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The Causes of China's Great Leap Famine, 1959–1961*

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I. Introduction

Aroused by the unexpected magnitude of excess deaths estimated by Western demographers,¹ recently there has been a revival of interest in the causes of the Great Chinese famine of 1958–61.² Depending on the underlying assumptions and methodologies employed, the excess deaths of this famine are estimated to range from a minimum of 16.5 million to as many as 30 million.³ With a population of roughly 660 million in 1958, the year marking the origin of this famine, 30 million amounted to a loss of close to 5% of the country's population.⁴ Moreover, the loss of lives of this magnitude occurred within an incredibly short period of time; within 2 years the country's death rate was doubled from slightly below 12 per thousand in 1958 to 25 per thousand in 1960, making it "the worst famine in human history."⁵

Pinning down the exact cause(s) of this famine is clearly a Herculean endeavor. In part data availability presents a problem, but what makes the analysis daunting is that this famine occurred at a time of "profound social upheaval and disorganization," to borrow the words of Carl Riskin, which makes it difficult to isolate the effect of a number of relevant factors.⁶ This may explain why current studies have focused on only one single factor as explanation, such as excessive grain procurement, wasteful communal dining, and politics, or at the most two—food availability decline (FAD) and urban bias.⁷

There is hardly any doubt that all these factors must have played a role in causing the excess deaths during the Leap; the relevant question is one of assessing their joint significance within a comprehensive analytical framework using appropriate proxies, which is the primary goal of this study. For example, given that grain output had fallen for three consecutive years beginning from 1958, FAD was arguably a possible culprit.⁸ By the same token, the fact that

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death rates were much higher in rural areas similarly suggests the possibility of an urban bias.⁹ Take 1960, the year when death rates peaked, as an example. While the rural casualties were in excess of 28 per thousand in that year, the urban mortality rate was only 13.7 per thousand, a magnitude less than half of the former.¹⁰ In particular, the compulsory procurement system, a centralized institution designed to facilitate the transfer of agricultural surplus from farm to city population for consumption, is regarded as the mechanism through which this bias was realized, in view of the fact that procurement had increased sharply during the Leap.¹¹

A third view connects the famine's severity to the manner in which food was distributed and consumed. Specifically, its proponents see the free and unrestricted provision of food under the communal dining system as the principal mechanism responsible for rapid food depletion.¹² Finally, the higher mortality of the Leap may also be attributable to politics. In the course of advancing their political careers, many provincial officials allegedly mobilized rural laborers to engage excessively in a variety of energy-consuming activities, thereby raising the level of caloric intake at a time when food supply became less available. Consequently, this led to malnutrition and related diseases (such as edema) and culminated in excess deaths in a context of protracted medical treatment and persistent food shortages.¹³

Based on a panel data set that covers 21 Chinese provinces for 1958–61, the study's main goal is to assess the joint significance of the foregoing factors in accounting for the provincial variations in mortality rate, our dependent variable.¹⁴ Our choice of dependent variable is predicated on the observation that the famine's catastrophe was not evenly distributed across China but heavily concentrated in a number of provinces of diverse geographical variations.¹⁵ Our analysis reveals that the decline in food availability, excessive grain procurement caused by an urban-biased policy, and politics and its consequences, respectively, were important factors behind the observed provincial variations in the death rate. By contrast, we are unable to substantiate the thesis that communal dining negatively affected the death rate. This is probably because food was rationed to the peasantry instead of provided to them on a free and unrestricted basis.

In constructing the set of explanatory variables to proxy for the effect of the proposed hypotheses, conscious effort is made to improve the measurement of several variables. For instance, we use previously unavailable information to construct a variable on net procurement to directly measure the degree of urban bias across provinces. Similarly, to better gauge the effect of politics on death rate, we construct a variable to distinguish provinces on the basis of their affiliation with the Communist Party (or the lack of it) before 1949, based on the assumption that revolutionary history may have a significant bearing upon the implementation of the Leap's policy. How these policies were implemented, in turn, will presumably affect the mortality rate. This endeavor to improve the measurements of several hypotheses may be regarded

as part of our overall contributions toward understanding the joint significance of the pertinent causes of the Great Leap famine.

The remainder of this article is organized as follows. The next section provides an account of China's Great Leap Forward, the context within which the famine occurred. Specifically, we focus on the main elements of this institutional change to provide the necessary background for motivating the empirical analysis. The exact hypotheses are then spelled out in Section III, which ends with a detailed discussion of the proxies used in the empirical tests. In Section IV we specify our method for estimating these hypotheses and introduce the data sources. The estimation results are then presented and discussed in Section V. Section VI provides a brief conclusion.

II. The Great Leap Forward: Elements of an "Imposed" Institutional Change

Starting from the summer of 1958, China was to experience in the next few years one of the most radical revolutionary changes in the history of mankind—the Great Leap Forward. In a nutshell, the Leap was an unorthodox development strategy conceived to hasten the pace of transforming the Chinese economy from its predominantly agrarian nature into a powerful industrial state. To achieve this, a specific objective of the Leap was to increase both agricultural and industrial output by manifolds, the former by expanding the acreage covered by irrigation and the latter via increasing the capacity of steel and iron production. As China was severely constrained with capital and backward in technology, achieving rapid growth via technical change was an unlikely option. An obvious alternative, given China's abundant surplus rural workers, was to make greater use of these resources by mobilizing them to engage in a variety of industrial and public projects through the restructuring of work and other aspects of social organization and to speed up the rate of transfer of agricultural surplus from the countryside to the town. We discuss these core elemental changes in the remainder of this section.

Resource Mobilization and the Diversion of Resources away from Agriculture

In agriculture, Mao saw the expansion of irrigated acreage as key to raising crop yields, and the most effective way of achieving this was to utilize the country's vast amount of idle rural labor force to undertake water conservancy works during the agricultural slack seasons. Consisting of fewer than 200 farm families, the agricultural cooperatives were considered by Mao to be too small for effectively organizing large-scale irrigation projects, as many of these projects involved the cooperative efforts of several townships. Established by merging together a few collectives and consisting of several thousands of households, the commune was by this yardstick considered an organization whose scale was optimal for this kind of public project.

While mobilizing the farmers to work in rural public projects was not a

novel feature of China's socialist agriculture,¹⁶ the scale of mobilization during the Leap was unprecedented, as some tens of millions, or 30%–50% of the rural labor force, were now involved. Moreover, significant proportions of them were being diverted to activities totally unrelated to agriculture, most notably the smelting of iron and mining and transporting ore in the so-called backyard furnaces.¹⁷ As was the case with water conservancy works, these projects similarly required that the highly fragmented and localized interests be unified. Moreover, as these were primarily industrial projects and their effective execution required managerial skills and expertise that were rarely available in the smaller collectives, the larger commune arguably provided the organizational context within which a faster pace of rural-based industrialization could be made possible.¹⁸

However, the economic costs of this diversion were colossal. First, the 3 million tons of steel produced in these backyard furnaces was of such poor quality that at least half of it was considered wasted.¹⁹ Second, unintentionally many commune authorities were so preoccupied with iron and steel manufacturing in the autumn of 1958 that they neglected to harvest the crops, which were simply left to rot in the fields. This diversion of resources is estimated to account for 28.6% of the overall grain output collapse, a factor that was secondary only in importance to excessive procurement, according to one estimate.²⁰

Just as rural human resources were being diverted away from agriculture and much of their input was essentially wasted, a substantial amount of sown acreage was similarly being reallocated to the cultivation of nongrain crops. As a number of researchers have pointed out, the Leap had created an incentive structure of encouraging cadres to overreport grain output, which led to the illusion that China had already produced a huge grain surplus.²¹ It was this erroneous assumption that formed the basis of Mao's decision to reduce the acreage sown to grain by a substantial 9.6% in 1959, a diversion that according to Walker was an important factor behind the precipitous grain output decline in that year.²²

The Communalization of Work Organization and Consumption

As pointed out earlier, mobilization of the rural labor force during the Leap required concomitant changes both in the size and mechanisms of the organization through which the farm workers were mobilized. Although this transition may be regarded as a smooth one, and although both the cooperative and the commune entailed a structure of team-based production, the underlying incentive structure had nonetheless become considerably weakened upon communalization. In the collectives, a worker's income was based entirely on work points, which had to be earned by supplying one's effort (allowing for shirking within limits). Although the work-point system was retained under the commune, work incentives were nonetheless severely weakened as the reward system became predicated less on work effort. To begin with, and assuming essentially a form of egalitarian rationing of grain and other staples,

a substantial part of a worker's income—recommended to be half in some instances—would now be distributed simply “according to need” on the basis of household size.²³ In bad years, such as 1959 and 1960, this in-kind payment easily exhausted “all the remuneration due and little or no cash may be payable at all.”²⁴ Second, the widespread replacement of time wages for piece rates (the so-called work norm management system), with a very narrow spread between each labor grade, had a negative effect on work incentives similar to the negative effect of the egalitarian rationing of food and other daily necessities.²⁵

The changes imposed by the Leap were confined not only to work organization but also to food distribution and consumption. Before the communes were established, the harvested grain was distributed to the individual peasant households for private consumption based upon their work-point earnings. Inspired by the practical implication that public dining arrangements could have on women's participation in farm work, Mao encouraged the communes to set up communal dining facilities and centralized food preparation and consumption.²⁶ It has in fact been contended that the negative effect of communal dining stems not only from the fact that food was provided to the participants free of charge but that consumption was not restricted in quantity. This allegedly led to an overconsumption of grain and culminated eventually in severe food shortages.²⁷

Urban Bias and Excessive Grain Procurement

A system of “unified purchase and sale” (*Tonggou tongxiao*) of grain and other major farm products was set up in late 1953 to facilitate the transfer of agricultural surplus between the agricultural and industrial sectors. As procurement was essentially compulsory by nature, with farm-gate prices unilaterally set by the government at below-scarcity levels, the system had an inherent urban bias.²⁸ This systemic bias became deepened during the Leap. As a percentage of total grain output, gross procurement in 1959 increased by more than 30% over the previous year and reached a record level of 64 million tons, or 38% of total output, against an average procurement rate of 25% in the pre-Leap years. As mentioned earlier, a widely held view attributes this excessiveness to Mao's erroneous belief that China had produced a grain output that was twice the size of the previous year,²⁹ a belief fueled by the exaggerations and falsification of grain output.³⁰

But procurement ratio remained high, at 32.4%, in 1960, after Mao became aware of the multitude of problems associated with the commune in general and the public dining institution in particular.³¹ What then might explain the Chinese government's unsympathetic attitude toward its rural subjects? Increases in the rate of urban growth and, more importantly, the systemically embedded urban bias in China's development strategy, wherein urban residents were guaranteed the protected rights or entitlement to a fixed amount of grain consumption by the government, were the key explanatory factors.

First, after growing at a steady pace of around 5% per annum during 1949–57, the urban population increased sharply by 13% in just 1 year during 1957–58, with another 16%, or 18 million, added to it by year-end 1960. Given the urban bias just alluded to, this growth rate had to entail correspondingly higher rates of grain procurement, unless grain output also increased at rates that would allow the procurement ratio to remain constant.³² Not only had grain output failed to increase during this period of rapid urban growth, it actually fell throughout the three consecutive years of the Leap. After peaking at 200 million tons in 1958, grain output fell precipitously in 1959 by a magnitude of 15%, to be followed by a further reduction of 16% in 1960. Cumulatively, output fell by a substantial 28% against the level of 1958, to 143.5 million tons. It was only in 1966 that for the first time grain output surpassed the level reached in 1958.

As yet another indication of a deepening of the urban bias during the Leap, provincial grain exports grew at the same time as grain output fell. To be sure, urban bias already existed before the Leap, in view of the fact that the three municipalities Beijing, Tianjian, and Shanghai collectively took in close to half, or 45.4%, of the provincial grain imports.³³ With Liaoning, a highly industrialized province, importing another 21.6%,³⁴ these four importers collectively absorbed two-thirds of the overall grain transfers exported from the “surplus” provinces.³⁵

While this systemic bias already existed before the Leap, it did not necessarily lead to famine conditions because food supply was still adequate. But as grain output fell and provincial exports continued to rise, the rural population became increasingly vulnerable to food shortages and the development of famine conditions. Indeed, that the urban residents were better protected during the crisis is borne out by the evidence that the percentage of grain that the three municipalities had imported during this period (1958–62) had soared further to 60% of total provincial grain imports. And with Liaoning taking in another 26.7%, these four major urban centers accounted for close to 90% of the provincial exports during this crisis period. B. Sands and S. Buelow’s remark on the good fortune of the residents of these major Chinese municipalities succinctly sums up the essence of this urban bias: “[That] Beijing, Tianjin, and Shanghai . . . [exhibited] . . . an almost complete lack of an increased death response, gives weight to the view that in the late 1950s and early 1960s China’s large cities constituted separate and protected economic zones.”³⁶ It follows that this bias in favor of urban residents was eventually translated into differences in grain availability between urban and rural residents. In 1959, for example, whereas an urban resident was still able to consume 303 kilograms of grain, a villager was left with only 223 kilograms, 19% below the recommended norms of 275 kilograms required for subsistence, or 26.4% below what her urban counterpart consumed.³⁷ This difference was likely a key factor in accounting for differences in the mortality rates between urban and rural populations.

III. Hypotheses and Proxies

After outlining the salient elements of the Leap, we now turn to account empirically for the effects of resources misallocation, communal dining, and grain procurement, respectively, on differences in provincial death rates in this period. We will first set up a number of specific hypotheses based on discussions in the previous section, followed by a discussion of the choice of proxies for these hypotheses.

Hypotheses

Against the background that grain output had declined for three consecutive years during 1958–61, our first hypothesis concerns the effect of this decline on death rate variations. As a conventional explanation of famine, the food availability decline (FAD) hypothesis postulates that death rates would be higher in response to a grain output decline and specifically a reduction in caloric intake below the minimum threshold required for subsistence (hypothesis 1).³⁸ The expected sign of this variable on death rates during 1959–61 is therefore negative.

Our second hypothesis concerns the effect of urban bias on death rate. According to this thesis, the government's guarantee of subsistence consumption for the urban population even in times of food shortages would leave the rural population inadequate grain for consumption. The result was therefore higher death rates among the rural population. This is the entitlement thesis inspired by A. Sen.³⁹ According to this thesis, the death rate would be higher the greater the degree of urban bias or, more specifically, the higher the procurement rate (hypothesis 2).⁴⁰

The third hypothesis relates to whether communal dining and its attendant incentive structure of wasteful food preparations and consumption had negatively affected the death rate. Unlike the family, whose members would typically be conscientious with food consumption, mess hall participants did not have the same strong incentives to conserve food insofar as they operated under the assumption that doing so would only benefit others. This allegedly led to enormous waste and resulted in higher death rates. While provinces were indeed encouraged to set up mess halls, communal kitchens were nonetheless not strictly compulsory in the beginning. Discretions regarding the setting up of, and participation in, these mess halls before late 1959 thus lay primarily with the provincial and probably lower-level officials, whose differences in political dispositions may be a primary factor in determining variations in the participation rates across provinces. Thus, we hypothesize that provinces with higher participation rates in communal dining were likely to suffer from higher death rates (hypothesis 3).⁴¹

Our fourth and final hypothesis concerns the differential impact of the Leap's policies caused by variations in their implementation by government officials across provinces. Specifically, it is hypothesized that, in the predominantly southern region where provinces were weakly affiliated with the Com-

munist Party before 1949, leaders were prone to implementing radical policies more so than their counterparts in the north—provinces ruled by the Communist Party before 1949. The reason is that the former group of provinces—commonly referred to as the “old liberated areas” (OLAs)—enjoyed tremendous legitimacy and support from the local people than those formerly governed by its political opponent—the Nationalists’ government, referred to as the “newly liberated areas” (NLAs). For this reason, Chairman Mao anticipated that the NLAs were unlikely to implement the Leap’s policies with the same enthusiasm and rigor as the OLAs. To ensure policy compliance, Mao thus sent a crop of “southbound cadres” (literally translated from the term *nanxia ganbu*), or senior officials with a tough political stance, to govern the NLAs. Whether these officials, in anticipation of Mao’s preferences, acted more radically than was necessary or were forced to take draconian measures in response to opposed local interests, the resulting policies adopted in these provinces were invariably more radical, thereby resulting in higher death rates.

While “political radicalism” consists conceivably of a multitude of dimensions ranging from excessive grain procurement and export to the excessive mobilization of labor by some provinces to engage in a variety of energy-consuming activities, our focus here is solely upon the latter.⁴² In times of food shortages, the excessive mobilization of labor would likely lead to caloric deficiencies and malnutrition and induce such diseases as edema, which, if left untreated, would eventually lead to death. Equally possible was the likelihood that deteriorating health conditions might predispose one to contract epidemic diseases like malaria more easily, diseases that would most certainly reduce survivability in a situation of protracted treatment and/or continuing food shortages. However, in view of the lack of data on sickness and disease-related deaths, we simply connect death rate directly with the excessive mobilization of labor resources. Thus, in provinces where such energy-draining activities were pursued most feverishly, the corresponding death rate would be higher (hypothesis 4).

Proxies

To measure the effect of output variations on death rate, per capita grain output (GRAIN) is employed to proxy for grain availability or FAD. This allows us to measure the gross effect of changes in grain output before accounting for the procurement effect (table 1, col. 1). There are two alternative measures of urban bias. The first one, the rural-to-urban population ratio, RATRUP, is an indirect proxy premised on the reasoning that the rural population did not have legally protected rights to food and was thus more likely to suffer from higher death rates in times of food shortages (see table 1, col. 2). The limitations of such a proxy are obvious, however. First, it is not a direct measure of food entitlement. Second, it captures other dimensions of the urban bias, most notably health care, housing, and education, and is therefore a noisy measurement of the concept. As a more direct measurement

TABLE 1
MEAN AND STANDARD DEVIATION OF PER CAPITA GRAIN OUTPUT, PERCENTAGE OF RURAL POPULATION, AND GROSS PROCUREMENT RATIO

YEAR	PER CAPITA GRAIN OUTPUT (in kg)		PERCENTAGE OF RURAL POPULATION (%)		GROSS PROCUREMENT RATIO (%)	
	Mean	SD	Mean	SD	Mean	SD
1954	291.05	95.16	79.16	21.76	30.02	9.29
1955	303.89	89.75	79.04	21.66	25.87	8.67
1956	306.81	94.07	78.69	20.96	20.87	7.52
1957	277.40	64.32	77.64	21.31	23.57	9.27
1958	293.20	94.26	76.62	17.92	25.92	11.48
1959	251.05	89.72	74.78	15.89	37.71	11.88
1960	208.74	61.83	74.04	16.08	32.43	12.64
1961	203.47	57.61	76.34	16.26	24.78	10.69
1962	219.76	59.10	78.76	15.99	20.26	8.27
1963	239.46	68.20	78.82	15.86	21.76	6.85
1964	258.77	65.30	79.11	15.68	21.41	7.71
1965	280.30	59.92	78.88	15.58	20.16	5.27
1966	281.92	73.99	78.81	15.55	19.35	5.68

SOURCE.—State Statistical Bureau, *A Compilation of Historical Statistical Data of Provinces, Autonomous Regions, and Municipalities, 1949–1989* (Quanguo Gesheng Zizhiqu Zhixiashi Lishi Tongji Ziliao Huibian, 1949–1989) (Beijing: Zhongguo Tongji Chubanshe [China Statistical Press], 1990).

NOTE.—The figures are unweighted, arithmetic means of provincial percentage of rural population and per capita grain output. As a result, they differ from the national average.

of the bias due specifically to procurement, we use figures on grain procurement instead (see table 1, col. 3).

In order to measure the effect of procurement more precisely, a distinction is made between net procurement from gross procurement; the latter includes remittances or “rural resale” (*fanxiao liang*) by the government to rural areas to support farmers who specialized in the production of economic crops, fishery, and forestry and those who suffered from temporary natural disasters. Clearly, net procurement is a more accurate reflection of urban bias in a given province than either gross procurement or rural population ratio.⁴³ However, given that procurement was calculated on the basis of output and that grain output is part of the model specification, the simultaneous use of the variable net procurement may easily result in a problem of multicollinearity. To avoid this, we use the ratio of net procurement to output, NETPROCU, as a direct measure of urban bias instead.⁴⁴

With respect to the effect of communal dining on death rates, we follow those who have earlier done the same by using mess hall participation rates (hereafter MHPR), or the percentage of a province’s population engaged in communal dining arrangements (table 2, col. 1).⁴⁵ As hypothesized earlier, higher participation rates were likely to result in higher death rates. While MHPR is intended to capture the possible effect of a specific mechanism

TABLE 2
MESS HALL PARTICIPATION RATE, PARTY MEMBERSHIP DENSITY,
AND TIME OF LIBERATION

Province	Mess Hall Participation Rate at End of 1959 (%) (1)	Party Membership Density (%) (2)	Time of Liberation (3)
Anhui	90.5	.83	01/1949
Fujian	67.2	1.06	08/1949
Gansu	47.7	1.54	08/1949
Guangdong	77.6	.93	11/1949
Guangxi	91.0	.85	11/1949
Guizhou	92.6	.86	11/1949
Hebei	74.4	3.14	11/1947
Heilongjiang	26.5	1.38	10/1948
Henan	97.8	1.08	06/1948
Hubei	68.2	.77	05/1949
Hunan	97.6	.80	08/1949
Inner Mongolia	16.7	1.78	09/1949
Jiangsu	56.0	1.37	04/1949
Jiangxi	61.0	1.39	05/1949
Jilin	29.4	1.62	10/1948
Liaoning	23.0	1.75	11/1948
Ningxia	52.9	N.A.	09/1949
Qinghai	29.9	1.04	09/1949
Shaanxi	60.8	1.15	05/1949
Shandong	35.5	2.14	09/1948
Shanxi	70.6	2.92	10/1948
Sichuan	96.7	.71	11/1949
Yunnan	96.5	.98	12/1949
Zhejiang	81.6	.78	05/1949

SOURCES.—A *Compendium of Important Articles on Agricultural Collectivization, 1949–1957* (Nongye Jitihua Zhongyou Wenjian Huibian, 1949–1957) (Beijing: Zhonggong Zhongyang Dangxiao Chubanshe [The Chinese Communist Party School Press], 1990); Li Xin and Chen Tiejian, *The Final Showdown: A History of the New China Democratic Revolution, 1947–1949* (Zuihou de Juezhuan: Zhongguo Xin Minzhu Zhuyi Geming Shi Chanbian, 1947–1949) (Shanghai: Shanghai Chubanshe, 1997); Dali Yang, *Calamity and Reform in China: State, Rural Society, and Institutional Change since the Great Leap Famine* (Stanford, Calif.: Stanford University Press, 1996); Zhang Xionggu, *A Compendium of Important Events in Twentieth-Century China* (Ershi Shiji Zhongguo Dashi Quanshu) (Beijing: Beijing Chubanshe, 1993).

through which provincial mortality rates may be differentially affected, a caveat of this proxy is that participation rates are available for the year 1959 only and therefore their effect on death rates does not vary from one year to another. Because of this limitation, its effect should be interpreted with some caution.

Our fourth and final hypothesis requires a proxy for measuring the effect of radical policies on mortality. Ideally, year-over-year changes in provincial iron and steel output and/or irrigated acreage would be good measures of the extent to which a province mobilized its rural labor force in pursuing the

Leap's goals and, as a corollary, negatively affected the mortality rate. Unfortunately, many provinces do not report such data. As a compromise, we rely on the proposed connection between the catastrophe's severity and differences in radical behavior among provincial governments for empirically testing the alleged fatal effect of politics.⁴⁶ According to this thesis, variations in political radicalism in the Chinese context could be largely explained by (1) the depth of Party base in a province and (2) the length of a province's revolutionary history. On these bases, Yang proposes to use the concept of Party membership density (hereafter PMD)—a measure of how many Party members there were per every 100 persons—to proxy for the possible effect of these political-cum-historical legacies. The intuitive idea behind this reasoning is that provinces with a shallower Party base and a shorter revolutionary history had a higher proportion of cadres being non-Party members. As these cadres were eager to advance their own political careers by joining the Party, they had powerful incentives to “signal” to Chairman Mao their loyalty through the adoption of radical policies.⁴⁷

While inspiring, this proxy has the following limitations. First, the range of variations among the provinces is exceedingly narrow: the lowest being 0.77 and the highest only 3.14 (table 2, col. 2); this raises the question of whether or not this could conceivably explain the enormous differences in political behavior and mortality outcome across provinces. Second, equally problematic is the idea that non-Party member cadres were in the center of the political limelight, a presupposition that overlooks the critically important issue of what rank(s) in the China's political hierarchy was primarily responsible for policy formulation and implementation during the Leap. Available evidence on Henan Province, for example, clearly suggests that it was the provincial leader, typically the First Party Secretary, that played a pivotal role in shaping local policies.⁴⁸ Last, but not least, is that the PMD thesis ignores the dissimilar interests between officials of different hierarchies. Being peasants themselves, it is unlikely that grassroots cadres would put the state's interests before their own and pursue courses of action that would hurt their own welfare.⁴⁹ In view of these qualifications, an alternative proxy is considered.

While we have had reservations about the PMD thesis, we nonetheless agree that the relationship between the central and provincial governments before 1949 may have a subtle but profound impact on the severity of famine in a province. We too, therefore, resort to revolutionary history as our point of departure but see a province's affiliation with the Communist Party before 1949 as having greater analytical relevance. As rehearsed earlier, one way of conceptualizing this is to broadly divide those provinces governed by the Communist Party prior to 1949 into the old liberated areas and the rest into the newly liberated areas categories, respectively. To put this idea to work, an index known as the time of liberation (TOL), based on the actual month and year that a province was declared “liberated” by the CCP, is constructed (table 2, col. 3). For instance, as the first liberated province (in November

1947), Hebei is assigned a value of 1 in the index, whereas Yunnan, the last province to be liberated (in December 1949), receives an assigned value of 25, reflecting the fact that it was liberated 25 months after Hebei. Following the logic rehearsed above, our specific hypothesis is that political radicalism varies positively with TOL; that is, the later a province was liberated the greater the chances that radical policies would be pursued in that province, to be followed by a higher death rate. In the estimations to follow, we will use both PMD and TOL to ascertain which of the two would indeed be a better proxy of the Leap's radical policies.

IV. Estimation and Data

Our estimations consist of seven equations, all of which include the three economic variables employed to assess the relative importance of grain availability and urban bias. In the first three estimations, only one of the three political variables is included (eq. [1] and estimations 2–3, table 3), after which they are put in pairs (estimations 4–6), before all three are entered in the final estimation 7. The full model of our estimation is as follows:

$$\ln \Delta_{it} = \alpha + \beta \ln Q_{it} + \gamma E_{it} + \lambda P_{it} + \mu Y_t + \varepsilon_{it}, \quad (1)$$

where i indexes a province, t indexes a year, and Δ_{it} stands for the death rate, respectively. The expression Q_{it} refers to per capita grain output (GRAIN), a proxy for food availability before procurement, whereas E_{it} is a vector representing the two entitlement or urban bias proxies, RATRUPRO and NET-PROCU, respectively. As both death rates (DEAD) and GRAIN are size variables, taking natural logarithms of them converts their relationship into a linear one. We lag the procurement variable by 1 year because procurement is typically carried out after the autumn harvest, so that the amount procured in a given year does not affect grain availability of the rural population until the subsequent year. The vector P_{it} stands for the three political variables, namely, MHPR, PMD, and TOL, all of which are time-invariant, and Y_t stands for the year dummies. Inclusion of the latter in the estimation assumes that certain characteristics unique to individual years can be captured by differences in the constant terms, thereby causing shifts in the provincial death rates. Finally, ε_{it} is the error term, and β , γ , λ , and μ are the variables' coefficients.

The provincial data on grain output, gross procurement, population, and death rates are obtained from sources published by the State Statistical Bureau of China.⁵⁰ Figures on net procurement ratios during 1958–61 are based on an unpublished compendium compiled by the Ministry of Agriculture and cited in Kenneth Walker's latest work.⁵¹ Data on mess hall participation rates are taken from a publication of the Communist Party School Press,⁵² whereas those pertaining to the time of liberation are compiled from various sources outlined in table 2.⁵³ Finally, data on party membership density are adapted from Yang.⁵⁴ After dropping those provinces for which data required for the estimations are lacking, we are left with 21 provinces,⁵⁵ and, with each prov-

TABLE 3

ONE-WAY FIXED-EFFECT ESTIMATION OF PROVINCIAL DEATH RATE, 1958–61

Independent Variables	Dependent Variable = Death Rate (log)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	4.313 (3.40)	3.675 (2.80)	4.388 (3.19)	4.462 (3.52)	4.341 (3.16)	4.361 (3.29)	4.308 (3.27)
LnGrain	-.715** (-3.51)	-.384* (-1.99)	-.540** (-2.68)	-.676** (-3.29)	-.495** (-2.42)	-.715** (-3.49)	-.670** (-3.24)
RATRUPO (% rural population)	1.594** (3.18)	.483 (.69)	1.299** (2.45)	1.015 (1.49)	.759 (1.06)	1.576** (3.03)	.976 (1.41)
Net procurement ratio (lag)	1.810** (3.30)	.833 (1.63)	1.000* (1.96)	1.685** (3.04)	.945* (1.85)	1.788** (3.11)	1.746** (3.05)
Time of liberation	.026*** (3.71)	...	...	.023** (3.13)	...	.025** (2.63)	.026** (2.71)
Mess hall participation rate	...	.005** (2.25)	...	.003 (1.25)	.003 (1.12)	...	.003 (1.32)
Party membership density	...	...	-.150** (-2.49)	...	-.108 (-1.53)	-.011 (-.13)	.040 (.46)
Y1959	.093 (.83)	.145 (1.26)	.137 (1.20)	.087 (.79)	.132 (1.15)	.093 (.83)	.086 (.77)
Y1960	.159 (1.02)	.370** (2.47)	.319** (2.11)	.171 (1.10)	.326** (2.15)	.162 (1.02)	.164 (1.05)
Y1961	-.254* (-1.76)	-.057 (-.41)	-.125 (-.88)	-.233 (-1.61)	-.107 (-.74)	-.252* (-1.73)	-.235 (-1.62)
Adjusted R^2	.434	.373	.382	.438	.384	.426	.432
Sample size	84	84	84	84	84	84	84

NOTE.—Figures in parenthesis are t values.* $p < .1$.** $p < .05$.*** $p < .01$.

ince having four time points, 1958–61, there are altogether 84 observations available for the analysis.

V. Estimation Results

Table 3 reports the estimation results. According to estimations 1–3 of equation (1), the proxy for preprocurement food availability, GRAIN, is consistently significant at the 5% level of significance.⁵⁶ Depending on the specification, both the indirect measure of urban bias, RATRUPO, and the direct measure, NETPROCU, are significant at the 5% level of significance in the estimations in which either TOL or PMD is included.⁵⁷ Conversely, where the mess hall variable, MHPR, is included, both measures of urban bias are not significant (estimation 2).⁵⁸

On its own the three political variables are all significant at varying levels of statistical significance, with TOL being the most significant of the three. This finding suggests that the Leap's policy, or at least certain aspects of it, was pursued in varying degrees of political fervor between the broadly categorized OLA and NLA provinces, with higher mortality rates among the latter.⁵⁹

The signs of these variables are all consistent with the directions hypothesized. For instance, the negative coefficient of GRAIN means that the death rate would be lower the greater the preprocurement grain availability, whereas the positive sign of the two urban bias variables implies that the death rate would be higher the greater the degree of policy biases against the countryside. Consistently, the positive coefficient of TOL implies significantly lower death rates in the OLAs, whereas the negative coefficient of PMD supports the notion that provinces with more Party members per capita had a lower death rate. Finally, the positive coefficient of MHPR implies a lower death rate in provinces where communal dining was enforced less rigorously. With respect to the YEAR coefficients, the positive sign of 1959 and 1960 suggests that death rates were increasing in those 2 years relative to 1958, eventually reaching a peak in 1960, before declining in 1961.

In estimations 2 and 3, the YEAR variable 1960 is significant, suggesting that some unexplained factors specific to that year, such as the mass engagement of the male labor force in various onerous activities, are unaccounted for by the existing variables in explaining death rate variations in that year. In estimations where TOL is included, 1960 drops its significance. This suggests that the two variables may be capturing some common, underlying effect or, specifically, that TOL may have captured a considerable extent of the unobserved effect attributable to the radical policies being pursued in that particular year, an issue to which we will later return.

Turning to estimations 4–6, where the three political variables are arranged in pairs, the effect of TOL strictly dominates MHPR and PMD in both estimations. In addition, MHPR is not significant in any of these paired estimations. There are at least two reasons why the communal dining variable is insignificant in this analysis, in contradistinction with the result of G. H.

Chang and G. J. Wen.⁶⁰ First, compared to MHPR, TOL is a more comprehensive “political” variable—one that includes more than just one aspect of the Leap’s radicalism.⁶¹ Second, by having only one variable in their regression (i.e., MHPR), Chang and Wen essentially omit and thus fail to control for the effect of those other variables that are also likely to have an effect on variations in the provincial death rate. For these reasons, the relationship between MHPR and the death rate in the Chang and Wen equation is likely a spurious one. Finally, in the full model in which all three political variables are included (estimation 7), only TOL remains significant; both MHPR and PMD drop their explanatory power altogether.⁶²

Summing up, our multivariate analysis fails to support the hypothesis that communal dining was the “triggering” mechanism of the Great Leap famine. While “political radicalism” was an important factor that helps account for variations in the death rate across provinces, it is better captured by the comprehensive variable of TOL than PMD (e.g., estimations 5–7). Finally, the FAD hypothesis is strongly confirmed, as its proxy, GRAIN, is consistently significant across all the estimations. The urban bias thesis is also broadly confirmed, considering that RATRUPO is consistently significant in estimations where MHPR is excluded. Lending even greater support to this thesis is that our own proxy, NETPROCU, a more direct measurement of urban bias, is significant in almost all of the estimations (the only exception being estimation 2, the one in which MHPR is included).

We now turn to examine briefly the substantive evidence on how the mess halls were organized, in order to make better sense of the statistical finding of why communal dining failed to affect death rates negatively. That consumption behavior in the communal mess halls is regarded as irrational possibly stems from the confusion associated with the political slogan “open up your stomach and eat as much as you can,” a slogan that gives rise to the popular perception that food was provided not only free of charge but also in unrestricted quantity. However, research based on a detailed analysis of provincial newspapers’ archives reveals that food was generally rationed to the peasants in the mess halls.⁶³ Moreover, official evidence also suggests that communal dining was already becoming unpopular with the peasants as early as the spring of 1959, and many public mess halls were in fact allowed to operate on a seasonal rather than a year-round basis.⁶⁴ In many instances, peasants were actually allowed to prepare and cook their own meals at home. While the government’s stance on communal dining was tightened again in 1960, by then the sharply reduced output could hardly have afforded the peasantry the luxury of a surplus readily available for “wasteful” consumption.⁶⁵ It is thus not fortuitous that, instead of pleading with the peasants to economize on food consumption, the government was primarily concerned with raising the milling efficiency of grain so that more rice and noodles could be ground from a dwindling supply of foodgrains.

Returning to the curious relationship between TOL and the YEAR variable 1960, the latter is consistently significant across those estimations where

TOL is not included (estimations 2, 3, and 5, respectively) but loses its significance when the same variable is included (eq. [1] and estimations 4, 6, and 7). In addition to the possibility that the two are capturing some common, underlying trend, as earlier suggested, it is also possible that some specific policy or incident occurring in that year may have had the effect of eradicating any initial differences that provinces might have had over the implementation of policies. The vastly intriguing question is therefore what policy or incident may have this all-empowering effect of converging provinces into a more or less uniform action? Consider the following possibility.

Before Marshal Peng Dehuai challenged Mao at the Lushan Conference, the Communist Party's main concern was to contain the excessive leftist tendency, or "winds of exaggeration," from further developing (*fangzuo*). In responding publicly to basically a personal letter written by Marshal Peng to Mao addressing the Leap's problems, Mao charged the Marshal as having "leaned towards the right for about 30 kilometers"; as a result, "it was the rightist tendency that had now become the main danger."⁶⁶ Naturally, the result was an intensification of the Leap's development. Under the slogan of "anti-right with all the might" (*fanyouqing, guganjing*), provinces were under enormous pressure to reengage substantial resources once again in the pursuance of a variety of onerous activities, most notably steel production, irrigation works, and large hog farms. For example, after the deliberation to scale down steel production target in 1960 to a moderate 13 million metric tons on May 23, 1959, the target was abruptly revised upward in January 1960 to 18.4 million metric tons. By the same token, grain output for 1960 was targeted to reach 300 million metric tons, when actual, realized output in 1958 was only 200 million tons. To the extent that the "Lushan incident" effectively eliminated the differences in policy orientations between the old and the newly liberated provinces, the YEAR variable loses its significance.

Before concluding this section, we want to remark on the robustness of the overall fit of the estimations. First, all the estimations have consistently high *R*-squared values that range from 0.373 to 0.438. Second, the coefficients of the significant variables do not change spuriously in response to different specifications but remain in consistently close ranges. Finally, the small size of the YEAR coefficients suggests that much of its effect on provincial death rate variations is not captured by this variable as "residual." Altogether, these characteristics suggest that the reported estimations are reasonably robust, despite the small number of observations.

VI. Conclusion

Premised on the reasoning that China's Great Leap famine occurred in a complex institutional environment, this article attempts to assess the joint significance of a set of proposed causes of this famine within a multivariate analysis framework. Based on carefully constructed panel data on 21 Chinese provinces, our estimations confirm the intuition that excess deaths were indeed

the result of a multitude of factors. They are, respectively, a decline in food availability, the deepening of an existing systemic bias that discriminated against the rural population in the form of excessive grain procurement, and, finally, the relationships between policy discretions, excessive labor mobilization, and death rates. Conversely, we fail to support the idea that communal dining was the main cause of the Leap's famine, despite its negative features and unpopularity among the Chinese villagers.

There has thus far been no relevant framework for analyzing the primary cause(s) of famine in the context of a centrally planned economy such as China's in the 1950s. While the entitlement thesis provides a fresh perspective from which to understand the nature of food shortages and, accordingly, the cause(s) of famine, its reliance on differences in income and endowments as the key explanatory variables has limited power in the context of a centrally planned economy. Indeed, in Socialist China, the famine was attributable to a strong urban bias—one that was not predicated on differences in individual earning abilities but patterned systemically on a conscious government policy of promoting industrialization at the expense of the rural population's welfare.

But economics was at best only part of our story; our analysis suggests that politics had also importantly shaped the Leap's outcome. Had the Leap been much less politicized a process, for example, much of the excessiveness experienced in the realms of grain procurement and steel and iron production, to name but the two most obvious policy errors, could have been easily avoided. But it is unlikely that politics could have been kept out of the process of the Great Leap Forward in view of the central role played by resource mobilization in the process—a strategy that is prone to politicization. But where politics played a role in shaping the famine's outcome so did history—insofar as the higher death rates in some provinces were connected to political radicalism, which, in turn, was embedded in their relationships with the Communist Party before it ruled the entire China.

Appendix

TABLE A1
DEATH RATE OF THE CHINESE PROVINCES, 1954–64 (.1%)

Province	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Anhui	11.8	14.25	9.1	12.36	16.72	68.58	8.11	8.51	7.92	8.59
Fujian	8.26	8.43	9.02	7.5	7.95	15.61	12.18	8.28	7.51	8.68
Gansu	11.98	10.78	11.33	21.11	17.38	41.32	11.48	8.25	10.38	15.55
Guangdong	10.7	11.19	8.42	9.15	11.76	15.09	10.67	9.32	11.78	8.32
Guangxi	14.8	12.48	12.42	11.98	17.33	29.2	20.37	10.15	10.34	10.55
Guizhou	16.24	13.01	12.35	15.26	20.28	52.33	23.27	11.64	17.14	20.66
Hebei	11.86	11.26	11.59	10.92	12.31	12.19	13.34	8.97	10.66	10.48
Heilongjiang	11.33	10.08	10.45	9.17	12.76	10.52	11.12	8.62	8.56	11.47
Henan	11.75	14	11.8	12.69	14.1	39.65	10.2	8.04	9.39	10.65
Hubei	11.6	10.81	9.61	9.6	14.49	21.22	9.08	8.77	9.83	10.94

TABLE A1 (Continued)

Province	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Hunan	16.41	11.5	10.35	11.58	12.92	29.26	17.48	10.23	10.26	12.88
Inner Mongolia	11.40	7.90	10.50	7.90	11.00	9.40	8.80	9.00	8.50	11.80
Jiangsu	11.65	12.81	10.04	9.33	14.55	18.41	13.35	10.36	9.04	10.13
Jiangxi	16.23	12.49	11.47	11.33	13.01	16.06	11.54	11.00	9.76	10.87
Jilin	9.91	7.53	9.05	9.12	13.43	10.13	11.12	9.96	9.44	12.62
Liaoning	9.40	6.60	9.40	8.80	11.80	11.50	17.50	8.50	7.90	9.30
Ningxia	N.A.	N.A.	N.A.	14.1	15.81	13.88	10.71	8.49	10.22	13.44
Qinghai	13.76	9.34	10.4	12.64	16.29	40.73	11.68	5.35	8.37	15.53
Shaanxi	10.55	9.85	10.31	11.04	12.76	12.27	8.76	9.35	10.55	15.60
Shandong	13.73	12.16	12.05	12.77	18.14	23.51	18.49	12.35	11.78	12.06
Shanxi	12.93	11.6	12.68	11.73	12.84	14.21	12.2	11.34	11.44	13.98
Sichuan	13.26	11.79	11.82	17.37	19.22	47.78	28.01	14.61	12.82	13.87
Yunnan	13.76	15.21	16.29	21.62	17.96	26.26	11.84	10.86	14.14	15.23
Zhejiang	12.58	9.46	9.32	9.15	10.81	11.88	9.84	8.61	7.89	9.21

SOURCE.—State Statistical Bureau, *A Compendium of Materials on Population and Census Statistics, 1949–1985* (Renkou Tongji Ziliao Huibian, 1949–1985) (Beijing: Zhongguo Caizheng Jingji Chubanshe [China's Economic and Financial Press], 1988).

Notes

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1. Demographers define excess deaths as the difference between actual death rates and what would have occurred based on the linear trend of the 1950s. See, e.g., Basil Ashton, Kenneth Hill, Alan Piazza, and R. Zeitz, "Famine in China, 1958–61," *Population and Development Review* 10 (December 1984): 613–45.

2. For example, D. Gale Johnson, "China's Great Famine: Introductory Remarks," *China Economic Review* 9 (Fall 1998): 103–9. See also Gene H. Chang and G. James Wen, "Communal Dining and the Chinese Famine of 1958–1961," *Economic Development and Cultural Change* 46 (January 1997): 1–34; Justin Y. Lin and Dennis T. Yang, "Food Availability, Entitlements and the Chinese Famine of 1959–61," *Economic Journal* 110 (January 2000): 136–58; Barbara Sands and Sven Buelow, "Recounting China's Great Leap Forward Casualties," working paper (University of Arizona, Department of Economics, 1996); and Dali Yang, *Calamity and Reform in China: State, Rural Society, and Institutional Change since the Great Leap Famine* (Stanford, Calif.: Stanford University Press, 1996).

3. John S. Aird, "Population Studies and Population Policy in China," *Population and Development Review* 8 (June 1982): 85–97; Ashton et al.; Judith Banister, "An Analysis of Recent Data on the Population of China," *Population and Development Review* 10 (June 1984): 241–71; Ansley J. Coale, "Population Trends, Population Policy, and Population Studies in China," *Population and Development Review* 7 (March 1981): 267–97; Peng Xizhe, "Demographic Consequences of the Great Leap Forward in China's Provinces," *Population and Development Review* 13 (1987): 639–70. The Chinese official estimate puts the death toll at 15 million only.

4. The loss of human lives would be greater if lost or postponed births, estimated at 33 millions, were included.

5. Ashton et al., p. 620. Before then the Chinese famine of 1876–79, with an estimated casualty of between 9.5 to 20 million, was considered the worst famine ever. Moreover, notwithstanding that the Irish famine remains the “best-known historical famine of all,” the Great Leap famine is decidedly “in a macabre league of its own”; Cormac O’ Grada, *Black ’47 and Beyond: The Great Irish Famine in History, Economy, and Memory* (Princeton, N.J.: Princeton University Press, 1999), p. 5.

6. Carl Riskin, “Seven Questions about the Chinese Famine of 1959–61,” *China Economic Review* 9 (Fall 1998): 111–24, p. 115.

7. For excessive grain procurement, see Thomas Bernstein, “Stalinism, Famine, and Chinese Peasants,” *Theory and Society* 13 (May 1984): 339–77. For wasteful communal dining, see Chang and Wen. For politics, see Dali Yang. For food availability decline and urban bias, see Lin and Yang.

8. Lin and Yang.

9. *Ibid.*

10. In terms of the rate of change, the urban death rate rose only slightly from a little below 11 per thousand in 1959 to 13.7 per thousand in 1960, whereas it was almost doubled for the rural areas in the same period—from 14.61 to 28.58 per thousand.

11. Bernstein; Lin and Yang. It is worth pointing out that grain exports also peaked in this period. China exported 4.2 and 2.7 million tons of grain, respectively, during 1959 and 1960, despite reduction in grain output in both years, a magnitude that would have provided 500 calories per day for approximately 50–60 million people. It is rather obvious that exports of these magnitudes likely affected the death rate negatively. We owe this observation to D. Gale Johnson. According to Riskin, “Seven Questions about the Chinese Famine of 1959–61,” the record high export of 4.2 million tons in 1959 may be attributed in part to the growing pressure faced by the Chinese government to repay its debt to the Soviet Union as the relations between the two deteriorated.

12. Chang and Wen; Dali Yang.

13. As will be explained later in greater detail, our reasoning behind the causal connections between politics and its mortality consequences differs somewhat from that of Dali Yang.

14. Our goal is to account only for the variations in levels, not timing, of the famine’s severity across provinces. In addition, we are also not assessing the relative importance of these factors, an objective that would necessitate a decomposition of their individual effects.

15. The roster of famine-stricken provinces included Sichuan and Guizhou (in the southwest), Gansu and Qinghai (in the northwest), Henan and Shandong (on the North China Plains), and Anhui (in the eastern central part of China) (see appendix).

16. It actually began in the winter of 1957, when Mao made his plea to the peasants to bring with them their own tools and food while engaging in the water conservancy projects.

17. Audrey Donnithorne, *China’s Economic System* (New York: Praeger, 1967); Gargi K. Dutt, *Rural Communes in China: Organizational Problems* (New York: Asia Publishing House, 1967).

18. Donnithorne; Dwight H. Perkins, *Market Control and Planning in Communist China* (Cambridge, Mass.: Harvard University Press, 1966); Carl Riskin, *China’s Political Economy: The Quest for Development since 1949* (New York: Oxford University Press, 1987).

19. Donnithorne; Perkins; Riskin, *China’s Political Economy: The Quest for Development since 1949*.

20. Mark Y. An, Li Wei, and Dennis T. Yang, “China’s Great Leap: Forward or

Backward? Anatomy of a Central Planning Disaster,” Center for Economic Policy Research working paper (London School of Economics, 2001).

21. Ashton et al. (n. 1 above); Bernstein (n. 7 above). Initially, output figures for grain were inflated so much that a doubling of output in 1958 over the previous year was reported. This vastly exaggerated figure is attributable to a feature contained in an important policy document entitled “Sixty Articles on Work Methods,” issued in early 1958 by the Central Committee of the Chinese Communist Party, which called for a new dual system of target setting. (According to Roderick MacFarquhar, “the document was apparently issued by the Central Committee’s general office on 19 Feb.; . . . it was distributed down to the level of the county secretary during the second half of February”; *The Origins of the Cultural Revolution*, vol. 2, *The Great Leap Forward, 1958–60* [New York: Columbia University Press, 1983].) Under this system, there were supposed to be two sets of production plans at each level of the government—a publicized minimum and a larger expected one—but the latter became the publicized minimum for the level below. However, it turned out that each level set increasingly higher targets for the one below, thereby escalating the targets at each level. As cadres of a lower level anticipated the expectations of their superiors, a strong incentive existed on their part to report overfulfillment of the targets prescribed; the result was one of wildly exaggerated outputs.

22. Kenneth R. Walker, *Food Grain Procurement and Consumption in China* (New York: Cambridge University Press, 1984), pp. 146–47. Walker’s argument was made on the basis of an extrapolation of grain yields in 1952–57. According to his estimate, a 10% reduction in sown acreage would result in a reduction of output by 17 million tons or 56% of the reduced output (of 30 million tons) in 1959.

23. Donnithorne. In more radical communes, such as Seven-Mile Camp in Henan Province, this “free supply” ratio reached 70%–80% of the distributed income. Deng Liqun, Ma Hong, and Wu Hang, eds., *Dangdai Zhongguo de Jingji Tizhi Gaige* (Economic systems reforms of contemporary China) (Beijing: Zhongguo Shehui Kexue Chubanshe, 1984), p. 260.

24. Donnithorne, p. 76.

25. Time wages were based on a worker’s skills, strength, and attitude to labor. According to Donnithorne, “six to eight grades were the number officially recommended with the wages of the highest grade set at four or more times that of the lowest” (p. 79). In practice, however, wage differentials could be much narrower. In Seven-Mile Camp Commune, for instance, the monthly wage set for first grade labor was only 3 yuan, which was only three times higher than the fifth grade (the latter of only 1 yuan per month). Typically, the difference between each successive labor grade was a mere 0.5 yuan, a difference clearly too narrow to motivate workers to supply their effort enthusiastically; Deng, Ma, and Wu, *Dangdai Zhongguo de Jingji Tizhi Gaige*. In even more radical instances, even the work-point system was abolished; in these communes, income was distributed completely “according to need” in the form of egalitarian rationing of food and other daily necessities. Deng Liqun, Ma Hong, and Wu Hang, eds., *Dangdai Zhongguo Nongye* (Contemporary Chinese agriculture) (Beijing: Dangdai Zhongguo Chubanshe, 1992), p. 156.

26. The communal mess halls were advocated also for their symbolic significance in eradicating selfishness—an attribute that implicitly exists under a system of private property rights in food.

27. Chang and Wen (n. 2 above); Dali Yang (n. 2 above).

28. This may explain why agriculture had to be collectivized alongside this development, as it would be far more difficult to procure farm surpluses from a vastly more decentralized and profits-oriented peasantry.

29. The original estimate puts the figure at 375 million tons.

30. Bernstein (n. 7 above). To an important extent, output exaggerations were made possible by data falsification, the latter a result caused by the devolution of

authority to collect agricultural production statistics from the State Statistical Bureau to commune authorities. While it was a measure intended by Mao to encourage local officials to put greater initiatives into achieving the Leap's goals, the result was "economic anarchy"; Perkins (n. 18 above), p. 19; Riskin, "Seven Questions about the Chinese Famine of 1959–61" (n. 6 above), p. 115.

31. Bo Yibo, *Ruogan Zhongda Juece yu Shijian de Huigu* (Several important policy decisions and events in retrospect) (Beijing: Zhonggong Zhongyang Dangxiao Chubanshe, 1993). While the absolute amount of grain procured in 1960 had been scaled back by some 18 million tons in absolute terms, the gross procurement-to-output ratio nevertheless stood at 32.4% due to further reduction in grain output in that year.

32. Urban grain supplies already began to fall short of demand as early as the winter of 1958–59 as a result of rapid urban growth; Walker, *Food Grain Procurement and Consumption in China*, p. 145.

33. *Ibid.*, p. 81. It should be pointed out that grain exports to the three major municipalities represented only a more obvious case of urban bias, given that it necessitated the transfer of agricultural surpluses between provinces or administrative jurisdictions. Urban bias can and did exist within provinces, insofar as farm surpluses were siphoned from the rural to the urban areas.

34. The urban bias thesis is unequivocally illustrated in the following remarks regarding the high share of grain imports accounted for by Liaoning: "The necessity of shipments on this scale is explained by Liaoning's high rate of urbanization and industrialization, most of the imports being destined for urban mining areas"; Kenneth R. Walker, "Food and Mortality in China during the Great Leap Forward, 1958–61," in *Agricultural Development in China, 1949–1989: The Collected Papers of Kenneth R. Walker*, ed. Robert F. Ash (New York: Oxford University Press, 1998).

35. It is interesting to note in this context that Sichuan already emerged as an important grain exporter before 1958. Its exports quadrupled between 1953 and 1957, and by 1957 it alone supplied 31.5% of the total provincial grain exports; Walker, *Food Grain Procurement and Consumption in China*, p. 81.

36. Sands and Buelow (n. 2 above), p. 6. Ashton et al. (n. 1 above) reached a similar conclusion: "[The urban Chinese were insulated] from the agrarian crisis through grain rationing systems and the maintenance of state-controlled stockpiles" (p. 628).

37. In 4 out of the 5 years during 1958–62, grain available for rural consumption averaged less than 200 kilograms of grain per person, far less than what her urban counterpart consumed; Walker, "Food and Mortality in China during the Great Leap Forward, 1958–61," p. 137.

38. Lin and Yang (n. 2 above). While the issue regarding the causes of output decline is an important one, it is not our primary concern. This may explain why we do not include factors like weather variability as one of our hypotheses. While weather certainly affects grain yields, it does not affect death rate directly except through its effect on output change. For a specific attempt addressing the causes of output decline during the Great Leap, see An, Li, and Yang (n. 20 above).

39. Amartya Sen, *Poverty and Famines* (Oxford: Clarendon Press, 1981).

40. Lin and Yang; but see also Ashton et al.; Bernstein (n. 7 above); Sands and Buelow.

41. Chang and Wen (n. 2 above); Dali Yang (n. 2 above).

42. Examples of these activities are abundant. In addition to the previously adduced backyard steel manufacturing and irrigation projects, "deep plowing," one of the scientific methods that Mao believed would help raise yields, were typically "back-breaking and exhausting" and were undertaken by "crack teams of peasants who sweated around the clock"; Jasper Becker, *Hungry Ghosts: China's Secret Famine* (New York: Random House, 1996), p. 73.

43. As data on net procurement are available for only the famine period, we use gross procurement figures in table 1 instead in order to show a longer time trend.

44. The suspected strong correlation between grain procurement and output is confirmed in a partial correlation test, which shows that the two are indeed correlated significantly at the 0% level of significance and with a coefficient of close to .8. Conversely, the correlation between net procurement ratios, or NETPROCU, and grain output is considerably weaker; it is significant at the 5% level of significance, and with a coefficient of only .2. This helps justify our decision of using the latter variable as the proxy for procurement.

45. Chang and Wen; Dali Yang.

46. Dali Yang.

47. Dali Yang refers to this as the "politics of loyalty compensation" (p. 59).

48. Xu Ming, "Wu Zhi-pu yu Henan Dayuejing Yundong" (Wu Zhi-pu and the Great Leap Forward in Henan), *Ershiyi Shiji* (Twenty-first century), no. 48 (August 1998), pp. 37–47.

49. See, e.g., Bernstein. In fact, that some production teams in Guangdong Province were found to have secretly divided the harvests among their members instead of handing them to the state grain agencies provides strong empirical support of this thesis; Becker.

50. The first three items are obtained from *Quanguo Gesheng Zizhiqu Zhixiashi Tongji Ziliao Huibian, 1949–1989* (A compilation of historical statistical data of provinces, autonomous regions, and municipalities, 1949–1989) (Beijing: Zhongguo Tongji Chubanshe, 1990), whereas data series on provincial death rates are taken from *Renkou Tongji Ziliao Huibian, 1949–1985* (A compendium of materials on population and census statistics, 1949–1985) (Beijing: Zhongguo Caizheng Jingji Chubanshe, 1988).

51. Walker, "Food and Mortality in China during the Great Leap Forward, 1958–61" (n. 34 above), p. 138, table 3.18. According to Walker ("Food and Mortality in China," p. 107), the source is *Nonye Jingji Ziliao, 1949–1983* (Materials on the agricultural economy, 1949–1983) (Beijing: Planning Office of the Ministry of Agriculture, Livestock, and Fisheries, 1983).

52. *Nongye Jiti hua Zhongyou Wenjian Huibian, 1949–1957* (A compendium of important articles on agricultural collectivization, 1949–1957) (Beijing: Zhonggong Zhongyang Dangxiao Chubanshe, 1990).

53. *Ibid.*; Dali Yang; Li Xin and Chen Tiejian, *Zuihou de Quezhan: Zhongguo Xin Minzhu Zhuyi Geming Shi Changbian, 1947–1949* (The final showdown: A history of the New China Democratic Revolution, 1947–1949) (Shanghai: Shanghai Chubanshe, 1997); Zhang Xiongru, *Ershi Shiji Zhongguo Dashi Chuanshu* (A compendium of important events in twentieth-century China) (Beijing: Beijing Chubanshe, 1993).

54. Yang (n. 2 above).

55. Beijing, Tianjin, and Shanghai are not included because of their municipal status. Ningxia Province is excluded because it lacks data on Party membership, whereas Qinghai and Yunnan are dropped for their lack of data on grain procurement. Last, Xizang is excluded simply because no systematic data exist for this province.

56. An exception is estimation 2, in which this variable is significant at the 10% level only.

57. There is once again an exception. In estimation 3, NETPROCU is significant only at the 10% level.

58. The lack of a significant relationship between MHPR and the two urban bias variables is attributable to the strong partial relationship between them, and therefore the potential problem of multicollinearity. For example, MHPR and RATRUPU are significantly correlated at the 1% level of significance with a coefficient of .62. Intuitively, insofar as communal mess halls were set up primarily in the rural areas, participation rates are largely an increasing function of the rural population ratio.

59. Ashton et al. (n. 1 above), e.g., find that the mortality rate was higher among

the male cohort ages 40 and above during 1953–64 than it was previously. Restricting their analysis to the poverty-stricken provinces, Sands and Buelow (n. 2 above) also find that the younger male cohort, that of 20–40 years old, similarly suffered higher mortality rates, as their older counterpart (ages 40–60) did during the Leap. This evidence lends support to the thesis that the mass engagement of the male laborers in onerous, off-farm work negatively affected the death rate.

60. Chang and Wen (n. 2 above).

61. We thank an anonymous referee for pointing this out.

62. This is to be expected, given that TOL and PMD are essentially “competing” variables. A reviewer raises the question of whether or not the ranking of TOL based simply on the timing of liberation may correctly approximate the degree of political radicalism that we intend to capture. To verify this, she suggests that we construct a group dummy variable and divide the provinces into OLAs and NLAs. Given that there are no objective criteria for dividing the provinces, we use the median of the month in which a province was “liberated” as the dividing line and run the regressions again. The results of so doing are strikingly similar; variables that are significant in table 3 remain significant in the new set of regressions and even with the same levels of significance. What has changed though is that the coefficients of all the significant variables have decreased in varying degrees, whereas the group dummy variable of TOL has increased. As there are no qualitatively different new findings, we do not separately report these results here.

63. James K. Kung and Justin Y. Lin, “Food Availability versus Entitlement: The Cause(s) of China’s Modern Famine Re-examined” (paper presented at the American Economic Association’s annual meeting, New York, 1999). This counterargument is anecdotally confirmed by a Hong Kong-based journalist, who recalls the use of coupons to exchange for 24 catties of rationed grain on a monthly basis during the Leap in Guangdong Province; Lau Kin Wai, “The Yangzi Water Banks,” *Hong Kong Economic Journal* (June 29, 2001).

64. Even in the latter instance, communal dining had been scaled back to the provision of only one meal a day and to the main household laborer only, a compromise measure recommended by Chairman Mao himself. In June 1959, the chairman was quoted as saying that it was not necessary for communal dining to be adopted everywhere, that it would be sufficient to keep just 20%–33% of the villagers dining in the mess halls; see Bo (n. 31 above).

65. As Riskin, “Seven Questions about the Chinese Famine of 1959–61” (n. 6 above), echoes: “Of course, when public dining halls were reemphasized after the Lushan Conference of July 1959 the illusion of plentiful supplies had long been shattered” (p. 117).

66. Bo.