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"Get rid of the four olds": the long-lasting impact of the Chinese Cultural Revolution on Chinese society

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Abstract: This paper studies the long-term impact of the Chinese Cultural Revolution on interpersonal trust, mental health and perceived equality. The Cultural Revolution was a social upheaval in China between 1966 and 1976 initiated by China's leader Mao Zedong that resulted in a period of anarchy, violence and chaos as well as a large number of deaths, injuries and much persecution across China and was in particular targeted at intellectuals and the wealthy. The Cultural Revolution is likely to have had a long-lasting impact on social capital and preferences as well as on mental well-being. Using data from the Chinese General Social Survey as well as county level data on the number of abnormal deaths and victims of political persecution between 1966 and 1971 from Walder and Su (2003), I use a difference-in-difference strategy comparing individuals born before the Cultural Revolution with those born thereafter as well as across different counties to estimate the impact of Cultural Revolution intensity measured by victims and abnormal deaths on interpersonal trust, depression and perceived equality. To control for potential endogeneity due to unobservables as well as for measurement error, I instrument Cultural Revolution Intensity with the number of universities in a county at the time of the Cultural Revolution. I find that the Cultural Revolution is associated with lower levels of interpersonal trust, perceived equality and depression for more educated individuals born before the Cultural Revolution. These results are largely robust to a battery of tests. This shows that violence and conflict can have long-lasting effects on societies and that the consequences of the Cultural Revolution persist in China up to today.

JEL codes: Z13, N45, N35, P26
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1. Introduction

A large number of countries and people around the world are affected by conflict, episodes of violence or civil war and developing countries suffer disproportionally from conflict. According to the World Development Report 2011 on conflict "One-and-a-half billion people live in areas affected by fragility, conflict, or large-scale, organized criminal violence, and no low-income fragile or conflict-affected country has yet achieved a single United Nations Millennium Development Goal" (The World Bank 2011: 1). Conflict and episodes of violence have been found to affect countries and societies not only in the short run through a disruptive effect on economic growth and losses of human capital through death and injuries but also in the long and medium run through a negative impact on health, human capital and social capital. In particular, the impact of conflict and violence on interpersonal trust has been found to be persistent (Nunn and Wantchekon 2011; Rohner et al. 2013).

The Cultural Revolution was a social upheaval as well as episode of conflict and violence of singular scale between 1966 and 1976 in China that resulted in an estimated 750,000 to 1.5 million dead, the same number of injured and around 36 million victims of political persecution (Walder and Su 2003) as well as a period of anarchy and chaos. The goal of this paper is to study whether the Cultural Revolution has had a long-lasting and persistent impact on interpersonal trust, perceived equality and mental health in China.

I combine individual-level self-reported data on trust, perceived equality and depression from the Chinese General Social Survey with data on the number of unnatural deaths and victims of political persecution during the Cultural Revolution by Walder and Su (2003). I employ a difference-in-difference estimation strategy that compares individuals born before the beginning of the Cultural Revolution in 1966 with those born thereafter as well as respondents across counties with different Cultural Revolution intensities. I further test whether the Cultural Revolution has had a larger impact on more educated individuals since these were disproportionally targeted by the violence as well as on respondents in their impressionable years during the Cultural Revolution[2]. The main threat to identification is endogeneity through omitted unobservables that vary across age groups and counties and are

[2] Defined as ages 12 to 25, see Krosnick and Alwin, 1989.

correlated with both, the outcome variables and Cultural Revolution intensity. I address this concern in different ways, including by instrumenting Cultural Revolution intensity with counties' numbers of universities in 1966.

I find that the Cultural Revolution has indeed had a significant and robust negative effect on trust and perceived equality for more educated individuals born before 1966 but not for all respondents born before 1966. Further, there is evidence for a positive impact of the Cultural Revolution on mental health for more educated individuals born before 1966, possibly by fostering resilience and lowering individuals' reference points for evaluating life experiences. This is evidence for a persistent impact of the Cultural Revolution on more educated individuals, the group most targeted by the violence. My results show that episodes of conflict and violence can have a long-lasting impact on trust, perceived equality and mental health. Since, in particular, trust and mental health play an important role in economic development, these are channels through which violent events can persistently affect countries' development processes.

Even though others have studied the long-term impact of conflict and other traumatic events (e.g. Rohner et al. 2013; Nunn and Wantchekon 2011), few studies on the long-term impact of the Cultural Revolution exist. Further, the Cultural Revolution was a social upheaval unique in its scale and scope that significantly differs from other conflicts, episodes of violence and traumatic events in the past. Most closely related to my work are studies on the long-term impact of the Cultural Revolution on the Chinese economy (Bai, 2015) and on trust for those individuals that suffered from interrupted education during the Cultural Revolution (Wu, 2015). Both studies make use of the data from Walder and Su (2003) on unnatural deaths to measure Cultural Revolution intensity. This study will make considerable improvements on Wu's work. My data is much more detailed than Wu's and Bai's data since I have access to data on Cultural Revolution victims as an additional and novel Cultural Revolution intensity measure and this measure is likely to suffer from considerably less measurement error than the unnatural deaths data. Further, in addition to survey respondents' current place of residence, I can reconstruct the likely place of residence during the Cultural Revolution for part of my observations. I am able to solve the

endogeneity problem by instrumenting for Cultural Revolution intensity with a novel instrument. I am the first to study the impact of the Cultural Revolution on all respondents born before 1966 as well as specifically on intellectuals and more educated individuals who were the Cultural Revolution's main target group. I am further the first to study the impact of the Cultural Revolution on depression and perceived equality.

This paper further contributes to the literature on the impact of violent conflict and other traumatic events on interpersonal trust (e.g. Rohner et al. 2013; Nunn and Wantchekon 2011; Lichter et al. 2015; Cassar, Grosjean and Whitt 2013) as well as on political and individual preferences and political participation (e.g. Chen and Yang 2015; Bellows and Miguel 2009; Blattman 2009). My work also adds to the literature on the determinants of interpersonal trust (e.g. Fisman and Khanna 1999; Alesina and La Ferrara 2002) as well as of preferences (e.g. Alesina and Fuchs-Schündeln 2007). This paper complements studies on the importance of interpersonal trust for economic development (e.g. Fafchamps 2006; Knack and Keefer 1997) as well as financial development (Guiso, Sapienza and Zingales 2004) and trade and FDI (Guiso et al. 2009). The literature documenting the persistence of culture, social capital and preferences over time is also related to my work (e.g. Guiso et al. 2006; Tabellini 2010; Algan and Cahuc 2010). Finally, this paper is contributes to the literature on the medium- and long-term social and economic impact of the Cultural Revolution, for example, on educational attainment and earnings (Meng and Gregory 2007; Deng and Treiman 1997) and on economic development (Bai 2015).

Section 2 outlines the historical background of the Cultural Revolution. Section 3 provides an overview of the theory and related literature motivating the empirical analysis. Section 4 describes the data and section 5 lays out the empirical strategy. Section 6 shows the main results and section 7 performs a range of robustness checks, including instrumental variable estimation. Section 8 discusses the results and section 9 concludes.

2. Historical background of the Cultural Revolution

The Cultural Revolution was a socio-political movement, turmoil and upheaval in China from 1966 to 1976 resulting in a period of anarchy, violence and chaos, especially during its initial phase from 1966 to 1968, and was mainly directed against the "capitalist" elite, the

formerly wealthy, intellectuals as well as all traditional elements in Chinese society. China's leader Mao Zedong launched the Cultural Revolution to regain full control of the country and the Communist Party and in order to distance China from the Soviet Union (MacFarquhar and Schoenhals 2009).

The initial period of the Cultural Revolution started with the formation of the "Red Guards", a paramilitary force, made up mainly of students whom Mao asked to criticize everybody whom they imagined to lack revolutionary and communist spirit, in particular, people in authority such as teachers, academics and officials but also neighbours, friends and family members. The Red Guards organized struggle sessions, mass meetings and criticism, published newspapers, distributed posters in public places, raided homes of whomever they believed to lack revolutionary spirit and even set up prisons for "counter-revolutionaries" (Kraus 2012). The Cultural Revolution was largely targeted at intellectuals and the more educated and those that had been wealthy before the Communist Era and these people suffered disproportionally from persecution. Victims experienced torture, public humiliation and harassment as well as seizure of property and many died from torture or its consequences or committed suicide. Fear of being targeted as counter-revolutionaries incentivised people to signal their devotion and loyalty to the Cultural Revolution and the Communist Party, in particular, by criticizing and reporting on their neighbours, family members and friends and labelling these as lacking revolutionary spirit (MacFarquhar and Schoenhals 2009). Different Red Guard organizations fought each other and Red Guards clashed with groups of workers and the situation was close to civil war in some places. In the context of the "Destroy the Four Olds" (old customs, old culture, old habits, old ideas) campaign, much of China's cultural heritage was destroyed (Kraus 2012).

In 1968, the army intervened to restore order. Further, in the context of the "Up to the Mountains, Down to the Villages" movement, an estimated 17 million urban youths, many of them former Red Guards and intellectuals, were forcefully sent to rural areas between 1967 and 1978 to work as peasants for re-education purposes.

In terms of education, starting from 1966, all primary schools were closed for two to three years and secondary schools and institutions of higher education such as universities were

closed for even longer. After re-opening, schools were not allowed to follow normal curricula but taught Mao Zedong Thought. Admission to universities was based on political attitudes and family background (MacFarquhar and Schoenhals 2009).

The closure of all schools and youths' engagement in revolutionary activities, in particular in the formation of the "Red Guards", instead of schooling resulted in an enormous loss of human capital. Further, the chaos and violence also entailed a huge loss in terms of economic development and China's economy experienced a period of recession followed by low economic growth for several years between 1966 and 1976. Much of China's cultural heritage was destroyed and lost (Kraus 2012). Walder and Su (2003) estimate, based on their data on unnatural deaths, injuries and political persecution during the Cultural Revolution from county annals, that the Cultural Revolution caused between 750,000 and 1.5 million deaths, the same number of injured and around 36 million victims of political persecution.

3. Theory and Mechanisms

3.1 Impact of conflict, violence and traumatic events on trust and perceived equality

There is an increasing amount of literature documenting a negative and persistent impact of conflict or other violent or traumatic events on interpersonal trust.[3] In the context of the slave trade, many individuals were sold into slavery by neighbours, friends, local chiefs and family members. Consistently with this fact, Nunn and Wantchekon (2011) find that individuals in Africa belonging to ethnic groups living in areas that were more exposed to slave trade have lower levels of trust in their relatives, neighbours, co-ethnics and local governments up to today. Rohner et al. (2013) find that a recent civil conflict in Uganda resulted in a fall in interpersonal trust in areas more affected by fighting. Other studies reporting similar results include Lichter et al. (2015), Hong and Kang (2015) and Chen and Yang (2015).

In line with this literature, I expect Cultural Revolution to have had a negative impact on individuals' levels of interpersonal trust. The continued violence and chaos during the Cultural Revolution is likely to have traumatized individuals and made them more wary and

[3] Trust is in general, measured by survey questions asking respondents whether they trust in strangers or not.

careful and less trusting. Further, the incentives to criticise and report on friends, family members and neighbours can be expected to have reduced trust.

During the Cultural Revolution, many individuals, in particular, intellectuals and individuals of higher social classes, lost their property and social status and became victims of harassment, violence and mainly unjust accusations of wrongful behaviour. Therefore, the Cultural Revolution is also likely to have had an impact on individuals' sense of justice and perceived equality, especially, for the groups targeted. These experiences during the Cultural Revolution are likely to have made these individuals perceive society as less equal. I expect this negative effect on perceived equality to be specific to the Cultural Revolution and not to apply to most other traumatic events and episodes of conflict and violence in other countries due to the specific characteristics of the Cultural Revolution where people of previously high social status all of a sudden became victims of violence and alleged criminals. To the best of my knowledge, this paper is the first to study the impact of violent and traumatic events on perceived equality, probably for the above cited reasons. The most closely related literature studies the impact of traumatic events or the political environment on preferences (e.g. Alesina and Fuchs-Schündeln 2007; Giuliano and Spilimbergo 2014).

Since intellectuals as well as wealthy individuals were disproportionally targeted by and persecuted during the Cultural Revolution, I expect the Cultural Revolution to have had a larger impact on the above described dimensions for these groups of people.

3.2 Impact of conflict, violence and traumatic events on mental health

In addition to interpersonal trust and perceived equality, I expect the Cultural Revolution to also have persistently affected the mental well-being of individuals exposed to it. The psychological literature associates experiencing violence, conflict and traumatic events with two distinct and opposite effects on individuals' mental health.

Firstly, experiencing violence and traumatic events (e.g. torture, mass conflict, displacement, natural disasters, intimate partner violence, sexual abuse) entails an increased risk of mental health problems, in particular depression and posttraumatic stress disorder which is associated with feeling helpless and depressed (e.g. Breslau et al. 1998; Steel et al. 2009).

In line with these findings, I would expect the Cultural Revolution to have had a traumatizing effect on individuals exposed to a high Cultural Revolution intensity, thereby increasing their risk of mental health problems. Even though, I expect the prevalence of mental health problems of individuals exposed to the Cultural Revolution to have declined with the amount of time passed since the Cultural Revolution[4], the Cultural Revolution can also be expected to have had a persistent negative effect on the mental well-being of the individuals exposed: firstly, the risk of mental health problems increases with the cumulative adversity experienced throughout one's life[5] and therefore, individuals that were exposed to the Cultural Revolution are more likely to develop mental disorders following other adverse events in later life. Secondly, not all individuals affected by mental health problems following trauma and adversity fully recover (e.g. Steel et al. 2009).

Secondly, the psychological literature also predicts a positive long-term impact of adverse events on mental health by fostering resilience and toughness, thereby raising levels of life-satisfaction and reducing the risk of depression (Seery et al. 2010; Seery 2011). Individuals that experienced some adversity are found to be better at dealing with future adverse events as well as with problems and challenges in life in general (Seery et al. 2010). Further, adverse experiences in life can make people happier by reducing their reference points for current life experiences. Thus, they are more able to enjoy and appreciate "life's small pleasures" (Croft et al. 2014: 1). In contrast, "an abundance of desirable life experiences may undermine people's ability to savour simple pleasures" (Quoidbach et al. 2015: 393).

Overall, traumatic and adverse events can be expected to have a more negative impact on mental health in the short-run and a positive impact on mental well-being in the long-run. In line with this literature, I would expect the Cultural Revolution to have had a positive long-term impact on the mental health and well-being of individuals exposed to the Cultural Revolution violence by making them more resilient to problems and future adverse events and reducing their reference points for evaluating life experiences. In particular, in face of China's impressive economic development that has lifted millions of people out of poverty

[4] The risk of mental health problems is found to decline with the time passed since the traumatic or adverse experience and many individuals affected by health problems resulting from adverse events discover as time passes (e.g. Steel et al., 2009).
[5] The higher cumulative adversity, the full amount of adversity people have experienced throughout their lifetime, the larger the risk of mental health problems (e.g. Turner and Lloyd, 1995).

and enormously improved people's living standards, I would expect individuals that experienced the Cultural Revolution to be happier and suffer from less mental health problems such as depression today since they are likely to have very low reference points due to the extremely adverse experiences in the past.

3.3. Impressionable Years Hypothesis

The impressionable years hypothesis states that "individuals are highly susceptible to attitude change during late adolescence and early adulthood" (Krosnick & Alwin 1989: 416). An individual's impressionable years are generally defined as somewhere in between the ages 12 and 25. There is a large amount of empirical evidence for this hypothesis. For example, Giuliano and Spilimbergo (2013) find that experiencing a recession during one's impressionable years affects individuals' beliefs and political orientation. Gong et al. (2014) find that being sent to the country side to work as a peasant in China has affected individuals' beliefs and values. In line with this evidence, the Cultural Revolution is likely to have had a larger impact on individuals aged 12 to 25 at the time of the Cultural Revolution.

4. Data

4.1 Chinese General Social Survey data

The dependent variables measured at the individual level from the Chinese General Social Survey (CGSS) 2010 to 2013 waves are constructed from the following questions:

- Interpersonal trust: "In general, do you agree that most people in this society can be trusted?" with five possible answers: "I completely agree, I agree, I neither agree nor disagree, I do not agree, I do not agree at all".
- Perceived equality: "In general, do you think this society is equal or not?" with five possible answers: "Very equal, equal, neither equal nor unequal, unequal, very unequal".
- Depression: "Within the last four weeks, what was the frequency of you feeling depressed or disheartened?" with five possible answers: "Always, often, sometimes, rarely, never".

The CGSS is a Chinese household survey targeted at individuals aged 18 and above. My data covers 30 of China's 34 provinces and 101 counties. In the 2012 and 2013 survey waves respondents further list 1124 counties of birth in 31 provinces.

Each survey wave comprises between 11,000 and 12,000 respondents except for the 2011 wave which comprises only 5620 respondents. In total, there are 39,629 observations. For each of the three dependent variables a small number of observations are lost due to non-response or lack of knowledge by the respondent. Individual controls include gender, hukou status, level of education, frequency of watching TV and employment status. Summary statistics for the main variables of interest are presented in table 1, including variable means for observations from high and low Cultural Revolution intensity counties (defined as a victimization rate above or below 0.006, the median victimization rate, respectively).

Table 1: Summary Statistics

Variable	Mean	Mean victim. rate > 0.006	Mean victim. rate ≤ 0.006	s.d.	Min.	Max.	N
Dependent Variables - binary							
trust	0.6210	0.6049	0.6373	0.4852	0	1	39,585
depressed	0.1013	0.0995	0.1032	0.3017	0	1	33,930
equality	0.4229	0.4079	0.4381	0.4940	0	1	39,530
Dependent Variables - Ordered Logit							
trust	3.4258	3.4028	3.4491	1.0502	1	5	39,585
depressed	2.1322	2.0911	2.1738	1.0004	1	5	33,930
equality	3.0304	3.0072	3.0541	1.0714	1	5	39,530
Independent variables							
victimization rate	0.0245	0.0468	0.0017	0.0427	0	0.2739	39,629
death rate	0.0004	0.0007	0.0001	0.0008	0	0.0066	39,629
year of birth	1963	1964	1963	16.0892	1909	1996	39,629
born before the CR	0.5369	0.5209	0.5532	0.4986	0	1	39,629
educated	0.3271	0.3692	0.2842	0.4691	0	1	39,614
educated father	0.2691	0.2975	0.2402	0.4435	0	1	39,218
high social class	0.1727	0.1834	0.1619	0.3780	0	1	39,629
Impressionable years	0.2613	0.2502	0.2726	0.4394	0	1	39,629
universities per county	7.5576	11.2196	3.8348	14.4203	0	56	39,629

It has to be born in mind that all three outcome variables are likely to suffer from measurement error due to deliberate or unintentional misreporting, framing effects and biases since they are self-reported. The question "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" is widely employed in surveys across countries such as the World Values Survey or barometer surveys

and data from this question is used as a measure of interpersonal trust in many economic studies (e.g. Nunn and Wantchekon, 2011; Algan and Cahuc 2010). However, Glaeser et al. (2000) criticize this question for being "vague, abstract and hard to interpret" (Glaeser et al. 2000: 812) and many academics argue that experimental data from trust games is a more accurate measure of interpersonal trust than survey data. Glaeser et al. (2000) find that trust questions in surveys are a better predictor of trustworthiness than of trusting behaviour. Sapienza et al. (2013) show that trust consists of a belief-based component and a preference-based component and that survey questions capture mainly the belief-based component.

4.2 Cultural Revolution intensity measures at the county level

Data from Walder and Su (2003) on numbers of unnatural deaths and victims of political persecution between 1966 and 1971 across Chinese counties is used as Cultural Revolution intensity measure. Walder and Su collected this data from more than 1,500 Chinese county annals (about two thirds of Chinese counties) published mostly during the late 1980s. County annals are statistical and historical volumes published every 30 to 50 years across Chinese counties since the Ming Dynasty and the usage of county annals originated in the Han Dynasty (202 BC – 220 AD).

Walder and Su's data is likely to suffer from measurement error. There is much evidence for underreporting and misreporting of the true number of Cultural Revolution deaths and victims in county annals due to self-censorship of functionaries and scholars compiling county annals as well as official censorship (Walder and Su 2003). According to Walder and Su (2003), there is likely to be a larger amount of underreporting on deaths and injuries than on victims of political persecutions since deaths and permanent injuries were more sensitive issues than persecutions, entailed a higher risk of punishment and were less likely to be reported to and recorded by authorities.

This evidence suggest that counties' reported number of victims is a more accurate measure of Cultural Revolution intensity than the reported number of unnatural deaths and therefore, I use the number of victims as my primary measure of Cultural Revolution intensity but re-estimate my results using counties' number of unnatural deaths as Cultural Revolution intensity measure as a robustness check.

There is evidence that counties with zero reported victims and deaths suffer disproportionally from measurement error since Walder and Su recorded the number of deaths or victims respectively as zero whenever statements on victims and deaths did not allow for accurate estimates of the actual numbers of victims and death.[6] Therefore, I will re-estimate the econometric model excluding all counties with zero reported deaths or victims as another robustness check. Walder and Su (2003) find evidence for underreporting through shorter records on the Cultural Revolution in county annals. Hence, in a further robustness check, I will limit my analysis to those counties with a detailed account on the Cultural Revolution in their annals only.

I weight both, the number of victims of political persecution and the number of unnatural deaths by counties' populations to obtain death and victimization rates. Data on county populations is from the 1982 Census. This data is likely to be a good approximation of counties' populations between 1966 and 1971 since according to Chen and Zhou (2007) and Liang and White (1996) there were severe restrictions to migration up to the 1990s in China and therefore, little migration occurred.

Data on counties' numbers of universities and professional colleges in 1966 is used as instrument for counties' victimization rates. This data is available on the Chinese Ministry of Education's website (www.moe.gov.cn).

5. Econometric Model and Estimation

The benchmark model and preferred equation uses difference-in-difference estimation to compare individuals across counties with different Cultural Revolution intensities as well as those individuals born before the Cultural Revolution with the ones born thereafter:

$$Y_{i,c,t,s} = \alpha_c + \alpha_t + year_s + \beta(CR\ intensity_c \times born\ pre\ CR_t) + \boldsymbol{\delta}'\boldsymbol{X}_{i,c,t,s} + \varepsilon_{i,c,t,s} \qquad (1)$$

Where *i* indexes individuals, *c* counties, *t* generations and *s* denotes survey waves. Y_i is the outcome of interest (trust, subjective equality or depression), $CR\ intensity_c$ is the Cultural Revolution intensity measure at the county level (the victimization rate or alternatively the

[6] For example, in the case of statements such as "many people were persecuted to death".

death rate) and $born\ pre\ CR_t$ is a binary indicator variable equal to one for individuals born before 1966 and zero otherwise. As a robustness check, I re-estimate my results redefining $born\ pre\ CR_t$ as equal to one for all individuals born before 1961 and zero otherwise since individuals born between 1960 and 1966 may have been too small to fully experience and internalize the Cultural Revolution. α_c are county fixed effects, α_t year of birth fixed effects and $year_s$ survey wave fixed effects. X_i is a vector of individual controls, including gender, frequency of watching TV, employment status, 8 level of education dummies, six hukou status dummies and a constant. β measures the additional impact of a more intense Cultural Revolution on individuals born before 1966 only as compared to those born after 1966.

My preferred measure of individual Cultural Revolution exposure is the Cultural Revolution intensity measure at respondents' counties of current residence since information on respondents' place of current residence is available for all four survey waves. Alternatively, as a robustness check, I re-estimate the model for the 2012 and 2013 CGSS data only measuring Cultural Revolution exposure based on individuals' counties of residence during the Cultural Revolution.

The difference-in-difference estimation allows to control for county fixed effects. Therefore, endogeneity or reverse causality due to county-specific time and age invariant unobservables such as geographic variables, a county's wealth or long-term economic performance is not a concern. However, the estimate of β may be biased if county-specific age-varying unobservables are correlated with the Cultural Revolution intensity measure. A further disadvantage of this specification is that the estimates do not account for the transmission of the Cultural Revolution experience from parents and society in general to children and a long-term impact of the violence even on generations born after the Cultural Revolution.

I use a linear probability model (LPM) because of the estimation of a large number of fixed effects, the distribution of the outcome variables, since ordered logit and probit models cannot be combined with IV estimation and for simplicity. I create binary variables for each of the three outcomes coding the top two categories as one and the other three categories as zero. The binary variables are my preferred measure since the outcome variables' values, in particular for trust and equality, are not normally distributed (as shown in figure 1,

Appendix).[7] However, a disadvantage of the binary variables is that part of the information is lost and it is not clear whether the middle category should be assigned zero or one. Therefore, I re-estimate my results using an ordered logit model and assigning the value one instead of zero to the middle categories of the binary variables as a robustness checks.

The main threats to identification are endogeneity of the intensity of the Cultural Revolution due to omitted age-variant unobservables, measurement error and migration. Unobservables that vary across counties and for different age groups such as certain age groups having lived through conflict or natural disaster in some regions only may bias the results. In other words, the validity of the parallel trends assumption is a concern: this assumption states that in the absence of the Cultural Revolution, county-specific factors would have been the same for those individuals born before 1966 and those born thereafter. However, respondents born before and after the Cultural Revolution may differ due to unobservable factors that vary across age groups and counties other than exposure to different Cultural Revolution intensities which are correlated with Cultural Revolution intensity and the outcome variables and may thus bias my results. Therefore, as a robustness check, I will re-estimate the model for individuals born before the Cultural Revolution only. However, the disadvantage of this specification is that county fixed effects cannot be accounted for. Secondly, I will also re-estimate the above model for those cohorts born between 1958 and 1978 only since these individuals do differ to a lesser extent in terms of age and generation-specific experiences than the entire sample but part of them was born before the Cultural Revolution and the other part thereafter. Thirdly, I also include the individual controls interacted with the *preCR* dummy variable in the model as a further robustness check.

Secondly, as discussed earlier, measurement error in the death and victimization data due to underreporting as well as measurement error in the outcome variables (since these are self-reported) are concerns. Measurement error in the Cultural Revolution intensity measure will bias the results only if underreporting is systematically linked to counties' death and victimization rates. This would be the case, for example, if underreporting was more likely

[7] People tend to avoid the top, bottom and middle answers, favouring the less extreme ones. For example, an individual is much more likely to report "equal" than "very equal".

for counties with higher victimization (or death) rates. According to Walder and Su (2003), this is unlikely: they find a huge variation in the amount of underreporting but no systematic relationship between the number of deaths and victims and the amount of underreporting. As discussed earlier, as robustness checks to control for measurement error, I will re-estimate the model excluding all counties with zero reported victims or deaths as well as for those counties with detailed accounts on the Cultural Revolution only (measured by the number of characters in the county annals devoted to the Cultural Revolution).

Thirdly, migration might bias my results. Respondents may not have lived at their counties of current residence at the time of the Cultural Revolution and migration during and after the Cultural Revolution may have been non-random. Firstly, if individuals particularly targeted by the Cultural Revolution migrated out of counties where the Cultural Revolution was very violent toward less violent counties, this could bias the results. However, very little migration occurred in China before 1978 since the Chinese government imposed very severe restrictions on migration up to then (and even up to the 1990s) (Chen and Zhou 2007; Liang and White 1996) and very few respondents in my data report having migrated between 1966 and 1971. Secondly, after the Cultural Revolution, when growth in China started to pick up, more educated people may have migrated to areas that suffered more from the Cultural Revolution due to relatively lower levels of skilled labour at these places and thus higher returns in the form of wages for skilled labour in these areas (Bai 2015). Therefore, as a robustness check, I re-estimate the above model using the victimization rate at respondents' counties of residence during the Cultural Revolution instead of the current county of residence as measure of Cultural Revolution exposure.

The usual OLS standard errors as well as standard errors that are clustered at the county level will be reported but statistical inference is based on the clustered standard errors. As a robustness check, I also calculate standard errors clustered by year or birth, by province and by year of birth and county jointly for my most important equations and results.

5.1 Intellectuals

To investigate whether the Cultural Revolution had a larger negative effect on more educated individuals and intellectuals, I will interact the Cultural Revolution intensity measure in the

equation (1) with a binary indicator that is equal to one for more educated individuals and zero otherwise, estimating the following equation:

$$Y_{i,c,t,s} = \alpha_c + \alpha_t + year_s + \beta\left(CR\ intensity_c \times born\ pre\ CR_t \times educated_{i,c,t,s}\right) + \sum_{e=0}^{10} \gamma_e education\ level_{e,i,c,t,s} + \boldsymbol{\delta'} \boldsymbol{X}_{i,c,t,s} + \varepsilon_{i,c,t,s} \quad (2)$$

Where e denotes levels of education and $educated_{i,c,t,s}$ is equal to one for respondents with a level of education above middle school and zero otherwise. Middle school is chosen as cut-off value between more and less educated individuals since both, the mean and the median levels of education are primary school for individuals born before 1966 (one level below middle school). As a robustness check, I re-estimate this model for $educated_{i,c,t,s}$ being defined as equal to one for those individuals with a level of education higher than primary school and zero otherwise as well as being equal to one for those individuals having a level of education higher than technical high school (one level above middle school) and zero otherwise. I include a set of 10 level of education dummies ($education\ level_{e,i,c,t,s}$).

As an alternative proxy for origin from an intellectual family, I define a binary indicator variable that is equal to one for individuals with an educated father and equal to zero otherwise. I define a more educated father as having received a level of education above primary school. The mean level of father's education for individuals born before 1966 is below primary education and the median level is no education. My definition for more educated father differs from my definition for a more educated respondent since fathers are born one generation prior to respondents and therefore expected to have received less education on average as also apparent from their lower mean and median levels of education.

5.2 Social Class

Since wealthy individuals were particularly targeted by the Cultural Revolution, I investigate whether the Cultural Revolution had a larger impact on individuals of a higher self-reported social class origin which serves as a proxy for wealth by estimating the following equation:

$$Y_{i,c,t,s} = \alpha_c + \alpha_t + year_s + \beta\left(CR\ intensity_c \times born\ pre\ CR_t \times high\ social\ class_{i,c,t,s}\right) + \gamma high\ social\ class_{i,c,t,s} + \boldsymbol{\delta'} \boldsymbol{X}_{i,c,t,s} + \varepsilon_{i,c,t,s} \quad (3)$$

Where $high\ social\ class_{i,c,t,s}$ is a binary indicator variable equal to one for individuals with a high self-reported social class (defined as a reported social class of above 5 on a scale from one to ten[8]) and zero otherwise. As a robustness check, I will re-define $high\ social\ class_{i,c,t,s}$ as being equal to one for values of social class above 4 or above 6, respectively.

5.3 Impressionable years

To study whether the Cultural Revolution had a larger negative effect on individuals in their impressionable years at the time of the Cultural Revolution, I interact the Cultural Revolution intensity measure with a binary indicator that is equal to one for individuals in their impressionable years during the Cultural Revolution and zero otherwise:

$$Y_{i,c,t,s} = \alpha_c + \alpha_t + year_s + \beta(CR\ intensity_c \times imp.years_t) + \boldsymbol{\delta'X}_{i,c,t,s} + \varepsilon_{i,c,t,s} \quad (4)$$

Where $imp.years_t$ is equal to one for respondents aged between 12 and 25 in 1967 (I choose 1967 as reference year since the Cultural Revolution was most violent between 1966 and 1968). For robustness, I re-estimate the model, redefining $imp.years_i$ as being equal to one for respondents aged between 12 and 25 in 1966 or 1968, respectively.

5.4 Instrumental Variable Estimation

To account for reverse causality and omitted variables that vary across counties and age groups as well as for non-random measurement error, I instrument the Cultural Revolution intensity measure with the number of universities in a county in 1966. I chose 1966 as a reference year since universities founded between 1966 and 1971, are likely to suffer from endogeneity. Further, few universities were founded between 1966 and 1971.

This instrument is expected to be relevant since the Cultural Revolution was disproportionally targeted at intellectuals. Thus, the Cultural Revolution can be expected to have been more violent at places with universities since more intellectuals tend to live there. There are also reports of a large amount of violence at universities as well as directed towards university professors (MacFarquhar and Schoenhals 2009). I also expect this instrument to be exogenous since unobservable factors that are correlated with a county's number of

[8] The mean value of social class is 4.18 and the medium 4.

universities and the outcome variables at the same time such as geographic or cultural variables are likely to be time-invariant (at least across the lives of the respondents included in the survey) and therefore captured by the county fixed effects.

I estimate the following first-stage equation:

$$CR\ intensity_c \times born\ pre\ CR_t = \alpha_c + \alpha_t + year_s + \beta(universities_c \times born\ pre\ CR_t) + \boldsymbol{\delta' X}_{i,c,t,s} + \varepsilon_{c,t} \quad (5)$$

Where $universities_c$ is the number of universities per capita in 1966. For equation (2), $CR\ intensity_c$ and $universities_c$ are interacted with $educated_{i,c,t,s}$ in addition.

6. Results

Table 2: OLS estimates equation (1)

	Dependent variables					
	trust (1)	**depressed (2)**	**equality (3)**	**trust (4)**	**depressed (5)**	**equality (6)**
victimization rate x born before CR	-0.220 (0.113)* [0.158]	-0.186 (0.0787)** [0.100]*	-0.139 (0.114) [0.183]	-0.146 (0.114) [0.140]	-0.150 (0.0786)* [0.0919]	-0.0596 (0.115) [0.177]
Year of birth FEs	yes	yes	yes	yes	yes	yes
County FEs	yes	yes	yes	yes	yes	yes
Individual Controls	no	no	no	yes	yes	yes
Number of Clusters	100	100	100	100	100	100
$\hat{\beta}^{UR}/(\hat{\beta}^{R} - \hat{\beta}^{UR})$	N/A	N/A	N/A	1.970	4.081	0.754
Observations	39,582	33,927	39,527	39,509	33,871	39,456
R^2	0.046	0.041	0.064	0.052	0.057	0.069

Notes: Below each coefficient estimate, two standard errors are reported, firstly, in parentheses, OLS standard errors and secondly, in square brackets, standard errors clustered at the county level. Individual controls include gender, frequency of watching TV, employment status, 8 level of education dummies and 6 hukou status dummies. The R^2 is from a model with factor variables instead of fixed effects. $\hat{\beta}^{R}$ is the coefficient estimate on the victimization rate from columns 1 – 3 and $\hat{\beta}^{UR}$ from columns 4 – 6, see Altonji et al. (2005). *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent

Table 2 reports the OLS results for equation (1) for the three different outcome variables without individual controls (columns 1 – 3) and with individual controls (columns 4 – 6). The usual OLS standard errors as well as standard errors clustered at the county level are reported and the clustered standard errors are significantly larger than the OLS standard errors. The victimization rate is found to be associated with a lower levels of trust and of perceived equality and less depression for individuals born before 1966. However, the coefficient on the victimization rate is significant only with depression as outcome variable

but and becomes insignificant once individual controls are added. The results remain very similar when estimating an ordered logit model (see Table 6, Appendix), for the alternative definition of the binary outcome variables, when using the death rate instead of the victimization rate as Cultural Revolution intensity measure and when controlling either for age fixed effects, for the year of birth and the year of birth squared or for age and age squared instead of year of birth fixed effects. Thus, there is no evidence for an impact of the Cultural Revolution on all individuals born before 1966.

6.1 Intellectuals

Table 3: OLS estimates equation (2)

	Dependent variables					
	trust	**depressed**	**equality**	**trust**	**depressed**	**equality**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
victimization rate x born before CR x educated	-0.509	-0.260	-0.524	-0.550	-0.240	-0.567
	(0.157)***	(0.108)**	(0.159)***	(0.157)***	(0.108)**	(0.159)***
	[0.186]***	[0.0519]***	[0.218]**	[0.188]***	[0.0520]***	[0.226]**
Year of birth FEs	yes	yes	yes	yes	yes	yes
County FEs	yes	yes	yes	yes	yes	yes
Individual controls	no	no	no	yes	yes	yes
Number of clusters	100	100	100	100	100	100
$\hat{\beta}^{UR}/(\hat{\beta}^{R} - \hat{\beta}^{UR})$	N/A	N/A	N/A	-13.352	12.044	-13.062
Observations	39,561	33,907	39,505	39,509	33,871	39,456
R^2	0.050	0.048	0.065	0.052	0.057	0.069

Notes: Below each coefficient estimate, two standard errors are reported, firstly, in parentheses, OLS standard errors and secondly, in square brackets, standard errors clustered at the county level. Individual controls include gender, frequency of watching TV, employment status, 8 level of education dummies and 6 hukou status dummies. The R^2 is from a model with factor variables instead of fixed effects. $\hat{\beta}^{R}$ is the coefficient estimate on the victimization rate from columns 1 – 3 and $\hat{\beta}^{UR}$ from columns 4 – 6, see Altonji et al. (2005). *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent

Table 3 reports the results for equation (2) without control variables (columns 1 – 3) and with individual controls (columns 4 – 6). The signs of the coefficient estimates on the Cultural Revolution intensity measure remain unchanged but the coefficient estimates are much larger in absolute value in both specifications, with and without individual level controls and become statistically significant for all three outcome variables. Thus, the Cultural Revolution seems to have reduced the levels of trust, perceived equality and depression more for individuals born before the Cultural Revolution who have a higher level of education. Again, the results remain very similar in an ordered logit model and with different definitions of the binary outcome variables. If the death rate is used as measure of

Cultural Revolution intensity, the results become insignificant. This is not surprising since the death rate is reported to suffer from much more measurement error than the victimization rate and is therefore likely to suffer from a larger attenuation bias that may result in smaller coefficient estimates and less significance. The results remain largely the same when I define the educated dummy variable differently as discussed earlier. When I use more educated fathers as an alternative proxy for intellectual family origin, the results for trust and equality remain very similar in sign and effect size. Only the coefficient in the depression regression becomes insignificant and falls close to zero.

The negative coefficient in the depression equation is evidence for a long-term positive impact of the Cultural Revolution on mental health outweighing any short-term negative effects by increasing individuals' levels of resilience and reducing their reference points for evaluating life experiences.

In terms of magnitude, my estimates imply that a one standard deviation or 4 percent higher victimization rate in a given county implies that an individual resident in this county born before 1966 is about 2 percent less likely to trust a lot or very much in others and to perceive society as equal or very equal. This effect increases to 13.7 percent when comparing the county with the highest victimization rate with counties with zero reported victims. The effect on depression is somewhat smaller. Even though this effect is not very large in magnitude, it is economically significant, in particular, considering that this is a persistent long-term effect, remaining almost 50 years after the Cultural Revolution. Further, this effect may be a lower bound to the actual effect of the Cultural Revolution on social capital since my data is available only on the county level but the Cultural Revolution is likely to have varied considerably within individual counties.

For both, equations (1) and (2), results do not change much when I cluster standard errors at the provincial level, by year of birth or by county and year of birth jointly.[9]

[9] Standard errors clustered by county and year of birth jointly or by year of birth only are similar to the usual OLS standard errors and smaller than the standard errors clustered at the county level and in some cases even smaller than the OLS standard errors. For equation (1), β becomes significant with trust as outcome variable.

6.2 Social Class

The results of equation (3), for respondents with a high self-reported social class, are similar to equation (2) with and without individual controls. However, the coefficient estimates are smaller in magnitude than the ones for more educated individuals and β is insignificant with equality as outcome variable. When estimating an ordered logit model or using the differently defined binary outcome variable, in the trust equation, β becomes insignificant. Further, the results in the trust and equality equations become insignificant for different definitions of the social class dummy. The smaller magnitude of the coefficient estimates of interest and the lower level of robustness to alternative specifications is not surprising since self-reported social class is likely to be an imperfect proxy for actual social class. Further, individuals' social class may have changed since the time of the Cultural Revolution and is therefore an imperfect proxy for groups targeted by the Cultural Revolution.

6.3 Impressionable Years

No significant additional effect of exposure to a more intense Cultural Revolution on trust, perceived equality and depression is found for individuals in their impressionable years between 1966 and 1968 as compared to all other respondents. These results remain broadly the same in an ordered logit model, if individual controls are added, the binary outcome variable is defined differently, with the death rate as an alternative Cultural Revolution intensity measure and for different definitions of the impressionable years dummy variable.

7. Robustness Checks

7.1 Exclusion of individuals born after 1966

I re-estimate equations (1) and (2) for individuals born before 1966 only. The advantage of including individuals born before 1966 only in the estimation is that comparing individuals born before and after the Cultural Revolution is difficult since they may differ due to factors other than the Cultural Revolution experience that vary across both, counties and age groups, and therefore are not controlled for by the year of birth or county fixed effects. However, in this specification, it is not possible to control for county fixed effects. The results for equation (1) are quantitatively and qualitatively very similar to the ones obtained when

including all observations in the estimation, except for the depression equation where β becomes insignificant. For equation (2), β becomes insignificant with trust as outcome variable with and without individual controls and becomes insignificant with equality as outcome variable with individual controls only. However, β turns significant in the trust equation if the binary outcome variables are defined differently.

7.3 Individuals born between 1958 and 1978 only

When I re-estimate equations (1) and (2) for individuals born between 1958 and 1978 only, the results for equation (1) remain largely the same. However, for equation (2), the coefficient on the victimization falls (in absolute value) and becomes insignificant in the trust equation. An explanation might be that the Cultural Revolution caused a reduction in interpersonal trust only for the older generation at that time but not for children which is plausible since the victims of the Cultural Revolution were mainly adults. A disadvantage of this approach is that the sample size falls considerably.

7.4 Instrumental Variable estimation

Table 4: IV estimates equation (1)

	Dependent variables					
	trust	**depressed**	**equality**	**trust**	**depressed**	**equality**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
victimization rate x born before CR	-1.085	-0.626	-1.645	-0.761	-0.510	-1.326
	(0.279)***	(0.188)***	(0.282)***	(0.286)***	(0.191)***	(0.289)***
	[0.586]*	[0.288]**	[0.679]**	[0.506]	[0.267]*	[0.563]**
Year of birth FEs	yes	yes	yes	yes	yes	yes
County FEs	yes	yes	yes	yes	yes	yes
Individual Controls	no	no	no	yes	yes	yes
Number of clusters	100	100	100	100	100	100
Endogeneity test (p-value)	0.044	0.070	0.000	0.134	0.125	0.001
Observations	39,582	33,927	39,527	39,509	33,871	39,456
R^2	0.045	0.041	0.060	0.052	0.056	0.066
	First stage					
universities p.c. x born before CR	4,248	4,253	4,254	4,200	4,210	4,207
	(48.29)***	(50.35)***	(48.34)***	(49.02)***	(51.09)***	(49.07)***
F-stat of excl. Instrument	6.35	7.49	6.36	6.25	7.35	6.27
R^2	0.633	0.640	0.633	0.633	0.640	0.633

Notes: Below each coefficient estimate, two standard errors are reported, firstly, in parentheses, OLS standard errors and secondly, in square brackets, standard errors clustered at the county level. Individual controls include gender, frequency of watching TV, employment status, 8 level of education dummies and 6 hukou status dummies. The Endogeneity test is equivalent to the Hausman test but does not rely on the homoscedasticity assumption and is thus valid with clustered standard errors. The null hypothesis is no endogeneity. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent

The IV coefficient estimates of β for equation (1) are several times larger in absolute value than the OLS estimates and become statistically significant. This could be explained by attenuation bias due to measurement error biasing the OLS results. However, when the individual controls are added, the estimates of β fall in absolute size and β becomes insignificant in the trust equation. For equation (2), the coefficient estimates on the victimization rate remain similar in size to the OLS ones with and without individual controls except for the equation with perceived equality as outcome variable where the coefficient estimate doubles in absolute size. However, the coefficient estimate in the equation with trust as outcome variable turns marginally insignificant. The similar magnitude of the IV and OLS estimates in the trust equation but lower significance with IV estimation can be explained by part of the variation in the endogenous variable being lost and the standard errors thus being larger by construction for IV estimation. β becomes significant in the trust equation for the different definition of the binary variable measuring trust and when I use universities only, excluding professional colleges, as instrument.

Table 5: IV estimates equation (2)

	Dependent Variables					
	trust	**depressed**	**equality**	**trust**	**depressed**	**equality**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
victimization rate x born before CR x educated	-0.469	-0.481	-1.065	-0.520	-0.472	-1.113
	(0.268)*	(0.181)***	(0.270)***	(0.268)*	(0.181)***	(0.271)***
	[0.346]	[0.187]**	[0.389]***	[0.347]	[0.190]**	[0.397]***
Year of birth FEs	yes	yes	yes	yes	yes	yes
County FEs	yes	yes	yes	yes	yes	yes
Individual Controls	no	no	no	yes	yes	yes
Number of Clusters	100	100	100	100	100	100
Endogeneity test (p-value)	0.140	0.093	0.001	0.224	0.104	0.005
Observations	39,561	33,907	39,505	39,509	33,871	39,456
R^2	0.050	0.048	0.065	0.052	0.056	0.069
	First Stage					
universities p.c. x born before CR x educated	5,663	5,645	5,670	5,665	5,640	5,667
	(39.53)***	(41.65)***	(39.57)***	(39.64)***	(41.76)***	(39.68)***
F-stat of excl. Instruments	8.22	13.93	8.24	8.09	8.48	8.11
R^2	0.522	0.532	0.522	0.523	0.532	0.523

Notes: Below each coefficient estimate, two standard errors are reported, firstly, in parentheses, OLS standard errors and secondly, in square brackets, standard errors clustered at the county level. Individual controls include gender, frequency of watching TV, employment status, 8 level of education dummies and 6 hukou status dummies. The Endogeneity test is equivalent to the Hausman test but does not rely on the homoscedasticity assumption and is thus valid with clustered standard errors. The null hypothesis is no endogeneity. *** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent

Using the Stock-Yogo critical values, the Kleibergen-Paap rk Wald F statistic indicates that the instrument is neither very strong nor very weak and stronger for equation (2) than for equation (1). However, it has to be born in mind that the Stock-Yogo critical values have been calculated for homoscedastic standard errors. Hence, weak instruments may be one reason for the large difference in the OLS and IV estimates for equation (1) and the IV estimates for equation (2) are likely to be more valid. Following Rohner et al. (2013), I further use the LIML estimator which is less efficient than 2SLS but median unbiased even with weak instruments to assess whether weak instruments are a problem. The estimates remain almost identical. This is evidence against weak instrument bias. Assuming that the instrument is valid and exogenous, a test for endogeneity (p-values reported in tables 4 and 5) indicates that there is no evidence for endogeneity with trust and depression as outcome variables once individual controls are added in both, equations (1) and (2).

7.5 County of residence

I re-estimate the model with the victimization rate at respondents' places of residence during the Cultural Revolution as Cultural Revolution intensity measure for the 2012 and 2013 CGSS waves. Respondents that report to have moved to their current place of residence after 1967 are assigned the victimization rate at their counties of birth as Cultural Revolution intensity measure and respondents that report to have moved to their current places of residence before 1967 are assigned the victimization rate at their current counties of residence as Cultural Revolution measure. Even though individuals reporting to have moved to their current county of residence after 1967 may have moved several times and not necessarily lived at their place of birth at the time of the Cultural Revolution, due to the severe restrictions to internal migration in China before 1978, they are very likely to have lived at their counties of birth at the time of the Cultural Revolution.

For both, equations (1) and (2), the results remain similar for trust and equality but the coefficient estimate in the depression equation becomes insignificant and close to zero, with and without individual controls. The results remain the same with the differently defined binary outcome variable and when dropping all counties with less than 10 observations.

7.6 More robustness checks

I use the procedure proposed by Altonji et al. (2005) to assess the bias from unobservable omitted variables based on the bias resulting from observable omitted variables (results reported in tables 1 and 2). My results suggest that bias from unobservables may be an issue for equation (1). However, for equation (2), β increases in absolute value when observable controls are added with trust and equality as outcome variables. This suggests that the effect size would be likely to further increase if more unobservable controls were added.[10]

The results for equations (1) and (2) remain largely the same, when I drop all those observations from counties with zero reported victims and when I re-estimate these equations for only those counties with a relatively detailed account on the Cultural Revolution (defined as either more than 5000 words in all county annals documents or more than 3000 words in the county annals section devoted to the Cultural Revolution). When I add the individual controls interacted with the pre-Cultural Revolution dummy to equation (1), for depression, β becomes insignificant. For equation (2), the coefficient estimates fall somewhat in absolute value but remain significant for all three outcome variables.

When I add province fixed effects in addition to county fixed effects to equations (1) and (2), the results do not change. When I define individuals exposed to the Cultural Revolution as those born before 1961, for equation (1), the coefficient in the depression equation becomes insignificant. In equation (2), the coefficient in the equality equation becomes insignificant with and without individual controls. When I re-estimate the model dropping the 5 percent of observations with the highest and lowest victimization rates respectively, with trust as outcome variable, in equation (1), β quadruples in size and becomes significant at the 10% significant level without controls and marginally insignificant when individual controls are added. The coefficient estimates with equality and depression as outcomes are insignificant. For equation (2), the coefficient estimates more than double in absolute value for all three dependent variables and remain significant with and without individual controls.

[10] As suggested by Altonji et al. (2005), I calculate $\hat{\beta}^{UR}/(\hat{\beta}^{R} - \hat{\beta}^{UR})$ ratios where *UR* denotes unrestricted and *R* restricted. My unrestricted model includes all fixed effects and individual controls and my restricted model either (i) includes no controls at all or (ii) includes all fixed effects but no individual controls. Results for (ii) are reported in tables 1 and 2.

As a further robustness check, I re-estimate equation (2) interacting the Cultural Revolution intensity measure with a dummy variable equal to one for all less educated individuals born before 1966 and zero otherwise (where less educated is defined as a level of education of middle school or lower) as a placebo. The coefficient estimates on the Cultural Revolution intensity measure are all insignificant with and without individual controls for all three outcome variables. As a further placebo, I re-estimate equations (1) and (2) for individuals born after 1966 only and do not find any significant estimates of β either, except for a significantly negative estimate of β in equation (2) when depressed is the outcome variable, but this estimate becomes insignificant and falls close to zero once I add individual controls.

I control for spillovers from other counties in the same province by including the average victimization rate in the province as an additional regressor. For equation (1), the provincial victimization rate enters insignificantly. For equation (2), with trust and equality as outcome variables, β remains significant but falls in absolute value and the coefficient estimate on the provincial victimization rate is significant and about four times as large as β. This result could be explained by either substantial spillovers or by the average victimization rate at the provincial level being a better proxy of a county's Cultural Revolution intensity than the county's reported victimization rate due to measurement error from misreporting.

8. Discussion

I find that levels of trust, perceived equality and depression are significantly lower in regions with a more intense Cultural Revolution for more educated individuals born before 1966 and this result is largely robust. This indicates that the Cultural Revolution may have had a long-lasting and persistent effect on trust, perceived equality and depression only on those groups most targeted by the violence. However, the lack of a significant effect of the Cultural Revolution on all respondents born before 1966 could also be due to measurement error as well as insufficient detail in my Cultural Revolution intensity data: The Cultural Revolution may have varied significantly in violence not only across counties but also across cities, towns and villages within counties. In this case, the negative and insignificant effects of the Cultural Revolution on the outcome variables I find in equation (1) would be a lower bound for the true effect. Once I further narrow down my analysis to a group of individuals that are

likely to have suffered disproportionally more from violence during the Cultural Revolution (more educated individuals), the effect on the outcome variables becomes significant.

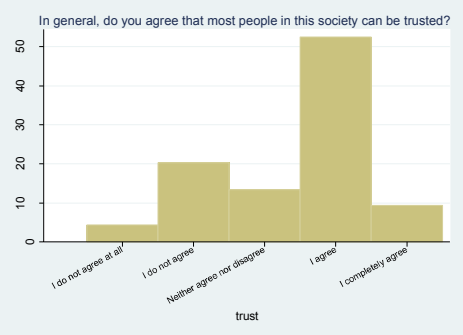
The negative correlation between Cultural Revolution intensity and depression for more educated individuals born before 1966 is evidence for a long-term positive effect of violent and traumatic events on mental well-being: traumatic events such as the Cultural Revolution can increase long-term mental health and well-being by fostering resilience and lowering people's reference points for life experiences. However, this result is less robust than the negative effects on trust and perceived equality for the more educated.

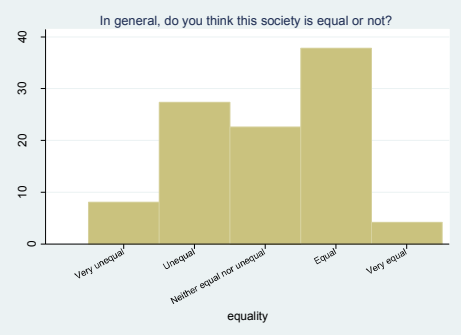
9. Conclusion

In this paper I have shown that the Chinese Cultural Revolution has had a persistent and long-lasting impact on Chinese society. There is robust evidence that the Cultural Revolution has reduced trust and perceived equality for those groups most targeted by the violence up to today. The empirical evidence also suggests that the Cultural Revolution has had a positive long-term impact on mental health for more educated individuals born before 1966, possibly by changing their reference points for evaluating life and by making them more resilient. This adds to the existing evidence that conflict and other episodes of violence and traumatic events can have persistent long-term effects on society thereby affecting countries' economic development. My work differs from existing studies in the sense that the Cultural Revolution was a period of violence and anarchy unique in its scale and the amount of people it affected. Previous studies on the impact of the Cultural Revolution were limited to its effect on the Chinese economy and on individuals that suffered from interrupted education during the Cultural Revolution. My work is the first to study the impact of the Cultural Revolution on all individuals born before 1966 as well as on intellectuals in particular. I have access to more detailed data as well as a novel measure of Cultural Revolution intensity across counties, the victimization rate. Future research should aim at obtaining more detailed geo-coded data on village level Cultural Revolution intensity from China's archives that are mostly still closed to the public in order to better and more precisely identify and quantify the exact impact of the Cultural Revolution on social capital, preferences and health in China as well as on the Chinese economy.

Appendix:

Figure 1: Distributions of the values of the three outcome variables (trust, equality and depression)





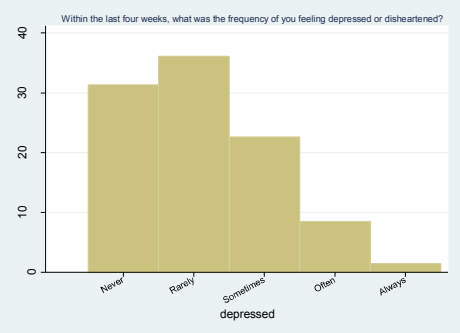


Table 6: Ordered Logit estimates equation (1) and (2)

	Dependent Variables					
	trust	**depressed**	**equality**	**trust**	**depressed**	**equality**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Marginal Effects victimization rate x born before 1966			**Marginal Effects victimization rate x born before 1966 x educated**		
dep. variable = 1	0.0234	0.267	0.0265	0.0932	0.726	0.184
	(0.0285)	(0.135)**	(0.0524)	(0.0383)**	(0.179)***	(0.0712)***
dep. variable = 2	0.0761	0.00572	0.0512	0.303	0.0161	0.355
	(0.0924)	(0.00298)*	-0.101	(0.123)**	(0.00404)***	(0.135)***
dep. variable = 3	0.0257	-0.156	0.00475	0.102	-0.423	0.0329
	-0.0316	(0.0788)**	-0.00944	(0.0434)**	(0.103)***	(0.0132)**
dep. variable = 4	-0.0779	-0.0982	-0.0679	-0.310	-0.267	-0.471
	(0.0949)	(0.0496)**	-0.135	(0.127)**	(0.0665)***	(0.181)***
dep. variable = 5	-0.0473	-0.0192	-0.0145	-0.188	-0.0523	-0.101
	-0.0576	(0.00995)*	-0.0287	(0.0775)**	(0.0140)***	(0.0385)***
Year of birth FEs	yes	yes	yes	yes	yes	yes
County FEs	yes	yes	yes	yes	yes	yes
Individual Controls	yes	yes	yes	yes	yes	yes
Number of Clusters	100	100	100	100	100	100
Observations	39,509	33,871	39,456	39,509	33,871	39,456

Notes: Columns 1 – 3 report the average marginal effects for equation (1) on *victimization rate x born before 1966* and columns 4 – 6 report the average marginal effects for equation (2) on *victimization rate x born before 1966 x educated*. Marginal effects on the probabilities that the dependent variables are equal to each of the five possible values are reported. Standard errors (in parentheses) are clustered at the county level. Individual controls include gender, frequency of watching TV, employment status, 8 level of education dummies and 6 hukou status dummies.

*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent

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