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Population Change during China's "Three Years of Hardship" (1959-1961)

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Abstract

Much of the debate about population change following China's "Great Leap Forward" has relied on the population statistics released by China's National Bureau of Statistics in 1983. However, few have investigated the methods by which the statistics were gathered, and the extraordinary historical conditions of both population movement and its recording process in those affected decades before market reforms. This report offers such an investigation and notes dramatic discrepancies in demographic statistics between 1954 and 1982. It also examines what caused these discrepancies and argues that any research in famine deaths should not and cannot be separated from its larger context and the discussion of anomalous population change both before and after the Leap.

Keywords: *Great Leap Forward, "famine deaths of 30 million", abnormal population change,* hukou *system, statistic compilation and analysis*

JEL classification: *C81, J11, J61, N35*

1. Introduction

Much of the debate about population change during China's "three years of hardship (1959-1961)" has relied on the population statistics released by China's National Bureau of Statistics (NBS) in 1983. However, few have investigated the methods with which the statistics were gathered and the extraordinary historically-conditioned messiness and irregularity that accompanied the process of recording population movement. This report offers such an investigation and notes dramatic discrepancies in demographic statistics between 1954 and 1982. It also examines what caused these discrepancies and argues that any anomalous population change during and following China's "Great Leap Forward" (GLF) should be understood in the larger context of anomalous population change both before and after the GLF.

In 1983, Li Chengrui, Director of the National Bureau of Statistics, stated that "China's current population statistics are derived from household registration via the Public Security Bureau. Household registration numbers during the 'Great Leap Forward' and the period of economic hardship following have remained unpublished for some time … In 1983, the State Council approved a request by the National Bureau of Statistics (NBS) to include these statistics in the 1983 edition of the *China Statistical Yearbook*. This was the first time that yearly figures for China's registered population were released externally."[1] This comment clearly tells us that the population data released in 1983 by the NBS was derived from household registration figures.[2] It is therefore apparent that changes to the actual household registration system have a major impact on resultant statistics. In order to adequately research the 1983 data, we must understand the overall makeup and changes to the registration

system in history. The sole purpose of this article is to analyze what caused the dramatic discrepancies in demographic statistics in those years, according to the changing patterns of China's household registration. This will allow us to gain reliable knowledge of China's population changes during 1959-1961.

2. The Evolution of China's *Hukou* 户口 System and Statistics Collected Under the System

Before 1949, there was no complete national household registration management system in place. After the founding of the People's Republic of China, the country began to gradually establish such a system. The work took roughly two phases.

*2.1. Phases of Establishment of Household Registration (*Hukou*) System*

Phase One (before 1958): Initial Set-up

In October, 1950, the Public Security Bureau (PSB) convened its first national work conference, ruling that household registration "... would begin in the cities, and rural household registration work can begin in townships, and gradually expand from there."[3] In July, 1951, the PSB issued a temporary ruling: "Interim Regulations on Urban Household Registration". This ruling only applied to cities, and as a result, 87% of China's population in the countryside was not yet included in the household registration work around 1951.[4]

The nationwide census undertaken in 1953 was the first time that China's overall population had been tabulated, including in rural regions with a rudimentary household registration system.[5] In 1954, the "*hukou* change statistical annex" was published by the Ministry of Internal Affairs, leading to the establishment of a unified, national household

registration yearly statistical system.[6] In other words, it was not until 1954 that China had a nationally unified statistical series from the household registration system.

On June 22, 1955, the State Council issued a "Directive on Establishing a Permanent Household Registration System", requesting that "within a few years, a permanent household registration system gradually be set up and implemented."[7] This shows that in 1955 and several years following, China was only starting the process of gradually establishing a rigorous and permanent household registration management system. That is, during this period the system and population statistics were still incomplete and simply cannot be expected to be adequately accurate.

Phase Two (1958-): The Uncommon Background of Implementation

On January 9, 1958, the PRC Household Registration Statute was issued to set up a complete household registration system. "It was a milestone in the formal formation of a national and urban-rural unified household registration system."[8] However, because of the onset of the Great Leap Forward and the People's Communes movement, its actual implementation was in effect postponed. It was not implemented nationwide until the time period between the second half of 1958 and 1961, coinciding with the "three difficult years".

Here are a few examples. Sichuan Province has the highest population of any province in China. In the beginning of 1960, the Sichuan Provincial Party Committee issued the "Decision Regarding Strengthening Household Registration Statistical Work", requesting that a population census be undertaken.[9] Shandong is the second most populous province in China. On September 4, 1959, the Shandong Provincial Party Committee selected one full-time individual from each People's Commune to serve as a household registration official,

allocating 800,000 yuan for the production of household registration cards.[10] Guizhou Province was one of the provinces with the highest death rates in 1960. In that year, "the Provincial PSB began to undertake a provincial-wide household census as per order by central PSB."[11] These recorded efforts show that the implementation of the PRC Household Registration Statute on a nationwide scale began in 1960, around the time of the famine.

This exceptional background factor that the embarking of the system coincided with the famine years undoubtedly had a major impact on China's population statistics (including statistics of deaths). This can be, for example, illustrated by examining the situation in Shandong. In order to implement the Statute and obtain accurate population statistics, in September 1959 the province conducted its first rural population census. According to the Provincial History Gazetteer, "[this census] discovered that some communes, production brigades, mines, government agencies, and schools, have over-reported their population by 1.52 million in order to receive larger shares of grain."[12] This was 2.81% of Shandong Province's total 1959 year-end population of 54.025 million. This error was corrected in the household registry during the census. But this cancellation of the falsely reported extra figure must have had a direct impact on the population statistics of Shandong Province during this period – a large-scale reduction in the registered population of 1.52 million.

If we extrapolate based on the ratio of Shandong Province, it would mean that 18.9 million individuals would have been struck from the national population statistics. Of course other provinces might not have a similar proportion of over-reporting (it could be smaller but also even larger). But Shandong was certainly not an isolated case. Over-reporting was a common practice at the time for well-known incentive-based reasons during the Leap's implementation. But if the household

registration for such an over-reported "population" figure would be duly removed as the Statute was implemented, then it would lead to a large reduction in the *hukou*-based population numbers during the 1959-61 period. Clarifying this matter has a decisive significance for researching famine deaths in China. Yet the point has been almost completely ignored by all research to date.

2.2. Household Registration Management and the Collection and Compilation of Hukou *Statistics*

In order to best analyze the statistics released by the NBS in 1983, we need a basic understanding of the content and the process of collecting and compilation of population data within the *hukou* system. Based on the 1955 State Council Directive, on January 9, 1958, the Standing Committee of the National People's Congress issued the "PRC Household Registration Statute".[13] These are two most important legal documents that guide China's household registration work with clearly specified legal requirements for collection and compilation of population statistics. The basic framework of the two documents is as follows:

1) Household registration agencies: "The *hukou* jurisdiction will be identical to the Public Security Bureau jurisdiction in cities, as well as rural townships with Public Security Bureau offices; in townships without Public Security Bureau offices the *hukou* jurisdiction will be that of the (rural, urban) townships. The People's Committees of the townships, as well as the Public Security Bureau offices will serve as the household registration agencies."[14] After People's Communes were set up, the Management Committees of People's Communes were the agencies responsible for household registration management in rural areas. Birth, death, and outward and inward migration of citizens were supposed to be registered at the designated local offices.

2) In rural areas, the basic principles are the same as for urban areas: "concerning townships and commercial towns that have not set up Public Security Bureau offices, the Township People's Committees should establish township household registration and document birth, death, outward and inward migration." That is, "township registration should record the entire permanent population of the townships, and should reflect population changes, adding or removing registrations [as the population changes], thereby grasping the actual population situation in the entire township." In other words, the population of a particular township was based on the local household registration on the ground; this was the source of the total township population statistics. Moreover, "birth, death, out-migration and in-migration were recorded in four registers to timely track population changes." In other words, numbers reflecting population changes in any township were based on recorded registration.

3) Household registration information was updated "once a year", and "townships and other regions should report statistics reflecting population changes for the previous year to the county by February. Counties should collect and report this information to the provincial level by March, and provinces should pass on the information to the Ministry of Internal Affairs by April." ("Reporting to the Ministry of Internal Affairs" changed in 1956 to "Reporting to the Public Security Bureau".)

The above rules show that the data collection process was characterized by the following. For townships, if they possessed statistics about the year-end population from the previous year and changes for the current year (birth, deaths, out-migration and in-migration), then the year-end population for the current year could be easily calculated with the following equation:

Year-end population of current year = year-end population of previous year + (current year births – current year deaths) + (current year out-migration – current year in-migration)

In other words, the process of calculating the "year-end population" of a particular township was unified with the collection of statistics on its population changes. It was not necessary to independently calculate the "year-end population". This is the basic characteristic of population statistics that are calculated on the basis of household registration information.

3. Conflicts in the Data: Population Balance Equation and Anomalous Population Changes

The 1983 NSB data are based on household registration for the years 1949-1982. The data show that China experienced a large and unexpected fall in population from 1960 to 1961.

Table 1 China's Population, 1957-1962[15]

Year	Year-end population (million)	Yearly change (million)
1957		–
1958		
1959		12.13
1960	662.07	–10
1961	658.59	–3.48
1962	672.95	14.36

Table 1 shows that China's year-end population dropped by 10 million during 1959-1960, and fell again by 3.48 million during 1960-1961. Considering that the yearly population growth during these years was around 12 million a year, the drop in population during these two years is striking. The release of the statistical series created a stir in China and news headlines abroad in the mid-1980s. The Kyodo newswire stated that this was the most significant population event during peacetime.[16]

However, it was quickly realized that the data from the NBS are contradictory and their origins difficult to explain. During that period, international migration out of China was negligible. Theoretically, then, in order to arrive at a reasonable figure for the decline of the population we should subtract "year-end population from the previous year" from "year-end population of the current year"; this must then be equated or balanced with the "current year births" minus the "current year deaths". The major discrepancy in the 1983 statistical series is that in most years of 1954-1982, the sums on either side of this equation appeared vastly different. This contradiction has not been explained since. In order to gain the truth of population change during the famine of 1959-1961, we must seek a sound explanation.

Let us begin with what we call the basic "population balance equation". Again, if international migration is small enough to be ignored, a country's population during a particular period should satisfy the equation below:

Year-end population of the current year – year-end population from the previous year = current year births – current year deaths

But such an equation does not exist in most years of the NBS 1983 data. To find the real cause of this vast discrepancy, we refer to the sum computed from the following formula as the "anomalous population change":

> *Yearly anomalous population change = (year-end population of the current year – year-end population from the previous year) – (current year births – current year deaths)*

If the figure of "anomalous population change" is larger than zero, then the population has "anomalously increased", and if negative, then the population has "anomalously decreased". It must be pointed out that the existing data inputted into the above equation is based on household registration statistics. Therefore, "anomalous population change" refers to anomalous changes to population accounted for in the household registration system rather than to the actual population. The concept of "anomalous population change" plays a pivotal role in explaining the discrepancy in the NBS data.

Below is a preliminary analysis of "anomalous population change" in China during 1954-1982. We have chosen the start year of 1954 and end year of 1984 because the first national census took place in 1952 and the third national census was in 1982.

Table 2 shows that the total year-end population was 587.96 million in 1953 and 1,015.41 million in 1982. For the sake of argument these numbers can serve as benchmarks for research into population changes between 1954 and 1982. The adequate quality of the 1953 and 1982 censuses is recognized by demographic experts in China and abroad. The table also shows that in the 29 years from 1954 to 1982, the "anomalous population change" was more than one million for 17 of those years, more than 3 million for seven years, and exceeded 5 million

Table 2 China's Yearly "Anomalous Population Changes"[17] (unit: 10,000)

Year	Year-end population	Overall population growth	Natural population growth	Anomalous population changes	Accumulated anomalous population changes
1953	58,796				0
1954	60,266	1,470	1,466	4	4
1955	61,465	1,199	1,233	–34	–30
1956	62,828	1,363	1,270	93	63
1957	64,653	1,825	1,479	346	409
1958	65,994	1,341	1,124	217	626
1959	67,207	1,213	677	536	1,162
1960	66,207	–1,000	–304	–696	466
1961	65,859	–348	249	–597	–131
1962	67,295	1,436	1,794	–358	–489
1963	69,172	1,877	2,270	–393	–882
1964	70,499	1,327	1,927	–600	–1,482
1965	72,538	2,039	2,026	13	–1,469
1966	74,542	2,004	1,928	76	–1,393
1967	76,368	1,826	1,927	–101	–1,494
1968	78,534	2,166	2,121	45	–1,449
1969	80,671	2,137	2,076	61	–1,388
1970	82,992	2,321	2,114	207	–1,181
1971	85,229	2,237	1,954	283	–898
1972	87,177	1,948	1,910	38	–860
1973	89,211	2,034	1,842	192	–668
1974	90,859	1,648	1,574	74	–594
1975	92,420	1,561	1,438	123	–471
1976	93,717	1,297	1,178	119	–352

Table 1 (Cont.)

Year	Year-end population	Overall population growth	Natural population growth	Anomalous population changes	Accumulated anomalous population changes
1977	94,974	1,257	1,138	119	–233
1978	96,259	1,285	1,147	138	–95
1979	97,542	1,283	1,125	158	63
1980	98,705	1,163	1,160	3	66
1981	100,072	1,367	1,440	–73	–7
1982	101,541	1,469	1,461	8	1
Totals		42,745	42,744		

in four years. Large anomalous population increases and/or decreases took place.

From Table 2, patterns to the anomalous population changes can be summed up into three phases: During the first, from 1956 to 1959, the population anomalously increased, amounting to 11.92 million "extra" people. In the second phase, from 1960 to 1964, the population anomalously decreased, ending up with a total of 26.44 million "missing" people. In the third phase from 1968 to 1979, China's population anomalously increased greatly by a total of 15.57 million in a consecutive 12 years.

Overall, the issue of anomalous population changes in China from the 1950s to the 1970s raises three questions: (i) From 1956 to 1959, what was the cause of the large jump in the anomalous population for those four years? (ii) Why was there an anomalous population drop for the five years from 1960 to 1964? (iii) What was the cause of the anomalous population increase for the twenty years of 1968-1979?

If we carefully examine Table 2 above, we discover that China's population anomalously decreased by 26.44 million from 1960 to 1964. But the population also anomalously increased by 11.62 million from 1954 to 1959, and then 14.83 million from 1965 to 1982 – combined, this is an anomalous population increase of 26.45 million. There is a striking similarity between these two figures for anomalous population changes: 26.44 million and 26.45 million. Assuming this is no mere coincidence, it leads to a *fourth* question: (iv). What is the cause of the high degree of similarity between these two numbers of increase and decrease?

In fact this high degree of similarity might reveal a key to the anomalous population changes during this period. The true reason for the anomalous population decrease of 1960-1964 could be found, at least partly, in the causes of the anomalous population increases in the previous period (1954-1959) and the subsequent period (1965-1982).

From the perspective of historical and demographic complexities, China's population change from the beginning of 1954 to the end of 1982 must be researched as an integrated whole. If we isolate population changes in the years around 1960 as independent of changes to those of the other periods, we will fail to reach any credible conclusion.

Most of the research on this topic in China and abroad only focuses on the second question (the drop between 1960 and 1964), and either glosses over or downplays the first and third questions (increases before and after the GLF). The fourth question, i.e. the similarity between these "missing" and "gained" population amounts, is completely ignored. Regarding why China's population anomalously fell by 26.44 million from 1960 to 1964, some scholars contend that the drop was solely caused by large-scale death from famine. This is the main source of the claim that 30 million starved to death ("饿死三千万") during the great

leap adventure. But these scholars have not also explained why there were anomalous population increases in the preceding and following periods. That is, these four questions are closely interrelated. If we want to get to the bottom of the anomalous population changes in China and explain the major conflict in the NBS statistics, we must answer all four of the above questions.

4. What Are Anomalous Household Registration Population Changes Related to?

The 1983 NBS statistics were calculated based on household registration data. Therefore, we must begin by understanding "household registration" as the most basic factor in our research.

Preliminarily, "actual population" referred to the actual living total population during a particular period in the nation. Household registration population referred to the population statistics derived from collecting information at a particular time from the household registration system. Based on stipulations of China's household registration system, each time a citizen was born, died, in-migrated or out-migrated, this basic information would be recorded by the related grassroots household registration office personnel. Under ideal conditions, the "household registration population" would be identical to the "actual population".

"Ideal conditions" would include: i) each birth or death would be recorded within the year it happens; ii) each in-migration or out-migration would be accurately recorded, and the registration of such migration would be recorded in the same year; iii) there would be no false reporting, or fictitious household registrations; iv) household registration statistical agencies would honestly and correctly report household registration to higher levels based on the rules established in

the household registration system. If all of these conditions were met, then the "household registration population" should equal the "actual population".

But real conditions rarely lived up to this ideal scenario. The earlier mentioned case of errors in reporting in Shandong Province is only one of many examples. Moreover, an easy illustration follows. Suppose that a factory shut down in a city in December 1960. 10,000 workers in the factory who had come from the countryside returned to their homes. They would each fill out paperwork relocating their household registration out of the city in the second half of December, and would return to their homes in January 1961 and fill out paperwork to relocate their household registrations back to their villages. It is clear that this population of 10,000 was then not registered in the household registration system at the end of 1960 (before midnight, December 31), and as such not be counted towards the 1960 year-end registered population. In this way the 1960 year-end household registration population would be reduced by 10,000. This has nothing to do with actual births or deaths, but resulted in an anomalous population reduction of 10,000. This example reveals an important fact: The anomalous population reduction within the NBS data only refers to a change in "household registration population", and this does not necessarily imply a reduction in the actual population. Therefore, we must strictly distinguish between the "actual population" and the "household registration population".

When the births, deaths, in-migrations or out-migrations of some members of society are not accurately registered, it will result in an inaccurate household registration population. Precisely because the "actual population" differs from the "household registration population", we must put forth the concept of "anomalous household registration population changes". This concept refers to household registration

population numbers that are not identical with the actual population. In other words,

> *Anomalous household registration population = household registration population – actual population*

Changes to the actual population – if there is no international migration – is solely dependent upon births and deaths. Any change to the anomalous household registration population is the total difference between the registrations and the actual population (including registrations of births and deaths, and in-migrations and out-migrations). China's population is very large, therefore the emergence of even a very small percentage of anomalous household registration population will result in a very large discrepancy between the household registration population and the actual population.

In most conditions, the emergence of an anomalous household registration population is random, that is, there is an equal probability for the emergence of a positive anomalous household registration population as a negative one. If this obtains, then we can largely ignore the influence of the anomalous household registration population, and the household registration population will basically reflect the actual population. However, in some special historical periods and under special socioeconomic conditions, it becomes highly probable that anomalous household registration population numbers skew in a particular direction (either positive or negative). If this is the case, then large anomalous household registration population numbers (positive or negative) can emerge. This is reflected in large discrepancies between the household registration population and the actual population. China experienced a special historical period during the 1950s through the 1970s.

4.1. Anomalous Population Changes Are Unrelated to Recorded Births and Deaths

Based on China's laws and regulations, household registration data are calculated from recorded births, deaths, in-migrations and out-migrations. The laws stipulate that when a citizen dies, related individuals should register the death and de-register the deceased's household registration. There are two possibilities here. The first is that the death is recorded in the same year that it occurred. The second is that the death is not recorded or not recorded in the same year that it occurs.

Consider an individual who died in a particular year but whose death was for various reasons not registered in that year (as specified below), but only later in another year. If this were to happen, it would be considered an unrecorded death in the first instance and a delayed or remedially recorded death in the second instance. This is a crucial point for our research, as some researchers indeed very specifically use the unrecorded deaths to explain the sudden drop of China's population during 1959-1961.

We can reach the following conclusions about the relationship between unrecorded deaths, retroactively recorded deaths, and anomalous population changes:

Conclusion 1. In terms of household registration population data, neither unreported deaths nor retroactively reported deaths have an impact on anomalous population change numbers. (This argument can also be deduced from Conclusion 3 below.)

When researching the large anomalous drop in China's household registration population in the few years immediately following 1960, some scholars conclude that it was caused by large-scale unreported deaths. They therefore further argue that there were tens of millions of abnormal deaths during the famine. Their research commits a major error by not distinguishing between the data from the new household

registration system of the time and the real population changes. But as long as we understand the basic content and mathematical method of the system, we can see how this viewpoint is mistaken. In entirely the same way, we can prove the following proposition:

Conclusion 2. Regarding household registration statistics, neither non-reported births nor retroactively reported births will influence the anomalous population change statistics.

4.2. The Correlation of Anomalous Population Changes and Registered Migration – the Formula for Calculating Accumulated Anomalous Population Changes

If anomalous population changes are unrelated to normal deaths, births and their registration, then what is the real reason behind the anomalies?

In addition to the recording of births and deaths, recording in- and out-migrations is another household registration factor that affects total population numbers. The recording of migrations is fundamentally different from that of deaths and births, and this is seen in the following. The recording of births and deaths is completed with a single registration, but the registering of migrations requires an out-migration registration and an in-migration registration. Only when both of these registrations are completed is the migration registration itself fully complete.

In the case of a migrant population, if the out-migration and the in-migration are registered in the same year, then this will not have an effect on the national household registration population numbers (as mentioned, this does not include consideration of international migration). But in practice the opposite often occurs.

Duplicate migration registration: Consider Ms. Zhang, who migrated in 1958 from her original home to another location. She did not cancel her household registration in her hometown, but registered as an

in-migrant in the locale she moved to (in other words, her household was registered in both locales). In 1960, one of these household registrations was cancelled as a correction. In this situation, we can say that this individual caused a duplicate migration registration in 1958, and a cancelled duplicate migration registration in 1960.

Un-recorded migrations: Consider Mr. Wang, who in 1963 moved away from a city and cancelled his household registration there. He returned to his original home in the countryside, but did not complete his in-migration household registration until 1969. In this situation, we can say that this individual led to an un-recorded migration in 1963, and a retroactive migration registration in 1969.

In terms of household registration statistics, the formation of "year-end population levels" is identical to the collection of statistics on population changes (births, deaths, migrations). Based on this, mathematically:

Conclusion 3: In terms of household registration statistics, each year's anomalous population change is comprised of that year's "duplicate migration registrations", "cancelled duplicate migration registrations", "un-recorded migrations", and "retroactive migration registrations". This final figure is unrelated to either registered or unreported births and deaths.

Assuming the nationwide census undertaken in 1953 is largely reliable, there should be no significant duplicate migration registrations or un-reported migrations at the end of 1953, and the statistics from that census can be used as a baseline.[18] From 1954 to 1982, the "accumulated anomalous population change" for any particular year can be defined as being equal to the total of the "anomalous population change" of each year since 1954. This is the last row of figures from Table 1. The "accumulated anomalous population change" can be proven with the following formula:

Accumulated anomalous population change of the year = year-end duplicate migrations – year-end un-reported migrations

This formula is a basic tool for researching the anomalous population changes, especially population changes during the "three years of hardship".

4.3. Anomalous Population Changes in China, 1954-1982

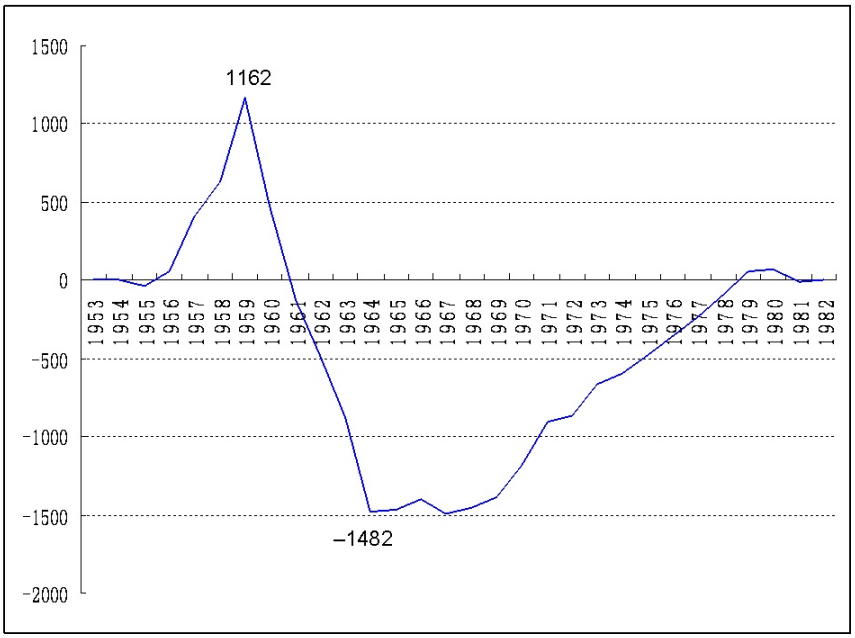
Based on the NBS data, we can determine the yearly anomalous population changes and the accumulated anomalous population change from 1954 to 1982. Our calculations of year-end anomalous population changes use statistics from the end of 1953 as a baseline. Accumulated figures for year-end anomalous population changes are found in Figure 1.

Based on Figure 1, we can divide China's anomalous population changes during this time into three periods.

First Period: 1954 to 1959. From the start of 1954 to the end of 1959, China's "accumulated anomalous population change" rose from 0 to 11.62 million, experiencing a rising trend. The rate of growth was relatively slow from the end of 1953 to the end of 1956, while the pace of growth picked up from the end of 1956 to the end of 1959. Utilizing the "accumulated anomalous population change" formula we can make the following basic points.

Inference 1: A very large number of duplicate migration registrations occurred between 1954 and 1959. The net figure is 11.62 million. It is determined by subtracting un-reported migrations from the gross figure. Below is the estimated net figure of duplicate migrations minus un-reported migrations. The population figures in the second and fourth deductions are also net figures.

Figure 1 Accumulated Figures for China's Year-End Anomalous Population Changes, 1954-1982 (unit: 10,000)



N.B.: The vertical coordinate indicates accumulated figures of anomalous population changes.

Second Period: 1960-1964. From the end of 1959 to the end of 1964, the "accumulated anomalous population change" dropped from 11.62 million to –14.82 million, a total fall of 26.44 million. That is, not only was the initial net duplicate migration registration of 11.62 million cancelled by a net unreported migration figure,the latter also additionally created a negative figure of 14.82 million. Combined, in five years the population appeared to have decreased by 26.44 million. This anomalous population change will be further explained later. Based on this we may consider:

Inference 2: The 11.62 million duplicate household registrations of the first period were cancelled in the period from 1960 to 1964.

Inference 3: A large number of unreported migrations took place from 1960 to 1964, reaching a net 14.82 million.

Third Period: 1965 to 1982. In the period from the end of 1964 to 1982, the "accumulated anomalous population change" exhibited a rising trend. This allows us to reach the following:

Inference 4: The 14.82 unreported migrations from inference 3 were subsequently retroactively registered from 1965 to 1982.

This allows us to present a unified reply to the four question raised above. Very importantly, from 1960 to 1964, China's registered population anomalously fell by 26.44 million in statistics largely due to household migrations. This drop was unrelated to population deaths.

5. Abnormal Population Changes and an Analysis of Their Causes, 1953-1959

Does the statistical analysis above reflect the real changes to China's populations in the 1950s to the 1970s? What are the social causes for the numerical changes to the population? What is the reality of population changes in China? Population changes in China during 1959-1961 should be seen against the backdrop of population changes from 1954 to 1959. So we must first analyze the true reasons for the anomalous population changes in that period.

5.1. Characteristics and the Reality of Population Changes in China, 1953 to the First Half of 1960

China's economic development began to pick up pace in 1953, and this brought about a high point in internal migration. There are two characteristics to the migrations in China during this period.

Rural-urban migrations: Due to the massive expansion of demand following the launch of the Great Leap Forward, a large number of migrants began to move from the countryside to the cities. China undertook its first five-year plan in 1953. According to a major research: "In order to facilitate national construction, and the establishment and expansion of mining and manufacturing enterprises, the government organized the migration of a large number of farmers to the cities, and absorbed a large number of spontaneous migrants from the countryside. This formed a wave of migration that mainly consisted of rural-to-urban migrants." The launching of the Great Leap Forward in 1958 "led to the rapid expansion of urban industrial production and a sharp increase in demand for labor power. This induced a boost in migrants, and led to a wave of rural-urban migration on a scale unprecedented since the founding of the PRC." In this period, "population migration was extraordinarily active, and the main stream was rural-to-urban migration spurred on by the Great Leap Forward." It is estimated that "in the three years of the Great Leap from 1958 to 1960, more than 10 million farmers moved to the cities each year."[19]

Particularly notable was also migration in the eastern and northern areas. During the First Five-Year Plan: "There were a large number of both industrial migrants as well as reclamation migrants. People from coastal regions in the east and heavily populated central regions migrated to the northeast, northwest and northern central China to build industrial districts and reclaim wasteland." From 1958 to 1960 industrial and reclamation migrants made up most of the overall migration.[20]

The large-scale migration that took place during this period had a great and lasting effect on China's population changes. For instance, from 1954 and especially 1958 to the first half of 1960, the large migration of people from the countryside to the cities necessarily led to a large reduction in the rural population. At the same time given the large

numbers of migrants from eastern (and central) China to the north and border areas to work in industry or to open up new land, this in turn led to a reduction in the population of eastern (and to a lesser extent central) China. Yet these facts have been overlooked by some researchers.

5.2. Urban and Rural Population Change and Their Causes, 1956-1959

Because the Public Security Bureau announced and implemented the "Provisional Regulations on Urban Household Registration Management" as early as 1951, and because the focus of household registration was on urban areas, the management of household registration was much more strict in urban than rural areas. Hence statistics for urban household registration are more accurate. Let us examine China's urban population changes during this period.

Table 3 Urban Population Changes, 1956-1959 (unit: 10,000)

Year	Year-end Household Registration Population	Natural Population Growth Rate (‰)	Natural Population Growth	Household Registration Population Growth	Net Household Registration Population In-Migration
1955	8,285				
1956	9,185	30.44	266	900	634
1957	9,949	36.01	345	764	419
1958	10,721	24.33	251	772	521
1959	12,371	18.51	214	1,650	1,436
Totals			1,076	4,086	3,010

In Table 3, the year-end urban household registration numbers were taken from the NBS 1983 data. Because the yearly statistical yearbook did not include the natural population growth rate of the "urban" population (or the number of natural population increase), and only published the "municipal" and "county" natural population growth rate,[21] we will use the "municipal" natural population growth rate to estimate the "urban" natural population growth rate.[22] In the table, the growth of household registered population = year-end household registered population – previous year year-end population; net household registered migration = household registration population increase – natural population increase, and this is also the net migration between urban and rural areas. A positive number is in-migration, while a negative number is out-migration.

Based on data from Table 3, in the four years from 1956 to 1959, China's household registered urban population increased by 40.86 million. Of this growth, only 10.76 million was accounted for by natural population growth (increase taking into account births and deaths). *This left 30.1 million unaccounted for, which in turn means that 30.1 million individuals migrated from the countryside to urban areas, and is the net figure of migrants who registered their household in urban areas.*[23] This fits with the historical reality of large-scale migration in China during this period that rural people "moved into the cities like a wave", and "the total number of rural-to-urban migrants each year surpassed 10 million".[24] This also shows that the urban household registrations from then on fairly accurately reflect the real population changes in urban China during this period.

Let us now examine population changes to the rural population during this period.

Table 4 Rural Population Changes, 1956-1959 (unit: 10,000)

Year	Year-end Household Registration Population	Natural Population Growth	Household Registration Population Growth	Net Household Registration Population In-Migration
1955	53,180			
1956	53,643	1,004	463	–541
1957	54,704	1,134	1,061	–73
1958	55,273	873	569	–304
1959	54,836	463	–437	–900
Total		3,474	1,656	–1,818

Table 5 Rural-to-Urban Migration, 1956-1959 (unit: 10,000)

Year	Urban Household Registration Net In-Migration	Rural Household Registration Net In-Migration	Anomalous Population Changes
1956	634	–541	93
1957	419	–73	346
1958	521	–304	217
1959	1,436	–900	536
Total	3,010	–1,818	1,192

In Table 4, year-end rural household registration data are again taken from the same NBS data. Because the statistical almanac from that year did not release data on the natural population growth rate of the rural population (or the total natural population increase), the estimates we employ are arrived at by subtracting the urban natural population growth (Table 3) from the national natural population growth numbers (see Table 2). Household registration growth numbers and household registration net migrations are shown in Table 3. Table 4 reveals that in the four years from 1956 to 1959, China's rural population increased by 34.74 million, but the household registration population only increased by 16.56 million, leaving a discrepancy of 18.18 million. Linking this to the historical fact of the large-scale rural-to-urban migration that occurred during this period, we can conclude that this 18.18 million represents the net figure of rural-to-urban migrants that canceled their rural household registration. Using data from Table 3 and Table 4, we can merge the data on the rural-to-urban household registration migrants into Table 5. Positive numbers represent in-migration, while negative numbers represent out-migration.

The last column in Table 5 is the sum of column 2 and column 3 which is precisely the anomalous population change for each year (these figures match those found in the last column of Table 2 for the corresponding years). It is easy to see how this would be the case. We can now further engage in analysis of the source of China's anomalous population change during this period.

The second column of figures in Table 5 shows that from 1956 to 1959, China's urban population increased by 30.10 million due to in-migration. It is obvious that this migration came mainly from rural areas. If these individuals had registered as out-migrants and canceled their rural household registration, then China's rural household registration

numbers should have decreased by 30.1 million, after taking into consideration natural population growth. However, column 3 in Table 5 (and Table 4) tells us that China's rural household registered population only decreased by 18.18 million, after taking into consideration natural population growth. This is 11.92 million less than anticipated.

This reveals the fact that 30.1 million individuals migrated from rural areas to urban areas and registered their households in urban areas. But only 18.18 million of these migrants submitted out-migration registration in their original rural residency areas. The remaining 11.92 million did register their households in urban areas, but failed to deregister their original rural residency. As a result these individuals came to have duplicated household registrations (in both rural and urban areas). The last column in Table 5 shows figures for each year's duplicate household registrations created due to migration, and these are precisely the anomalous population change numbers for each year. This clearly shows that from 1956 1959, the anomalous population changes in China were mainly due to migration, unrelated to births and deaths and their recording during this period.

The above discussion deals with the conditions from 1956 to 1959. For the years 1954 and 1955, Table 2 shows that there were over 300,000 unrecorded migrants during those two years. Subtracting this 300,000 from the aforementioned 11.92 million duplicate household registrations due to migration, we can conclude that by the end of 1959 there were net duplicate household registrations reaching 11.62 million.

The above analysis shows that the total population statistics for China at the end of 1959 included 11.62 million duplicate (and falsely reported) household registrations that have been caused by migration. The case of Shandong's overestimation of its population by 1.52 million in 1959 by including duplicate registrations provides an excellent illustration of our conclusions.

The facts listed above show that large-scale migration within China resulted in very large anomalous population changes in household registration statistics. Clarifying this point is first key step in solving the puzzle of the anomalous population changes during China's famine. Our analysis explains the reasons behind such changes from 1956 to 1959. This is a blind spot in nearly all of the research on this issue within China and internationally.

During this period there were also legal gaps in China's household registration system. The "State Council Directive on Establishing a Regular Household Registration System" stipulated that: "If an entire household or individual moves to a new address ... they must provide an out-migration certificate or other proof ... before being registered in the new location."[25] In other words, when migrating it was possible to not register as an out-migrant, yet still register as an in-migrant, as long as one possessed "other proof" (such as a work ID, a voting certificate, or a diploma of graduation). This legal gap and duplicate household registrations were exacerbated by various economic and other interests, leading to large-scale duplicate household registrations in China during this period.

6. Anomalous Population Changes in China from 1960 to 1964, and an Analysis of Their Causes

6.1. Large-scale Urban Population Reduction in China, 1960 to 1964

In the second half of 1960, due to serious difficulties in the Chinese economy, the central government decided to undertake major policy changes. Against this backdrop, from the second half of 1960 to 1964, China's migration patterns underwent a major shift, changing fundamentally from rural-to-urban migration to urban-to-rural migration.

The significant reduction in urban population began in the second half of 1960, but mainly occurred from 1961 to 1963.

"In the second half of 1960, based on the spirit of a series of instructions from the party central committee, various locales quickly undertook a clearing out of labor to fill out the front lines in rural production. A portion of employees in various agencies were sent down."[26] At the Central Work Conference in Beijing, May and June 1961, a major decision was reached to undergo a large-scale reduction in the urban population. The conference passed the "Nine Ways of Reducing Urban Population and Urban Grain Consumption", which clearly stipulated that "according to the baseline urban population level of 129 million, within three years the urban population will be reduced by 20 million. And this year's goal is at least 10 million."[27] The result of this nationwide work was that the urban population fell by 10 million during the course of 1961 alone.[28]

On February 14, 1962, the party central committee issued a "Decision Regarding Continuing To Reduce the Urban Population by 7 Million in the First Half of 1962", stipulating that the main target of the urban population reduction would be new workers who had moved to urban areas since 1958.[29] The Central Work Conference held in May decided that based on the urban population reduction of 10 million in 1961, the urban population would be reduced by a further 20 million by the end of 1963.[30] On May 27, the party central committee and the State Council issued the "Decision Regarding Continuing To Streamline Urban Employees and Lower the Urban Population". It instructed that "employees that migrated from rural areas since 1958 ... in most cases should return to their hometowns. Employees that migrated from rural areas before the end of 1957 should also be advised to return to their hometowns if this is feasible."[31] This shows that the major reduction in the urban population took place after 1956, and had a particular effect on

rural migrants to urban areas after 1958. These individuals returned to their rural hometowns.

6.2. Urban and Rural Population Changes and Their Causes, 1961 to 1963

Due to the fact that household registration statistics for urban areas are relatively accurate, we begin by analyzing the population change in urban areas during this period.

Table 6 Urban Population Changes, 1961-63 (unit: 10,000)

Year	Year-end Household Registration Population	Natural Population Growth Rate (‰)	Natural Population Growth	Household Registration Population Growth	Net Household Registration Population In-Migration
1960	13,073				
1961	12,707	10.24	132	–366	–498
1962	11,659	27.18	331	–1,048	–1,379
1963	11,646	37.37	435	–13	–448
Total			898	–1,427	–2,325

The sources, definitions, and methods of calculation for data in Table 6 are the same as for Table 3.[32]

Table 6 shows that in the three years from 1961 to 1963, China's urban household registered population dropped by 14.27 million, despite a natural population growth of 8.98 million. Taking into consideration natural population growth, China's urban household registered

population fell by 23.25 million during this period. This figure represents the urban population that migrated out of urban areas and had their urban household registration canceled during the population reduction movement.

In rural areas, Table 7 shows the population changes from 1961 to 1963. Data in this table were calculated in the same fashion as for Table 4.

Table 7 Rural Population Changes in China, 1961-1963 (unit: 10,000)

Year	Year-end Household Registration Population	Natural Population Growth	Household Registration Population Growth	Net Household Registration Population In-Migration
1960	53,134			
1961	53,152	117	18	–99
1962	55,636	1,463	2,484	1,021
1963	57,526	1,835	1,890	55
Totals		3,415	4,392	977

Table 7 reveals that in the three years from 1961 to 1963, the natural growth of China's rural population (calculated from natural births and deaths) was 34.15 million, while the household registered population increased by 43.92 million. There is a discrepancy of 9.7 million between these two figures. Linking this finding with the historical fact of the urban population reduction movement that was ongoing at the same time, we can understand that this figure of 9.7 million is the net figure of

migrants who were sent down from the city back to the countryside and registered in rural areas as in-migrants.

Table 8 combines data from Table 6 and Table 7, which include the sums of population that migrated from urban to rural areas. Positive numbers in the two columns signify in-migration, while negative numbers stand for out-migration.

Table 8 Urban-to-Rural Migration, 1961-1963 (unit: 10,000)

Year	Urban Household Registration Net Migration	Rural Household Registration Net Migration	Anomalous Population Changes
1961	–498	–99	–597
1962	–1,379	1,021	–358
1963	–448	55	–393
Totals	–2,325	977	–1,348

The last column in Table 8 is the sum of column 2 and column 3, and is identical to the yearly abnormal population change figures (also identical to the last column of Table 2 for the corresponding years). This correspondence is predictable.

The second column of figures in Table 8 shows that China's urban population dropped by 23.25 million from 1961 to 1963, due to the population reduction movement. It is apparent that this population migrated from urban to rural areas. If all of these individuals registered their households in rural areas, the rural population should have increased by 23.25 million, excluding natural population growth. However, the 3rd column in Table 8 (as well as Table 7) reveals that the

rural household registered population only increased by 9.77 million during this period, 13.48 million less than expected.

This shows the fact that of the 23.25 million out-migrants from urban areas who cancelled their urban household registration, only 9.77 million (re)registered their households in rural areas. The remaining 13.48 million did cancel their urban household registration before migrating to rural areas, but did not undertake rural in-migration registration, and as a result were unreported within the household registration system. The last column in Table 4 and 6 shows the figures for this population by year (this is also one of the sources of the abnormal population changes). This clearly shows that the abnormal population change of 1961 to 1963 (reflected in abnormal numbers of population change) was caused by migration, and unrelated to births, deaths and their recording.

This was the situation from 1961 to 1963. If we consider the conditions from 1960 to 1964 (as the urban population reduction work had already begun by 1960), then we can conclude that there were 14.82 million unreported migrations by the end of 1964.

6.3. On the Question of Whether Non-Registration Would Affect An Individual's Ability to Survive

Given the novelty of the above conclusions, critiques are expected. Debating central and related issues would be an excellent way of promoting sound further research. Yang Jisheng, for example, has raised the question: "Everyone knows that in that era, individuals' basic material provisions were obtained through food coupons and other supply certificates. If a person moved from one locale to another ... without registering in the new location, he/she would not be able to eat. Yet Mr. Sun concludes that tens of millions of individuals migrated without registering. What did these people eat?"[33] This is a serious

objection and must be adequately replied.

There were two distinct conditions for securing food in China during this period. For urban residents, "household registration" was a precondition for a supply of grain and other food coupons. If an individual was not registered within a household, then s/he would not have the needed certificates to gain regular access to a secure food supply, and would find it difficult to survive. But most of China's population were rural residents. The majority of them could produce their own grain, and did not need to purchase it or use any food coupons. At the time, as long as a rural resident participated in collective labor they would receive a proportionally distributed grain according to the "individual-labor ratio" [of the production unit].

China experienced a large-scale rural-to-urban migration from 1956 to 1959, and then an urban population reduction from 1961 to 1963. When the rural migrants returned to the countryside, the vast majority returned to their home villages where they had families and houses to live in. Obviously in normal cases they participated in collective labor and could receive their due reward without purchasing commodity grain. So there was no issue of them "being unable to eat". For this population, the lack of household registration had a limited impact on their lives. If they were not registered, they might not have been able to receive cloth and cooking oil ration tickets, but many rural areas produced their own cotton and oil crops. Moreover, for most of those migrated individually without bringing their families with them, the family members had remained registered, and would receive their own cloth and cooking oil ration tickets to share. As such individuals who had not registered their household would not be impacted heavily. As the focus of China's household registration system was to control the flow of rural residents into the cities, the system had a much smaller effect on the daily lives of rural residents.

The figure of 14.82 million missed household registrations is a large number in absolute terms, but only accounts for approximately 2.1% of China's total population at the time. Given the conditions in those years, it should be considered normal to have an unregistered population of such a scale in rural areas overall.

From 1960 to 1964, a large number of duplicate household registrations were gradually cancelled (reaching 11.62 million individuals). But a large number of unreported household registrations also occurred (reaching 14.82 million). Added together the figure is 26.44 million. These twin causes are the real reason for a large anomalous drop in the population for five consecutive years from 1960 to 1964, according to household registration statistics. As to why the 1964 census did not correct the error of unreported population, the obvious explanation is the fact that the focus of that census was to clarify duplicate registration in response to the pressure of shortage of food supply. Moreover, from the point of view of household registration management, duplicate registration with documented record was easy to rectify as compared with unreported population without a complete record in household registration.

6.4. Anomalous Population Change, 1965 to 1982

Following the recovery and growth of China's economy, industry and other sectors in urban areas needed a large number of new workers again. Most of the 14.82 million individuals who were sent back to the countryside but did not reregister in their hometowns between 1960 and 1964 now asked to return to urban areas. As a result during the long period from 1965 to 1979 (mainly from 1970 to 1979), various government departments at all levels expended an exceptional amount of energy to deal with this issue that history had left over. As the cases of these individuals were gradually solved, the majority of the 14.82

million people returned to cities and registered their households in urban areas. The remainder for various reasons also registered their households in rural areas. This led to an abnormal and continuous increase in the household registration from 1970 to 1979.

This can answer the third question posed above ("What was the cause of the anomalous population increase for the twenty years of 1968-1979?"), and confirm inference 4 ("The 14.82 duplicate migration registrations were subsequently retroactively registered from 1965 to 1982"). From 1965 to 1982, China's abnormal population growth reached 14.83 million (see Table 2), a figure that very closely matches the sum of 14.82 million. This proves from a different perspective that there were really 14.82 million missed household registrations from 1960 to 1964. As a result, from 1956, China experienced 24 years of household registration abnormal population change, sometimes positive, and sometimes negative. This situation roughly ended in 1979.

As we have demonstrated, the population statistics released by the NBS in 1983 were based on aggregated national household registration data. The NBS did not revise or fabricate these data. However, there was a major problem in these data, as seen in their "abnormal population changes". What we should realize is that these data came from household registrations, and confirmed the patterns and specificities of that system. The problems and contradictions exhibited in the data were only superficial, and can be resolved through rational explanation of their causes.

If the data's major contradiction can be plausibly explained as we have attempted above, the abnormal population reduction of 26.44 million in China's official record from 1960 to 1964 may not be attributable to abnormal deaths during the GLF famine. The prevailing view on the famine toll might be untenable given the historical evolution of the household registration system and its attendant data. In light of

our research, this specific reduction of 26.44 million was unrelated to actual deaths.

7. Needed Adjustments on China's Mortality Rates of 1959-1961

Further from the analysis in the previous sections, we can now address the specific question concerning China's famine deaths during the "three difficult years".

Table 9 China's Mortality Rates 1949-1958[34]

Year	Mortality ‰	Year	Mortality ‰
1949	20.00	1954	13.18
1950	18.00	1955	12.28
1951	17.80	1956	11.40
1952	17.00	1957	10.80
1953	14.00	1958	11.98

As shown in Table 9, China's gross mortality rate was 20‰ in 1949 and 10.80‰ in 1957. Within merely eight years, that rate had astonishingly declined almost by half on paper, while the same reduction took 30 years by the world's average speed.

Table 10 below tells us that normally a reduction of mortality rate from 20‰ to 10‰ would take 20-35 years, which is far more than China's record of eight years. In eight years, from the starting point of 20‰, the marks of all the countries recorded reached no further than 15.3‰ as compared to China's 10.8‰. Given that China is the world's most populous country and its mortality reduction should show more inertia than others, apparently the existing statistics of its mortality rate

in that period was incredibly low or the decline of that rate was too fast to be credible.

Table 10 Mortality Rates of States in Asia and the Middle East[35]

States	Time needed for mortality reduction from 20‰ to 10‰ (year)	Mortality reduction from 20‰ in eight years (‰)
India	32.6	16.9
Bangladesh	20.7	15.3
Indonesia	22.3	15.6
Iran	23.5	15.8
South Korea	26.2	16.2
Pakistan	27.0	16.3
The Philippines	32.3	16.8
Thailand	35.8	17.1
Turkey	28	16.4
Egypt	29	16.5
Average	27.7	16.3

The explanation of these extraordinary figures can be found precisely in the major shift in China's household registration system discussed above. That is, since that system had not been rigorously operational until 1958, there was a serious underreporting of deaths (mainly in rural areas). The actual mortality rate between 1949 and 1957 (especially 1953-57) could not be as low as what was recorded. The mortality rate of the same period should be adjusted upward.

In the 1950s, the government conducted two sampling surveys which confirmed our findings. In 1953, a dynamic national survey of

30.18 million people resulted in a mortality rate of 17‰.[36] The 1957 survey of age differentials of the population and ages at death included 52.25 million people in 126 cities and counties and 171 townships in 19 provinces, autonomous regions and centrally administered municipalities. The resulting mortality rates were 8.59‰ for cities and 13.43‰ for counties.[37]

Based on these numbers, the estimation of the rate of underreported deaths is 17.65% in 1953 and 16.34% in 1957. The actual mortality rates should therefore be adjusted accordingly.

Table 11 Adjusted Mortality Rates, 1953-1958[38]

Year	Published mortality rate (‰)	Published deaths (10,000)	Underreporting of death (%)	Adjusted mortality rate (‰)	Adjusted death (10,000)	Underreported death (10,000)
1953	14	814	17.65	17	988	87 (half year)
1954	13.18	779	17.32	15.94	943	164
1955	12.28	745	16.99	14.79	898	153
1956	11.4	706	16.67	13.68	848	142
1957	10.8	688	16.34	12.91	822	134
1958	11.98	781	8.17	13.05	851	70
Total						750

Based on adjusted mortality rate, we can work out that between the first national census in 1953 (by 30 June) and the end of 1958, underreported deaths were about 7.5 million in total.

During 1959-61, the government implemented "Regulations on Household Registration" (*hukou tiaoli* 户口条例) and it became clear

that there was a problem of underreporting. Further analysis allows us to also note that among the estimated 7.5 million of underreported deaths, about 6.75 million were cleared during the famine years by deregistration from the *hukou* record. This correspondingly created a false increase of deaths in the same number of 6.75 million.

During those three years, the total number of registered deaths was 36.02 million. This number should be deducted by 6.75 million of unreported deaths. The actual mortality of the period would then be 29.27 million. We could thus make statistical adjustments accordingly.

Table 12 Adjusted Statistics of China's Demography, 1953-1982[39]

	Registered numbers	Adjusted numbers					Difference
Year	End-of-year population (10,000)	End-of-year population (10,000)	Birth	Birth rate (‰)	Death	Death rate (‰)	10,000
1953	58,796	58,709					87
1954	60,266	60,011	2,245	37.82	943	15.89	255
1955	61,465	61,091	1,978	32.67	898	14.83	374
1956	62,828	62,219	1,976	32.05	848	13.75	609
1957	64,653	63,564	2,166	34.44	821	13.05	1,089
1958	65,994	64,618	1,905	29.72	851	13.28	1,376
1959	67,207	65,295	1,647	25.36	970	14.93	1,912
1960	66,207	65,666	1,389	21.21	1,018	15.55	541
1961	65,859	65,915	1,188	18.06	939	14.27	–56
1962	67,295	67,686	2,460	36.83	689	10.31	–391
1963	69,172	69,933	2,954	42.93	707	10.27	–761
1964	70,499	71,981	2,729	38.46	681	9.60	–1,482

Table 12 (Cont.)

	Registered numbers	Adjusted numbers					Difference
Year	End-of-year population (10,000)	End-of-year population (10,000)	Birth	Birth rate (‰)	Death	Death rate (‰)	10,000
1965	72,538	74,008	2,704	37.04	678	9.29	–1,470
1966	74,542	75,936	2,577	34.37	649	8.66	–1,394
1967	76,368	77,863	2,563	33.33	636	8.27	–1,495
1968	78,534	79,984	2,757	34.93	636	8.06	–1,450
1969	80,671	82,060	2,715	33.51	639	7.89	–1,389
1970	82,992	84,174	2,736	32.92	622	7.48	–1,182
1971	85,229	86,128	2,567	30.15	613	7.20	–899
1972	87,177	88,038	2,566	29.47	656	7.53	–861
1973	89,211	89,880	2,463	27.69	621	6.98	–669
1974	90,859	91,454	2,235	24.65	661	7.29	–595
1975	92,420	92,892	2,109	22.88	671	7.28	–472
1976	93,717	94,070	1,853	19.82	675	7.22	–353
1977	94,974	95,208	1,787	18.88	649	6.86	–234
1978	96,259	96,355	1,745	18.22	598	6.24	–96
1979	97,542	97,480	1,727	17.82	602	6.21	62
1980	98,705	98,640	1,779	18.14	619	6.31	65
1981	100,072	100,080	2,069	20.82	629	6.33	–8
1982	101,541	101,541	2,126	21.09	665	6.60	0

If we are correct about China's actual total deaths as 29.27 million during 1959-1961, then using the adjusted mortality rate of 1957 as the baseline, the famine death toll due to starvation should be about 3.66 million.[40] This figure cannot be treated as exact and conclusive, but is nonetheless a logical conclusion from examining anomalous population change data for the three periods discussed above. The point is that any discussion of the anomalous population change during the GLF should not, and cannot be separated from discussing anomalous population change both before and after. More extensive discussions and mathematical proofs are forthcoming (in *Return Truth to History: A Rebuttal about "30 Million Famine Deaths"*). We fully acknowledge that this research remains preliminary and should be followed by serious and more extensive scholarly scrutiny and debate.

Notes

[*] Sun Jingxian 孙经先, Professor of Mathematics at Shandong University (山东大学) and Jiangsu Normal University (江苏师范大学), is an independent and experienced scholar in applied mathematics within the social sciences. He is completing a book about anomalous deaths during the Great Leap Forward, in which he carefully examines an established literature produced in part by such influential scholars as Ansley J. Coale and Judith Banister, as well as Jiang Zhenghua 蒋正华, Cao Shuji 曹树基, Yang Jisheng 杨继绳 and others. Based on extensive historical and archival research, including over 2,000 local chronicles and county chorographic records, he identifies a series of major errors in statistical compilation, computation, and analysis. His conclusion shows how the previous consensus on a famine death toll of around 30 million is fundamentally flawed. This paper forms a part of this research project, one that he has embarked on since 2010; in it he proposes an innovative

approach to explain discrepancies in the official demographic statistics for 1954-82. The author would like to thank Professor Yan Hairong 严海蓉 and her colleagues Daniel Vukovich 胡德 , Lin Chun 林春 , Gao Mobo 高默波 , and Cao Tianyu 曹天予 for their support and help, and Jonathan Lassen for his original translation of this paper into English. <*Email: jxsun7083@163.com*>

1. See Li Chengrui 李成瑞 (1997). ‘大跃进’引起的人口变动 [population changes caused by the ‘Great Leap Forward’]. 中共党史研究 [*Journal of Chinese Communist Party History Studies*], No. 2, p. 2.
2. National Statistical Bureau (国家统计局). *China Statistical Yearbook 1983* (中国统计年鉴 1983). 北京：中国统计出版社 (Beijing: China Statistical Publishing House), pp. 103-105.
3. Lu Yu 路遇 and Zhai Zhenwu 翟振武 (eds) (2009). 新中国人口六十年 [population in new China over six decades]. 中国人口出版社 (China Population Publishing House), p. 912.
4. Based on the first nationwide census, China’s rural population accounted for 86.75% of China’s total population (*ibid.*, p. 855).
5. *Ibid.*, p. 914.
6. *Ibid.*, p. 924.
7. See <*http://www.chinabaike.com/law/zy/xz/gwy/1331745.html*>.
8. Lu Yu 路遇 and Zhai Zhenwu 翟振武 (eds) (2009). 新中国人口六十年 [population in new China over six decades]. 中国人口出版社 (China Population Publishing House), p. 916.
9. Quoted in Yang Jisheng 杨继绳 (2010). 墓碑：一九五八 —— 一九六二年中国大饥荒纪实 [*Tombstone: The Great Chinese Famine 1958-1962*], 8th edition. Hong Kong: Tiande Publishing Co., p. 252.
10. 山东省地方史志编纂委员会 (Shandong Provincial Historical Compilation Committee) (1994). 山东省志人口志 (*Shandong Provincial History Gazetteer*). 齐鲁书社 (Qilu Publishing House), p. 189, p. 230.

11. 贵州省地方志编纂委员会 (Guizhou Provincial Historical Compilation Committee) (2003). 贵州省志公安志 (*Guizhou Provincial History Gazetteer*). 贵州人民出版社 (Guizhou People's Publishing House), p. 523.
12. 山东省地方史志编纂委员会 (Shandong Provincial Historical Compilation Committee) (1994). 山东省志人口志 (*Shandong Provincial History Gazetteer*). 齐鲁书社 (Qilu Publishing House), pp. 230-231
13. *http://www.law-lib.com/law/law_view.asp?id=1338*
14. *http://www.law-lib.com/law/law_view.asp?id=1338*
15. *Ibid.*
16. Quoting Li Chengrui 李成瑞 (1997). '大跃进' 引起的人口变动 [population changes caused by the 'Great Leap Forward']. 中共党史研究 [*Journal of Chinese Communist Party History Studies*], No. 2, pp. 2-3.
17. Annual year-end population data are from the National Statistical Bureau (国家统计局). *China Statistical Yearbook 1983* (中国统计年鉴 1983), p. 103; yearly natural population growth data are from National Statistical Bureau and Public Security Bureau, Third Division (国家统计局人口统计司、公安部三局) (eds) (1988), 中华人民共和国人口统计资料汇编：1949—1985 [*PRC Population Statistical Data Compilation, 1949-1985*], 中国财政经济出版社 (China Financial and Economic Publishing House), p. 268. Natural population growth rate for 1982 was calculated using this equation and based on a natural growth rate for this year of 14.49‰. "Anomalous population changes" are calculated according to the equation.
18. The selection of a baseline at 0 is only to facilitate discussion. Even if it were the case that there were duplicate migration registrations or unreported migrations at the end of 1953, it would not have a practical impact on the statistics discussed in the following pages.
19. Lu Yu 路遇 and Zhai Zhenwu 翟振武 (eds) (2009). 新中国人口六十年 [population in new China over six decades]. 中国人口出版社 (China Population Publishing House), pp. 400-401, 405-406.

20. *Ibid.*, pp. 401-405, 407-408.
21. See National Statistical Bureau (国家统计局). *China Statistical Yearbook 1983* (中国统计年鉴 1983), p. 103, p. 105.
22. A certain amount of error is introduced by using the "municipal" natural population growth rate to estimate the "urban township" natural population growth rate. But because the city population is the largest component of the "urban" population, the difference between the city and urban township's natural population growth rate cannot be very large. This means that our use of the "municipal" statistics to stand for "urban" statistics will not significantly affect our conclusions.
23. There may have been a number of individuals who migrated from urban to rural areas during this period, and the net figure here excludes these individuals. Data for migrants is understood in this fashion throughout this paper.
24. Lu Yu 路遇 and Zhai Zhenwu 翟振武 (eds) (2009). 新中国人口六十年 [population in new China over six decades]. 中国人口出版社 (China Population Publishing House), p. 406.
25. The PRC State Council (中华人民共和国国务院), " 关于建立经常户口登记制度的指示 " (Directives on Establishing a Permanent Household Registration System), June 22, 1955.
26. Luo Pinghan 罗平汉 (2003). 大迁徙：1961—1963 年的城镇人口精简 [great migration: urban population streamlining, 1961-63]. 南宁：广西人民出版社 (Nanning: Guangxi People's Publishing House), p. 138.
27. " 中央工作会议关于减少城镇人口和压缩城镇粮食销量的九条办法 " (Nine Ways of Reducing Urban Population and Urban Grain Consumption), June 16, 1961. In: 建国以来重要文献选编，第十四册 [*A Selection of Important Documents since the Founding of the PRC*, Vol. 14], 北京：中央文献出版社 (Beijing: Central Documentation Publishing House), 1997, p. 412.

28. Luo Pinghan 罗平汉 (2003). 大迁徙：1961—1963 年的城镇人口精简 [great migration: urban population streamlining, 1961-63]. 南宁：广西人民出版社 (Nanning: Guangxi People's Publishing House), p. 154.
29. *Ibid.*, pp. 185-186.
30. *Ibid.*, p. 197.
31. "中共中央、国务院关于进一步精简职工和减少城镇人口的决定" (The Central Party Committee and the State Council, "Decision on Continuing To Streamline Urban Employees and Lower the Urban Population"), May 27, 1962. In: 建国以来重要文献选编，第十五册 [*A Selection of Important Documents since the Founding of the PRC*, Vol. 15], 北京：中央文献出版社 (Beijing: Central Documentation Publishing House), 1997, pp. 462-467.
32. In Table 6, we take the natural population growth rate of the "city" as representing the "urban" natural population growth rate to incorporate also that of urban townships. This, as noted earlier, will create a statistically insignificant error. Such errors (also in Table 7 and Table 8) do not affect the abnormal population change statistics.
33. Yang Jisheng 杨继绳 (2012). 脱离实际必然走向谬误 —— 就大饥荒年代的人口问题与孙经先商榷 [escaping from reality necessarily leads to mistakes – a discussion with Sun Jingxian on the population question during the Great Famine], *The New York Times* Chinese edition, September 17, 2012.
34. National Statistical Bureau (国家统计局). *China Statistical Yearbook 1983* (中国统计年鉴 1983). 北京：中国统计出版社 (Beijing: China Statistical Publishing House), p. 105.
35. Yao Qiyuan 姚齐源 and Song Xiaoli 宋晓丽 (2010/2011). 三年困难时期异常死亡人数新探 [new research on abnormal death during the three years of hardship]. <*http://wenku.baidu.com/link?url=Ye3-YwqrbI0eBNfjwGr7qyd1a0FCbac4fIOBe1JPrc_0tzaAaKhsuzblXF7dPdHzS2ZSSvMAe9768_vac869B52YGGqvUQy3qCgFnZufOt_*>

36. Lu Yu 路遇 and Zhai Zhenwu 翟振武 (eds) (2009). 新中国人口六十年 [population in new China over six decades]. 中国人口出版社 (China Population Publishing House), p.53.
37. Wang Weizhi 王维志 (1987). 中国人口寿命问题研究 [a study of life expectancy in China]. 中国人口科学 [*China Demographic Science*], No. 1, 1987, p. 37 / Yang Zihui 杨子慧 (ed.) (1996). 中国历代人口统计研究 [a research in demographic statistics of China's dynasties]. 改革出版社 (Reform Publisher), p. 1615.
38. In this table, "published mortality rate" is taken from National Statistical Bureau (国家统计局). *China Statistical Yearbook 1983* (中国统计年鉴 1983), p. 105; "published death" from National Statistical Bureau and Public Security Bureau, Third Division (国家统计局人口统计司、公安部三局) (eds) (1988), 中华人民共和国人口统计资料汇编： 1949—1985 [*PRC Population Statistical Data Compilation, 1949-1985*], p. 268 (rounded off to 10,000). "Adjusted death" is calculated by "adjusted mortality rate".
39. In the table, death rate is calculated according to the baseline of adjusted end-of-year population. In the earlier sections adjusted death rate is calculated according to registered statistics. Insignificant discrepancies thus appear between the figures resulted from these two methods.
40. This famine death toll due to starvation is known in the scientific literature as a "superlinear death toll" (" 超线性死亡 " 人数):

    Superlinear death of a given year = a given year's average population x (a given year's mortality rate – mortality rate of baseline)

    A given year's average population = (beginning of the year's population + end of the year's population) ÷ 2. This paper uses 1957 as the baseline (基准年). Death toll due to starvation is only part of superlinear death.

Policy Comments