

# Do Colleges Breed Revolutionaries? Education and Political Participation in China

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## Abstract

Modernization theorists believe that education empowers citizens to take collective action to challenge authoritarian rule. I argue that education in most authoritarian countries is government run, and that authoritarian governments have enormous incentives to shape the form and content of education in their favor. In post-Tiananmen China, the government has used propaganda, control, and recruitment to contain collective action on university campuses. I report the first quasi-experimental evidence in a noncompetitive authoritarian regime to challenge the modernization view. Exploiting China's college expansion reform as a natural experiment, I show that higher education only has a positive effect on people's *individualistic, expressive* behavior, but has no effect on *collective action*. I also find that China's college graduates do not differ from the less educated in a range of political attitudes, such as demand for political rights. These findings call into question previous theoretical and practical emphasis on education's empowering effect in non-democracies.

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*Education is the most powerful weapon which you can use to change the world.*

–Nelson Mandela

*Universities have no monopoly on critical discourse, but they are the most important source of dissidents.*

–Alvin W. Gouldner

Both Mandela, former president of South Africa, and Gouldner, a sociologist, believe that education can change people in a way that disrupts the existing political order. Modernization theorists have long argued that education helps undermine authoritarian rule and promote political development. As Lipset (1959, 80) put it bluntly, “If we cannot say that a ‘high’ level of education is a sufficient condition for democracy, the available evidence does suggest that it comes close to being a necessary condition.” Scholars have attributed the “Third Wave of Democratization” in the 1970s and 1980s to improved education (Huntington 1991), and the onset of the “Arab Spring” to the expansion of education in the Arab world (Campante and Chor 2012). Knowing education’s empowering impact, several U.S. states historically restricted the education of slaves for fear that it would encourage revolt (Woodson 1915), and Belgian colonial authorities in Africa enacted similarly restrictive education policies (Hochschild 1999).

Despite an expansive literature that documents a positive correlation between aggregate education and autocratic regimes’ transitions to democracy (Przeworski et al. 2000; Boix and Stokes 2003; Glaeser et al. 2004), few studies have tested the underlying assumption that education empowers people to take collective action to disrupt authoritarian rule.

I contend that education in most authoritarian countries is government run. Authoritarian governments have enormous incentives to shape the form and content of education in their favor. Wedeen’s (1999) study shows how Syrian official discourse provides the correct “grammar” and formula for acceptable speech, thus habituating citizens to behave “as if” they believe in official rhetoric. Similarly, Lott (1999) argues that governments use public education to control the information that their citizens receive. More totalitarian governments make greater investments in publicly controlled information. Huang (2015) demonstrates that the Chinese state frequently uses political education to signal its strength in social control, and that students who are more exposed to such education are more likely to believe the regime maintains

strong social control (and will therefore be less willing to participate in political dissent). The scholarly research on the relationship between education and political participation is far from converging on the modernization view that education necessarily empowers citizens to take collective action to challenge the authoritarian state.

I investigate the individual-level relationship between education and participation in China—the world’s largest authoritarian regime, which governs more than one-fifth of its population. After the 1989 Student Movement, China represents a direct counterexample to the modernization hypothesis. Despite hundreds of thousands of protests every year (Lorentzen 2013), most collective action in China is initiated by the less-educated segment of the population, such as the peasantry (O’Brien and Li 2006), migrant workers (Lee 2007), and laid-off state-owned enterprise employees (Hurst 2009; Chen 2012). In post-Tiananmen China, large-scale demonstrations have rarely been organized by the upper echelon of the education system.<sup>1</sup> As Perry (2015, 12) observes, “in the midst of this widespread social ferment, college students and their professors have remained conspicuously quiet.” The tranquility of Chinese campuses after 1989 indicates that something about the regime’s education policy has successfully contained student activism.

A closer examination shows that the regime has significantly reshaped its higher education policies since the 1989 Tiananmen Incident. Propaganda, control, and cooptation constitute the three components of China’s post-1989 higher education policies. First, after the Student Movement of that year, the Chinese Communist Party (CCP) launched an extensive propaganda campaign for patriotic education (Zhao 1998). This campaign was engineered to ensure loyalty in a population that was otherwise subject to considerable domestic discontent. Second, after 1989, the party-state deployed an array of control mechanisms to maintain order on university campuses, such as “guidance counselors” trained to keep a close watch on the behavior and mindset of college students and “everyday” political education events to prevent students from taking to the streets during extraordinary political situations (Perry 2015; Yan 2014). Lastly, since the 1990s, the CCP has stepped up its efforts to recruit college students (Guo 2005).

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<sup>1</sup>There are few exceptions, for example, the middle class was involved in Xiamen’s environmental protest against a PX plant in 2007.

The heightened ideological and political control on Chinese campuses since 1989 has exerted a long-term effect on college students' political behavior and attitudes. We therefore should not expect that education has an empowering effect on students' collective behavior, as the existing literature claims.

Establishing a causal relationship between educational attainment and political participation, however, inevitably encounters the empirical challenge of differentiating between "education as cause" and "education as proxy." As [Kam and Palmer \(2008, 612-613\)](#) point out, "The likelihood that an individual will pursue higher education is systematically determined by a number of factors, including parental characteristics, individual abilities, and predispositions. The same factors that propel individuals into pursuing higher education may also propel them into participating in politics."

In this study, I exploit a natural experiment in which the Chinese government implemented a college enrollment expansion reform that exogenously increased post-reform cohorts' probability of entering college. Analyzing a nationally representative sample in China, I find that higher education only has a positive effect on people's *individualistic, expressive* behavior, such as discussing politics on the Internet; it has no effect on their participation in collective action, such as joining a protest or demonstration.

I further explore several testable implications by combining the national survey data with a survey that interviewed more than 4,000 college students in 2010. I discover that college students are more likely to join the CCP than the less educated, and CCP members are less approving of collective action than non-CCP members. In addition, I report evidence that more exposure to college education is not associated with higher levels of approval of (or real experience of) collective action. I also test an alternative socio-economic mechanism but find no support. These results add further support to the claim that China's higher education system has not encouraged citizens to take collective action.

Utilizing the rich details in the survey data, I further uncover that respondents with a college degree do not differ from those without a degree in a wide range of political attitudes, such as political efficacy, demand for political and civil rights, political knowledge, and satisfaction

with government performance. The only characteristics that distinguish the college educated from those who are less educated are that college graduates care more about local affairs (but not national affairs) and are more worried about socioeconomic issues that potentially threaten their material well-being, such as medical services and unemployment. College graduates, however, show no particular concerns about broader political issues, such as corruption, social justice, or the rule of law.

To my knowledge, this is the first quasi-experimental evidence regarding whether higher education affects political participation in a noncompetitive authoritarian regime. My findings challenge the conventional modernization view that education necessarily empowers citizens to challenge the authoritarian state, and remind us that authoritarian governments can utilize education systems to strengthen their own rule (Lott 1999; Huang 2015; Cantoni et al. Forthcoming).

## **CHINESE UNIVERSITY EDUCATION AFTER TIANANMEN**

Most empirical works find a positive association between education and virtually all forms of political activity (Rosenstone and Hansen 1993; Verba, Schlozman and Brady 1995; Wolfinger and Rosenstone 1980). Putnam (1995, 68) has labeled education “the best individual-level predictor of political participation.” However, most existing evidence about the liberalizing effect of education is from developed democracies. Studies that focus on authoritarian regimes often remind us of the “dark side” of education. Many argue that education serves as a tool of cultural indoctrination and social control, instilling obedience to authority (Lott 1999; Huang 2015). Cantoni et al. (Forthcoming), exploiting a curriculum change in China as a natural experiment, reveal that studies under the new curriculum are robustly associated with changed views on political participation and democracy, increased trust in government officials, and a more skeptical view of free markets.

Here, I define education broadly as a process of learning, the acquisition of knowledge,

skills, values, beliefs, and habits, or experiencing life lessons. Therefore it encompasses more than schooling; it also includes the content and format of curricula, life experience in school, and formal and informal interactions with teachers, administrators, and other students.

Aware of the powerful role of education in shaping public opinion, many authoritarian governments have used education as a tool to strengthen their rule. Vladimir Lenin once famously said, “Give us the child for 8 years and it will be a Bolshevik forever” (quoted in [Hartman \(2008, 103\)](#)). After the Tiananmen Student Movement in 1989, Deng Xiaoping regretted that, “in the past 10 years our biggest mistake was in the aspect of education; ideological and political education of the youth was not adequately grasped” (quoted in [Guo \(2005, 376-377\)](#)). As a consequence, the CCP started in the 1990s to reshape its education and control policies in Chinese universities, using the mechanisms of propaganda, control, and cooptation as discussed above.

First, the Chinese government launched an extensive propaganda campaign for patriotic education. The main goals of the patriotic education campaign are to make sure that students understand “The great achievements of the party rule in China’s modernization process” and ensure loyalty in a population that was otherwise subject to much domestic discontent ([Zhao 1998](#)). During the campaign, patriotic education courses were added to the curriculum of colleges. For example, the authorities launched the “I am Chinese” program in universities, which taught students to be proud of being Chinese by concentrating on the “great achievements” of the Chinese people and especially the party ([Zhao 1998, 293](#)). In addition to two major political education courses (Marxist Theory, and Ideology and Politics), one new course, The State of the Nation, was added in various schools. It was designed to teach students that China is too unique to accommodate Western-style democracy.

Some recent empirical work has shown that propaganda is largely effective in changing mass behavior; it does not necessarily affect mass beliefs. For example, [Huang \(2015\)](#) argues that, by being able to afford significant resources to present a unified propaganda message and impose it on citizens, a government that has a strong capacity to maintain social control and political order can send a credible signal about this capacity and distinguish itself from a

weak government, hence implicitly intimidating the masses, who may otherwise contemplate challenging the regime. In other words, such propaganda is not meant to “brainwash” people with its specific content about how good the government is, but rather to forewarn the society about how strong it is via the act of the propaganda itself. [Huang \(2015\)](#) then uses unique survey data of college students in China to show that students who are more familiar with the government’s propaganda messages embedded in their ideological and political education courses are not more satisfied with the government, but they are more likely to believe that it has a strong capacity to maintain political order, and are hence less willing to express dissent.

The second policy change after 1989 was an array of control mechanisms to maintain order on university campuses. As [Perry \(2015, 17\)](#) observes, “The cornerstone of the control regimen is made up of so-called ‘guidance counselors,’ trained personnel tasked with keeping close tabs on their student charges to ensure that their beliefs and behavior do not violate approved boundaries. Although a system of guidance counselors was originally introduced at Tsinghua University as early as 1953, it assumed renewed and enlarged significance after 1989.” According to [\(Yan 2014\)](#), after 1989, Chinese universities started or significantly increased the frequency of “everyday” political education events, such as regular class meetings, Communist Youth League meetings, reading sessions, and party branch meetings. A party school for university students also operates on each campus, which serves as an important center for routine ideological training.

These control mechanisms have been shown to be effective during extraordinary political situations at containing students’ collective action. [Yan \(2014, 502\)](#), based on his interviews, shows that in the spring of 2011, when overseas websites called upon Chinese youth to launch a “Jasmine revolution,” university students were immediately summoned for special study sessions to insulate them from “oppositional forces.”

The last policy change was the CCP’s deliberate targeting of college students for recruitment. Based on [Guo’s \(2005\)](#) calculation, in 1990, 16,000 students (or 0.81% of all undergraduates) were CCP members. By 2000, this number had grown to 209,000 (or 3.83% of all undergraduate students). [Guo \(2005\)](#) argues that party recruitment is largely determined by the

party, not by self-initiated actions undertaken by individual students. He shows that the whole recruitment process begins with the local party organization obtaining a quota and/or guidelines for recruiting new members from the upper level. The number of new party members recruited from the student body each year is set by party committees at various levels in their five-year plans. [Dickson \(2014\)](#) shows that party members have higher levels of support for the Chinese national government than the rest of population generally.

Based on the discussion above, I do not expect China's college graduates to be more likely to engage in contentious behavior, such as joining protests or demonstrations. It is important to note that protests and demonstrations in China are not necessarily against the state. As [Perry \(1994\)](#) contends, traditional Chinese intellectuals appeal to the state not in order to challenge it but to ask for its response. Thus, noncompliant behavior can be constructive ([Tsai 2015](#)); some protests support the regime ([Wallace and Weiss 2015](#)), and collective resistance in China often stabilizes the state ([O'Brien and Li 2006](#); [Lorentzen 2013](#)). However, the regime still manages collective action even when it does not challenge the state ([Weiss 2014](#)) due to the fear that these actions will escalate out of the state's control ([King, Pan and Roberts 2013](#)).

## **EMPIRICS**

The central question I address is: Does college education increase political participation? Exploiting a massive college enrollment expansion reform that the Chinese government implemented in 1999, and analyzing a nationally representative survey that interviewed over 4,000 adult Chinese citizens in 2008, I estimate the causal effect of college education on political participation. In what follows I will discuss the background of the 1999 college enrollment expansion reform, introduce the data, discuss my identification strategy, and then present the results. I will first show results using the overall level of political participation as the dependent variable and then disaggregate participation into separate activities. I also conduct robustness checks and test other empirical implications of my theory using a college survey. Exploring the substance of political participation, I take advantage of the rich information in the survey data to examine a wide range of political attitudes among college graduates and show that higher



education has not “enlightened” Chinese college graduates.

## China’s 1999 College Enrollment Expansion Reform

In 1977, the post-Mao leadership rehabilitated the college entrance exam that was abolished during the Mao era (Hannum et al. 2008). From 1978 to 1998 the number of colleges in China increased from 598 to 1,022, and the number of college students increased from 0.86 million to 3.41 million (Li, Whalley and Xing 2014, 568). However, the growth in colleges and college students before the 1999 reform was much slower than afterwards.

In June 1999, the Chinese central government and the Ministry of Education announced a college enrollment expansion reform that increased the number of new college students by 520,000. The resulting 48% growth rate was the highest since 1978. Adjusting for population growth, high school graduates’ probability of entering college increased from 34% in 1998 to 56% in 1999, and the rate kept growing afterwards (see Figure 1).<sup>2</sup>

Many features of the 1999 reform make it a valid natural experiment that assigns “subjects” into “control” and “treatment” groups at random (or at least as-if random). First, the reform was not expected by high school graduates or their families. Given that the college entrance exams were held in early July, the announcement made in June was too late to significantly change the behavior of high school graduates (Li, Whalley and Xing 2014, 568).<sup>3</sup> The cohort that was slightly too old to benefit from the expansion was not able to anticipate the reform and sort itself into the “treatment” group. I also compare the three cohorts that were born right after 1981 (i.e., the group that reached college age when the reform occurred) with the three cohorts that were born in or right before 1981 (so that they were slightly too old to be “treated” by the reform).<sup>4</sup> All of the subjects in my comparisons were born after China started its reforms in 1978, and

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<sup>2</sup>The reasons for the college enrollment expansion are manifold. In 1997, the Chinese government initiated a massive privatization plan in which more than 20 million former state-owned enterprise employees were laid off. Meanwhile, the Asian Financial Crisis of 1997 significantly deteriorated China’s employment situation. The higher education expansion was initiated to alleviate the unemployment problem and to stimulate consumption. Please see Li, Whalley and Xing (2014, 568).

<sup>3</sup>The announcement was even unexpected by Chinese universities, many of which did not have enough time to prepare dorms to accommodate the increased enrollment. Please see <http://news.sina.com.cn/c/2009-01-05/092316979224.shtml> (Accessed August 12, 2015).

<sup>4</sup>I later show that the results are not sensitive to the choice of bandwidths.

they were exposed to similar socioeconomic conditions when they grew up. I will later show that many of their pretreatment characteristics, such as sex, growing up in urban/rural areas, and ethnicity, are balanced. The only difference that distinguishes the post-1981 cohorts is that they were far more likely to get into college than the pre-1981 cohorts. Some recent studies have started to use the same event as a natural experiment to study the effect of the expansion (Li, Whalley and Xing 2014).

## Data

I analyze the Chinese Citizens' Awareness Survey (CCAS), which was conducted by the Research Center for Contemporary China (RCCC) at Peking University in 2008. The CCAS interviewed 4,004 adults who lived in mainland China's 31 provinces. This survey used spatial sampling techniques to include both residents and migrants, and a stratified sampling design to draw a nationally representative sample (Landry and Shen 2005). Peking University students (along with their local collaborators) conducted face-to-face interviews under strict quality control from the Beijing headquarters, and RCCC is often considered "the most competent academic survey research agency on the mainland" (Manion 2010, 190). Section I in the Web Appendix provides more information about the survey.

Political participation, the principal dependent variable, is operationalized using nine ordinal variables. All variables have three levels: 2 means "did it last year," 1 "did it earlier," and 0 "never." I will later show that a dichotomous coding (collapsing 1 and 2) of these activities yields similar results. The nine activities are as follows:

1. *Attended Political Meetings* indicates whether the respondent has ever attended political meetings of any sort;
2. *Contacted Leaders* indicates whether the respondent has ever contacted a government official to voice her opinion;
3. *Contacted Media* indicates whether the respondent has ever voiced her opinion through the media;
4. *Contacted Social Organizations* indicates whether the respondent has ever voiced her opinion through social organizations;

5. *Discussed Politics on the Internet* indicates whether the respondent has ever voiced her opinion in political forums or discussion groups on the Internet;
6. *Collected Donations* indicates whether the respondent has ever collected donations for a social activity or organization;
7. *Signed Petition* indicates whether the respondent has ever signed a petition;
8. *Protest/Sit-In/Demonstration* indicates whether the respondent has ever joined a protest, sit-in, or demonstration;
9. *Joined Organizations* indicates whether the respondent has ever joined an organization for idealistic reasons.

Table 2.1 in the Web Appendix presents the original Chinese wordings and summary statistics of these nine variables. Following other practices in the literature (e.g., [Croke et al. \(Forthcoming\)](#)), I then add these nine variables, which are positively correlated with a Cronbach's alpha of 0.69, into a summary index (*Participation Scale*). I will first use this index as the dependent variable to examine the overall level of political participation and then use the individual activities to investigate the nuances of political participation.

Figure 2 shows the distribution of the nine variables and the index. Most respondents had never participated in any political activities. The most common activities were *Attended Political Meetings*, *Contacted Leaders*, and *Collected Donations*. This is consistent with earlier work, such as [Shi's \(1997\)](#) finding that people in China participate in politics in order to persuade the leaders of their own organization. *Protest/Sit-In/Demonstration* has the lowest frequency. Only 0.32% of respondents had engaged in such actions in the year before the survey and 1.32% had done so earlier; the vast majority (98.36%) had never taken part. Despite the low percentage, considering the size of the Chinese population, this still suggests that over 21 million people in China had participated in a protest/sit-in/demonstration at some point in their lives. This is consistent with the skyrocketing number of "mass incidents" in China ([Lorentzen 2013](#); [Wang and Minzner 2015](#)).

I appreciate the concern that Chinese respondents might underreport their involvement in politically sensitive activities, such as protests, because of political fear. However, I show several pieces of evidence below that political fear does not contaminate my findings in any

significant way. First, the survey was conducted by a university rather than a governmental organization. RCCC, experienced in conducting political surveys in China, took several measures to ease respondents' concerns about political sensitivity. For example, in the preface of the survey that was read to every respondent prior to the survey, respondents were guaranteed the confidentiality of their identifying information, including their names, addresses, and contact information. In addition, every respondent was informed of the right to skip a question if he/she did not feel like answering it. Second, respondents could avoid a sensitive question by selecting "Don't Know" or "No Response" (Presser et al. 2004). A close look at the response rate of each question shows that *Protest/Sit-In/Demonstration* does not solicit the highest number of item non-responses: its non-response rate is 5.32%, but *Discussed Politics on the Internet*, which is a perfectly safe activity (King, Pan and Roberts 2013), has a non-response rate of 5.57%. Third, simply admitting to have participated in a protest in the past would not lead to repression, because only protest leaders are arrested or harassed (Li and O'brien 2008). Lastly, and most importantly, in the robustness checks, I control for political fear measured by survey questions asking about respondents' fear of government repression, and my main results remain the same.

Education is my key (endogenous) explanatory variable. The CCAS asked the respondents their highest degree. *College* indicates whether the respondent has received a college degree;<sup>5</sup> 7.64% reported having a college degree, which is very close to the 8.93% reported in the 2010 census.<sup>6</sup> Later, I will show that my results are not sensitive to this particular coding of education. The results remain similar when using an ordinal measure of education (*Level of Education*), which uses a five-point scale: incomplete primary, complete primary, complete junior high, complete senior high, and complete college and above, or a continuous variable (*Year of Education*), which is simply the total years of schooling. Section II in the Web Appendix presents the summary statistics and measurements of all of the variables used in the analysis.

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<sup>5</sup>Here, college degrees include degrees from a three-year college (*dazhuan*) and a four-year university (*daben*), as both were included in the college enrollment expansion reform.

<sup>6</sup>Please see [http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/201104/t20110428\\_30327.html](http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/201104/t20110428_30327.html) (Accessed August 11, 2015).

## Identification

To identify education's causal effect, similar to the strategies used in [Duflo \(2001\)](#) and [Croke et al. \(Forthcoming\)](#), I exploit the cross-cohort variation in access to higher education created by the 1999 college enrollment expansion reform. In particular, I compare the respondents who were just young enough to be “treated” by the reform with those who were just too old to benefit from it. I define those born after 1981, who were 18 or younger when the expansion was implemented, as “treated” ( $Post1981=1$ ). Those born in 1981 or earlier, and thus just old enough to miss out on the expansion, are defined as the control group that was not “treated” by the reform ( $Post1981=0$ ).

Figure 3 provides evidence that the expansion increased the number of college degree holders across cohorts. The upper-left panel, using a regression discontinuity (RD) design with birth year as the running variable, reveals that the cohorts born after 1981 exhibit a substantially higher probability (coeff.=0.26,s.e.=0.07) of having a college degree than do the cohorts born earlier. Figure 4 further confirms the impact of the expansion on educational attainment using regressions. Using a “bandwidth” of three cohorts on either side of the cutoff and provincial fixed effects to account for provincial variation in college recruitment,  $Post1981$  has a consistently, significantly positive effect on *College, Level of Education*, and *Year of Education*. On average, the cohorts born right after 1981 enjoy one more year of schooling than their immediate older counterparts do.  $Post1981$  therefore provides a good source of exogenous variation.

My identification strategy relies on the assumption that the cohorts on both sides of the reform cutoff are effectively identical, with the exception that only the post-1981 cohorts were eligible for greater access to higher education. However, people who were born many years apart were exposed to different socioeconomic conditions and socialization processes. I therefore compare only respondents who were born in the same era. My main analysis uses a “bandwidth” of three cohorts on either side of the reform cutoff ([1979, 1981] vs. [1982, 1984]). This is a powerful design because neighboring cohorts were exposed to almost identical economic, social, and political environments, as they all grew up in China's post-Mao era. They differ

only on educational attainment due to an unexpected college expansion reform. I will later show that my results are robust to using either wider or narrower bandwidths.

There are good reasons to believe that important pretreatment covariates are balanced across the cutoff. Figure 3 shows that respondents on either side of the cutoff do not differ on sex (upper right), ethnicity (lower left), or growing up in urban areas (lower middle). None of the RD coefficients is statistically significant.

If *Post1981* provides a valid source of exogenous variation with reasonable bandwidths, then I can use it as an instrumental variable (IV) to estimate the causal effect of college education on political participation. As suggested by [Dunning \(2012\)](#), I use two approaches. I first estimate the effect of *Post1981* on political participation, which is equivalent to an “intention-to-treat” (ITT) analysis. The ITT analysis uses ordinary least squares (OLS) or ordered probit (OPROBIT), depending on the coding of the dependent variable, to fit the following equation to the CCAS data:

$$Political\ Participation_i = \beta Post1981_i + \gamma_j + \epsilon_{ij}, \quad (1)$$

where *Political Participation<sub>i</sub>* is the outcome measure (either *Participation Scale* or the nine individual measures), and *Post1981* is the treatment variable. I include provincial fixed effects,  $\gamma_j$ , to account for different college quotas and recruitment policies across provinces, and I cluster standard errors by province.

Being born before 1981 does not deprive one of a college education, and being born after 1981 does not guarantee a college degree (it only enhances the chance of getting into college). For example, not everyone born after 1981 ended up attending high school, and even among high school graduates, only 56% of them eventually entered college. There is also a cutoff date for starting school: children born after September 1st can enter school one year earlier than those born before. In addition, the years of starting school and entering college are also variable across provinces in China. Lastly, people are allowed to take the national entrance exam multiple times, so although some took their first exam before 1999, they could still retake it in or after 1999. These complications mean that being in the treatment group (born after

1981) does not guarantee receipt of the treatment (attending college), and being in the control group (born before 1981) does not mean a failure to receive the treatment. This is a typical case of treatment with noncompliance. The usual strategy to deal with noncompliance is to use an indicator of whether a subject *should* be in the treatment group to instrument whether he/she *actually* receives the treatment, and to use the predicted value from the first stage in the second stage to predict the outcome. In the first stage, I estimate the effect of *Post1981* on *College*:

$$College_i = \delta Post1981_i + \gamma_j + \eta_{ij}, \quad (2)$$

and then in the second-stage estimate the following structural equation using two-stage least squares (2SLS):

$$Political\ Participation_i = \theta College_i + \gamma_j + \zeta_{ij}, \quad (3)$$

The IV approach requires two additional assumptions. First, the instrument must be valid and strong. I discussed the validity of the instrument earlier in this section, and as Table 4.1 in the Web Appendix shows, the first stage yields large  $F$  statistics of 15.38, which exceeds the standard critical value of 10 required to avoid weak instrument bias (Staiger and Stock 1997). Second, the exclusion restriction assumption requires that *Post1981* only affect political participation through increased education. There are several reasons to believe this is the case. The primary reason is that the strongest predictor of political participation—socioeconomic status, which includes vocation and income—can be seen as a downstream consequence of a respondent’s education. In addition, some notable policy changes in China, such as the start of the economic reform in 1978, affected the six cohorts in my analysis equally. Below I discuss several potential confounding factors and show why they should not contaminate my results.

One potential confounding treatment is the one-child policy that was introduced in 1979 and formalized in 1981 when the Chinese government established the State Commission of Family Planning. However, the timing and stringency of the one-child policy varied greatly across the country (Hesketh, Lu and Xing 2005). As a consequence, there is no sharp “discontinuity” in fertility rates around 1981 that could constitute an alternative treatment. For example, China’s

fertility rate (average number of births per woman) was 2.71 in 1980, 2.67 in 1981, and 2.68 in 1982.<sup>7</sup>

A second potential confounding treatment might be the 1997 Asian Financial Crisis that occurred two years before the college expansion, which suppressed the employment opportunities of post-crisis graduates. Given that one's socioeconomic status is the strongest predictor of political participation (Verba, Schlozman and Brady 1995), graduating into a crisis economy might depress one's participation level. In my robustness checks, I show that even when the analysis is restricted to a very narrow window that includes only the post-crisis cohorts, my results still hold.

Another confounder might be curriculum change. As Cantoni et al. (Forthcoming) shows, new textbooks that emphasize patriotism and the uniqueness of the Chinese society and political system may change students' political attitudes toward the regime. If there was a substantive university-level curriculum change in 1999, then college education would have different meanings for the pre- and post-1999 college students, which violates an important assumption (SUTVA) for causal inference. I hence review information on all curriculum changes at the university level since the 1990s and find that the timing of new textbooks often lag that of new leaderships: the two recent curriculum changes occurred in 2005 and 2013, respectively, following leadership changes in 2002 and 2012. Curriculum change, therefore, does not constitute a confounding treatment because there was no leadership change immediately before 1999.

The last confounder, one might argue, is the quality of education. Because of the expansion reform, many universities were unprepared for the increased number of new students, and the quality of college education decreased after 1999. If this were true, my treatment (college education) would mean differently for the two cohorts, which could violate the SUTVA assumption for causal inference. To tackle this issue, I conduct a donut RD analysis to drop observations in the immediate vicinity of the cutoff to take advantage of the increased fiscal expenditure on education after the expansion reform. As I show in the robustness checks, the results from the donut RD analysis are the same.

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<sup>7</sup>Please see <https://goo.gl/iiy8PX> (Accessed February 8, 2016).



## Level of Political Participation

I find that college education increases the overall level of political participation. First, an RD graphic analysis (upper-middle panel in Figure 3) demonstrates that the post-1981 cohorts exhibit a significantly higher level of political participation than the pre-1981 cohorts (coeff.=0.56, s.e.=0.27). Second, Figure 5 shows that both the ITT analysis and IV estimates find that college education has a positive effect on *Participation Scale*. The IV estimates suggest that a person with a college degree is three points higher on an 18-point participation scale than one who does not. This finding is consistent with existing studies that focus on developed democracies (Rosenstone and Hansen 1993; Verba, Schlozman and Brady 1995; Wolfinger and Rosenstone 1980) and democratic developing countries (Larreguy and Marshall Forthcoming).

## Disaggregating Political Participation

However, in contrast to previous literature that finds a positive effect of education on virtually all forms of political activity, I find that higher education in China has only selectively increased political participation. Figure 6 reports both the ITT and IV estimates using individual activity as the dependent variable. Interestingly, college education only increases people's propensity to engage in *individualistic, expressive* behavior, such as voicing opinions through social organizations (*Contacted Social Organizations*) or in political forums or discussion groups on the Internet (*Discussed Politics on the Internet*). Higher education has the greatest effect on increasing people's online participation. A person who has a college degree is 1.21 points higher on a 3-point scale than one who does not. In contrast, people with higher education do not seem to be interested in *collective action*, such as signing a petition (*Signed Petition*) or joining a protest, sit-in, or demonstration (*Protest/Sit-In/Demonstration*). The only exception is collecting donations for a social activity or organization (*Collected Donations*), which might refer to their involvement in raising funds for the student organizations in which they were involved while in college. The higher frequency of online political activities is not simply due to the availability of the Internet for the post-expansion cohorts, as Internet access was not available

on most Chinese campuses until 2004 (after the first post-expansion cohort graduated).<sup>8</sup> And outside university campuses, the number of Internet cafes remained largely constant before and after 1999 (Hong 2006).

The null effect of college education on *Protest/Sit-In/Demonstration* is not likely a mechanical result of small sample size. In Table 3.4 in the Web Appendix, I use ordered probit to estimate the effects of *College* and *Year of Education* on *Protest/Sit-In/Demonstration*, respectively, with the full sample and still find no effects.<sup>9</sup>

These findings challenge the modernization view that education empowers citizens to engage in collective behavior that could disrupt authoritarian rule (Lipset 1959; Huntington 1968; Campante and Chor 2012). My results suggest that the Chinese government's efforts to repress collective action (Perry 2015; Yan 2014; King, Pan and Roberts 2013) and to signal regime strength through propaganda and education have been largely effective (Zhao 1998; Huang 2015).

## Robustness Checks

The finding that, while college education increases the overall level of political participation, its effect mainly focuses on individualistic, expressive behavior rather than collective action is highly robust across a wide range of checks.

First, I vary the size of the bandwidth used. Table 4.2 in the Web Appendix shows results with larger windows, for example, [1975,1988], [1976,1987], [1977,1986], and [1978,1985], and a narrower window—[1980,1983]. Varying the bandwidth does not change my findings. The results using the narrower window are particularly encouraging, because the cohorts that were born in and after 1980 were equally exposed to the 1997 Asian Financial Crisis (they all reached 18 after the crisis). This indicates that the results are not driven by the crisis's treatment effect on different cohorts.

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<sup>8</sup>For example, Peking University, one of the best universities in China, did not provide Internet access to its students until May 2004. Please see <http://web5.pku.edu.cn/academic/pkucc/zxjj/zxdsj/> (Accessed September 21, 2015).

<sup>9</sup>The sample includes respondents who graduated from high school, the coefficient is hence the effect of obtaining a college degree or year of education on collective action among the people who have a high school degree.

Second, in the main analysis, I use a dummy coding of education (*College*). While it directly tests the effect of college education, it arbitrarily divides the subjects based on whether or not they have a college degree. Table 4.3 in the Web Appendix shows the estimates with an ordinal coding (*Level of Education*) and a continuous coding (*Year of Education*). In both cases, the results remain the same.

Third, although my quasi-experimental design minimizes differences in citizen characteristics around the cutoff, I show that the results are robust to the inclusion of other potentially confounding omitted variables. Table 4.4 in the Web Appendix presents the estimates that control for the pretreatment variables described in Figure 3, including *Male*, *Han*, and *Urban*. The results are unchanged.

Fourth, another potential confounder is the worsened employment opportunities. As a result of the college expansion, there were more students graduating from college starting in 2003. This increase in college graduates in the labor market created a shortage of employment opportunities for the post-expansion cohorts. Thus, although higher education might empower college students to take collective action, this positive effect is offset by the dearth of employment opportunities. For this alternative explanation to be valid, the post-expansion college students must be in a worse economic situation than their pre-expansion counterparts. The most direct measure of economic conditions is one's personal income. I therefore compare the *Personal Monthly Incomes* of pre- and post-expansion college students. Comparing either two or three cohorts on either side of the cutoff, as Table 3.5 in the Web Appendix shows, demonstrates there is no significant difference in personal income between the two groups.

Fifth, as Figure 2 reveals, participation is a rare event, as most people choose not to participate in collective action. Table 4.5 in the Web Appendix reports results estimated using **King and Zeng's** (2001) rare events logistic regression, with a dichotomous coding of political activities (by grouping "did it before" and "did it last year") as the dependent variable. The results are similar.

Sixth, I employ a placebo test to estimate the effect of a (hypothetical) reform in 1996 and compare cohorts three years on either side of this arbitrary cutoff. Contrary to the concern that

cohort trends might drive the results, I find no significant effect of education on participation around the placebo reform (see Table 4.6 in the Web Appendix).

Seventh, because the CCAS employed a complex survey sampling design, following Landry and Shen's (2005) suggestions, I rerun the analyses considering the survey design effects by using sampling weights. Table 4.7 in the Web Appendix shows similar results.

Eighth, I address the concern that respondents might underreport their involvement in contentious collective action in an authoritarian regime. The CCAS asked the respondents whether or not they feared the consequences of criticizing the central government, local governments, and political leaders. I construct a variable (*Fear*) to measure the overall level of political fear and control for it in the regressions. The results (Table 4.8 in the Web Appendix), which indicate the effect of college education on political participation after holding political fear constant, are not changed.

Lastly, to ease the concern that the college expansion reform might have worsened the quality of education immediately after 1999, I conduct a donut RD analysis. The idea of the donut RD is to drop the observations in the immediate vicinity of the cutoff to avoid the estimates being contaminated by the side effects of the treatment (Barreca et al. 2011). It might be true that in 1999, many universities were unprepared for the expansion and could not provide education at the same quality with before. However, fiscal expenditure on education has caught up since then (Figure 4.1 in the Web Appendix), and we should expect the quality of college education to recover to the pre-expansion level two or three years after the reform. Table 4.9 in the Web Appendix presents 2SLS results dropping the respondents who were born in 1981 and 1982 (the donut hole) and only including those born in 1979 and 1980 on one side and those born in 1982 and 1983 on the other side. The results are similar.

## **Testable Implications**

The analyses above, by comparing respondents with and without a college degree, reveal that China's higher education has not encouraged people to take collective action. So far, I have not shown any empirical evidence of *how* higher education contains collective action. My

theoretical discussions identify three mechanisms that universities use to keep students away from the streets: propaganda, control, and recruitment. Given data limitations, I cannot directly test all three of these mechanisms. Below, I combine the CCAS and a college survey to examine how party recruitment has had a dampening effect on collective action. I also test an alternative socio-economic mechanism and find no support.

I first demonstrate that attending college has a causal effect on party membership. Table 5.1 in the Web Appendix uses an IV strategy to show that people with a college degree (instrumented by *Post1981*) are 22% more likely to be a CCP member.<sup>10</sup> This confirms Guo's (2005) observation that the CCP has deliberately targeted college students for recruitment.

To test whether the CCP's recruitment strategy has decreased college CCP members' propensity to engage in collective action, I draw on another dataset from the the Beijing Colleges Panel Survey (BCPS). The 2010 wave of the BCPS, the only wave that has been released, interviewed 4,752 college freshmen and juniors enrolled in Beijing's 15 universities. Designed and conducted by a team at the People's University, the BCPS drew a random sample of college students based on the Beijing Municipal Government's Students Registration Database.<sup>11</sup> All questionnaires were distributed by universities and self-administered by the respondents. Because there was no interviewer present, the survey reduced respondents' concerns about political sensitivity.

The BCPS asked college students the extent to which (on a 1-5 scale) they approve of using collective action to express one's (or an organization's) interests. The actions listed included public gathering, protesting, striking, and petitioning. Tables 5.2-5.5 in the Web Appendix show ordered probit estimates of *CCP Membership*'s effects on approval of public gathering, protesting, striking, and petitioning while controlling for sex, ethnicity, number of siblings, entrance exam score, major, academic ranking in class, and class year. CCP members are consistently less likely to approve of these forms of collective action. All point estimates are negative and significant (except when petition is the dependent variable, when the coefficient

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<sup>10</sup>The model includes three cohorts on either side of the college expansion cutoff with provincial fixed effects and clustered standard errors at the provincial level.

<sup>11</sup>For more information about the BCPS, please see <http://www.uchicago.cn/wp-content/uploads/2011/05/Shizheng-Feng.pdf> (Accessed August 25, 2015).

is not significant at the 0.1 level). This finding is consistent with Dickson's (2014) conclusion that party members are more supportive of the Chinese regime.

Although I cannot test the other two mechanisms—propaganda and control—more directly, I am able to show some indirect evidence that more exposure to college education has not empowered students to take collective action. Again, I draw on data from the BCPS to compare juniors and freshmen to probe whether two more years of college education changes students' views of collective action. Tables 5.2-5.5 in the Web Appendix show that juniors are not significantly different from freshmen in their approval of collective action, except that juniors are *less* supportive of petitioning than freshmen are.<sup>12</sup>

The BCPS also asked college students whether they had participated in any collective action before. Table 5.6 in the Web Appendix shows that juniors are not significantly different from freshmen in their experience of participating in collective action. These results further support the idea that China's higher education has not encouraged citizens to take collective action.

However, there is an alternative socio-economic mechanism. One possibility might be that higher education elevates individuals' social status and reduces grievances. Because some of the most important social conflicts in China now are among the "have-nots," individuals with higher education need not resort to collective action. Another possibility is that people with more education also have higher opportunity costs in participating in collective action: they have more to lose. To measure one's social status, I use *Social Status* constructed from a question in CCAS asking the respondents to evaluate their own social status on a zero to ten scale. Comparing *Social Status* between individuals with and without college education (using an IV approach with three cohorts on each side), as Table 5.7 in the Web Appendix shows, demonstrates that there is no significant difference between the two groups.

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<sup>12</sup>These are based on ordered probit estimates of *Junior's* effects on approval of public gathering, protesting, striking, and petitioning while controlling for sex, ethnicity, number of siblings, entrance exam score, major, academic ranking in class, and CCP membership.

## Substance of Political Participation

So far, I have established that Chinese college graduates are more interested than the less educated in expressing their opinions through either social organizations or the Internet. However, we still know little about *what* they are expressing. The *substance* of their political participation is important, because we cannot tell whether it is pro- or anti-regime by simply examining its frequency. Exploring the rich data in the CCAS, I can examine how college graduates differ from the less educated on a wide spectrum of political attitudes, such as trust in political institutions, political efficacy, demand for political and civil rights, political knowledge, satisfaction with government performance, interest in national and local affairs, and awareness of China's problems.

Next, I will summarize my main findings; the technical details and results are available in Section VI of the Web Appendix. In all estimations, I use *College* instrumented by *Post1981* as the explanatory variable, and I compare the three cohorts on either side of the college expansion cutoff with provincial fixed effects and clustered standard errors at the provincial level.

First of all, I find that Chinese college graduates do not exhibit a higher level of trust in political institutions, such as the central government, courts, people's congress, village/street committees, the CCP, procuratorates, local governments, the media, and the police. This is consistent with Huang's (2015) finding that China's education only signals the regime's strength and does not indoctrinate particular values. Nor do Chinese college graduates enjoy a higher level of political efficacy. Compared to their less educated counterparts, Chinese college graduates do not think they are better equipped to influence politics.

College graduates are also not particularly dissatisfied with the (lack of) political and civil rights in China, including the right to be informed about government affairs, the right to join associations, survival rights, freedom of speech, voting rights, and the right to criticize the government. This finding contradicts many studies that find a strong positive association between education and democratic values (Inglehart 1997; Woodberry 2012).

Surprisingly, respondents with a college education do not have a higher level of political knowledge, measured by whether they can name the general secretary of the CCP, China's

prime minister, chairman of the National People's Congress, and China's vice president. In addition, college graduates are not especially unsatisfied with the Chinese government's handling of social and economic issues, including compulsory education, public health, crime, social security, environmental protection, and infrastructural construction.

When asked about the extent to which they care about the affairs of their own villages/communities, counties/cities, or China, college graduates reported more attention to affairs at the county/city level (but not at the national level) than the less educated did. When asked what problem concerns them the most, college graduates are more worried about the environment, medical services, and, ironically, unemployment than the less educated are. They are, however, not particularly concerned with broader political issues, such as corruption, social justice, and the rule of law.

In summary, my findings show that education has not "enlightened" China's college graduates. They care more about socioeconomic issues at the local level that could influence their material well-being, such as medical services and unemployment, and less about bigger sociopolitical issues at the national level, such as social justice, democracy, and the rule of law.

## **DISCUSSION AND CONCLUSION**

William Rainey Harper, a leading American education leader of the late 19th century and the first president of the University of Chicago, once said, "The university, I contend, is this prophet of democracy" (Harper 1905, 19). Inspiring students with cognitive abilities that facilitate critical thinking, higher education is believed to produce citizens who constitute the pillar of democracy. Bueno de Mesquita and Downs (2005) identify access to higher education as one of the most important types of public coordination goods, the supply of which they suggest poses an existential survival threat to autocratic rule. They contend, "[a]round the world, from Beijing to Moscow to Caracas, authoritarian regimes seem to be well aware of the dangers of providing coordination goods to their people, and they refrain from doing so with remarkable consistency" (Bueno de Mesquita and Downs 2005, 84). International agencies have asserted the importance of schooling for support for democracy (Evans and Rose 2007, 904). For ex-



ample, the World Bank argues that “Broad and equitable access to education is thus essential for sustained progress toward democracy, civic participation, and better governance” (Verspoor 2001, 8). As a consequence, a huge emphasis among foreign aid donors has been placed on boosting student attendance and achievement in developing countries (Gift and Wibbels 2014, 292).

However, there has been very little systematic evidence to support such claims in authoritarian contexts. Following Gift and Wibbels’s (2014) call to pay “more attention to the comparative politics of education,” I present, to my knowledge, the first quasi-experimental evidence on whether higher education affects citizens’ political participation in a non-competitive authoritarian regime.

Exploiting China’s college enrollment expansion reform in 1999 that exogenously increased high school graduates’ probability of entering college, and analyzing a nationally representative sample survey, I demonstrate that higher education only increases one’s propensity to engage in individualistic, expressive behavior, such as discussing politics on the Internet, and has no effect on collective action, such as protests, sit-ins, or demonstrations.

The Chinese case challenges a popular view, especially among modernization theorists, that education empowers citizens to take collective action to disrupt authoritarian rule (Lipset 1959; Huntington 1968, 1991; Campante and Chor 2012). My findings remind us that authoritarian governments can also utilize education to serve their purposes (Lott 1999; Huang 2015). The limited liberalizing effects of China’s higher education system also help inform on our understanding of the Chinese authoritarian regime’s durability.

This article speaks to several strands of literature in comparative politics and political behavior. First, while consistent with prior studies that find a positive causal effect of education on political participation<sup>13</sup> (Dee 2004; Sondheimer and Green 2010), this study is one of the few that shows differential causal effects of education on various political activities and detects cross-cohort variations in political participation. Second, while most existing studies on education and political participation are conducted in developed democracies, I join a scarce but growing literature that focuses on authoritarian regimes (Croke et al. Forthcoming). Lastly, this

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<sup>13</sup>For a counterargument, please see Berinsky and Lenz (2011) and Kam and Palmer (2008).

study adds a new perspective to explaining the resilience of Chinese authoritarianism (Nathan 2003). Several recent studies have shown the legitimizing effect of public goods provision and propaganda (Lü 2014; Tang 2005; Stockmann and Gallagher 2011). I show that China's higher education system has not produced a revolutionary generation that could threaten the regime. This helps explain what Perry terms a "striking situation" in which, despite the veritable explosion of popular protest found in virtually all other sectors of post-Tiananmen Chinese society, "China's university campuses have been notably tranquil" (Perry 2015, 12).

Although the findings relate to more than 110 million college graduates in China (roughly the population of Mexico), exploring whether these findings apply in other countries is an empirical question for future research. There is ample evidence that government control of education is not unique in China. During the 1920s and 1950s, the Soviet Union experimented with raising children in "communal children's houses, dining halls, and other institutions that would decrease the importance of the individual household" (Shipler 1983, 88-89). While fighting in Afghanistan during the 1980s, the Soviet government forcibly took tens of thousands of 3- and 4-year-old Afghans to the USSR to be raised away from the influences of their families (Amstutz 1986). The hope was that when later returned to Afghanistan, they would form the core of a loyal government administration. Even in some democracies, such as Sweden, governments have gone to great lengths to instill desired values in children. When Ingvar Carlsson (who later became prime minister) was education minister, he said that "school is the spearhead of Socialism" and "pre-school training is essential 'to eliminate the social heritage'" of undesirable parental views (quoted in Lott (1999, 128)). Swedish educational theorists even advocated for tax and government employment policies "to get both parents out of the home, so that children are forced out as well" (Lott 1999, 128). Future research can explore the relationship between education and political participation in authoritarian regimes beyond China and the specific variables that mediate this relationship.

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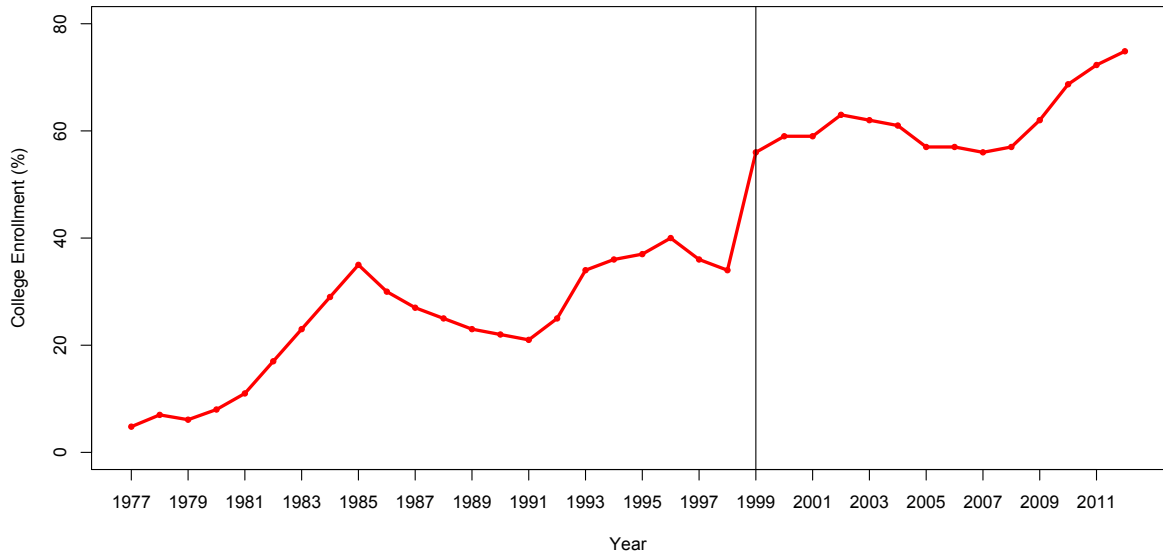


Figure 1: China's College Enrollment Rate (1977-2012)

*Notes:* The college enrollment rate is calculated as  $\text{Number of recruited} \times 100 / \text{Number of college entrance exam takers}$ . The data are from the Ministry of Education (<http://edu.people.com.cn/n/2013/0503/c116076-21359059.html>) (Accessed August 14, 2015).

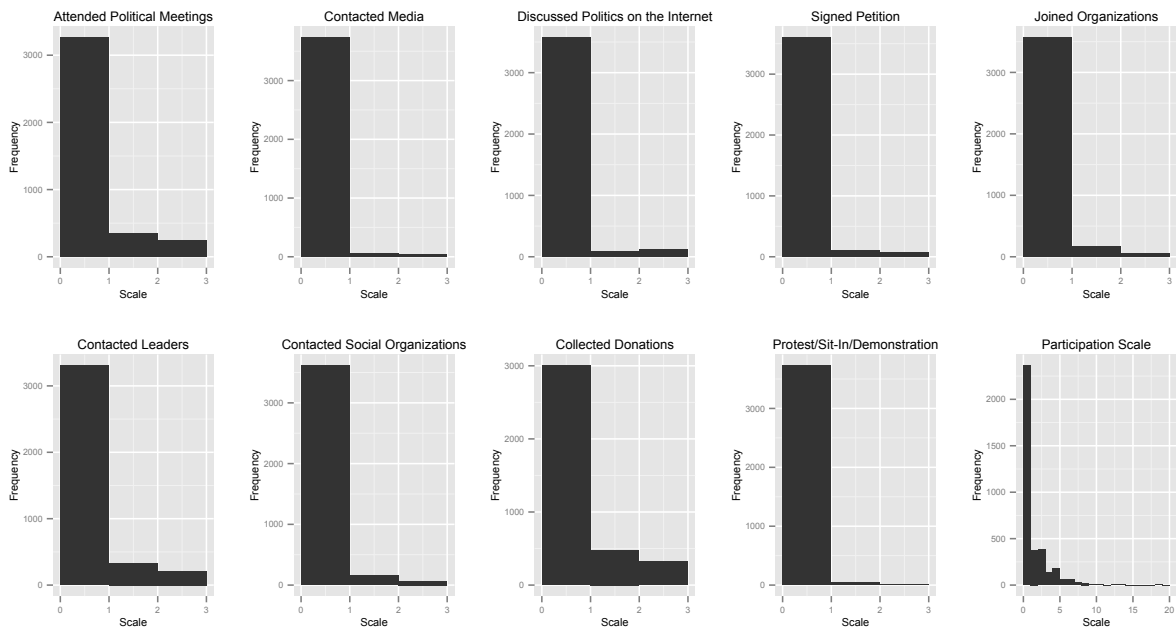


Figure 2: Histograms of Political Participation

*Notes:* The figure plots the histograms of each participation activity and the participation index. The nine participation activities are all coded as ordinal variables (0 = never, 1 = did it earlier, 2 = did it last year), and the *Participation Scale* is the sum of all nine activities.



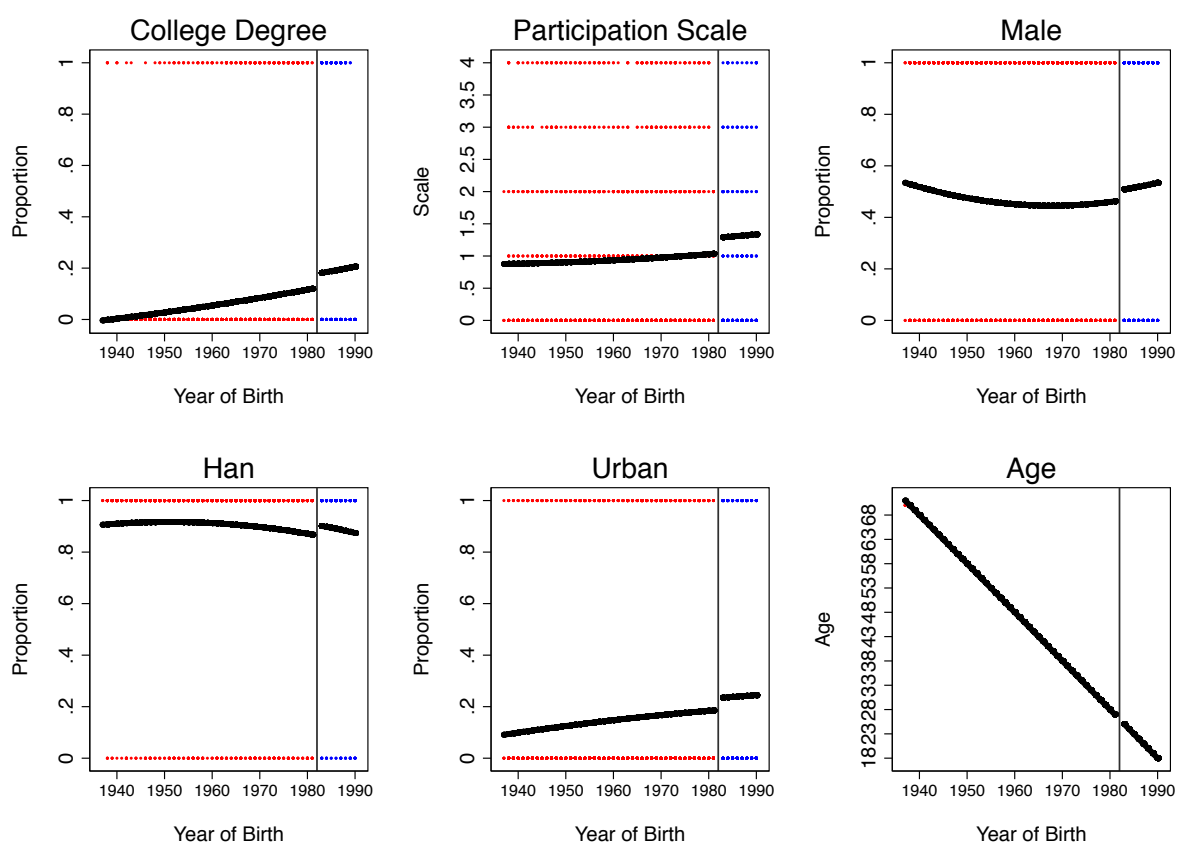


Figure 3: Trends in Key Variables by Cohort

Notes: The figure plots the RD graphic analysis of key variables in the analysis. The plotted lines indicate the fitted values from a regression of each dependent variable on a cubic polynomial in year of birth. The local linear regression smoothers are fit on either side of the cutoff point (1982), demarcated by the vertical line. The dots indicate the actual distribution of observations in the sample. The jump of *College Degree* at the cutoff point is estimated to be 0.26 (s.e.=0.07). The jump of *Participation Scale* at the cutoff point is estimated to be 0.56 (s.e.=0.27). The jump of *Male* is estimated to be 0.12 (s.e.=0.17), that of *Han* 0.03 (s.e.=0.14), and that of *Urban* 0.13 (s.e.=0.07). All are estimated using the “Imbens-Kalyanaraman optimal” bandwidth and a rectangular kernel.

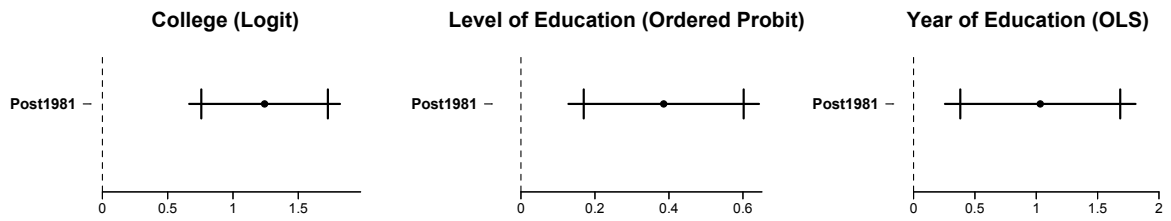


Figure 4: Estimates of Education Reform on Educational Attainment

*Notes:* The figure plots regression estimates of the effect of *Post1981* on education. The left panel reports logistic regression estimates using *College* (an indicator of whether the respondent received a college degree) as the dependent variable. The middle panel reports ordered probit estimates using *Level of Education* (a 5-point ordinal variable) as the dependent variable. The right panel reports OLS estimates using *Year of Education* (a continuous measure of the total years of schooling) as the dependent variable. The black dots are estimates of regression coefficients. Lines represent the 95% confidence intervals, and the small bars 90% confidence intervals, both of which are based on clustered standard errors at the provincial level. All specifications include provincial fixed effects and three cohorts on either side of the reform cutoff. Table 3.1 in the Web Appendix reports the results that generate this figure.

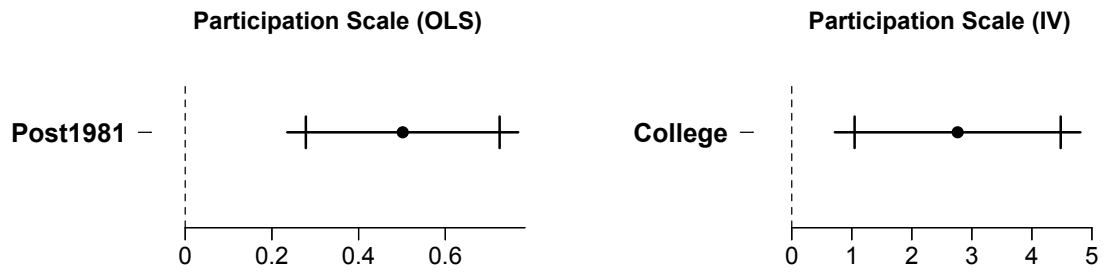


Figure 5: The Effects of College Education on Political Participation

*Notes:* The figure plots regression estimates of the effects of college education on the overall level of political participation. The left panel reports ITT estimates using *Post1981* (an indicator of whether the respondent was born after 1981) as the explanatory variable. The right panel reports IV estimates using *College* (instrumented by *Post1981*) as the explanatory variable. The black dots are estimates of regression coefficients. Lines represent the 95% confidence intervals, and the small bars 90% confidence intervals, both of which are based on clustered standard errors at the provincial level. All specifications include provincial fixed effects and three cohorts on either side of the reform cutoff. Table 3.2 in the Web Appendix reports the results that generate this figure.

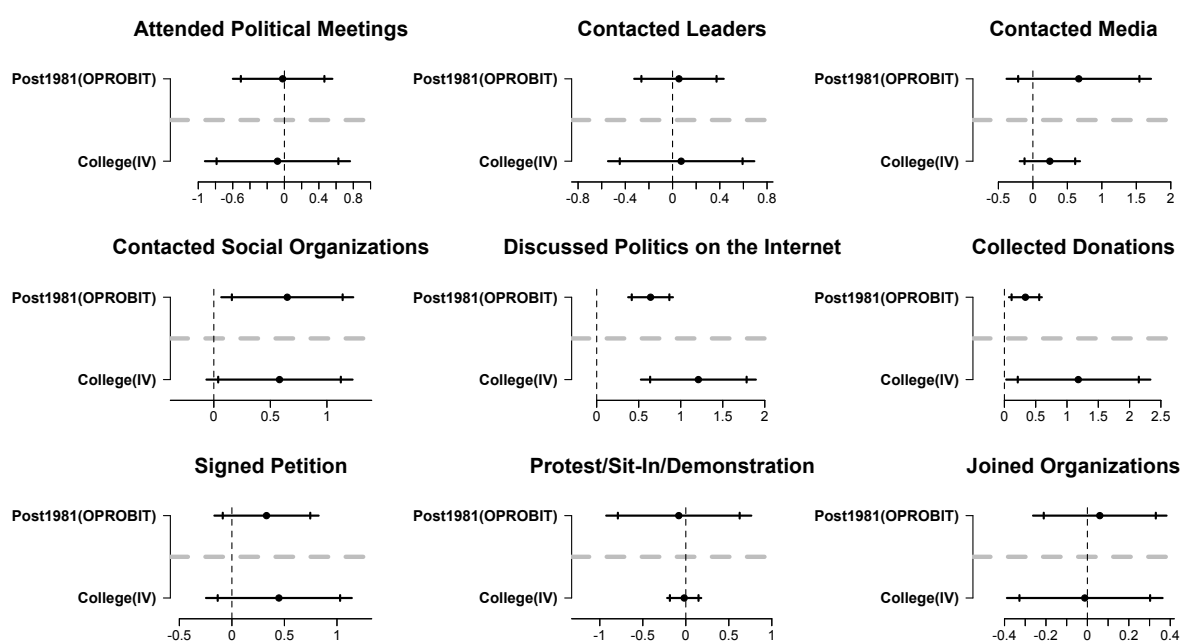


Figure 6: The Effects of College Education on Participation Activities

*Notes:* The figure plots regression estimates of the effects of college education on individuals' participation in various activities. Each line represents a separate regression. The upper line reports ITT estimates using *Post1981* as the explanatory variable. The lower line reports IV estimates using *College* (instrumented by *Post1981*) as the explanatory variable. The black dots are estimates of regression coefficients. Lines represent the 95% confidence intervals, and the small bars 90% confidence intervals, both of which are based on clustered standard errors at the provincial level. All specifications include provincial fixed effects and three cohorts on either side of the reform cutoff. Table 3.3 in the Web Appendix reports the results that generate this figure.