There Will Be Killing: Collectivization and Death of Draft Animals (Online Appendix)

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Appendix: Data Sources

Main Data

Our data sources consist of 20 declassified government files, 15 government reports (both internal and public), seven published compilations of statistics, and 1,720 county gazetteers. Appendix Figure A6 shows some pictures of these declassified files. We collect these documents from the National Library of China, university libraries in both mainland China and Hong Kong, the search engine Duxiu with full-text Chinese books for subscribers, and the Kongfuzi website, the largest online market in China for used or antique books and documents.

For 1,323 counties in 20 provinces, we find complete agricultural statistics compiled by the provincial bureaus of statistics or of agriculture. For a centrally planned economy in the 1950s, these statistics were indispensable to the planning committees and governments. There were three waves of provincial compilations of such statistics. The first wave was in 1958, which summarized the first five-year plan (1953-57). The second wave was in 1978-83, which reviewed the first three decades of the People's Republic of China. The third wave was in 2009, which was compiled to celebrate the 60th anniversary of the republic.

Where provincial compilations are unavailable, we use prefectural compilations of county statistics. A prefecture is an administrative division under a province, and each prefecture consists of several counties. We find 19 prefectural compilations of statistics of 155 counties. When neither provincial nor prefectural compilations are available, we use individual county gazetteers. China has a thousand-year-long tradition of recording local history in gazetteers. The most recent gazetteers were published in the late 1980s and 1990s. Every gazetteer has a section on agriculture that documents relevant policies and some official statistics of agricultural production. Few gazetteers, however, report the annual inventory of draft animals in the 1950s. We find such statistics in 252 county gazetteers. Below are the data sources, all in Chinese, ordered by provincial administrative division code.

11 Beijing Municipality

The statistics are from county gazetteers.

12 Tianjin Municipality

Historical Yearly Statistics of Animal Husbandry in Tianjin Municipality, the Bureau of Animal Husbandry in Tianjin Municipality, Hebei Science and Technology Press, 1988

Other statistics of agricultural production and population are from county gazetteers.

13 Hebei Province

Historical Agricultural Statistics in Chengde Prefecture: *1949-1978*, the Agricultural Bureau of Hebei Province, the Agricultural Bureau of Chengde Prefecture, 1979

Economic Statistics in Langfang Prefecture: *1949-197*9, the Statistic Bureau of Langfang Prefecture, 1980

Economic Statistics in Qinhuangdao Prefecture: *1949-19*84, the Statistic Bureau of Qinhuangdao Prefecture, 1985

The statistics of other counties are from county gazetteers.

14 Shanxi Province

Shanxi's Economy: Cities and Counties; Shanxi Economy Press, 1992

15 Nei Mongol Autonomous Region

Statistics of Agricultural and Animal Husbandry Production: 1947-1978, Volumes I-IV. the Statistic Bureau of Nei Mongol Autonomous Region, 1983

Brilliant Inner Mongolia: 1947-1999, China Statistics Press, 1999. We use this book for the data of population.

21 Liaoning Province

*One Decade of Economic Achievements of Jinzhou Prefecture 1949-19*58, the Statistics Bureau of Jinzhou Prefecture, 1959

Economic Statistics in Andong Prefecture: *1949-196*2, the Statistics Bureau of Andong Prefecture, 1964

Compendium of Economic Statistics in Benxi Prefecture: *1949-197*1, the Statistics Bureau of Benxi Prefecture, 1975

The statistics of other counties are from county gazetteers.

22 Jilin Province

Jilin Compendium of Statistics of Sixty Years of Agricultural Development: 1949-2009, Jilin Press Group Corporation, 2011

23 Heilongjiang Province

Heilongjiang Compendium of Economic Statistics (Agricultural and Subsidiary Production): 1949-1957, the Statistics Bureau of Heilongjiang Province, 1958

32 Jiangsu Province

Agricultural Statistics in Jiangsu Province: 1949-1975, Volumes I and II, the Agricultural Bureau of the Revolutionary Committee in Jiangsu Province, 1976

33 Zhejing Province

Agricultural Statistics in Hangzhou Prefecture (1949-1973), the Agricultural Bureau of Huzhou Prefecture, 1974

Progressive Huzhou Prefecture: Thirty-five Years of Economic Statistics (1949-1984), the Statistic Bureau of Huzhou Prefecture, 1985

*Vivid Wenzhou Prefecture: Four Decades of Great Economic and Social Achievements (1949-19*88), the Statistic Bureau of Wenzhou Prefecture, 1989

*Four Decades of Zhoushan Prefecture (1949-19*88), the Statistic Bureau of Zhoushan Prefecture, 1989

*Progressive Taizhou Prefecture: 1947-199*0, the Statistics Bureau of Taizhou Prefecture, China Statistics Press, 1994

The statistics of other counties are from county gazetteers.

34 Anhui Province

The statistics are from county gazetteers.

35 Fujian Province

Fujian Compendium of Statistics (the Agricultural Sector): 1950-1957, the Planning Committed of Fujian Province, the Agricultural Bureau of Fujian Province, and the Statistic Bureau of Fujian Province, 1958

36 Jiangxi Province

Jiangxi Compendium of Agricultural Statistics, by Cities and Counties (1949-1965), Volumes I and II, the Bureau of Agriculture, Animal Husbandry, and Fishery in Jiangxi Province, 1989

37 Shandong Province

Statistics of Agricultural Production of Shandong Province during the First Five-Year Plan Period: 1952-1957, the Agricultural Bureau of Shandong Province, and the Statistic Bureau of Shandong Province, 1958

41 Henan Province

Agricultural Statistics in Henan Province in the Three Decades since 1949: 1949-1979, Volumes II-XI, the Agricultural Bureau of Henan Province, and the Statistic Bureau of Henan Province, 1981

42 Hubei Province

Agricultural Statistics in Hubei Province: 1949-1975, Volume II, the Agricultural Bureau of the Revolutionary Committee in Hubei Province, 1979

Agricultural Statistics in Hubei: 1949-1978, the Agricultural Bureau of Hubei Province, 1980

43 Hunan Province

Economic Statistics in Hunan Province (Section 2: Agriculture): 1949-1975, Volumes 3-5, the Statistics Bureau of Hunan Province, 1978

44 Guangdong Province

Agricultural Statistics in Guangdong Province (1949-1981, by Cities and Counties), Statistics Bureau of Guangdong Province, 1982

45 Guangxi Zhuang Autonomous Region

Economic Statistics in Guangxi Zhuang Autonomous Region (Agriculture): 1949-1980, Volumes II and III, the Statistics Bureau of Guangxi Zhuang Autonomous Region , 1985

46 Hainan Province

Agricultural Statistics in Guangdong Province (1949-1981, by Cities and Counties), Statistics Bureau of Guangdong Province, 1982

In 1982, Hainan was still a part of Guangdong province.

50/51 Chongqing Municipality and Sichuan Province

Agricultural Statistics in Wenjiang Prefecture of Sichuan Province: 1949-1979, the Statistic Bureau of Wenjiang Prefecture, 1980

Historical Agricultural Statistics in Leshan Prefecture: *1949-19*86, the Agricultural Bureau of Leshan Prefecture, 1988

Historical Statistics of the Economic and Social Development in the Ethnic Minority Regions in Sichuan Province: *1949-19*85, the Committee of Minorities Affair of Sichuan Province, and the Statistics Bureau of Sichuan Province, 1988

The statistics of other counties are from county gazetteers.

52 Guizhou Province

Economic Statistics of Bijie Prefecture in Guizhou Province: 1949-1959, the Statistics Bureau of Bijie Prefecture, 1960

*Forty Years of Progress in Qiannan Prefecture: 1949-19*88, the Editorial Committee of the Book, and the Statistics Bureau of Qiannan Buyei and Miao Autonomous Prefecture, 1989

Fifty Years of Tongren Prefecture: 1949-2009, the Editorial Committee of the Book, 1999

Sixty Years of Zunyi Prefecture: 1949-2009, the Statistics Bureau of Zunyi, and the Survey Team of Zunyi of the National Bureau of Statistics, 2009

The statistics of other counties are from county gazetteers.

53 Yunan Province

Glorious Sixty Years of Yunan Province, Volumes of Economic Achievements,the Statistics Bureau of Yunnan Province, Yunnan Press Corporation, Yunnan People Press, 2010

61 Shaanxi Province

*Forty Years in Yulin Prefecture: 1949-19*88, the Statistics Bureau of Yulin Prefecture, 1989

*Forty Years in Weinan Prefecture: 1949-19*88, the Statistics Bureau of Weinan Prefecture, 1989

Xi'an Compendium of Historical Statistics: *1949-19*89, Volume I, the Statistics Bureau of Xi'an Prefecture, China Statistics Press, 1995

The statistics of other counties are from county gazetteers.

62 Gansu Province

Statistics in Agriculture, Forestry, Animal Husbandry, Water Conservation, and Weather in Gansu Province: 1949-1957, the Division on Rural Issues of the Committee of Chinese Communist Party of Gansu Province, 1958

63 Qinghai Province

Economic Statistics in Qinghai Province :1949-1979, the Statistics Bureau of Qinghai Province, 1981

64 Ningxia Hui Autonomous Region

Economic Statistics in Ningxia Hui Autonomous Region (Agriculture) :1949-1965, Statistics Bureau of Ningxia Hui Autonomous Region, 1966

65 Xinjiang Uygur Autonomous Region

Agricultural Statistics in Xinjiang Uygur Autonomous Region: 1949-1978, Volumes I and II, the Agricultural Bureau of Xinjiang Uygur Autonomous Region, and the Statistics Bureau of Xinjiang Uygur Autonomous Region; 1980

Animal Husbandry Statistics in Xinjiang Uygur Autonomous Region: 1949-1978, the Animal Husbandry Bureau of Xinjiang Uygur Autonomous Region, and the Statistics Bureau of Xinjiang Uygur Autonomous Region; 1980

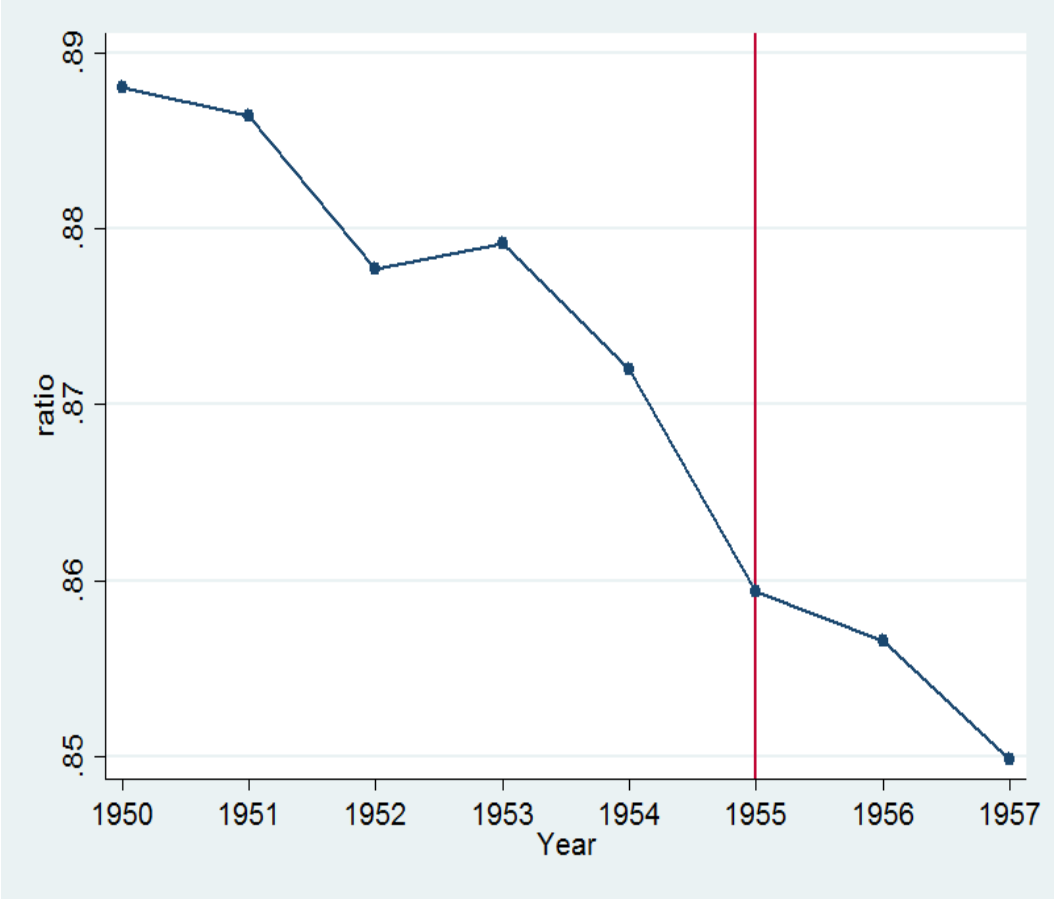
The statistics of population are from county gazetteers.

Weather Data

The historical local weather data are compiled by the State Meteorological Society, recorded in 267 weather stations as well as in county gazetteers. We assign these station records to their closest counties, based on the algorithm of Thiessen polygons. This method creates a polygon around each weather station, and these non-overlapping polygons cover all the counties. The counties closest to a station are the counties within the polygon of the station. The weather data use a discrete variable for rainfall: 1 for exceptional floods, 2 for limited floods, 3 for normal weather, 4 for limited droughts, and 5 for exceptional droughts.[1] We define two separate binary indicators for exceptional floods and exceptional droughts.

[1]The variable is defined according to the descriptions in local gazetteers or the amount of precipitation, when available. Typical descriptions of events categorized as "exceptional floods" are "countless people and animals drowned in floods," or "typhoons and heavy rains flood fields and houses," etc. When the annual amount of precipitation is available, "exceptional floods" are the years in which the amount is higher than a 1.17 standard deviation above the mean.

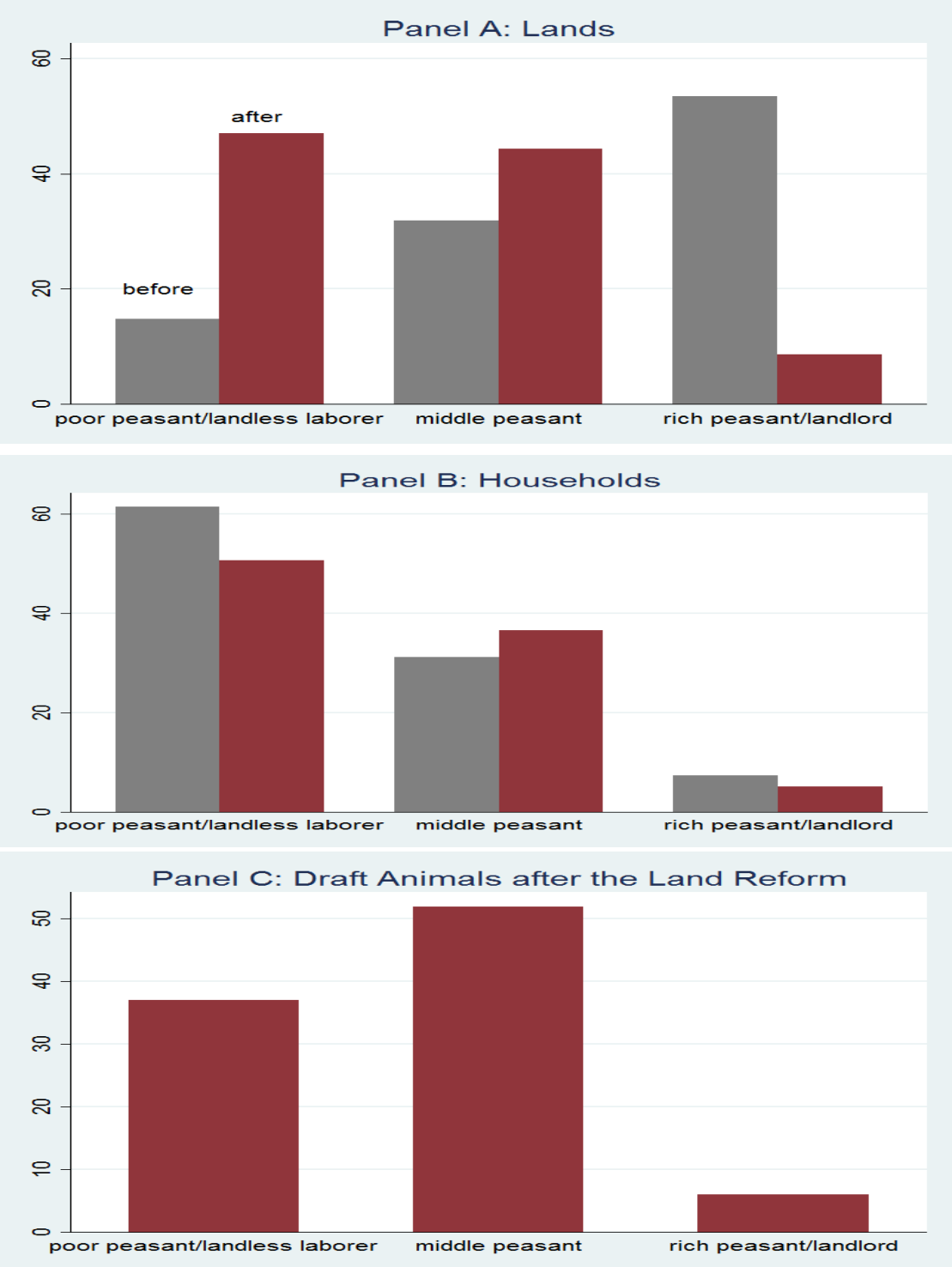
Appendix Figure A1 The Area Sown with Grain as a Proportion of the Area Sown with All Types of Crops



This figure shows that from 1950 to 1957, among all the sown land, the portion allocated to grain decreased continuously. The cumulative decline, however, was modest - less than 4 percentage points. This decline was neither disrupted nor accelerated by collectivization.

Source: National Bureau of Statistics (2010)

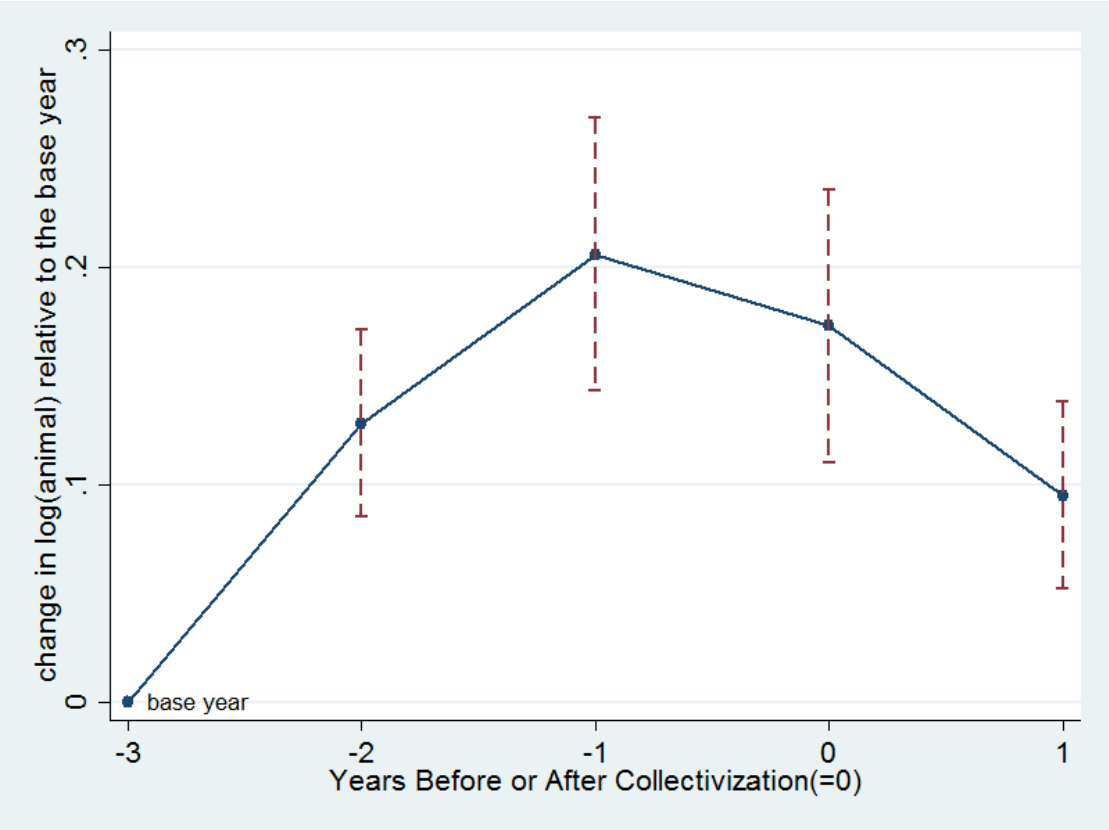
Appendix Figure A2 The Distribution (in percentages) of Lands, Households, and Draft Animals, before and after the Land Reform Movement, by the Classes Assigned



Notes: Panel B shows some slight changes in the ratios before and after land reform. There were typically two or three waves of reform in the same county, with each wave addressing the issues of misclassification in the previous wave. As a result, the ratio of classes was adjusted a bit in each wave. In Panel C, data before the reform are not available.

Source: National Bureau of Statistics (1980)

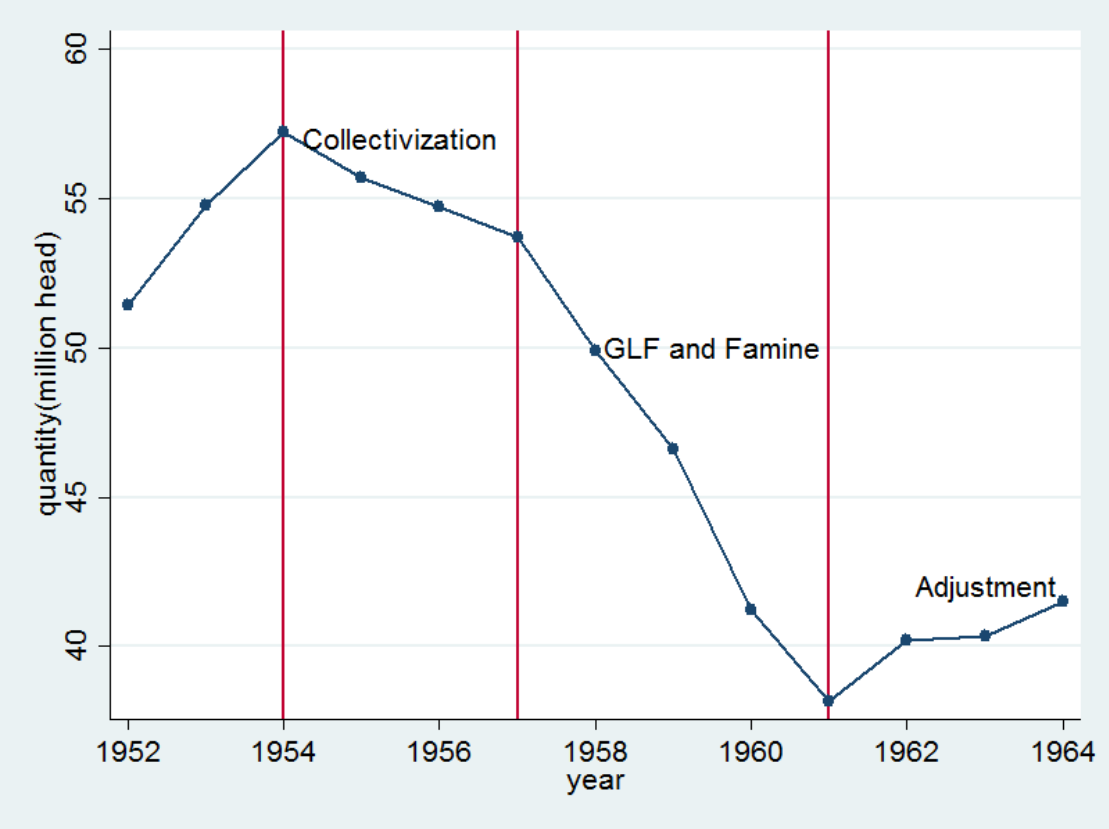
Appendix Figure A3 The Dynamic Effects of Collectivization on log (draft animals)



This figure shows that collectivization, began at year 0, changes the growth pattern in the animal inventory. After two years since collectivization, the animal inventory drops by 10% from its peak in the year before collectivization (x=-1).

We regress log (draft animals) on the normalized year dummies and plot the coefficients. The dotted lines indicate the 95 percent confidence intervals. The reported coefficients reflect the changes in log (draft animals) relative to its level in the base year, the third to last year prior to collectivization. All regressions include log(rural population), log(arable lands), flood, drought, calendar year dummies, county-specific trends, and a constant.

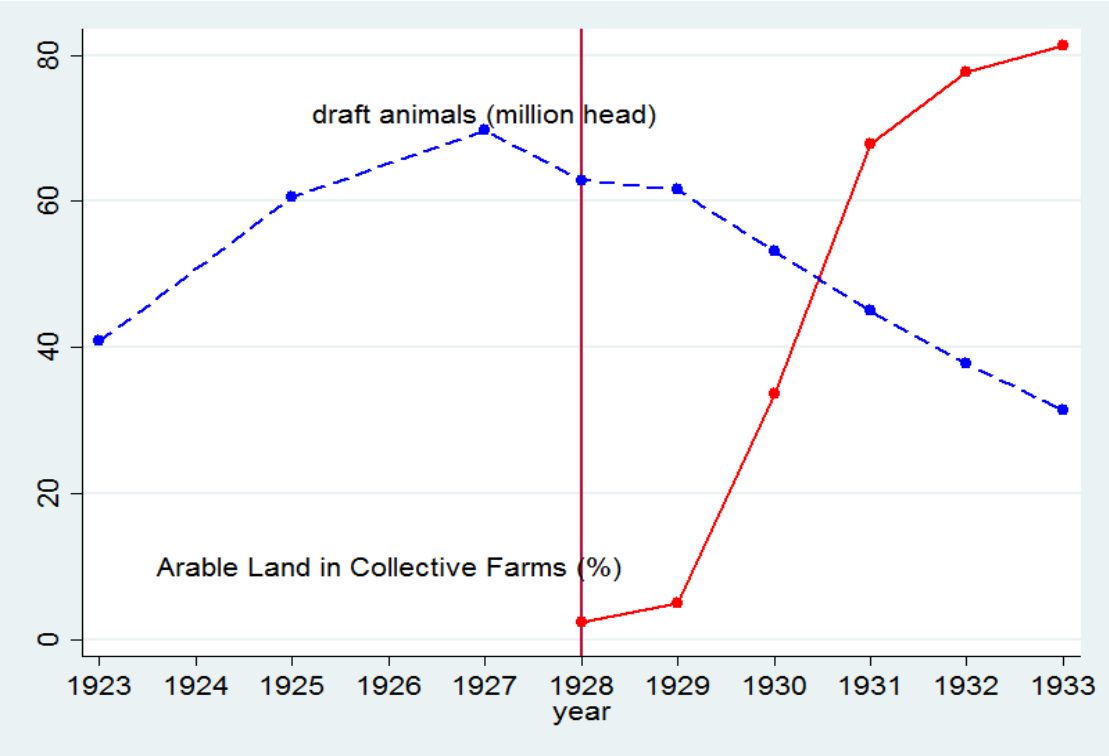
Appendix Figure A4 The National Inventory of Draft Animals (million head)



GLF stands for the Great Leap Forward movement in 1958. "Adjustment" is the three-year "adjustment period" from 1962 to 1964.

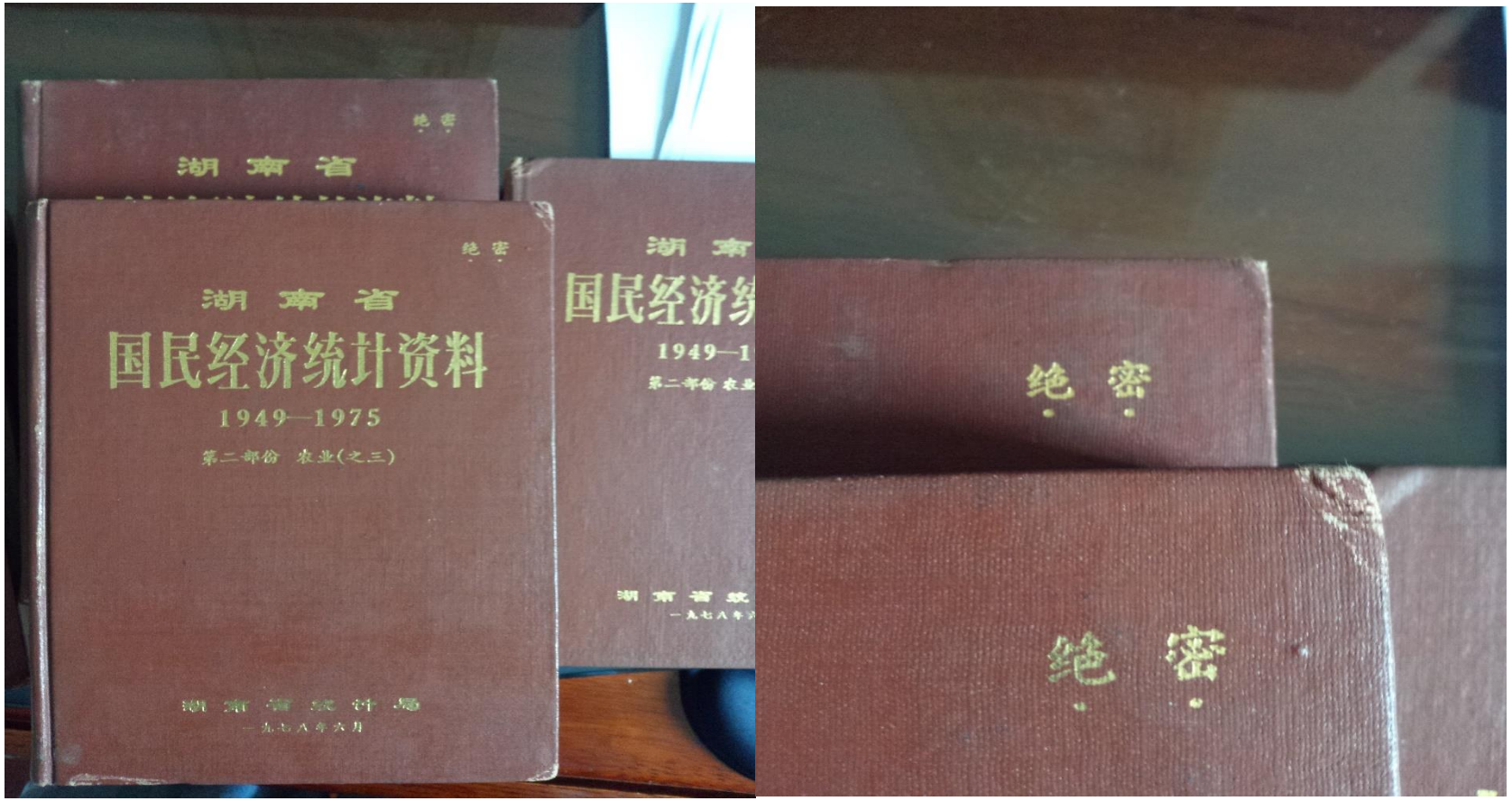
Source: Ministry of Agriculture (1990)

Appendix Figure A5 Collectivization and Draft Animals in the Soviet Union



The collectivization movement in the Soviet Union was between 1929 and 1933. Draft animals include horses and cows, excluding milk cows.
Source: Li (1981)

Appendix Figure A6 Examples of Declassified Government Files



The picture on the left shows the three volumes of the *Economic Statistics in Hunan Province (Section 2: Agriculture): 1949-1975.* The picture on the right highlights the classification level of the file, *Top Secret*, on the front cover.

Appendix Table A1 Placebo Test: The Effects of Collectivization on Rural Population and Arable Land

	log (rural population)		log (arable land)	
	(1)	(2)	(3)	(4)
collectivization	0.001	-0.000	-0.006	-0.001
	(0.002)	(0.003)	(0.004)	(0.004)
flood	-0.008***	-0.002	-0.021***	-0.009***
	(0.003)	(0.002)	(0.002)	(0.003)
drought	-0.001	0.002	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)
constant	12.105***	12.082***	3.712***	3.701***
	(0.001)	(0.002)	(0.002)	(0.002)
county FE*trend	N	Y	N	Y
N	8,826	8,826	8,623	8,623

Standard errors are clustered at the county level ***$p<0.01$

This table reports the results of a placebo test. It shows the difference-in-differences estimates of the effects of collectivization on log (rural population) and log (arable land). The collectivization dummy equals 1 for the year that a county began to establish advanced cooperatives and for the years after. All regressions include a set of year dummies and county dummies.

Appendix Table A2 The Effects of Collectivization on Log (draft animals): by Two Groups of Provinces

	Agricultural Machinery in 1958		Change of Crop Mix after Collectivization	
	More	Less	>=mean	<mean
	(1)	(2)	(3)	(4)
collectivization	-0.042**	-0.048***	-0.045***	-0.044***
	(0.017)	(0.006)	(0.008)	(0.008)
log(rural population)	-0.067	0.120*	-0.025	0.046
	(0.042)	(0.069)	(0.038)	(0.070)
log(arable lands)	0.550***	0.270***	0.283***	0.441***
	(0.110)	(0.070)	(0.080)	(0.079)
flood	-0.002	-0.012***	0.005	-0.018***
	(0.009)	(0.004)	(0.006)	(0.005)
drought	-0.000	-0.006	-0.017**	-0.000
	(0.013)	(0.005)	(0.007)	(0.006)
N	1,002	6,995	4,416	3,485

Standard errors are clustered at the county level *$p<0.1$, **$p<0.05$, ***$p<0.01$

This table shows that the effects of collectivization on the animal inventory do not vary across two groups of provinces. Columns (1) and (2) divide the provinces according to the extent of their mechanization. According to the National Bureau of Statistics (1980), 21 percent of tilled areas in Beijing were tilled by machines in 1958, 17.4 percent in Heilongjiang, 15.4 percent in Xinjiang, 13.1 percent in Hebei, and 10.4 percent in Qinghai. In all other provinces in column (2), the percentages were lower than 4.2. Columns (3) and (4) divide the provinces according to the changes in the ratio of land sown with grain among all the sown land after collectivization. The changes are modest in all provinces, ranging from -0.04 to 0.01 (National Bureau of Statistics, 2010). The mean change is -0.01. The total number of observations in columns (3) and (4) is smaller than the total number of observations in columns (1) and (2), because data of crop mix are not available in Hainan province and Tianjin municipality. All regressions include year dummies, county dummies, and a constant.

Appendix Table A3 The Effects of Collectivization on Log (draft animals), in a Truncated Sample

	(1)	(2)
Collectivization	-0.051***	-0.037***
	(0.009)	(0.012)
Collectivization*ratio of middle peasant households†		-0.092*
		(0.051)
Collectivization*log(number of people in a co-op)†		-0.028***
		(0.010)
Collectivization*log(distance from the capital city)†		-0.008
		(0.006)
Collectivization*dummy for a revolutionary base		0.009
		(0.027)
Collectivization*ratio of ethnic minorities		0.024
		(0.022)
N	6,144	3,134
Standard errors are clustered at the county level		*$p<0.05$, ***$p<0.01$

These regressions estimate the immediate effect of collectivization. We drop the observations in 1956 and 1957 for counties that started collectivizing in 1955, and the observations in 1957 for counties that started in 1956. All regressions include log(rural population), log(arable land), flood, drought, year dummies, county dummies, county-specific trends, and a constant.

† The variables are the deviation from their mean. This transformation does not affect the coefficients of the interaction terms, and the coefficients of the collectivization indicator are the effect at the mean level of these variables.

Appendix Table A4 The Dynamic Effects of Collectivization on the Annual Growth Rate of Draft Animals: △log (draft animals)

	Sample years: 1952-57	Sample years: 1949-57
Four years prior to collectivization		-0.003
		(0.007)
Three years prior to collectivization		0.016
		(0.013)
Two years prior to collectivization		-0.003
		(0.013)
One year prior to collectivization	-0.005	-0.009
	(0.006)	(0.015)
The year that started collectivization	-0.074***	-0.077***
	(0.007)	(0.016)
The year after collectivization	-0.078***	-0.080***
	(0.009)	(0.016)
N	5,216	7,904

Standard errors are clustered at the county level ***$p<0.01$

This table shows how collectivization affects the growth rate of the animal inventory, year on year. We regress △log (draft animals) on a set of normalized year dummies. The reported coefficients reflect the changes in △log (draft animals) relative to the base year. In the first column, the base year is the second to last year prior to collectivization. In the second column, we use an unbalanced panel data set in which some counties have data extending back to 1949. The base year is the fifth to last year prior to collectivization. All regressions include ∆log(rural population), ∆log(arable land), flood, drought, calendar year dummies, and a constant.