, where*

$$\Omega = \sup_{N \geq 1} \frac{\mathbb{E}_{\mu_0^B,\mu_0^{uc}} \sum_{t=1}^{N} \beta^{t-1} u(m_t = F)}{\sum_{t=1}^{N} \beta^{t-1}}$$

Then domestic media outlet is chosen initially, if and only if $\Omega \leq u(\lambda^D)$.

It then follows that given $p^B, p^G, \delta^{uc}, \delta^c, \lambda^D, \lambda^b, \lambda^{\varnothing}, C, \beta$, and assuming that $u(\cdot)$ follows CRRA structure, there exists $\mu_0^{B*} \in (0,1)$ and $\mu_0^{uc*} \in (0,1)$ such that $\Omega(\mu_0^{B*}, \mu_0^{uc*}) = u(\lambda^D)$. $\Omega(\mu_0^{B*}, \mu_0^{uc*})$ is called the *Gittins index* for foreign media consumption, representing the indifference condition such that citizens are indifferent between starting off with consuming foreign media outlet and choosing domestic media outlet all the time. Therefore, for any $\mu_0^B \in (0,1)$ and $\mu_0^{uc} \in (0,1)$ such

that $\mu_0^B \mu_0^{uc} < \mu_0^{B*} \mu_0^{uc*}$, citizens chooses to consume domestic media outlet in all periods.

In particular, we want to highlight the case of which μ_0^B and μ_0^{uc} are in the range such that $M^* = (D, D, D, ...)$ when $C = 0$ (given $p^B, p_B, \delta^{uc}, \delta^c, \lambda^D, \lambda^b, \lambda^\varnothing$). In this scenario, students wouldn't find foreign media outlet appealing enough to consume even when the cost is brought down to *zero*. However, once these beliefs are moved sufficiently upward (via external forces out of the equilibrium path), students may start to consume foreign media outlets and such behaviors would persist: $M^* = (F, F, F, ...)$.

B.4 Predictions of experimental outcomes

Factors that prevent consuming foreign media outlet In the framework that we just describe, there are 3 potential factors that prevent citizens from choosing foreign media outlet. Each factor generates testable predictions, which guide our experimental design in order to distinguish which is the relevant factor that prevents citizens from consuming foreign media outlet and the uncensored information hosted on the outlet. First, the foreign media outlet is costly (C) — in other words, the supply of uncensored information is restricted. If this is the relevant factor, when we provide citizens with free access to foreign media outlet, reducing C to zero, citizens would increase their consumption of foreign media outlet. Second, the payoff of foreign media outlet is low even when it reports bad events (λ^b) — in other words, citizens inherently do not value foreign media outlet. If this is the relevant factor, when we boost the value of consuming foreign media outlet, citizens would increase their consumption. Importantly, once we stop increase the value, citizens' consumption of foreign media outlet would revert back. Third, citizens hold low belief that foreign media outlet would report bad events (μ_0^{uc}) — in other words, citizens underestimate the value of foreign media outlet in terms of its reporting bad events. If this is the relevant factor, when we temporarily boost the value of consuming foreign media outlet, citizens would increase their consumption during those periods and update their beliefs on the value of foreign media outlet upward. This would lead to an increase in consumption of foreign media outlet even when the temporary boost in value ends.

Predictions The *supply treatment* provides free access to uncensored internet, which reduces C to zero. The *demand treatment* provides encouragement for students to consume uncensored internet (e.g. offering small incentives for students to visit *NYTimes* China), which generates additional reporting draw(s) of the foreign media outlet that students can observe and update their beliefs, prior to them making media consumption decisions at $t = 1$.

Suppose that μ_0^B and μ_0^{uc} are in the range such that $M^* = (D, D, D, ...)$ when $C = 0$ (given $p^B, p_B, \delta^{uc}, \delta^c, \lambda^D, \lambda^b, \lambda^\varnothing$). Then we have the following predictions of the experimental treatment effect:

- Group-N: remain at $M^* = (D, D, D, ...)$, and μ_t^B and μ_t^{uc} remain unchanged from μ_0^B and μ_0^{uc}

for all t; this is the *status quo*.

- Group-A: remain at $M^* = (D, D, D, ...)$, and μ_t^B and μ_t^{uc} remain unchanged from μ_0^B and μ_0^{uc} for all t; this is because given the belief μ_0^B and μ_0^{uc}, students wouldn't find foreign media outlet appealing enough to consume even when the cost is brought down to zero.

- Group-NE: remain at $M^* = (D, D, D, ...)$, and μ_t^B and μ_t^{uc} remain unchanged from μ_0^B and μ_0^{uc} for all t; this is because if the student is not willing to consume foreign media outlet in $t = 1$ (despite the fact that it would yield payoff of at least $\lambda^{\emptyset}$, as well as the indirect payoff from learning/exploration of foreign media outlet's payoff structure), then just the learning/exploration motive (namely, with zero direct payoff at that period) is not going to be sufficient for the student to purchase the additional signal at cost $C > 0$ prior to making his first media consumption decision. Without seeing the additional signals, students' prior belief μ_t^B and μ_t^{uc} will not be updated.

- Group-AE: students would opt in for the additional payoff signals (since it is now freely available, the learning value of the signal is weakly positive, and there is no opportunity cost of doing so). When the true government type is bad and foreign media outlet reports bad events in uncensored/informative manner, if $p^B \delta^{uc}$ is high or if the string of signals is sufficiently long, the probability that $\mu_0^{B'} > \mu_0^B$ and $\mu_0^{uc'} > \mu_0^{uc}$ approaches to 1 (where $\mu_0^{B'}$ and $\mu_0^{uc'}$ are the posterior beliefs after having observed the additional signals brought by the demand treatment). Therefore, $\mu_0^{B'} \mu_0^{uc'}$ can be moved sufficiently upward such that $M^* = (F, F, F, ...)$. In particular, if we hand pick the signals to be the ones that reveal high payoffs of foreign media outlets, then the total number of signals needed to move $\mu_0^B \mu_0^{uc}$ above the threshold such that $M^* = (F, F, F, ...)$ is small.

Appendix C Features of the censorship circumvention tool we provide

The premium censorship circumvention tool we offer provides fast, stable, and reliable access to internet bypassing the *Great Firewall*, allowing students to visit websites that are otherwise blocked due to censorship, and to consume information uncensored and unfiltered by the Chinese state.

This particular tool features the following characteristics: *(i)* it combines Http proxy service with the VPN, which means that once the students have set up the tool on their devices, they no longer need to sign-on each time they browse the internet — the tool is on and operating by default; *(ii)* the deep-tunnel technology ensures that the service is stable and robust, even during politically sensitive times when the Chinese government temporarily shut down certain VPN services; *(iii)* we aim to provide a frictionless experiences to students who wish to use the tool, for example, the setup requires less than 1 minute and we offer full technical support during the setup process and continuous customer services to troubleshot throughout the experiment; *(iv)* students would not experience noticeable speed reduction when browsing internet through the tool — the tool automatically detects whether destination websites are hosted inside or outside of China, and it only turns on when traffic reaches outside of China; hence it would not affect the speed and experiences for browsing websites hosted domestically; and *(v)* the tool works on both students' computer and mobile device (e.g. smart phone).

Appendix D Demand treatment: details

The demand treatment contains two main types, which were sent to Group-NE and Group-AE students simultaneously.

Type 1: introduce blocked news outlets & highlight divergent reporting across outlets The first type of demand treatment does not involve monetary incentives. It introduces students to a variety of foreign websites that are blocked by the *Great Firewall* that students may never hear of. For example, we introduced the *New York Times* Chinese edition, the *Intium* (a Hong Kong based news outlet), *TED talks*, etc. For each website, we provide a brief description of the website's content, functionality, and reputation. In addition, we present sample contents that will link students directly to the websites; for example, top 5 articles from past week, most popular videos from past month, etc. Appendix Figure A.1 shows a screenshot of such newsletter.

In addition, some later newsletters highlights to students that politically sensitive news events are often reported differently between domestic news outlets and their foreign counterparts that are blocked by the *Great Firewall*. For example, regarding the stock market crash in January 2016, we present headline articles (and links) from, among others, the *New York Times* Chinese edition titled "Does China lose its ability to manage complicated economic affairs?", and from the *Financial Times* Chinese edition titled "Gatekeeper cannot handle the crisis, leading the Chinese economy astray." In particular, due to the Propaganda Department's order to censor negative reports on economic and in particular stock market performance, these headlines represent information that students would not be able to find from domestic news outlets (even if they think they have already informed themselves with the current economic news from these outlets).[5] Appendix Figure A.2 shows a screenshot of such newsletter.

Type 2: news quizzes with monetary rewards The second type of demand treatment involves news quizzes with monetary rewards. The goal of the quizzes is to encourage students to visit foreign news outlets blocked by the *Great Firewall* — the *New York Times* Chinese edition, in particular.[6] For example, on the day when the *New York Times* Chinese edition front page features an article on underground water pollution in China, we inform students that they should look for an article on the *New York Times* Chinese edition front page on that day that covers such topic, and we ask students: *(i)* what percentage of China's underground water is reported to be polluted? — this is meant to make the question looks like a regular quiz, and we design the question such

[5]For example, according to leaked commands issued by the Propaganda Department, domestic news outlets are asked to organize and censor their economic news content to "highlight the optimistic outlook of the Chinese economy" (September 8, 2015), and should not report on the resignation of the National Stock Market Supervision Council chair in response to the stock market crash in January (February 18, 2016). Source: the *China Digital Times* hosted by the Berkeley Counter-Power Lab.

[6]We focus exclusively on the *New York Times* in order to maximize the power of this demand treatment in terms of leading to changes in students' news consumption, without diffusing students to multiple outlets.

that the answer is easy to spot as long as the students can locate the relevant article from the *New York Times*; *(ii)* who is the author of this article — this is meant to ensure that students need to go to the *New York Times* to read the original article, while search engine and re-posted version of the articles on other platforms typically would not include the author information; and *(iii)* what is the author's one other article on the *New York Times* published during the past week — this is meant to encourage students to browse the *New York Times* beyond the article that is related to the quiz. If students can answer all three questions correctly (via replying to E-mail or message on WeChat), we pay the students with US$ 2.5.

The quizzes carry out for a total of 4 rounds.[7] Other questions cover topics including wealth inequality in China, the censorship on economic indicators, and labor unrest.[8] Appendix Figure A.3 shows a screenshot of this type of newsletter.

[7] The first round of the quiz features news that is *not* strictly censored on the domestic media. We intentionally make this design choice, in order to minimize the political sensitivity upfront when students are paid by the researchers to consume particular news content. We also did not ask students about the author and other articles in the first quiz, for the same reason.

[8] All quiz questions are chosen to cover news content related to China and that are somewhat negative. We make this design choice in order maximize the demand treatment's ability to highlight content that students would be potentially interested, and are otherwise difficult to obtain from browsing domestic news outlets alone.

Appendix E Outcomes elicited in panel survey

Our repeated panel survey measures 5 broad groups of outcomes of interest, as well as a rich set of demographics and background characteristics that serve as both controls and criteria for heterogeneity analyses. Table A.1 presents the original wording (translated) on *all* questions that we ask in the panel survey, with the category numbers labeled correspondingly.

E.1 Beliefs and attitudes regarding media (A)

Given the critical role that beliefs regarding media outlets played in the framework we present in Section **??**, we explicitly measure participants' attitudes and beliefs regarding media and censorship across a wide range of domains.

Valuation of access to foreign media outlets (A.1) Lastly, we elicit participants' valuation of access of foreign media outlets in two different ways. First, we ask participants to what extent they think it is valuable to read the report on the same news event on foreign news outlet after having already read it on domestic news outlet. Second, we use a Becker–DeGroot–Marschak (BDM) method to elicit participants' willingness to pay for one month's service of censorship circumvention tool, in an incentive compatible manner.[9]

Trust in media outlets (A.2) We elicit participants' level of trust towards three types of news outlets: *(i)* domestic media outlets owned by the state (e.g. the *People's Daily*); *(ii)* domestic media outlets privately owned (e.g. the *Southern Weekend*); and *(iii)* foreign media outlets (e.g. the *New York Times*).

Belief of actual level of media censorship (A.3) We ask participants to what extent do they think domestic news outlets and foreign news outlets censor their news reports, respectively.

Calibration of news outlets' level of censorship (A.4) We next ask participants to calibrate, hypothetically, whether domestic and foreign news outlets would censor different types of news if they take place. Same as in *A.1*, the type of news spans the entire domain: positive news occurred in China, positive news occurred in the US, as well as their negative counterparts.

Calibration of news outlets' bias (A.5) We ask participants to calibrate, hypothetically, to what extent domestic and foreign news outlets would report different types of news in biased manner

[9] We incentivize the valuation decisions in the following way. For every 100 participants of this study, we randomly pick one item in the BDM elicitation module to implement. For participants assigned with the supply treatment, we override their choice with free provision of the censorship circumvention tool, in the case in the decision item that we pick to implement they choose cash payment over censorship circumvention tool.

relative to truth, respectively. The type of news spans the entire domain: positive news occurred in China, positive news occurred in the US, as well as their negative counterparts.

Justification of media censorship (A.6) We ask participants to what extent do they think it is justifiable to for domestic media outlets to censor: *(i)* economic news; *(ii)* political news; *(iii)* social news (in particular suicides, etc.); *(iv)* news related to foreign affairs; and *(v)* pornographic materials.

Belief regarding drivers of media censorship (A.7) Finally, we ask students what do they think is the main driver of news censorship: government policy, media company's business interest, media company's own ideology, or readers' demand.

E.2 Knowledge (B)

The next broad category of outcomes that we measure is students' knowledge, we we aim to cover a wide range of dimensions, both contemporary and historical, both politically sensitive and non-sensitive.

Current news events covered in demand treatment (B.1) We first ask participants quiz questions on news events that are directly covered in the demand treatment (in particular, the quizzes with monetary incentives). There are 4 such questions in total, and these quizzes are in the format of "true or false" regarding a statement describing the news event, and although the cover the same news events as the quizzes in the demand treatment, they do not resemble each other exactly. Note that B.1 items are the *only* questions in the entire survey that directly correspond to materials covered in the demand treatment — all other survey questions are not explicitly mentioned in the demand treatment. We code each outcome variable as indicator of 1 if the students answer the corresponding "true or false" quiz correctly.

Current news events *not* covered in demand treatment (B.2) We next ask participants 7 quiz questions on news events that are not covered in the demand treatment. These questions fall into 2 sub-categories: *(i)* 4 of them correspond to news events that are censored on domestic news outlets (e.g. the Panama Papers, and the film on Hong Kong independence that won the Best Picture in 2015 Hong Kong Film Festival); and *(ii)* 3 of them correspond to news evens that are not politically sensitive and hence are not censored on domestic news outlets (e.g. the Apple vs. FBI case, and the Taiwanese presidential election).[10] Same as the previous category, we code each

[10]Questions in B.1 and B.2 are not repeated in the panel survey. Instead, each wave of the survey will cover new questions reflecting the news events that take place since the last wave of the survey. Other knowledge questions are repeatedly asked across the panel waves.

outcome variable as indicator of 1 if the students answer the corresponding "true or false" quiz correctly.

Awareness of notable figures (B.3) We next ask participants whether they have heard of a range of notable figures in mainland China or Great China region. There are 10 of them in total, and they fall into 4 sub-categories: *(i)* politically sensitive notable figures are featured in recent news events since the baseline survey in November 2015 (e.g. Zhiqiang Pu, Joshua Wong); *(ii)* politically sensitive notable figures are not featured in recent news events (e.g. Xiaolin Li); *(iii)* notable figures who are not politically sensitive and are not censored on the domestic media outlets (e.g. Yushi Mao); and *(iv)* fake names that we randomly picked as a placebo in order to see whether participants are randomly clicking in this module.

Awareness of protests and independence movements (B.4) We then ask participants whether they have heard of several protest events that took place during the last decade. There are 9 of them in total. Given that protest events are in general very politically sensitive, all these events are censored on the domestic media outlets. They fall into 3 sub-categories: *(i)* protests took place in the Greater China region (e.g. the Umbrella Revolution in Hong Kong); *(ii)* protests took place around the world (e.g. the Arab Spring); and *(iii)* a fake protest that we make up as a placebo in order to see whether participants are randomly clicking in this module.

Meta-knowledge (B.5) Finally, we measure students' meta-knowledge by asking students to assess their familiarity with political events, both with respect to oneself, and in comparison with other students at the the university.

E.3 Economic beliefs (C)

We next elicit participants economic beliefs in an incentive compatible manner, and their corresponding confidence with respect to their beliefs.

Belief on economic performance in China (C.1) We first elicit participants' beliefs on economic performance in China in 2016. In particular, we ask participants to guess the GDP growth rate in China during 2016, and the Shanghai Stock Composite Index (SSCI) — the main stock market index in China — as of December 31, 2016. Participants will be rewarded with a bonus of RMB 5 if their GDP growth rate guess is within 0.1 percentage point of the truth, and an additional bonus of RMB 5 if their SHI guess is within 5% window of the truth.

Confidence on guesses regarding economic performance in China (C.2) We next ask participants to evaluate their own confidence regarding the guess they just submitted with respect to the

GDP growth rate in China and the stock market performance in the Shanghai Stock Composite Index, respectively.

Belief on economic performance in the US (C.3) We then elicit participants' beliefs on the economic performance in the US in 2016. In particular, we ask participants to guess the GDP growth rate in the US during 2016, and the Dow Jones Index (DJI) as of December 31, 2016. Participants will be rewarded with a bonus of RMB 5 if their GDP growth rate guess is within 0.1 percentage point of the truth, and an additional bonus of RMB 5 if their DJI guess is within 5% window of the truth.

Confidence on guesses regarding economic performance in the US (C.4) Lastly, we ask participants to evaluate their own confidence regarding the guess they just submitted with respect to the GDP growth rate in the US and the stock market performance in the Dow Jones Index, respectively.

E.4 Political attitudes (D)

We then measure a wide range of attitudes that the study participants hold with respect to politics, broadly defined. We believe that this is one of the most comprehensive political attitudes survey module that is ever conducted among citizens in China.

Demand for institutional change (D.1) We next ask participants to what extent do they think that the economic and political institutions need fundamental changes in the near future.

Trust in institutions (D.2) We next ask participants whether they trust a variety of institutions: *(i)* central, provincial, and local government of China; *(ii)* foreign government (Japan and the US); *(iii)* domestic and foreign financial institutions (e.g. banks); *(iv)* NGOs; and *(v)* court and police in China.

Evaluation of government's performance (D.3) We next measure participants' evaluation of Chinese government's performance in the past year, across the domain of: *(i)* economic affairs; *(ii)* political affairs; and *(iii)* foreign and diplomatic affairs.

Performance evaluation criteria (D.4) Related to D.4, we ask participants which are the most important criteria when they evaluate Chinese government's overall performance. Specifically, participants are asked to rank the following criteria: *(i)* electing state leaders through democratic elections; *(ii)* maintaining economic performance; *(iii)* promoting socioeconomic equality; *(iv)* maintaining the rule of law; *(v)* protecting human rights; *(vi)* respecting the freedom of speech; *(vii)* promoting China as a global power; and *(viii)* providing fairness to historical injustices.

Evaluation of severity of socioeconomic issues (D.5) We then measure participants' evaluation of to what extent certain socioeconomic issue is a severe problem in China today. This captures a combination of the participants' policy evaluation and their policy preferences. We ask participants to evaluate a total of 6 socioeconomic issues: *(i)* social welfare; *(ii)* unemployment; *(iii)* pollution; *(iv)* inequality; *(v)* corruption; and *(vi)* discrimination against ethnic minorities.

Evaluation of democracy and human rights protection in China (D.6) We next ask a set of questions concerning participants' evaluation of current status of democracy and human rights protection in China. For example, to what extent do participants consider the Chinese government cares for the interests of the masses (instead of the rich and powerful); what is the level of democracy in China today; what is the level of human rights protection in China today; and how important it is to live in a democratic society.

Justification of controversial policies and issues (D.7) We next ask participants whether certain policy or issue that is regarded as controversial is justified. We cover a total of 16 dimensions, and they fall into 2 sub-categories, broadly speaking: *(i)* controversial policies currently implemented by the Chinese government (e.g. one-child policy, and government's use of violence to achieve social stability); and *(ii)* controversial issues that are typically considered as liberal (e.g. legalization of homosexual marriage, and the legalization of soft drug usage).

Willingness to act (D.8) We next ask participants to what extent are they willing to act, hypothetically, in order to: *(i)* battle illegal acts conducted by the Chinese government; *(ii)* report government misconduct; and *(iii)* stand up to protect the interest of the weak.

Interest in politics and economics (D.9) We first ask participants to assess their own interests in political events as well as economic events, separately.

National identity (D.10) We next measure participants' national identity by asking them to what extent are they proud of being Chinese.

Fear to criticize the government (D.11) Lastly, we ask participants to what extent do they fear of criticizing the Chinese government (in terms of its policy or its behaviors).

E.5 Behaviors and planned behaviors (E)

Next, we ask participants to self-report a range of behaviors and planned behaviors for the near future.

Information source and media consumption (E.1) We first ask participants a set of questions related to their information sources an media consumption. We ask participants to rank media outlets/sources in terms of how important are they for the participants to obtain information (among domestic websites, foreign websites, domestic social media, foreign social media, and word of mouth). We next ask students to self-report their frequency to visit foreign websites, which would serve as an important benchmark for us to calibrate foreign media consumption among those participants who we do not observe online activities directly.

Social interaction on politics (E.2) We next ask participants how often do they interact with other students at school, particularly for politics: *(i)* what is the frequency that the participants talk about politics with other students; and *(ii)* what is the frequency that the participants persuade other students when they hold different opinions regarding politics and current affairs.

Investment in the Chinese stock market (E.3) We then ask participants whether they are currently invested in the Chinese stock market.[11] If so, participants would then have an option to report to us the total amount of fund they are currently investing, the specific stock that they are holding, etc.

Plan after graduation (E.4) We next ask participants regarding their plans upon graduating from undergraduate studies. Specifically, participants are asked to rank the degree of attractiveness across the following choices: *(i)* graduate study in China; *(ii)* master degree in a foreign country; *(iii)* PhD degree in a foreign country; *(iv)* military; and *(v)* work immediate after graduation.

Career preferences (E.5) Last but not least, we elicit participants' future career preferences in two dimensions: *(i)* sectorial preferences (e.g. civil servants, private firms, state-owned-enterprises, institutional organizations, entrepreneurship); and *(ii)* location preferences (e.g. Beijing, Shanghai, tier-2 domestic cities, Hong Kong, Taiwan, foreign cities).

E.6 Demographics, background characteristics, and fundamental preferences (F)

Finally, we measure and collect a range of individual and household characteristics. These questions are only included in the baseline survey, and are not repeated across other waves in the panel survey.

Personal characteristics (F.1) We collect a wide range of individual demographic characteristics: gender, birth date, height, ethnicity, hometown, *hukou* status, religiosity, and whether one is a member of the Chinese Communist Party at the time of the baseline survey.

[11] Chinese citizens are restricted from directly investing in foreign stock market such as Hong Kong Stock Exchange or the counterparts in the US.

Educational background (F.2) We collect information on students' track enrolled in high school (science vs. humanities), as well as the currnt major that students study in university. We code university major as an indicator of 1 if it belongs to the broad category of social sciences or humanities.

English ability and oversea travel experiences [at baseline] (F.3) We ask students regarding the tests they have passed in domestically hosted standardized English test (Level 4, Level 6, etc.), and we code it as an indicator of 1 if students have passed at least Level 4. We also ask students if they have taken any English tests hosted oversea, such as TOEFL and IELTS. In addition, we ask students if they have traveled to Hong Kong, Macau, Taiwan, or other foreign nations during the past 3 years.

Household characteristics (F.4) We also collect a range of household characteristics that capture participants' household background and the environment they grew up in. For example: the education attainment of parents, the Chinese Communist Party membership of parents, and the total annual household income.

Fundamental preferences (F.5) We elicit a complete profile of participants' fundamental economic preferences, covering four dimensions: *(i)* risk preferences; *(ii)* time preferences; *(iii)* altruism; and *(iv)* reciprocity.[12] We code those so that risk tolerance, patience, and reciprocity are all coded as larger numbers.

[12]Elicitation of these preferences is based on Falk et al. (2014). We add an incentivized component based on Eckel and Grossman (2008) to their original risk preferences module.

Appendix figures and tables



全球资讯资源精选

2015年12月5日
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TED公开课

进入首页

TED Ideas worth spreading

TED的的宗旨是"用思想的力量来改变世界"。TED演讲的特点是毫无繁杂冗长的专业讲座，每一个TED 演讲的时间通常都是18分钟以内：观点响亮，开门见山，种类繁多，看法新颖。

以下收集了一些你可能感兴趣的主题演讲：

- 关于"中国"相关话题的演讲
- 关于"大数据" 相关话题的演讲
- 关于"污染" 相关话题的演讲

纽约时报中文版

进入首页

纽约时报中文网 国际纵览
The New York Times

纽约时报是世界获得普利策新闻奖最多的新闻媒体。纽约时报中文版旨在向中国读者提供有关全球时事、商业及文化的高水准报道，将纽约时报屡获大奖的新闻内容中最精华部分带给全球中文读者。

以下是本周纽约时报中文版的一些热门文章：

- 《纽约时报》2015年度图书100本
- ISIS的"终极武器"幻想（一）：神秘的红水银
- 中国援建阴影下的尼日利亚（一）
- 投鼠忌器的中国经济改革
- 巴黎气候大会，中国读者有话说
- 汉字里的性别暴力与文化偏见

Figure A.1: Screenshot of newsletter from demand treatment – type 1 (introduce students to blocked foreign outlets).



Figure A.2: Screenshot of newsletter from demand treatment – type 2 (highlight divergent reporting across media outlets).



Figure A.3: Screenshot of newsletter from demand treatment – type 3 (news quizzes with monetary rewards).

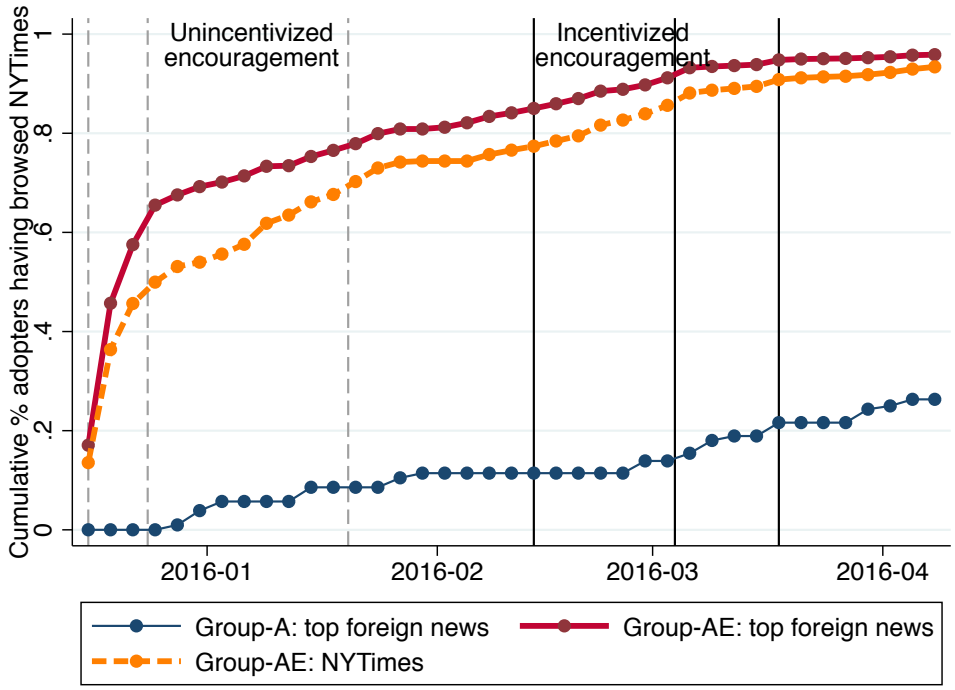


Figure A.4: Cumulative percentage of students who have browsed foreign news or the *NYTimes* at least once over the course of the experiment, separately for censorship circumvention tool adopters from the Group-A and Group-AE.

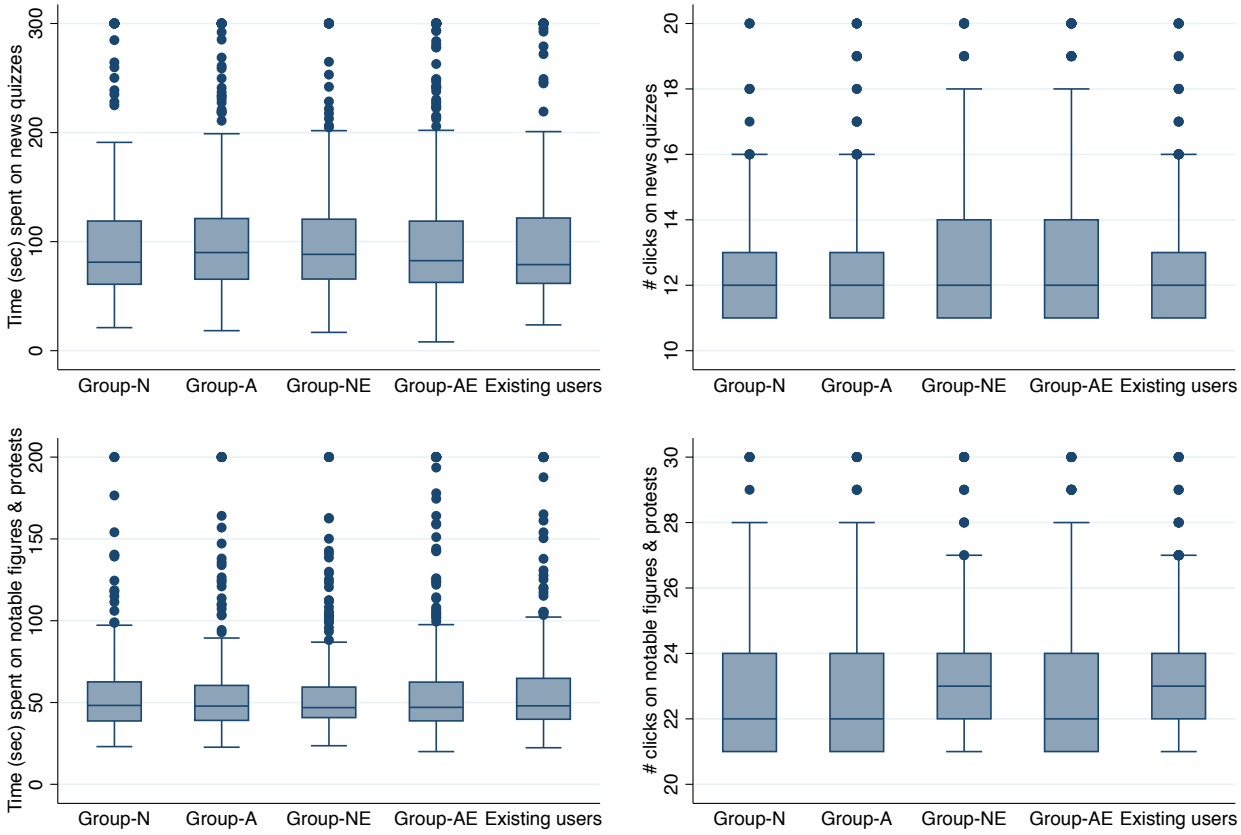


Figure A.5: Time spent during survey modules on news quizzes and knowledge accessment of notable figures and recent protests and independence movements, as well as total number of clicks recorded during the survey prior to submission, across 4 experimental treatment groups and existing users.

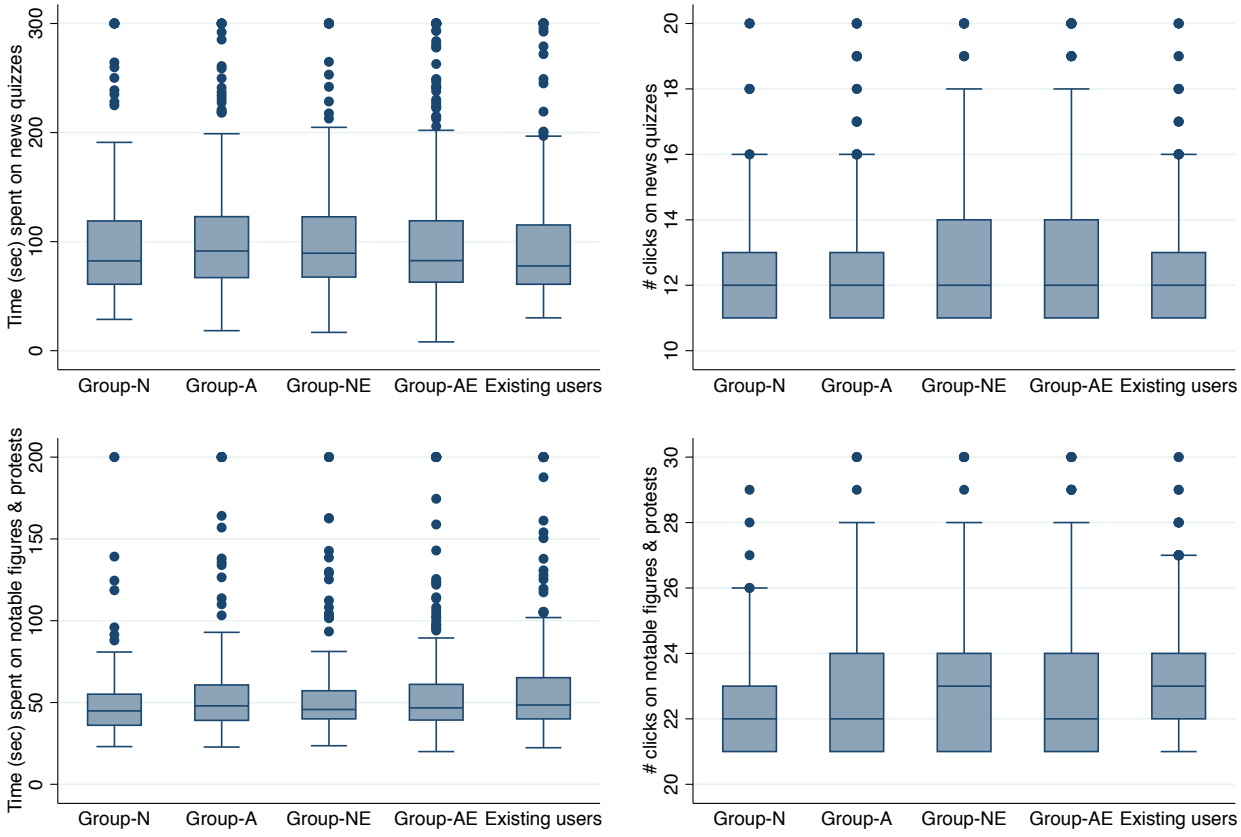


Figure A.6: Time spent during survey modules on news quizzes and knowledge accessment of notable figures and recent protests and independence movements, as well as total number of clicks recorded during the survey prior to submission, across 4 experimental treatment groups and existing users, conditional on being able to answer more than half of the questions correctly.

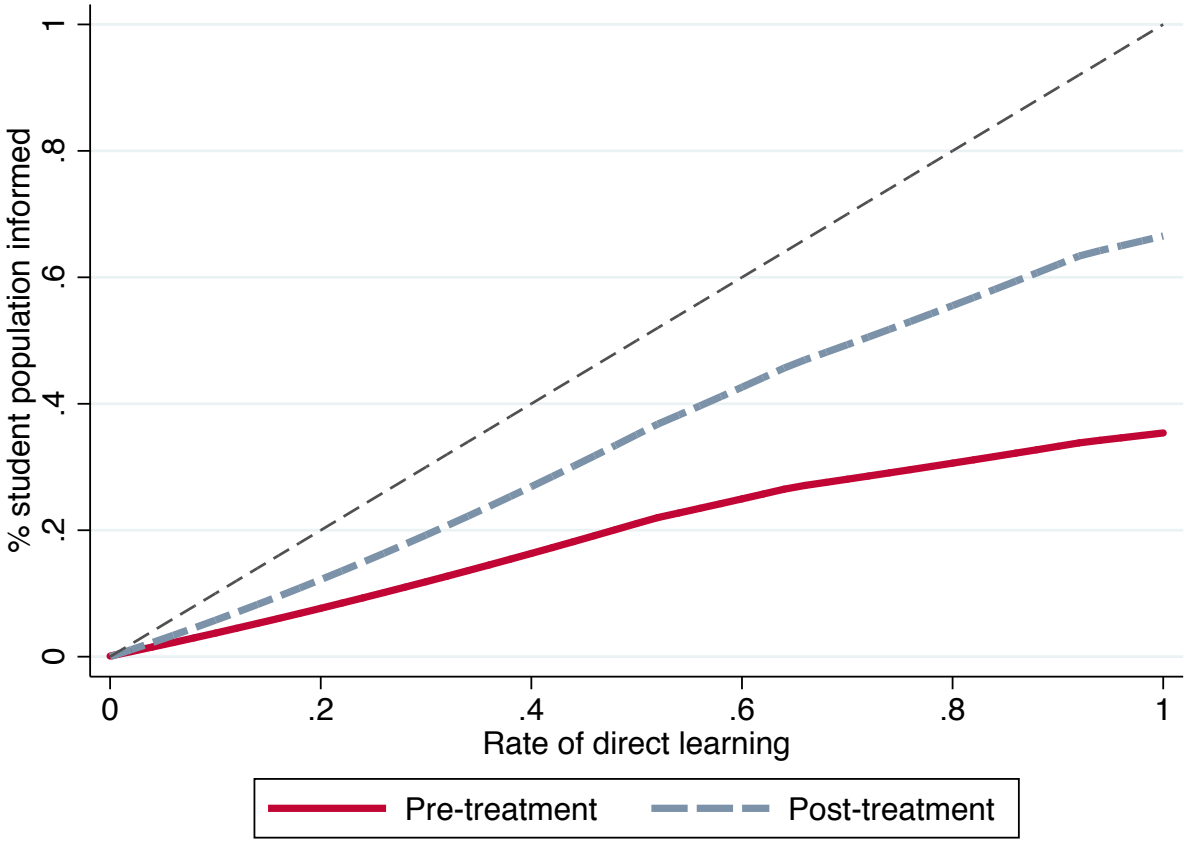


Figure A.7: Simulation of the rate of learning of politically sensitive information among students population, as a function of direct rate of learning if a student has access to uncensored internet. The simulation takes into account of cluster structure of the university dorm network as observed, as well as the differential social transmission rate towards students who have direct access themselves and those who don't. We simulate the rate of learning for the proportion of students who have direct access prior to the experimental invention, and for the proportion of students who have direct access six months after the start of the expeirment.

Table A.1: Panel survey questions

Panel A: Beliefs and attitudes regarding media

Category A.1: *Valuation of access to foreign media outlets*

A.1.1	Willingness to pay elicited using Becker–DeGroot–Marschak (BDM) method *[incentivized]* (which of the following two options do you prefer: one month subscription of a VPN product that allows you to access all foreign websites; or the amount of RMB xxx as a sure payment?)
A.1.2	Suppose you have already read about a particular piece of news from domestic news outlet that is privately owned (e.g. Xinjin Paper; Caijin; Southern Weekend). How much extra information will you learn if you read news stories from the foreign news outlet (e.g. New York Times; Wall Street Journal; Financial Times) in addition? (0 = no extra information will be learned; 10 = I will learn almost everything from the foreign news outlet)

Category A.2: *Trust in media outlets*

A.2.1-3	How much do you trust the following types of news outlets?
A.2.1	domestic news outlets owned by the state (e.g. People's Daily; Sunshine Times) (0 = completely trust; 10 = completely no trust)
A.2.2	domestic news outlets privately owned (e.g. Xinjin Paper; Caijin; Southern Weekend) (0 = completely trust; 10 = completely no trust)
A.2.3	foreign news outlets (e.g. New York Times; Wall Street Journal; Financial Times) (0 = completely no trust; 10 = complete trust)

Category A.3: *Belief regarding level of actual media censorship*

A.3.1	To what extent do you think the information published on domestic news outlets is censored overall? (0 = completely uncensored; 5 = censored to some extent; 10 = completely censored)
A.3.2	To what extent do you think the information published on foreign news outlets is censored overall? (0 = completely uncensored; 5 = censored to some extent; 10 = completely censored)

Category A.4: *Calibration of news outlets' level of censorship*

A.4.1	Suppose a major event happened in China that induced social and economic unrest. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (0 = report; 1 = not report at all)
A.4.2	Suppose a major event happened in China that is instrumental in boosting its socioeconomic development. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (0 = report; 1 = not report at all)
A.4.3	Suppose a major event happened in the US that induced social and economic unrest. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (0 = report; 1 = not report at all)
A.4.4	Suppose a major event happened in the US that is instrumental in boosting its socioeconomic development. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (0 = report; 1 = not report at all)
A.4.5	Suppose a major event happened in China that induced social and economic unrest. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (0 = report; 1 = not report at all)

Continued on next page

A.4.6	Suppose a major event happened in China that is instrumental in boosting its socioeconomic development. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (0 = report; 1 = not report at all)
A.4.7	Suppose a major event happened in the US that induced social and economic unrest. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (0 = report; 1 = not report at all)
A.4.8	Suppose a major event happened in the US that is instrumental in boosting its socioeconomic development. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (0 = report; 1 = not report at all)

Category A.5: *Calibration of news outlets' bias*

A.5.1	Suppose a major event happened in China that induced social and economic unrest. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report, if at all, this particular event? (1 = report very positively (opposite of reality); 6 = report very negatively (aligned with reality))
A.5.2	Suppose a major event happened in China that is instrumental in boosting its socioeconomic development. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report, if at all, this particular event? (1 = report very negatively (opposite of reality); 6 = report very positively (aligned with reality))
A.5.3	Suppose a major event happened in the US that induced social and economic unrest. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (1 = report very positively (opposite of reality); 6 = report very negatively (aligned with reality))
A.5.4	Suppose a major event happened in the US that is instrumental in boosting its socioeconomic development. How do you think the Chinese media outlet (e.g. People's Daily, Xinjing Paper) would report this particular event? (1 = report very negatively (opposite of reality); 6 = report very positively (aligned with reality))
A.5.5	Suppose a major event happened in China that induced social and economic unrest. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report, if at all, this particular event? (1 = report very positively (opposite of reality); 6 = report very negatively (aligned with reality))
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A.5.7	Suppose a major event happened in the US that induced social and economic unrest. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (1 = report very positively (opposite of reality); 6 = report very negatively (aligned with reality))
A.5.8	Suppose a major event happened in the US that is instrumental in boosting its socioeconomic development. How do you think the US media outlet (e.g. New York Times; Wall Street Journal) would report this particular event? (1 = report very negatively (opposite of reality); 6 = report very positively (aligned with reality))

Category A.6: *Justification of media censorship*

A.6.1-5	To what extent do you think the following media censorship practices are justified? (0 = completely justified; 10 = completely unjustified)
A.6.1	impose censorship on reporting domestic economic news (e.g. potential economic slowdown; stock market pessimism; bankruptcy among small exporters).

Continued on next page

A.6.2	impose censorship on reporting domestic political news (e.g. corruption scandal, political connections of businesses).
A.6.3	impose censorship on reporting domestic social news (e.g. environmental pollution, terrorism attacks, suicidal incidents).
A.6.4	impose censorship on reporting foreign news (e.g. economic recovery of the US, free trade agreements among EU nations).
A.6.5	impose censorship on pornographic information/entertainment (e.g. adult entertainment website).

Category A.7: *Belief regarding drivers of media censorship*

A.7.1-4	What do you think is the primary reason for domestic news outlets to censor their content and selectively report news events? Please rank the following factors in terms of their importance (1 = indicator for ranked as top).
A.7.1	government policies
A.7.2	commercial interest of the corporate
A.7.3	media company's own ideological preferences
A.7.4	readers' demand
A.7.5-8	What do you think is the primary reason for foreign news outlets to censor their content and selectively report news events? Please rank the following factors in terms of their importance (1 = indicator for ranked as top).
A.7.5	government policies
A.7.6	commercial interest of the corporate
A.7.7	media company's own ideological preferences
A.7.8	readers' demand

Panel B: Knowledge

Category B.1: *Current news events covered in the demand treatment*

B.1.1-4	Many events took place in China during the past 2 months. Below is a list of some of the events. Some actually happened, and some did not. For each event, please tell us if you think it happened or not. (0 = answered incorrectly; 1 = answered correctly)
B.1.1	According to the latest survey, the top 1% families in China who earn the most own less than 10% of the domestic wealth.
B.1.2	Since September 2015, Beijing Caixin Media has terminated its monthly publication of the China Purchase Management Index (PMI) index.
B.1.3	During January 2016, there are more than 500 cases of labor disputes, unrest, and protests throughout China.
B.1.4	According to the latest study, water quality in more than half of the wells in China has met or exceeded the international standard of excellence.

Category B.2: *Current news events not covered in the demand treatment*

B.2.1-7	Many events took place in China during the past 2 months. Below is a list of some of the events. Some actually happened, and some did not. For each event, please tell us if you think it happened or not. (0 = answered incorrectly; 1 = answered correctly)
B.2.1	The documents leaked from the offshore financial and legal firm in Panama involved 143 politicians around the world, including the ones from Russia, Argentina, and Iceland. *[censored]*
B.2.2	The Best Picture winner of the 2016 Hong Kong Film Festival is "Ten Years," which depicts authoritarian Hong Kong in year 2025. *[censored]*

Continued on next page

B.2.3	After the New Year Eve in 2016, the "trigger and break mechanism" introduced by the former China Securities Regulatory Commission head Xiao Gang led to the dramatic turbulence of the Chinese stock market. *[censored]*
B.2.4	Since April 2016, the English magazine "Economist" terminates its publication and distribution in China due to loss of profit. *[censored]*
B.2.5	Apple Inc. actively assisted the FBI in the US to unlock the iPhone owned by the suspect of the 2015 San Bernardino shooting. *[uncensored]*
B.2.6	Tsai Ing-wen from the Democratic Progressive Party won the Taiwan presidential election in 2016. The Kuomintang still maintains control of the Legislative Yuan of Taiwan. *[uncensored]*
B.2.7	The actual cause of the April 2016 Beijing Yihe hotel attack incidence is the business conflicts among various prostitution groups in Beijing. *[uncensored]*

Category B.3: *Awareness of notable figures*

B.3.1-10	Following are a list of notable figures in China. For each of these names, please indicate whether you have heard of him/her before? (0 = no; 1 = yes)
B.3.1	Zhiqiang Pu *[sensitive, featured in recent news]*
B.3.2	Zhiqiang Ren *[sensitive, featured in recent news]*
B.3.3	Joshua Wong *[sensitive, featured in recent news]*
B.3.4	Zehou Li *[sensitive, not featured in recent news]*
B.3.5	Guangcheng Cheng *[sensitive, not featured in recent news]*
B.3.6	Xiaolin Li *[sensitive, not featured in recent news]*
B.3.7	Yushi Mao *[non-sensitive]*
B.3.8	Huang Hong *[non-sensitive]*
B.3.9	Qiangdong Liu *[non-sensitive]*
B.3.10	Lequn Jia *[fake]*

Category B.4: *Awareness of protests and independence movements*

B.4.1-9	Following are a list of events that took place around the world during the past 5 years. For each of these events, please indicate whether you have heard of it before?
B.4.1	2012 Hong Kong Anti-National Curriculum Movement
B.4.2	2014 Hong Kong Umbrella Revolution
B.4.3	2016 Hong Kong Mong Kok Fishball Revolution
B.4.4	2014 Taiwan Sunflower Student Movement
B.4.5	2014 Ukrainian Euromaidan Revolution
B.4.6	2010 Arab Spring
B.4.7	2014 Crimean Status Referendum
B.4.8	2010 Catalonian Independence Movement
B.4.9	2011 Tomorrow Movement *[fake]*

Category B.5: *Meta-knowledge*

B.5.1	How would you rate your own informedness of important political and socioeconomic issues facing China today? (0 = I am completely ignorant about these issues; 10 = I am extremely well informed about these issues)

Continued on next page

B.5.2	How would you compare yourself to most other students in your university in terms of your informedness of important political and socioeconomic issues facing China today? (0 = they are extremely more informed than me; 5 = they are about the same as me; 10 = they are extremely less informed compared to me)

Panel C: Economic beliefs

Category C.1: *Belief on economic performance in China*

C.1.1	What do you think will China's GDP growth rate be during the entire year of 2016? If your guess is within 0.1% of what will be announced by China's Statistics Bureau after 2016, then you will earn a bonus payment of RMB 5.
C.1.2	What do you think will the Shanghai Stock Composite Index (SSCI) be by the end of December 31st, 2016? If your guess is within 5% of what the closing level of the Shanghai Stock Composite Index will be on the December 31st, 2016, then you will earn a bonus payment of RMB 5. To help you better predict, note that the closing level of Shanghai Composite Index on April 30th, 2016 is 2991.

Category C.2: *Confidence on guesses regarding economic performance in China*

C.2.1	How certain are you regarding your guess on China's GDP growth rate? (0 = completely uncertain; 5 = somewhat certain; 10 = completely certain)
C.2.2	How certain are you regarding your guess on the Shanghai Stock Composite Index? (0 = completely uncertain; 5 = somewhat certain; 10 = completely certain)

Category C.3: *Belief on economic performance in the US*

C.3.1	What do you think will USA's GDP growth rate be during the entire year of 2016? If your guess is within 0.1% of what will be announced by the US Department of Commerce after 2016, then you will earn a bonus payment of RMB 5.
C.3.2	What do you think will the Dow Jones Index (DJI) be by the end of December 31st, 2016? If your guess is within 5% of what the closing level of the Dow Jones Index will be on December 31st, 2016, then you will earn a bonus payment of RMB 5. To help you better predict, note that the closing level of the Dow Jones Index on April 30th, 2016 is 17651.

Category C.4: *Confidence on guesses regarding economic performance in the US*

C.4.1	How certain are you regarding your guess on USA's GDP growth rate? (0 = completely uncertain; 5 = somewhat certain; 10 = completely certain)
C.4.2	How certain are you regarding your guess on the Dow Jones Index? (0 = completely uncertain; 5 = somewhat certain; 10 = completely certain)

Panel D: Political attitudes

Category D.1: *Demand for institutional change*

D.1.1	What is your assessment of China's current economic system? (0 = it is working great, and should be maintained as it is now; 10 = China's economic system needs fundamental changes)
D.1.2	What is your assessment of China's current political system? (0 = it is working great, and should be maintained as it is now; 10 = China's political system needs fundamental changes)

Category D.2: *Trust in institutions*

Continued on next page

D.2.1-10	How much do you trust the following institutional bodies? (0 = completely no trust; 10 = complete trust)
D.2.1	central government of China
D.2.2	provincial government of China
D.2.3	local government of China (below provincial level)
D.2.4	court
D.2.5	police
D.2.6	domestic financial institutions (banks, etc.)
D.2.7	central government of Japan
D.2.8	federal government of the USA
D.2.9	foreign investors and financial institutions
D.2.10	NGOs

Category D.3: *Evaluation of government's performance*

D.3.1-3	How would you evaluate the Chinese government's performance in the following areas during the past 6 months? (0 = very unsatisfactory – performed way below my expectations; 5 = neutral – about the level of what I expected; 10 = very satisfactory – performed way exceeding my expectations)
D.3.1	economic development
D.3.2	domestic politics
D.3.3	international and diplomatic affairs

Category D.4: *Performance evaluation criteria*

D.4.1-8	We list below eight aspects of modern and developed society. Which of them should Chinese citizens place greater emphasis on when they evaluate the government's overall performance? The more important an aspect is to citizens' evaluation of the government's performance, the higher points you should allocate to it (out of 100; standardized as scale from 0 to 1).
D.4.1	leaders are chosen by the people in universal suffrage.
D.4.2	civil and human rights are protected and well respected.
D.4.3	the economy is prospering.
D.4.4	the state makes people's income and wealth equal.
D.4.5	rule of law.
D.4.6	freedom of speech.
D.4.7	exerting national power in international affairs.
D.4.8	historical events and mistakes are handled openly and fairly.

Category D.5: *Evaluation of severity of socioeconomic issues*

D.5.1-6	How severe do you think the following issue is to China today? (0 = not severe at all; 10 = extremely severe)
D.5.1	social security and welfare
D.5.2	employment
D.5.3	environmental pollution
D.5.4	wealth inequality
D.5.5	government corruption
D.5.6	discrimination against ethnic minority

Continued on next page

Category D.6: *Evaluation of democracy and human rights protection in China*	
D.6.1	For the following two statements, which do you think best describe the current situation in China? Statement A: China is run by a few big interests looking out for themselves; Statement B: China is run for the benefit of all the people. (0 = completely close to Statement A; 10 = completely close to Statement B)
D.6.2	How democratically is China being governed today? (0 = not at all democratic; 10 = completely democratic)
D.6.3	How much respect is there for individual human rights nowadays in China? (0 = no respect for human rights at all; 10 = a great deal of respect for individual human rights)
D.6.4	How important it is for you to live in a country that is governed democratically? (0 = absolutely important; 10 = not at all important)
Category D.7: *Justification of controversial policies and issues*	
D.7.1-16	We list below a few controversial socioeconomic issues. To what extent do you think they can be justified? (0 = never be justified; 10 = always be justified)
D.7.1	policies toward ethnic minorities in China
D.7.2	Hukou policy and internal migration restrictions
D.7.3	one-child policy
D.7.4	Mainland China's policy towards Hong Kong
D.7.5	Mainland China's policy towards Taiwan
D.7.6	the use of violence to pursue political goals (e.g. social stability)
D.7.7	state refusal of hosting refugees from neighboring countries (e.g. North Korea; Middle East)
D.7.8	government intervenes factory production to reduce pollution
D.7.9	college admission policies (based on Gaokao)
D.7.10	privatization of state-owned-enterprises in critical industries
D.7.11	legalization of homosexual marriage
D.7.12	legalization of prostitution
D.7.13	abortion
D.7.14	sex behaviors outside of marriage
D.7.15	adoption of genetically modified or transgenetic food
D.7.16	taking soft drugs (e.g. marijuana; hashish)
Category D.8: *Willingness to act*	
D.8.1-3	To what extent do you agree with the following statements about yourself? (0 = strongly disagree; 5 = neutral; 10 = strongly agree)
D.8.1	If the government does not operate according to the law, I have the rights to disobey the government.
D.8.2	I'm not fearful of officials and I don't hesitate to object to any official who has done something wrong, or report his misconduct to the authorities.
D.8.3	I can't stand the powerful and influential bullying the powerless and the weak. I like to stand up for the weak.
Category D.9: *Interest in politics and economics*	
D.9.1	How interested are you in economics? (0 = not at all interested; 4 = not very interested; 7 = somewhat interested; 10 = extremely interested)
D.9.2	How interested are you in politics? (0 = not at all interested; 4 = not very interested; 7 = somewhat interested; 10 = extremely interested)

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Category D.10: *National identity*	
D.10.1	How proud are you to be Chinese? (0 = not at all proud; 5 = so-so; 10 = extremely proud)
Category D.11: *Fear to criticize the government*	
D.11.1	People may hold critical attitudes toward the government. If you hold critical attitudes toward the government, to what extent would you be afraid of expressing your true attitudes in public? (0 = not at all afraid; 5 = somewhat afraid; 10 = extremely afraid)

Panel E: Behaviors and planned behaviors

Category E.1: *Information source and media consumption*	
E.1.1-5	To you, what do you depend on the most in order to keep yourself well-informed about news events and important information? Please rank the following sources of information, in terms of their importance to you personally. (1 = ranked bottom among five options; 5 = ranked top among five options)
E.1.1	domestic websites
E.1.2	foreign websites
E.1.3	domestic social media
E.1.4	foreign social media
E.1.5	talking with friends or classmates (direct word of mouth)
E.1.6	How often do you read news and other important information from foreign websites? (1 = never; 2 = every month; 3 = every week; 4 = every other day; 5 = every day; 6 = multiple times a day)
Category E.2: *Social interaction on politics*	
E.2.1	When you get together with your friends, would you say you discuss political matters frequently, occasionally, or never? (0 = never; 5 = occasionally; 10 = frequently)
E.2.2	When you, yourself, hold a strong opinion, do you ever find yourself persuading your friends, relatives or fellow schoolmates to share your views or not? If so, does this happen often, from time to time, or rarely? (0 = never, 2 = rarely; 5 = from time to time; 8 = often; 10 = always)
Category E.3: *Investment in the Chinese stock market*	
E.3.1	Are you currently investing in the Chinese stock market? Note: this is regarding your own brokerage account that you have full control over; not including the ones co-owned with your parents. (0 = no; 1 = yes)
Category E.4: *Plan after graduation*	
E.4.1-5	What do you plan to do after you graduate from the undergrad study? (0 = no; 1 = yes)
E.4.1	graduate school in China (e.g. direct master degree; 2+2 programs)
E.4.2	master degree abroad
E.4.3	PhD degree abroad
E.4.4	military
E.4.5	work right away
Category E.5: *Career preferences*	
E.5.1-8	From the following list of job types, please pick the top 3 that appeal to you the most, and rank them accordingly. (0 = not picked as top choices; 1 = picked as top choices)

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E.5.1	working in the national civil service
E.5.2	working in the local civil service
E.5.3	working in the military
E.5.4	working for a Chinese private firm
E.5.5	working for a foreign firm in China
E.5.6	working for a state-owned enterprise
E.5.7	working for institutional organizations (e.g. school, hospital, research institute)
E.5.8	starting your own firm as an entrepreneur
E.5.9-16	What is the ideal location for you, in terms of living and working in the future? (0 = not picked; 1 = picked)
E.5.9	Beijing
E.5.10	Shanghai
E.5.11	tier 2 cities in southern China
E.5.12	tier 2 cities in central China
E.5.13	other cities in China
E.5.14	Hong Kong / Macau
E.5.15	Taiwan
E.5.16	foreign cities

Panel F: Demographics, background characteristics, and fundamental preferences

Category F.1: *Personal characteristics*

F.1.1	What is your gender? (0 = female; 1 = male)
F.1.2	What is your birth year?
F.1.3	What is your height (in cm)?
F.1.4	What is your ethnicity? (0 = non-Han; 1 = Han)
F.1.5	Which province were you born? (0 = non-coastal provinces; 1 = coastal provinces)
F.1.6	Which province did you primarily reside in prior to entering college? (0 = non-coastal provinces; 1 = coastal provinces)
F.1.7	What is your hukou status before entering college? (0 = rural; 1 = urban)
F.1.8	What is your religious affiliation? (0 = non-religious; 1 = religious)
F.1.9	Are you a member of the Chinese Communist Party? *[at baseline]* (0 = no; 1 = yes)

Category F.2: *Educational background*

F.2.1	Which university are you enrolled in right now? (0 = 2nd-tier; 1 = elite)
F.2.2	Which academic track did you choose in senior high school? (0 = humanities; 1 = science)
F.2.3	What is your major at college? (indicator if it is social sciences or humanities)

Category F.3: *English ability and oversea travel experiences [at baseline]*

F.3.1	Which credentials hosted in China have you received in terms of your English ability? (0 = no credentials; 1 = yes, at least Level 4)
F.3.2	Which English exams hosted oversea have you taken (e.g. TOEFL, IELTS)? (0 = no; 1 = yes)
F.3.3	Have you traveled to Hong Kong, Macau, or Taiwan during the past 3 years? (0 = no; 1 = yes)
F.3.4	Have you traveled to any foreign countries beyond Hong Kong, Macau and Taiwan during the past 3 years? (0 = no; 1 = yes)

Category F.4: *Household characteristics*

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F.4.1	How many siblings to do have?
F.4.2	What is your father's highest educational attainment? (0 = below senior high school; 1 = at least senior high school)
F.4.3	Which sector does your father work at? (if retired, which sector did he work at prior to retirement) (indicator if works in government, SOE, or related public sectors)
F.4.4	Is your father a member of the Chinese Communist Party? (0 = no; 1 = yes)
F.4.5	What is your mother's highest educational attainment? (0 = below senior high school; 1 = at least senior high school)
F.4.6	Which sector does your mother work at? (if retired, which sector did she work at prior to retirement) (indicator if works in government, SOE, or related public sectors)
F.4.7	Is your mother a member of the Chinese Communist Party? (0 = no; 1 = yes)
F.4.8	How much is the total income that your household (including both your father, mother, and you) earned during the past year? (Note: include salary, wage, bonus, benefits, stipend, dividend; exclude retirement pension and other welfare payment from the government.) [number is imputed from categorical choices)

Category F.5: *Fundamental preferences*

F.5.1	Please tell me, in general, how willing or unwilling you are to take risks? (0 = completely unwilling to take risks; 10 = very willing to take risks)
F.5.2	Certainty equivalent from step-wise lottery choices (what would you prefer: a draw with 50 percent chance of receiving RMB 300, and the same 50 percent chance of receiving nothing, or the amount of RMB xxx as a sure payment?)
F.5.3	Eckel and Grossman (2002) lottery decisions: for the following lottery options, please choose one that you like the most? *[incentivized]* (coded as higher value means preferring riskier options)
F.5.4	How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future? (0 = completely unwilling; 10 = very willing)
F.5.5	I tend to postpone tasks even if I know it would be better to do them right away (0 = describes me perfectly; 10 = does not describe me at all)
F.5.6	How willing are you to give to good causes without expecting anything in return? (0 = completely unwilling; 10 = very willing)
F.5.7	Today you unexpectedly received RMB 10,000. How much of this amount would you donate to a good cause? (value between 0 and 10,000)
F.5.8	When someone does me a favor I am willing to return it. (0 = describes me perfectly; 10 = does not describe me at all)
F.5.9	I assume that people have only the best intentions. (0 = does not describe me at all; 10 = describes me perfectly)
F.5.10	When a stranger helps you, would you be willing to give one of the following presents to the stranger as a thank-you gift? (coded as higher value means choosing more valuable gifts)
F.5.11	How willing are you to punish someone who treats you unfairly, even if there may be costs for you? (0 = completely unwilling; 10 = very willing)
F.5.12	How willing are you to punish someone who treats others unfairly, even if there may be costs for you? (0 = completely unwilling; 10 = very willing)
F.5.13	If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so. (0 = describes me perfectly; 10 = does not describe me at all)