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Estimating the Long-Term Impact of the Great Chinese Famine (1959–61) on Modern China

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Summary. — This research analyzes the long-term impact of the Great Chinese Famine (1959–61) on the modern Chinese economy, and shows that areas in which famine was most severe have significantly lower per capita GDP today. The Great Famine coincided with the Chinese Communist Party's industrialization and agriculture modernization plan, the Great Leap Forward (GLF). To remove omitted variable and endogeneity problems, a unique relationship between the Communist army's takeover of mainland China (1946–50) and the degree to which subnational leadership was willing to enforce GLF policies to the detriment of rural citizens' well-being is exploited via instrumental variable (IV) estimation. Specifically, areas liberated later had a higher density of zealous administrators by the start of the GLF in 1958, and in turn experienced stricter enforcement of GLF policies which resulted in greater famine severity. As a result, this research finds a relatively pronounced impact of politically-triggered famine captured by the IV approach, which strengthens the growing outlook that famine is a consequence of inadequate food entitlement, as opposed to being simply food shortages.

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Key words — modern Chinese history, famines, instrumental variable approach, economic growth

1. INTRODUCTION

During Mao Zedong's rule of China, an estimated 32.5 million people died of starvation and related diseases between the fall of 1958 and the spring of 1961 (Cao, 2005). Known as the Great Chinese Famine, this famine stands out in world history as well as in Chinese history as the most devastating famine on record and, because its geographic distribution, bears little resemblance to earlier famines in China.² The onset of the Great Famine coincides with the Chinese Communist Party's implementation of Great Leap Forward (GLF) development policies in 1958. The GLF intended to bring about rapid industrialization, but its radical agricultural reforms disrupted rural citizens' food entitlement, causing mass starvation (Jones & Poleman, 1962). The impact of the Great Famine on individual outcomes over the long-term has been a recent focus for empirical analyses by health economists. Their research has found increased BMI and hypertension in Chinese citizens who endured the Great Famine as infants as well as reduced labor supply, wealth, literacy, and educational attainment for this cohort (Almond, Edlund, Li, & Zhang, 2010, chap. 9; Chen & Zhou, 2007; Luo, Mu, & Zhang, 2006; Meng & Qian, 2009; Shi, 2011). My research measures the impact of famine severity on per capita GDP in 2010 and finds that the Great Famine stunted economic development. This is the first analysis of the long-term impact of famine on the greater economy.

Identifying the legacy of famine is difficult because famine events are often accompanied by war, as in the Ethiopian (1984–85) and Cambodian (1975–79) famines, genocide, as in the Ukrainian famine (1932–33), and mass migration, as in the Irish famine (1845–49). Distinctively, the Great Chinese Famine occurred during a relatively peaceful period for modern China and did not target a specific group of people. Additionally, since the establishment of the PRC in 1949, a hukou internal passport system has been enforced. The hukou system greatly reduces migration, which may maintain the geographic extent of the Great Famine legacy.³ In 2005, Cao Shuji published the most comprehensive and accurate data on number of deaths that exceeded the normal rate for the Great Famine time period, recovered through meticulous compilation of

county-level censuses and population, mortality, and migration information from city and county gazetteers (Cao, 2005). I use his data for this research.

Using the Great Famine as a case-study, my fundamental research question is, “how does famine affect subsequent economic growth?” Estimation using ordinary least squares (OLS) cannot provide conclusive evidence of a Great Famine legacy, because famine severity and economic growth trajectories are likely jointly determined. In order to remove omitted variable or endogeneity problems, I implement an instrumental variable approach (IV) using the sequential turnover of regions from the Kuomintang to the Chinese Communist Party (CCP) during the Chinese Civil War (1946–51). The liberation sequence was considered during the process of collectivization throughout the 1950s by Mao and other (CITE). Consequently, later liberated areas had a higher density of non-local leaders positioned to implement the GLF, starting in 1958. During the collectivization process, non-local leaders allowed rural citizens' well-being to disintegrate to a relatively lower level than had local leaders.

Estimation of the Great Famine legacy using OLS likely yields a confounded treatment effect. However, if a causal interpretation of the OLS can be assumed, then an increase in famine severity by one standard deviation, translates to a lower income for a region with mean national GDP per capita equal to CNY 4454. IV estimates support the conclusion that famine is detrimental to economic growth. Specifically, the IV

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measures the impact on subsequent economic development from policy-induced famine events. Though this treatment effect is not generalizable to all famine situations, political famines are of great importance, since most famine events are not highly correlated with natural events but with policies restricting victims' control of their food supply. The relatively greater magnitude of the IV estimates as compared to the OLS may be because victims of policy-induced famines are unaccustomed to enduring famine conditions and the policies may restrict coping mechanisms necessary for survival.

Examining the causal legacy of the Great Famine on economic disparities in China joins a growing literature linking historical events with current day economic performance, showing that history matters in understanding the contemporary development landscape (Acemoglu, Johnson, & Robinson, 2001; Banerjee & Iyer, 2005; Dell, 2010; Huillery, 2009; Nunn, 2008, 2009). Additionally, the IV strategy provides support for the critical role that political radicalism played in the severity of Great Famine: accentuating grain procurement and labor mobilization (Kung & Lin, 2003) and limiting exit rights from communes, among other GLF policies for rapid agricultural modernization (Bernstein, 1984; Houser *et al.*, 2009; Kung & Chen, 2011; Lin, 1990; Lin & Yang, 1998, 2000; Meng *et al.*, 2015; Riskin, 1998; Teiwes & Sun, 1999; Yang, 1996, 2010). The IV estimates that measure politically caused famine on subsequent growth and align directly with current thinking on causes of famine, specifically that famine arises in situations where citizens' entitlement to food is interrupted (Liu, 2010a, 2010b; Sen, 1981).

The rest of the paper is structured as follows: Section 2 discusses the competing theories about the long-term impact of a demographic disaster on economic growth. Section 3 presents detailed information about the excess death rate data, economic outcome data, and covariates as well as a discussion on confounding characteristics and interceding events. In section 4, the identification strategy is explained. Finally, the estimation results are presented and discussed in section 5. Conclusions are presented in section 6 concludes.

2. THEORY

A famine event increases mortality and morbidity rates. Empirical studies of episodes of heightened mortality rates find mixed results in terms of long-term economic growth outcomes (Alfani, 2013; Voigtlander & Voth, 2009, 2013). The divergence in long-term growth can be illustrated using two models of production. First, using a simple aggregate production function of the form:

$$Y = F(AL, K) \quad (1)$$

in which Y is aggregate production, AL is the effective labor, K is the capital supply, and α , where $0 < \alpha < 1$, defines the complementary contribution of labor and capital to production. The effective labor supply consists of a measure of human capital, A , and the labor supply, L . Because mortality and morbidity rates vary directly with famine severity, this economic growth model predicts that a loss of labor and human capital will decrease aggregate output.

However, if Eqn. (1) is altered to model output per capita, then Y/L may increase if the labor supply decreases. Using the per capita production model of the form:

$$y = (A, k) \quad (2)$$

in which $y = Y/L$ is output per capita, $AL/L = A$ is still a measure of human capital, and $k = K/L$ is capital per person. A

loss of labor supply would increase k . This effect is known as capital deepening. If A is constant, then capital deepening will increase output per capita, y . However, there is evidence that human capital suffered because of the Great Famine (Almond *et al.*, 2010, chap. 9; Chen & Zhou, 2007; Luo *et al.*, 2006; Meng & Qian, 2009; Shi, 2011), indicating that decreasing human capital and increasing capital per person will have competing influences on output per capita.

3. DATA

In 2005, Cao Shuji published a reassessment of the demographic consequences of the Great Famine by combining the national county census data with his own collection of yearly population, mortality, and migration information from city and county gazetteers.⁵ I use his data on the average excess death rate (EDR) during 1959–61 as a proxy for regional famine severity. (Cao, 2005) defines the EDR as the ratio of average unexpected deaths (1959–61) relative to the population in 1958, just before the famine:

$$EDR_i = \frac{\sum_{j=1959}^{1961} \frac{Unexpected\ Deaths_{ij}}{3}}{Population\ 1958_i} \quad (3)$$

for each i , a 1,820 administrative unit known as a fu. The fu is the smallest administrative unit that the 1953, 1964, and 1982 national censuses have in common. The fu is based on the zhou regions from early history, a fairly stable administrative unit for a millennium. Fu were only recently abandoned by the CCP (circa 1950). The 1,820 boundaries of fu are published by Harvard's CHGIS department (CHGIS, 2010; Twitchett & Fairbanks, 1979). A map of EDR (1959–61) for fu is presented in Figure 1 and EDR at the province level is presented in Table 1.⁶

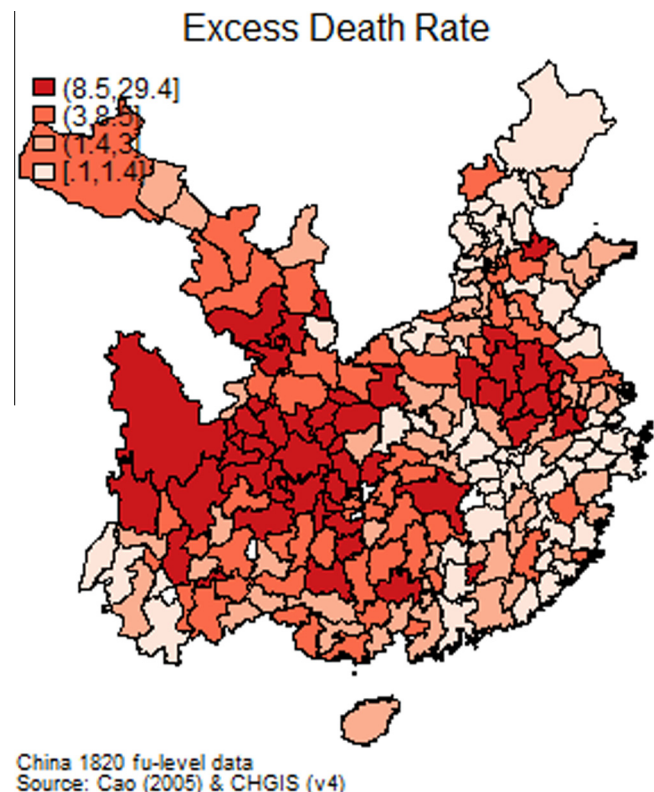


Figure 1. Geographic distribution of the EDR during the Great Famine.

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