Online Appendix to "The Political Development Cycle: the Right and the Left in People's Republic of China from 1953"

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Contents

1 Data

We collect and utilize data on six broad aspects of the Chinese economy: national accounts, labor inputs, capital inputs, foreign trade, prices and wages. In what follows, we describe the sources of data for each aspect and report the values that we draw from them. Then we describe the operations that we perform to combine these data to produce our final dataset. Although the main focus of the paper is on the pre-1978 period, the dataset described here covers the period from 1952 to 2012. This is important both for internal consistency of series that are normalized and compared using prices post-dating 1978, and for our numerical exercises, which use the post-1978 path in some simulations.

1.1 National Accounts

Our two main sources of data on the system of national accounts of China are published by the Chinese National Bureau of Statistics (NBS). The first one is the "China Statistical Yearbook" (CSY) which is available for different years from the official website (http://www.stats.gov.cn/ english/Statisticaldata/ AnnualData/) for the years 1996-2014. The second main source is the "60 Years of New China" (60Y) which aggregates data from previous publications for the years 1949-2009. (http://tongji.cnki.net/ overseas/engnavi/ YearBook.aspx? id=N2010030107). The second source is closely related with a book on pre-1996 statistics compiled by Hsueh and Li (1999), "China's national income 1952-1995" (HL).

Table 1 reports the Gross Domestic Product (GDP) measured as value added, for the whole economy and by sector, in current and constant prices, measured in 100 million yuan. Table 3 reports the Gross Domestic Product by Expenditure Approach, in current prices, measured in 100 million yuan. GDP is broken down into consumption, reported separately for households and for the government, gross capital formation (GCF), in turn broken down into gross fixed capital fromation (GFCF) and inventories, and net exports. The table also reports data on foreign trade: total value of imports, exports and the trade balance.

The source of data for Tables 1 and 3 are "60 Years of New China", which only covers 1952-2008 for the series of interest.

Table 5 reports the Gross Domestic Product (GDP) measured as value added, for the whole economy and by sector, in current and constant prices, measured in 100 million yuan. Table 6

Table 1: Value Added by Sector, 60Y, part 1

	Gross Domestic Product				Indices of Gross Domestic Product			
year	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
1952	679.0	346.0	141.8	191.2	100.0	100.0	100.0	100.0
1953	824.2	381.4	192.5	250.3	115.6	101.9	135.8	124.9
1954	859.4	395.5	211.7	252.2	120.5	103.6	157.1	124.4
1955	910.8	424.8	222.2	263.8	128.7	111.8	169.0	130.4
1956	1029.0	447.9	280.7	300.4	148.1	117.0	227.3	147.7
1957	1069.3	433.9	317.0	318.4	155.6	120.6	245.5	154.6
1958	1308.2	449.9	483.5	374.8	188.6	121.1	375.4	182.6
1959	1440.4	387.2	615.5	437.6	205.3	101.9	472.3	211.0
1960	1457.5	343.8	648.2	465.5	204.6	85.2	498.6	221.5
1961	1220.9	445.1	388.9	387.0	148.7	86.5	288.8	164.3
1962	1151.2	457.2	359.3	334.8	140.4	90.4	257.8	149.0
1963	1236.4	502.0	407.6	326.8	154.7	100.6	295.2	155.5
1964	1455.5	564.0	513.5	378.0	182.9	113.6	370.8	179.6
1965	1717.2	656.9	602.2	458.1	214.1	124.6	460.6	208.1
1966	1873.1	708.5	709.5	455.1	237.1	133.6	564.0	204.1
1967	1780.3	720.6	602.8	456.9	223.6	136.1	483.3	205.2
1968	1730.2	732.8	537.3	460.0	214.4	134.0	438.7	206.5
1969	1945.8	742.8	689.1	513.9	250.6	135.1	584.0	234.3
1970	2261.3	800.4	912.2	548.7	299.3	145.5	787.3	250.9
1971	2435.3	833.7	1022.8	578.7	320.4	148.2	884.2	265.5
1972	2530.2	834.8	1084.2	611.2	332.4	146.9	943.6	279.1
1973	2733.4	915.6	1173.0	644.7	358.5	160.1	1022.1	294.3
1974	2803.7	953.7	1192.0	658.1	366.8	166.7	1036.4	298.8
1975	3013.1	979.8	1370.5	662.8	398.7	170.1	1200.2	313.5
1976	2961.5	975.7	1337.2	648.6	392.2	167.1	1170.3	314.7
1977	3221.1	950.6	1509.1	761.4	422.1	163.4	1325.8	345.0
1978	3645.2	1027.5	1745.2	872.5	471.4	170.1	1525.2	392.7

Table 2: Value Added by Sector, 60Y, part 2

	Gross Domestic Product				Indices of Gross Domestic Product			
year	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
1978	3645.2	1027.5	1745.2	872.5	471.4	170.1	1525.2	392.7
1979	4062.6	1270.2	1913.5	878.9	507.1	180.6	1650.2	423.5
1980	4545.6	1371.6	2192.0	982.0	546.8	177.9	1874.1	448.9
1981	4891.6	1559.5	2255.5	1076.6	575.5	190.3	1909.1	495.7
1982	5323.4	1777.4	2383.0	1163.0	627.6	212.3	2015.3	560.0
1983	5962.7	1978.4	2646.2	1338.1	695.8	229.9	2224.2	645.0
1984	7208.1	2316.1	3105.7	1786.3	801.3	259.6	2546.2	769.8
1985	9016.0	2564.4	3866.6	2585.0	909.2	264.3	3019.0	909.6
1986	10275.2	2788.7	4492.7	2993.8	989.7	273.1	3327.6	1019.1
1987	12058.6	3233.0	5251.6	3574.0	1104.3	286.0	3783.3	1165.5
1988	15042.8	3865.4	6587.2	4590.3	1228.9	293.2	4332.6	1318.8
1989	16992.3	4265.9	7278.0	5448.4	1278.8	302.3	4495.8	1389.5
1990	18667.8	5062.0	7717.4	5888.4	1327.9	324.4	4638.3	1422.0
1991	21781.5	5342.2	9102.2	7337.1	1449.8	332.2	5280.9	1548.1
1992	26923.5	5866.6	11699.5	9357.4	1656.3	347.8	6398.0	1740.8
1993	35333.9	6963.8	16454.4	11915.7	1887.6	364.2	7669.1	1952.9
1994	48197.9	9572.7	22445.4	16179.8	2134.5	378.7	9077.1	2169.5
1995	60793.7	12135.8	28679.5	19978.5	2367.7	397.7	10336.6	2383.0
1996	71176.6	14015.4	33835.0	23326.2	2604.6	417.9	11587.9	2607.6
1997	78973.0	14441.9	37543.0	26988.1	2846.8	432.6	12802.2	2887.0
1998	84402.3	14817.6	39004.2	30580.5	3069.8	447.7	13943.0	3128.8
1999	89677.1	14770.0	41033.6	33873.4	3303.7	460.2	15077.3	3420.7
2000	99214.6	14944.7	45555.9	38714.0	3582.2	471.3	16499.0	3754.1
2001	109655.2	15781.3	49512.3	44361.6	3879.6	484.5	17891.8	4139.2
2002	120332.7	16537.0	53896.8	49898.9	4231.9	498.5	19650.4	4571.4
2003	135822.8	17381.7	62436.3	56004.7	4656.2	511.0	22140.5	5005.9
2004	159878.3	21412.7	73904.3	64561.3	5125.8	543.2	24600.8	5509.3
2005	183217.4	22420.0	87364.6	73432.9	5660.5	571.6	27478.0	6087.8
2006	211923.5	24040.0	103162.0	84721.4	6319.8	600.2	31040.8	6824.8
2007	257305.6	28627.0	124799.0	103879.6	7143.8	622.7	35591.8	7763.3
2008	300670.0	34000.0	146183.4	120486.6	7783.2	656.9	38884.1	8499.9

Table 3: GDP by Expenditure Approach, 60Y, part 1

	Gross Domestic Product by Expenditure Approach							Total Value of Exports and Imports		
year	Consumption	Households	Government	GCF	GFCF	Inventories	Net Exports	Exports	Imports	Balance
1952	546.3	453	93.3	153.7	80.7	73	-7.8	27.1	37.5	-10.4
1953	644.4	529.2	115.2	198.3	115.3	83	-8.4	34.8	46.1	-11.3
1954	654.1	550	104.1	226.9	140.9	86	-2.7	40	44.7	-4.7
1955	722.3	602.6	119.7	221.5	145.5	76	-8.9	48.7	61.1	-12.4
1956	772.6	646.8	125.8	257.6	219.6	38	4	55.7	53	2.7
1957	816.4	686.6	129.8	280	187	93	5.5	54.5	50	4.5
1958	852.6	724	128.6	432	333	99	6.6	67	61.7	5.3
1959	821.5	691.2	130.3	621.7	435.7	186	8.1	78.1	71.2	6.9
1960	932.6	741.7	190.9	575	473	102	0.4	63.3	65.1	-1.8
1961	995.1	816.7	178.4	274.6	227.6	47	5.5	47.7	43	4.7
1962	985.7	838.7	147	178.1	175.1	3	12.6	47.1	33.8	13.3
1963	1014.3	844.2	170.1	265.3	215.3	50	13.5	50	35.7	14.3
1964	1078.6	889.6	189	350.3	290.3	60	12.9	55.4	42.1	13.3
1965	1158.6	951.5	207.1	462.1	350.1	112	8.5	63.1	55.3	7.8
1966	1251.3	1021.1	230.2	569.8	406.8	163	6.2	66	61.1	4.9
1967	1275.7	1081.5	194.2	425.7	323.7	102	6.3	58.8	53.4	5.4
1968	1269.1	1076.6	192.5	432.2	300.2	132	7.4	57.6	50.9	6.7
1969	1359.4	1127.7	231.7	485.9	406.9	79	12.4	59.8	47.2	12.6
1970	1459.7	1206.8	252.9	744.9	545.9	199	2.4	56.8	56.1	0.7
1971	1557.9	1262	295.9	819	603	216	15.6	68.5	52.4	16.1
1972	1644.3	1334.2	310.1	791.1	622.1	169	18.4	82.9	64	18.9
1973	1751.3	1432.5	318.8	903.5	664.5	239	14.8	116.9	103.6	13.3
1974	1809.6	1467	342.6	936.1	748.1	188	-7	139.4	152.8	-13.4
1975	1887.4	1528.5	358.9	1062.3	880.3	182	0.7	143	147.4	-4.4
1976	1969.5	1588.5	381	990.1	865.1	125	8.7	134.8	129.3	5.5
1977	2057.8	1647.8	410	1098.1	911.1	187	10.1	139.7	132.8	6.9
1978	2239.1	1759.1	480	1377.9	1073.9	304	-11.4	167.6	187.4	-19.8

Table 4: GDP by Expenditure Approach, 60Y, part 2

	Gross Domestic Product by Expenditure Approach							Total Value of Exports and Imports		
year	Consumption	Households	Government	GCF	GFCF	Inventories	Net Exports	Exports	Imports	Balance
1978	2239.1	1759.1	480	1377.9	1073.9	304	-11.4	167.6	187.4	-19.8
1979	2633.7	2011.5	622.2	1478.9	1153.1	325.8	-20	211.7	242.9	-31.2
1980	3007.9	2331.2	676.7	1599.7	1322.4	277.3	-14.7	271.2	298.8	-27.6
1981	3361.5	2627.9	733.6	1630.2	1339.3	290.9	17.1	367.6	367.7	-0.1
1982	3714.8	2902.9	811.9	1784.2	1503.2	281	91	413.8	357.5	56.3
1983	4126.4	3231.1	895.3	2039	1723.3	315.7	50.8	438.3	421.8	16.5
1984	4846.3	3742	1104.3	2515.1	2147	368.1	1.3	580.5	620.5	-40
1985	5986.3	4687.4	1298.9	3457.5	2672	785.5	-367.1	808.9	1257.8	-448.9
1986	6821.8	5302.1	1519.7	3941.9	3139.7	802.2	-255.2	1082.1	1498.3	-416.2
1987	7804.6	6126.1	1678.5	4462	3798.7	663.3	10.8	1470.0	1614.2	-144.2
1988	9839.5	7868.1	1971.4	5700.2	4701.9	998.3	-151.1	1766.7	2055.1	-288.4
1989	11164.2	8812.6	2351.6	6332.7	4419.4	1913.3	-185.6	1956.0	2199.9	-243.9
1990	12090.5	9450.9	2639.6	6747	4827.8	1919.2	510.3	2985.8	2574.3	411.5
1991	14091.9	10730.6	3361.3	7868	6070.3	1797.7	617.5	3827.1	3398.7	428.4
1992	17203.3	13000.1	4203.2	10086.3	8513.7	1572.6	275.6	4676.3	4443.3	233.0
1993	21899.9	16412.1	5487.8	15717.7	13309.2	2408.5	-679.5	5284.8	5986.2	-701.4
1994	29242.2	21844.2	7398	20341.1	17312.7	3028.4	634.1	10421.8	9960.1	461.7
1995	36748.2	28369.7	8378.5	25470.1	20885	4585.1	998.6	12451.8	11048.1	1403.7
1996	43919.5	33955.9	9963.6	28784.9	24048.1	4736.8	1459.2	12576.4	11557.4	1019.0
1997	48140.6	36921.5	11219.1	29968	25965	4003	3549.9	15160.7	11806.5	3354.2
1998	51588.2	39229.3	12358.9	31314.2	28569	2745.2	3629.2	15223.6	11626.1	3597.5
1999	55636.9	41920.4	13716.5	32951.5	30527.3	2424.2	2536.6	16159.8	13736.5	2423.3
2000	61516	45854.6	15661.4	34842.8	33844.4	998.4	2390.2	20634.4	18638.8	1995.6
2001	66878.3	49213.2	17665.1	39769.4	37754.5	2014.9	2324.7	22024.4	20159.2	1865.2
2002	71691.2	52571.3	19119.9	45565	43632.1	1932.9	3094.1	26947.9	24430.3	2517.6
2003	77449.5	56834.4	20615.1	55963	53490.7	2472.3	2986.3	36287.9	34195.6	2092.3
2004	87032.9	63833.5	23199.4	69168.4	65117.7	4050.7	4079.1	49103.3	46435.8	2667.5
2005	97822.7	71217.5	26605.2	80646.3	77304.8	3341.5	10223.1	62648.1	54273.7	8374.4
2006	110595.3	80476.9	30118.4	94402	90150.9	4251.1	16654	77594.6	63376.9	14217.7
2007	128793.8	93602.9	35190.9	110919.4	105435.9	5483.6	23380.6	93455.6	73284.6	20171.1
2008	149112.6	108392.2	40720.4	133612.3	126209.5	7402.9	24134.9	100394.9	79526.5	20868.4

reports the Gross Domestic Product by Expenditure Approach, in current prices, measured in 100 million yuan. GDP is broken down into consumption, reported separately for households and for the government, gross capital formation (GCF), in turn broken down into gross fixed capital fromation (GFCF) and inventories, and net exports. The table also reports data on foreign trade: total value of imports, exports and the trade balance.

The source of data for Tables 5 and 6 are "China Statistical Yearbooks" from 1996 to 2014, which only cover 1978-2012 for the series of interest.

In order to get consistent series for the whole period of interest, 1952-2012, we merge the data from the two sources. The two sources largely agree for the overlapping periods. However, there are some discrepancies between the two sources, with the earliest appearing for year 1990. For the conflicting cases we always prefer the most recent data vintage - CSY 2014.

Table 7 reports merged series for GDP by sector, in current and constant prices, for 1952-2012. Table 9 reports merged series for the breakdown of GDP by expenditure approach, also for 1952-2012.

1.2 Prices and Wages

To obtain a consistent series for GDP and its sectoral split into agriculture and non-agriclture, we need to obtain sectoral GDP deflators. We compute aggregate and sectoral GDP deflators using Table 7 by dividing value added in current prices by the indices in constant prices, and multiply each series by a constant that converts nominal values into constant 1978 yuan. We report the results in Table 11. Taking the ratio of price deflators in the two sectors allows us to estimate the relative prices of agricultural goods to non-agricultural goods.

We also report indexes of agricultural and industrial goods prices advocated by Young (2003). These are the General Purchasing Price Index for Farm Products and the Ex-Factory Price Index for Industrial Products, available from the CSY for various years. For pre-1978 values we also use Chow (1987) who cites CSY 1981.

In Table 13 we report average wages for staff and workers in the agricultural and non-agricultural sectors for 1952-2011. These data come from two sources. The pre-1978 data come from Chow (1987), who cites CSY for year 1981. The post-1978 data come from CSY for years 1996-2013 from the official website. Two other columns report the factor share of income earned by labor in agriculture and non-agriculture, computed from Bai and Qian (2010), "The Factor

Table 5: Value Added by Sector, CSY

	Gross Domestic Product				Indices of Gross Domestic Product			
year	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
1978	3645.2	1027.5	1745.2	872.5	100.0	100.0	100.0	100.0
1979	4062.6	1270.2	1913.5	878.9	107.6	106.1	108.2	107.9
1980	4545.6	1371.6	2192.0	982.0	116.0	104.6	122.9	114.3
1981	4891.6	1559.5	2255.5	1076.6	122.1	111.9	125.2	126.2
1982	5323.4	1777.4	2383.0	1163.0	133.1	124.8	132.1	142.6
1983	5962.7	1978.4	2646.2	1338.1	147.6	135.1	145.8	164.3
1984	7208.1	2316.1	3105.7	1786.3	170.0	152.6	166.9	196.0
1985	9016.0	2564.4	3866.6	2585.0	192.9	155.4	197.9	231.7
1986	10275.2	2788.7	4492.7	2993.8	210.0	160.5	218.2	259.6
1987	12058.6	3233.0	5251.6	3574.0	234.3	168.1	248.1	296.8
1988	15042.8	3865.4	6587.2	4590.3	260.7	172.3	284.1	335.9
1989	16992.3	4265.9	7278.0	5448.4	271.3	177.6	294.8	353.9
1990	18667.8	5062.0	7717.4	5888.4	281.7	190.7	304.1	362.1
1991	21781.5	5342.2	9102.2	7337.1	307.6	195.2	346.3	394.3
1992	26923.5	5866.6	11699.5	9357.4	351.4	204.4	419.5	443.3
1993	35333.9	6963.8	16454.4	11915.7	400.4	214.0	502.8	497.4
1994	48197.9	9572.7	22445.4	16179.8	452.8	222.6	595.2	552.5
1995	60793.7	12135.8	28679.5	19978.5	502.3	233.7	677.7	606.9
1996	71176.6	14015.4	33835.0	23326.2	552.6	245.6	759.8	664.1
1997	78973.0	14441.9	37543.0	26988.1	603.9	254.2	839.4	735.3
1998	84402.3	14817.6	39004.2	30580.5	651.2	263.1	914.2	796.8
1999	89677.1	14770.0	41033.6	33873.4	700.9	270.5	988.6	871.2
2000	99214.6	14944.7	45555.9	38714.0	759.9	277.0	1081.8	956.1
2001	109655.2	15781.3	49512.3	44361.6	823.0	284.8	1173.1	1054.2
2002	120332.7	16537.0	53896.8	49898.9	897.8	293.0	1288.4	1164.2
2003	135822.8	17381.7	62436.3	56004.7	987.8	300.3	1451.7	1274.9
2004	159878.3	21412.7	73904.3	64561.3	1087.4	319.3	1613.0	1403.1
2005	184937.4	22420.0	87598.1	74919.3	1210.4	336.0	1807.9	1574.7
2006	216314.4	24040.0	103719.5	88554.9	1363.8	352.8	2050.0	1797.3
2007	265810.3	28627.0	125831.4	111351.9	1557.0	366.0	2358.8	2084.6
2008	314045.4	33702.0	149003.4	131340.0	1707.0	385.6	2591.8	2301.4
2009	340902.8	35226.0	157638.8	148038.0	1864.3	401.8	2849.4	2521.5
2010	401512.8	40533.6	187383.2	173596.0	2059.0	418.9	3198.4	2767.5
2011	473104.0	47486.2	220412.8	205205.0	2250.5	436.8	3527.4	3028.0
2012	518942.1	52373.6	235162.0	231406.5	2422.7	456.6	3806.6	3272.0

Table 6: GDP by Expenditure Approach, CSY

	Gross Domestic Product by Expenditure Approach							Total Value of Exports and Imports		
year	Consumption	Households	Government	GCF	GFCF	Inventories	Net Exports	Exports	Imports	Balance
1978	2239.1	1759.1	480.0	1377.9	1073.9	304.0	-11.4	167.6	187.4	-19.8
1979	2633.7	2011.5	622.2	1478.9	1153.1	325.8	-20.0			
1980	3007.9	2331.2	676.7	1599.7	1322.4	277.3	-14.7	271.2	298.8	-27.6
1981	3361.5	2627.9	733.6	1630.2	1339.3	290.9	17.1			
1982	3714.8	2902.9	811.9	1784.2	1503.2	281.0	91.0			
1983	4126.4	3231.1	895.3	2039.0	1723.3	315.7	50.8			
1984	4846.3	3742.0	1104.3	2515.1	2147.0	368.1	1.3			
1985	5986.3	4687.4	1298.9	3457.5	2672.0	785.5	-367.1	808.9	1257.8	-448.9
1986	6821.8	5302.1	1519.7	3941.9	3139.7	802.2	-255.2			
1987	7804.6	6126.1	1678.5	4462.0	3798.7	663.3	10.8			
1988	9839.5	7868.1	1971.4	5700.2	4701.9	998.3	-151.1			
1989	11164.2	8812.6	2351.6	6332.7	4419.4	1913.3	-185.6			
1990	12090.5	9450.9	2639.6	6747.0	4827.8	1919.2	510.3	2985.8	2574.3	411.5
1991	14091.9	10730.6	3361.3	7868.0	6070.3	1797.7	617.5	3827.1	3398.7	428.4
1992	17203.3	13000.1	4203.2	10086.3	8513.7	1572.6	275.6	4676.3	4443.3	233.0
1993	21899.9	16412.1	5487.8	15717.7	13309.2	2408.5	-679.5	5284.8	5986.2	-701.4
1994	29242.2	21844.2	7398.0	20341.1	17312.7	3028.4	634.1	10421.8	9960.1	461.7
1995	36748.2	28369.7	8378.5	25470.1	20885.0	4585.1	998.6	12451.8	11048.1	1403.7
1996	43919.5	33955.9	9963.6	28784.9	24048.1	4736.8	1459.2	12576.4	11557.4	1019.0
1997	48140.6	36921.5	11219.1	29968.0	25965.0	4003.0	3549.9	15160.7	11806.5	3354.2
1998	51588.2	39229.3	12358.9	31314.2	28569.0	2745.2	3629.2	15223.6	11626.1	3597.5
1999	55636.9	41920.4	13716.5	32951.5	30527.3	2424.2	2536.6	16159.8	13736.4	2423.4
2000	61516.0	45854.6	15661.4	34842.8	33844.4	998.4	2390.2	20634.4	18638.8	1995.6
2001	66933.9	49435.9	17498.0	39769.4	37754.5	2014.9	2324.7	22024.4	20159.2	1865.2
2002	71816.5	53056.6	18759.9	45565.0	43632.1	1932.9	3094.1	26947.9	24430.3	2517.6
2003	77685.5	57649.8	20035.7	55963.0	53490.7	2472.3	2964.9	36287.9	34195.6	2092.3
2004	87552.6	65218.5	22334.1	69168.4	65117.7	4050.7	4235.6	49103.3	46435.8	2667.5
2005	99357.5	72958.7	26398.8	77856.8	74232.9	3624.0	10209.1	62648.1	54273.7	8374.4
2006	113103.8	82575.5	30528.4	92954.1	87954.1	5000.0	16654.6	77597.2	63376.9	14220.3
2007	132232.9	96332.5	35900.4	110943.2	103948.6	6994.6	23423.1	93563.6	73300.1	20263.5
2008	153422.5	111670.4	41752.1	138325.3	128084.4	10240.9	24226.8	100394.9	79526.5	20868.4
2009	169274.8	123584.6	45690.2	164463.2	156679.8	7783.4	15037.0	82029.7	68618.4	13411.3
2010	194115.0	140758.6	53356.3	193603.9	183615.2	9988.7	15097.6	107022.8	94699.3	12323.5
2011	232111.5	168956.6	63154.9	228344.3	216203.3	121401.0	12163.3	123240.6	113161.4	10079.2
2012	261832.8	190423.8	71409.0	252773.2	239333.4	13439.8	14632.4	129359.3	114801.0	14558.3

Table 7: Value Added by Sector, Merge of CSY and 60Y

	Gross Domestic Product				Indices of Gross Domestic Product			
year	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
1952	679	346	142	191	100	100.0	100.0	100.0
1953	824.2	381	193	250	116	101.9	135.8	124.9
1954	859.4	396	212	252	120	103.6	157.1	124.4
1955	910.8	425	222	264	129	111.8	169.0	130.4
1956	1029.0	448	281	300	148	117.0	227.3	147.7
1957	1069.3	434	317	318	156	120.6	245.5	154.6
1958	1308.2	450	484	375	189	121.1	375.4	182.6
1959	1440.4	387	616	438	205	101.9	472.3	211.0
1960	1457.5	344	648	466	205	85.2	498.6	221.5
1961	1220.9	445	389	387	149	86.5	288.8	164.3
1962	1151.2	457	359	335	140	90.4	257.8	149.0
1963	1236.4	502	408	327	155	100.6	295.2	155.5
1964	1455.5	564	514	378	183	113.6	370.8	179.6
1965	1717.2	657	602	458	214	124.6	460.6	208.1
1966	1873.1	708	710	455	237	133.6	564.0	204.1
1967	1780.3	721	603	457	224	136.1	483.3	205.2
1968	1730.2	733	537	460	214	134.0	438.7	206.5
1969	1945.8	743	689	514	251	135.1	584.0	234.3
1970	2261.3	800	912	549	299	145.5	787.3	250.9
1971	2435.3	834	1023	579	320	148.2	884.2	265.5
1972	2530.2	835	1084	611	332	146.9	943.6	279.1
1973	2733.4	916	1173	645	359	160.1	1022.1	294.3
1974	2803.7	954	1192	658	367	166.7	1036.4	298.8
1975	3013.1	980	1371	663	399	170.1	1200.2	313.5
1976	2961.5	976	1337	649	392	167.1	1170.3	314.7
1977	3221.1	951	1509	761	422	163.4	1325.8	345.0
1978	3645.2	1028	1745	872	471	170.1	1525.2	392.7

Table 8: Value Added by Sector, Merge of CSY and 60Y

	Gross Domestic Product				Indices of Gross Domestic Product			
year	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
1978	3645.2	1028	1745	872	471	170.1	1525.2	392.7
1979	4062.6	1270	1914	879	507	180.6	1650.2	423.5
1980	4545.6	1372	2192	982	547	177.9	1874.1	448.9
1981	4891.6	1559	2256	1077	576	190.3	1909.1	495.7
1982	5323.4	1777	2383	1163	628	212.3	2015.3	560.0
1983	5962.7	1978	2646	1338	696	229.9	2224.2	645.0
1984	7208.1	2316	3106	1786	801	259.6	2546.2	769.8
1985	9016.0	2564	3867	2585	909	264.3	3019.0	909.6
1986	10275.2	2789	4493	2994	990	273.1	3327.6	1019.1
1987	12058.6	3233	5252	3574	1104	286.0	3783.3	1165.5
1988	15042.8	3865	6587	4590	1229	293.2	4332.6	1318.8
1989	16992.3	4266	7278	5448	1279	302.3	4495.8	1389.5
1990	18667.8	5062	7717	5888	1328	324.4	4638.3	1422.0
1991	21781.5	5342	9102	7337	1450	332.2	5280.9	1548.1
1992	26923.5	5867	11700	9357	1656	347.8	6398.0	1740.8
1993	35333.9	6964	16454	11916	1888	364.2	7669.1	1952.9
1994	48197.9	9573	22445	16180	2134	378.7	9077.1	2169.5
1995	60793.7	12136	28679	19978	2368	397.7	10336.6	2383.0
1996	71176.6	14015	33835	23326	2605	417.9	11587.9	2607.6
1997	78973.0	14442	37543	26988	2847	432.6	12802.2	2887.0
1998	84402.3	14818	39004	30580	3070	447.7	13943.0	3128.8
1999	89677.1	14770	41034	33873	3304	460.2	15077.3	3420.7
2000	99214.6	14945	45556	38714	3582	471.3	16499.0	3754.1
2001	109655.2	15781	49512	44362	3880	484.5	17891.8	4139.2
2002	120332.7	16537	53897	49899	4232	498.5	19650.4	4571.4
2003	135822.8	17382	62436	56005	4656	511.0	22140.5	5005.9
2004	159878.3	21413	73904	64561	5126	543.2	24600.8	5509.3
2005	184937.4	22420	87598	74919	5705	571.6	27573.2	6183.1
2006	216314.4	24040	103720	88555	6429	600.2	31265.5	7057.2
2007	265810.3	28627	125831	111352	7339	622.7	35975.2	8185.3
2008	314045.4	33702	149003	131340	8046	656.1	39528.6	9036.8
2009	340902.8	35226	157639	148038	8788	683.6	43457.9	9901.0
2010	401512.8	40534	187383	173596	9706	712.8	48781.6	10866.6
2011	473104.0	47486	220413	205205	10608	743.1	53798.6	11889.8
2012	518942.1	52374	235162	231406	11420	776.9	58057.5	12847.6

Table 9: Value Added and by Expenditure Approach, Merge of CSY and 60Y

	Gross Domestic Product by Expenditure Approach							Total Value of Exports and Imports		
year	Consumption	Households	Government	GCF	GFCF	Inventories	Net Exports	Exports	Imports	Balance
1952	546.3	453.0	93.3	153.7	80.7	73.0	-7.8	27.1	37.5	-10.4
1953	644.4	529.2	115.2	198.3	115.3	83.0	-8.4	34.8	46.1	-11.3
1954	654.1	550.0	104.1	226.9	140.9	86.0	-2.7	40	44.7	-4.7
1955	722.3	602.6	119.7	221.5	145.5	76.0	-8.9	48.7	61.1	-12.4
1956	772.6	646.8	125.8	257.6	219.6	38.0	4.0	55.7	53	2.7
1957	816.4	686.6	129.8	280.0	187.0	93.0	5.5	54.5	50	4.5
1958	852.6	724.0	128.6	432.0	333.0	99.0	6.6	67	61.7	5.3
1959	821.5	691.2	130.3	621.7	435.7	186.0	8.1	78.1	71.2	6.9
1960	932.6	741.7	190.9	575.0	473.0	102.0	0.4	63.3	65.1	-1.8
1961	995.1	816.7	178.4	274.6	227.6	47.0	5.5	47.7	43	4.7
1962	985.7	838.7	147.0	178.1	175.1	3.0	12.6	47.1	33.8	13.3
1963	1014.3	844.2	170.1	265.3	215.3	50.0	13.5	50	35.7	14.3
1964	1078.6	889.6	189.0	350.3	290.3	60.0	12.9	55.4	42.1	13.3
1965	1158.6	951.5	207.1	462.1	350.1	112.0	8.5	63.1	55.3	7.8
1966	1251.3	1021.1	230.2	569.8	406.8	163.0	6.2	66	61.1	4.9
1967	1275.7	1081.5	194.2	425.7	323.7	102.0	6.3	58.8	53.4	5.4
1968	1269.1	1076.6	192.5	432.2	300.2	132.0	7.4	57.6	50.9	6.7
1969	1359.4	1127.7	231.7	485.9	406.9	79.0	12.4	59.8	47.2	12.6
1970	1459.7	1206.8	252.9	744.9	545.9	199.0	2.4	56.8	56.1	0.7
1971	1557.9	1262.0	295.9	819.0	603.0	216.0	15.6	68.5	52.4	16.1
1972	1644.3	1334.2	310.1	791.1	622.1	169.0	18.4	82.9	64	18.9
1973	1751.3	1432.5	318.8	903.5	664.5	239.0	14.8	116.9	103.6	13.3
1974	1809.6	1467.0	342.6	936.1	748.1	188.0	-7.0	139.4	152.8	-13.4
1975	1887.4	1528.5	358.9	1062.3	880.3	182.0	0.7	143	147.4	-4.4
1976	1969.5	1588.5	381.0	990.1	865.1	125.0	8.7	134.8	129.3	5.5
1977	2057.8	1647.8	410.0	1098.1	911.1	187.0	10.1	139.7	132.8	6.9
1978	2239.1	1759.1	480.0	1377.9	1073.9	304.0	-11.4	167.6	187.4	-19.8

Table 10: Value Added and by Expenditure Approach, Merge of CSY and 60Y

	Gross Domestic Product by Expenditure Approach							Total Value of Exports and Imports		
year	Consumption	Households	Government	GCF	GFCF	Inventories	Net Exports	Exports	Imports	Balance
1978	2239.1	1759.1	480.0	1377.9	1073.9	304.0	-11.4	167.6	187.4	-19.8
1979	2633.7	2011.5	622.2	1478.9	1153.1	325.8	-20.0	211.7	242.9	-31.2
1980	3007.9	2331.2	676.7	1599.7	1322.4	277.3	-14.7	271.2	298.8	-27.6
1981	3361.5	2627.9	733.6	1630.2	1339.3	290.9	17.1	367.6	367.7	-0.1
1982	3714.8	2902.9	811.9	1784.2	1503.2	281.0	91.0	413.8	357.5	56.3
1983	4126.4	3231.1	895.3	2039.0	1723.3	315.7	50.8	438.3	421.8	16.5
1984	4846.3	3742.0	1104.3	2515.1	2147.0	368.1	1.3	580.5	620.5	-40
1985	5986.3	4687.4	1298.9	3457.5	2672.0	785.5	-367.1	808.9	1257.8	-448.9
1986	6821.8	5302.1	1519.7	3941.9	3139.7	802.2	-255.2	1082.1	1498.3	-416.2
1987	7804.6	6126.1	1678.5	4462.0	3798.7	663.3	10.8	1470	1614.2	-144.2
1988	9839.5	7868.1	1971.4	5700.2	4701.9	998.3	-151.1	1766.7	2055.1	-288.4
1989	11164.2	8812.6	2351.6	6332.7	4419.4	1913.3	-185.6	1956	2199.9	-243.9
1990	12090.5	9450.9	2639.6	6747.0	4827.8	1919.2	510.3	2985.8	2574.3	411.5
1991	14091.9	10730.6	3361.3	7868.0	6070.3	1797.7	617.5	3827.1	3398.7	428.4
1992	17203.3	13000.1	4203.2	10086.3	8513.7	1572.6	275.6	4676.3	4443.3	233
1993	21899.9	16412.1	5487.8	15717.7	13309.2	2408.5	-679.5	5284.8	5986.2	-701.4
1994	29242.2	21844.2	7398.0	20341.1	17312.7	3028.4	634.1	10421.8	9960.1	461.7
1995	36748.2	28369.7	8378.5	25470.1	20885.0	4585.1	998.6	12451.8	11048.1	1403.7
1996	43919.5	33955.9	9963.6	28784.9	24048.1	4736.8	1459.2	12576.4	11557.4	1019
1997	48140.6	36921.5	11219.1	29968.0	25965.0	4003.0	3549.9	15160.7	11806.5	3354.2
1998	51588.2	39229.3	12358.9	31314.2	28569.0	2745.2	3629.2	15223.6	11626.1	3597.5
1999	55636.9	41920.4	13716.5	32951.5	30527.3	2424.2	2536.6	16159.8	13736.4	2423.4
2000	61516.0	45854.6	15661.4	34842.8	33844.4	998.4	2390.2	20634.4	18638.8	1995.6
2001	66933.9	49435.9	17498.0	39769.4	37754.5	2014.9	2324.7	22024.4	20159.2	1865.2
2002	71816.5	53056.6	18759.9	45565.0	43632.1	1932.9	3094.1	26947.9	24430.3	2517.6
2003	77685.5	57649.8	20035.7	55963.0	53490.7	2472.3	2964.9	36287.9	34195.6	2092.3
2004	87552.6	65218.5	22334.1	69168.4	65117.7	4050.7	4235.6	49103.3	46435.8	2667.5
2005	99357.5	72958.7	26398.8	77856.8	74232.9	3624.0	10209.1	62648.1	54273.7	8374.4
2006	113103.8	82575.5	30528.4	92954.1	87954.1	5000.0	16654.6	77597.2	63376.9	14220.3
2007	132232.9	96332.5	35900.4	110943.2	103948.6	6994.6	23423.1	93563.6	73300.1	20263.5
2008	153422.5	111670.4	41752.1	138325.3	128084.4	10240.9	24226.8	100394.9	79526.5	20868.4
2009	169274.8	123584.6	45690.2	164463.2	156679.8	7783.4	15037.0	82029.7	68618.4	13411.3
2010	194115.0	140758.6	53356.3	193603.9	183615.2	9988.7	15097.6	107022.8	94699.3	12323.5
2011	232111.5	168956.6	63154.9	228344.3	216203.3	121401.0	12163.3	123240.6	113161.4	10079.2
2012	261832.8	190423.8	71409.0	252773.2	239333.4	13439.8	14632.4	129359.3	114801.0	14558.3

Table 11: Price indices, Merge of CSY and 60Y, Chow 1987

	Price Indices (1978=1)					
year	GDP deflator	Agric. deflator	Non-ag. deflator	Rel. price ag goods	Farm prices	Ex-Factory prices
1952	0.878	0.573	1.966	0.291	0.559	1.387
1953	0.922	0.620	1.588	0.390	0.609	1.342
1954	0.922	0.632	1.516	0.417	0.629	1.321
1955	0.915	0.629	1.517	0.415	0.621	1.304
1956	0.899	0.634	1.325	0.478	0.640	1.207
1957	0.889	0.596	1.339	0.445	0.672	1.210
1958	0.897	0.615	1.180	0.521	0.687	1.202
1959	0.907	0.629	1.084	0.581	0.700	1.210
1960	0.921	0.668	1.043	0.640	0.724	1.201
1961	1.062	0.852	1.236	0.690	0.926	1.261
1962	1.061	0.837	1.286	0.651	0.920	1.310
1963	1.033	0.826	1.247	0.662	0.894	1.303
1964	1.029	0.822	1.224	0.672	0.872	1.277
1965	1.037	0.873	1.174	0.743	0.864	1.217
1966	1.022	0.878	1.135	0.774	0.901	1.165
1967	1.030	0.876	1.169	0.750	0.899	1.151
1968	1.043	0.906	1.175	0.771	0.898	1.126
1969	1.004	0.911	1.072	0.850	0.897	1.088
1970	0.977	0.911	1.018	0.895	0.897	1.040
1971	0.983	0.931	1.012	0.920	0.912	1.034
1972	0.984	0.941	1.007	0.934	0.925	1.028
1973	0.986	0.947	1.007	0.940	0.933	1.023
1974	0.988	0.947	1.011	0.937	0.941	1.013
1975	0.977	0.954	0.989	0.964	0.960	1.010
1976	0.976	0.967	0.981	0.986	0.965	1.007
1977	0.987	0.963	0.997	0.966	0.962	0.998
1978	1.000	1.000	1.000	1.000	1.000	1.000

Income Distribution in China 1978-2007."

1.3 Labor Inputs

In Table 14 we report total population, total employment, employment in primary, secondary and tertiary sectors, measured in tens of thousand, from "60 Years of New China" (see previous section).

In Table 15 we report total population, total employment, employment in primary, secondary and tertiary sectors, measured in tens of thousand, from "China Statistical Yearbook".

Table 16 reports merged series for population and employment by sector, for 1952-2012.

Table 12: Price indices, Merge of CSY and 60Y, Chow 1987

	Price Indices (1978=1)					
year	GDP deflator	Agric. deflator	Non-ag. deflator	Rel. price ag goods	Farm prices	Ex-Factory prices
1978	1.000	1.000	1.000	1.000	1.000	1.000
1979	1.036	1.165	0.986	1.181	1.221	1.016
1980	1.075	1.277	1.006	1.269	1.308	1.021
1981	1.099	1.357	1.009	1.344	1.385	1.023
1982	1.097	1.387	0.993	1.397	1.415	1.021
1983	1.108	1.425	0.998	1.427	1.478	1.020
1984	1.163	1.478	1.057	1.398	1.537	1.034
1985	1.282	1.606	1.187	1.353	1.669	1.124
1986	1.343	1.691	1.247	1.356	1.776	1.167
1987	1.412	1.872	1.295	1.445	1.989	1.259
1988	1.583	2.183	1.446	1.510	2.446	1.448
1989	1.718	2.337	1.578	1.481	2.813	1.717
1990	1.818	2.584	1.637	1.578	2.740	1.788
1991	1.943	2.663	1.786	1.491	2.685	1.899
1992	2.102	2.793	1.967	1.420	2.776	2.028
1993	2.421	3.166	2.288	1.384	3.148	2.515
1994	2.920	4.185	2.716	1.541	4.405	3.005
1995	3.320	5.053	3.059	1.652	5.281	3.453
1996	3.534	5.553	3.245	1.711	5.503	3.553
1997	3.587	5.528	3.326	1.662	5.255	3.542
1998	3.555	5.480	3.308	1.657	4.835	3.397
1999	3.510	5.314	3.290	1.615	4.245	3.315
2000	3.582	5.251	3.390	1.549	4.092	3.408
2001	3.655	5.394	3.467	1.556	4.125	3.364
2002	3.677	5.493	3.493	1.572	4.113	3.290
2003	3.772	5.632	3.598	1.565	4.294	3.366
2004	4.033	6.527	3.808	1.714	4.856	3.571
2005	4.192	6.495	3.996	1.625	4.924	3.746
2006	4.351	6.632	4.172	1.590	4.983	3.859
2007	4.684	7.613	4.476	1.701	5.905	3.978
2008	5.047	8.505	4.812	1.767	6.738	4.252
2009	5.017	8.532	4.789	1.782	6.576	4.023
2010	5.350	9.416	5.102	1.845	7.293	4.244
2011	5.767	10.581	5.488	1.928	8.496	4.500
2012	5.876	11.163	5.580	2.001	8.725	4.423

Table 13: Labor Income by Sector (CSY, Bai Qian (2010), Chow (1987))

	Hourly Wages in		Labor Share in			Hourly Wages in		Labor Share in	
year	Agriculture	Non-agriculture	Agriculture	Non-agriculture	year	Agriculture	Non-agriculture	Agriculture	Non-agriculture
1952	358.2	474.2			1978	470.0	628.9	0.895	0.417
1953	413.6	530.4			1979	528.0	680.2	0.891	0.423
1954	438.5	549.7			1980	616.0	773.9	0.894	0.427
1955	440.4	552.5			1981	637.0	782.6	0.908	0.430
1956	475.7	620.6			1982	661.0	808.4	0.901	0.434
1957	478.6	635.3			1983	691.0	836.1	0.908	0.431
1958	449.9	484.3			1984	770.0	988.5	0.911	0.442
1959	392.6	473.3			1985	878.0	1166.1	0.917	0.448
1960	348.7	495.4			1986	1048.0	1347.3	0.906	0.461
1961	345.8	515.6			1987	1143.0	1479.1	0.896	0.458
1962	374.5	600.3			1988	1280.0	1775.7	0.893	0.471
1963	402.2	663.0			1989	1389.0	1967.9	0.887	0.474
1964	413.6	682.3			1990	1541.0	2175.2	0.886	0.494
1965	413.6	671.2			1991	1652.0	2375.9	0.889	0.490
1966	408.9	634.4			1992	1828.0	2758.7	0.887	0.476
1967	407.0	645.5			1993	2042.0	3437.5	0.879	0.487
1968	400.3	634.4			1994	2819.0	4620.5	0.873	0.498
1969	399.3	628.9			1995	3522.0	5591.6	0.883	0.504
1970	400.3	608.6			1996	4050.0	6303.7	0.888	0.499
1971	407.0	584.7			1997	4311.0	6564.0	0.888	0.506
1972	404.1	598.5			1998	4528.0	7615.7	0.889	0.509
1973	416.5	589.3			1999	4832.0	8508.1	0.887	0.506
1974	461.4	596.7			2000	5184.0	9563.1	0.879	0.503
1975	439.4	593.0			2001	5741.0	11097.3	0.876	0.499
1976	438.5	583.8			2002	6398.0	12677.8	0.871	0.498
1977	438.5	581.9			2003	6884.0	14293.6	0.861	0.484
1978	470.0	628.9	0.895	0.417	2004	7497.0	16284.0	0.865	0.494
					2005	8207.0	18596.6	0.862	0.493
					2006	9269.0	21289.1	0.858	0.492
					2007	10847.0	25205.4	0.855	0.497
					2008	12560.0	29428.9		
					2009	14356.0	32796.5		
					2010	16717.0	37130.9		
					2011	19469.0	42371.2		

Table 14: Employment and Population, 60Y

	Population	Employment					Population	Employment			
year		Total	Primary	Secondary	Tertiary	year		Total	Primary	Secondary	Tertiary
1952	57482	20729	17317	1531	1881	1978	96259	40152	28318	6945	4890
1953	58796	21364	17747	1715	1902	1979	97542	41024	28634	7214	5177
1954	60266	21832	18151	1882	1799	1980	98705	42361	29122	7707	5532
1955	61465	22328	18592	1913	1823	1981	100072	43725	29777	8003	5945
1956	62828	23018	18544	2468	2006	1982	101654	45295	30859	8346	6090
1957	64653	23771	19309	2142	2320	1983	103008	46436	31151	8679	6606
1958	65994	26600	15490	7076	4034	1984	104357	48197	30868	9590	7739
1959	67207	26173	16271	5402	4500	1985	105851	49873	31130	10384	8359
1960	66207	25880	17016	4112	4752	1986	107507	51282	31254	11216	8811
1961	65859	25590	19747	2856	2987	1987	109300	52783	31663	11726	9395
1962	67295	25910	21276	2059	2575	1988	111026	54334	32249	12152	9933
1963	69172	26640	21966	2038	2636	1989	112704	55329	33225	11976	10129
1964	70499	27736	22801	2183	2752	1990	114333	64749	38914	13856	11979
1965	72538	28670	23396	2408	2866	1991	115823	65491	39098	14015	12378
1966	74542	29805	24297	2600	2908	1992	117171	66152	38699	14355	13098
1967	76368	30814	25165	2661	2988	1993	118517	66808	37680	14965	14163
1968	78534	31915	26063	2743	3109	1994	119850	67455	36628	15312	15515
1969	80671	33225	27117	3030	3078	1995	121121	68065	35530	15655	16880
1970	82992	34432	27811	3518	3103	1996	122389	68950	34820	16203	17927
1971	85229	35620	28397	3990	3233	1997	123626	69820	34840	16547	18432
1972	87177	35854	28283	4276	3295	1998	124761	70637	35177	16600	18860
1973	89211	36652	28857	4492	3303	1999	125786	71394	35768	16421	19205
1974	90859	37369	29218	4712	3439	2000	126743	72085	36043	16219	19823
1975	92420	38168	29456	5152	3560	2001	127627	73025	36513	16284	20228
1976	93717	38834	29443	5611	3780	2002	128453	73740	36870	15780	21090
1977	94974	39377	29340	5831	4206	2003	129227	74432	36546	16077	21809
1978	96259	40152	28318	6945	4890	2004	129988	75200	35269	16920	23011
						2005	130756	75825	33970	18084	23771
						2006	131448	76400	32561	19225	24614
						2007	132129	76990	31444	20629	24917
						2008	132802	77480	30654	21109	25717

Table 15: Employment and Population, CSY

	Population	Employment					Population	Employment			
year		Total	Primary	Secondary	Tertiary	year		Total	Primary	Secondary	Tertiary
1978	96259	40152	28318	6945	4890	1995	121121	68065	35530	15655	16880
1979	97542	41024	28634	7214	5177	1996	122389	68950	34820	16203	17927
1980	98705	42361	29122	7707	5532	1997	123626	69820	34840	16547	18432
1981	100072	43725	29777	8003	5945	1998	124761	70637	35177	16600	18860
1982	101654	45295	30859	8346	6090	1999	125786	71394	35768	16421	19205
1983	103008	46436	31151	8679	6606	2000	126743	72085	36043	16219	19823
1984	104357	48197	30868	9590	7739	2001	127627	72797	36399	16234	20165
1985	105851	49873	31130	10384	8359	2002	128453	73280	36640	15682	20958
1986	107507	51282	31254	11216	8811	2003	129227	73736	36204	15927	21605
1987	109300	52783	31663	11726	9395	2004	129988	74264	34830	16709	22725
1988	111026	54334	32249	12152	9933	2005	130756	74647	33442	17766	23439
1989	112704	55329	33225	11976	10129	2006	131448	74978	31941	18894	24143
1990	114333	64749	38914	13856	11979	2007	132129	75321	30731	20186	24404
1991	115823	65491	39098	14015	12378	2008	132802	75564	29923	20553	25087
1992	117171	66152	38699	14355	13098	2009	133450	75828	28890	21080	25857
1993	118517	66808	37680	14965	14163	2010	134091	76105	27931	21842	26332
1994	119850	67455	36628	15312	15515	2011	134735	76420	26594	22544	27282
1995	121121	68065	35530	15655	16880	2012	135404	76704	25773	23241	27690

We are interested in the division of economic activity into agricultural and non-agricultural. For this purpose, we treat the primary sector as agricultural, and add up employment in the secondary and tertiary sectors to obtain employment in the non-agricultural sector.

At this point, we incorporate a correction proposed by Holz (2006), Appendix 13, page 236. The correction takes care of the reclassification of employed workers that was made by the NBS in 1990. As a consequence, for years prior to 1990 total employment values are adjusted up by a factor of approximately 1,1666. This correction increases the size of total employment, but does not tell us anything about sectoral employment. To adjust also the breakdown of employment into agricultural and non-agricultural activity, we use the proportions obtained from the official series, as described earlier.

1.4 Capital Inputs

We use Holz (2006), Tables 19 and 20 on pages 159-161, as our main source for aggregate and sectoral capital stock. We repeat the data on total and primary capital stock in current and 2000 prices in the right two panels of Table 18. We convert the series for total capital stock to

Table 16: Employment and Population, Merge of CSY, 60Y, Holz's correction

	Population	Employment				Population	Employment		
year		Total	Agriculture	Non-agriculture	year		Total	Agriculture	Non-agriculture
1952	574.82	241.83	202.03	39.81	1978	962.59	468.43	330.36	138.07
1953	587.96	249.24	207.04	42.20	1979	975.42	479.67	334.79	144.88
1954	602.66	254.70	211.76	42.94	1980	987.05	493.97	339.59	154.38
1955	614.65	260.49	216.90	43.59	1981	1000.72	510.39	347.58	162.81
1956	628.28	268.54	216.34	52.20	1982	1016.54	526.18	358.48	167.70
1957	646.53	277.32	225.27	52.06	1983	1030.08	541.17	363.04	178.14
1958	659.94	310.33	180.71	129.61	1984	1043.57	558.10	357.43	200.66
1959	672.07	305.35	189.82	115.52	1985	1058.51	575.51	359.22	216.29
1960	662.07	301.93	198.52	103.41	1986	1075.07	591.51	360.51	231.00
1961	658.59	298.54	230.38	68.17	1987	1093.00	607.44	364.38	243.06
1962	672.95	302.28	248.21	54.06	1988	1110.26	622.40	369.39	253.00
1963	691.72	310.79	256.26	54.53	1989	1127.04	635.61	381.68	253.94
1964	704.99	323.58	266.01	57.57	1990	1143.33	647.49	389.14	258.35
1965	725.38	334.48	272.95	61.53	1991	1158.23	654.91	390.98	263.93
1966	745.42	347.72	283.46	64.26	1992	1171.71	661.52	386.99	274.53
1967	763.68	359.49	293.59	65.90	1993	1185.17	668.08	376.80	291.28
1968	785.34	372.33	304.06	68.27	1994	1198.50	674.55	366.28	308.27
1969	806.71	387.62	316.36	71.26	1995	1211.21	680.65	355.30	325.35
1970	829.92	401.70	324.45	77.24	1996	1223.89	689.50	348.20	341.30
1971	852.29	415.56	331.29	84.27	1997	1236.26	698.20	348.40	349.79
1972	871.77	418.29	329.96	88.33	1998	1247.61	706.37	351.77	354.60
1973	892.11	427.60	336.66	90.94	1999	1257.86	713.94	357.68	356.26
1974	908.59	435.96	340.87	95.09	2000	1267.43	720.85	360.43	360.42
1975	924.20	445.28	343.65	101.64	2001	1276.27	727.97	363.99	363.99
1976	937.17	453.05	343.49	109.56	2002	1284.53	732.80	366.40	366.40
1977	949.74	459.39	342.29	117.10	2003	1292.27	737.36	362.04	375.32
1978	962.59	468.43	330.36	138.07	2004	1299.88	742.64	348.30	394.34
					2005	1307.56	746.47	334.42	412.05
					2006	1314.48	749.78	319.41	430.37
					2007	1321.29	753.21	307.31	445.90
					2008	1328.02	755.64	299.23	456.41
					2009	1334.50	758.28	288.90	469.38
					2010	1340.91	761.05	279.31	481.74
					2011	1347.35	764.20	265.94	498.26
					2012	1354.04	767.04	257.73	509.31

1978 yuan using the GDP deflator (see subsection on prices and wages).

We use the level of capital and its ratio to GDP in 1953 to estimate the initial level of capital in 1978 prices. We apply the perpetual inventory method (with a depreciation rate of 5 percent) to our series for real investment in 1978 prices (computed using Gross Fixed Capital Formation as share of GDP) to obtain the series for aggregate capital in 1978 prices. The series that we obtain is largely consistent with Holz's estimates of aggregate capital stock for 1953-2006, with two minor differences: Holz computes capital in constant 2000 prices and uses a variable depreciation rate which ranges between 3 and 5 percent.

This measure works well for the later part of the sample, but for the pre-1970 period it implies unrealistically low values for non-agricultural consumption, which is computed as the residual between value added, government, trade and investment.[1] To eliminate the influence of this issue on the level of the capital and labor distortions, we augment our estimates with data on non-agricultural consumption expenditure from CSY, Table 2.19, that we present in Table 20. Data on non-agricultural consumption for the 1952-74 period is converted to 1978 yuans using the non-agricultural value added deflator, and investment is computed as the residual for the same period.

We also use data from Holz (2006) to divide the aggregate capital stock into capital used in the agricultural (primary) and non-agricultural sectors. This sectoral division of capital stock is only available for 1978-2011.

For earlier years we use the data on sectoral investment from Chow (1993) to estimate the composition of capital stock by sector. As shown in Table 17, we use net capital stock accumulation by sector from Table 5 on page 820 in Chow (1993), and then apply the perpetual inventory method to accumulate sectoral capital stock for 1953-1978. As initial values we use the value from the same table for non-agricultural capital, and the value of 450 for agricultural capital. We then break down by sector the total real capital stock in 1978 prices computed earlier using the relative proportions implied by Chow's data.

For the most recent period, 2003-2012, we use CSY 2013, Table 5-9, Investment in Fixed Assets, total and in the agricultural sector, to compute the breakdown of investment into agricultural investment and non-agricultural investment. Using the perpetual inventory method,

[1] The standard assumption that all investment is produced using non-agricultural goods plays an important role when the non-agricultural sector is small.

we compute capital by sector in 2003-2012.

1.5 Defense Spending

The data on defense spending comes from three main sources. The earlier period of 1952- 1995 is jointly covered by HL and CSY, which report nominal defense spending in yuan. For the period 1983-2011 an alternative source of data is the website of the Stockholm International Peace Research Institute (SIPRI) which reports spending on defense for a variety of countries as a percent of GDP. For the overlapping period the trends are broadly consistent, but the exact estimates vary by a factor of 1 to 1.5. As there seems to be no reliable way of obtaining more precise estimates, we average the two available sources for the overlapping period. We obtain an estimate of real defense spending in 1978 prices using the share of defense in GDP from these two sources.

1.6 Foreign Trade

The main source for data on sectoral exports and imports is Fukao, Kiyota and Yue (2006) (FKY). FKY report data on China's exports and imports by commodity at the SITC-R 2-digit level for 1952-1964 and for 1981-2000, obtained from the "China's Long-Term International Trade Statistics" database. Using data from FKY, we construct estimates of nominal exports and imports of agricultural and non-agricultural commodities. We then subtract imports from exports to obtain estimates of net exports by sector. We use the price deflators computed earlier to estimate real net exports by sector in 1978 prices. For the 1965-1980 period, to our knowledge, there is no available data on trade by sector. We linearly interpolate the ratios of net export to value added by sector for this intermediate period. For the 2001-2012 period we use data directly comparable to that reported by FKY, now available in CSY.

1.7 Final Dataset

In this subsection, we combine series constructed and reported in previous subsections into a final dataset. Tables 23 and 25 present the combined dataset used in the analysis.

Table 23 presents total value added (GDP), value added by agriculture (YA) and non-agriculture (YM), which in turn is split into state (YS) and private (YP) non-agriculture. Agricultural value added is either consumed (CA) or exported (exA). Non-agricultural value

Table 17: Capital and Investment, Chow (1993)

	Capital Stock (cur prices)			Accumulation (cur prices)			Estimates of capital stock, Chow (1993) Table 5				
year	Ag	Non-Ag	Total	Ag	Non-ag	Land	Agric	Industry	Construction	Transportation	Commerce
1952	450	582.6	1032.6	8.20	126.00	720	0	248	9	152.3	173.3
1953	458.2	708.6	1166.8	7.30	150.50	720	8.2	299.1	18.2	162.6	228.7
1954	465.5	859.1	1324.6	9.10	147.30	720	15.5	366.3	27.8	179.7	285.3
1955	474.6	1006.4	1481	19.90	156.40	720	24.6	436.8	36.9	198	334.7
1956	494.5	1162.8	1657.3	14.60	186.90	720	44.5	539.2	47.5	219.3	356.8
1957	509.1	1349.7	1858.8	26.60	296.50	720	59.1	632	59.2	243.4	415.1
1958	535.7	1646.2	2181.9	28.20	439.40	720	85.7	844.4	61.6	287.4	452.8
1959	563.9	2085.6	2649.5	38.30	394.90	720	113.9	1147.8	67.4	350.4	520
1960	602.2	2480.5	3082.7	18.30	151.30	720	152.2	1436.6	73.9	406.3	563.7
1961	620.5	2631.8	3252.3	18.70	69.40	720	170.5	1545.4	76.1	427.9	582.4
1962	639.2	2701.2	3340.4	31.20	123.70	720	189.2	1600	79	437.2	585
1963	670.4	2824.9	3495.3	34.10	187.40	720	220.4	1682	83.8	445.1	614
1964	704.5	3012.3	3716.8	32.80	266.90	720	254.5	1805.5	91.1	460.5	655.2
1965	737.3	3279.2	4016.5	31.70	375.60	720	287.3	1957.2	100	494.2	727.8
1966	769	3654.8	4423.8	19.40	341.00	720	319	2198.5	108.8	537.3	810.2
1967	788.4	3995.8	4784.2	14.90	141.70	720	338.4	2352.1	114.2	563.4	966.1
1968	803.3	4137.5	4940.8	26.00	282.70	720	353.3	2496.4	118.1	584.5	938.5
1969	829.3	4420.2	5249.5	43.10	495.90	720	379.3	2682.7	125.2	621.7	990.6
1970	872.4	4916.1	5788.5	56.60	536.00	720	422.4	3001	137.1	681.6	1096.4
1971	929	5452.1	6381.1	52.50	507.20	720	479	3335.8	153.8	759.9	1202.6
1972	981.5	5959.3	6940.8	58.50	583.20	720	531.5	3657	169	836.2	1297.1
1973	1040	6542.5	7582.5	60.80	577.40	720	590	4015.7	186.1	917.1	1423.6
1974	1100.8	7119.9	8220.7	71.40	625.80	720	650.8	4384.2	204	1001.5	1530.2
1975	1172.2	7745.7	8917.9	82.30	586.70	720	722.2	4805.3	225.4	1092.7	1622.3
1976	1254.5	8332.4	9586.9	65.80	674.00	720	804.5	5239.1	246.2	1185.3	1661.8
1977	1320.3	9006.4	10326.7	137.60	828.00	720	870.3	5661.4	261.9	1263.3	1819.8
1978	1457.9	9834.4	11292.3	93.20	822.50	720	1007.9	6158.5	284.6	1383.6	2007.7
1979	1551.1	10656.9	12208	64.30	805.40	720	1101.1	6680.1	311.6	1464.9	2200.3
1980	1615.4	11462.3	13077.7	45.50	812.00	720	1165.4	7126	351	1551.1	2434.2
1981	1660.9	12274.3	13935.2	68.80	857.40	720	1210.9	7587.3	383.2	1597.5	2706.3
1982	1729.7	13131.7	14861.4	87.30	924.00	720	1279.7	8060.4	414.4	1686.8	2970.1
1983	1817	14055.7	15872.7	68.10	1071.50	720	1367	8614.4	451.7	1796.1	3193.5
1984	1885.1	15127.2	17012.3	143.50	1252.90	720	1435.1	9391.4	520.5	1957.4	3257.9
1985							1578.6	10514	606.9	2205.7	3053.5

Table 18: Capital and Investment, Merge of Holz (2006), Chow (1993), CSY

	Merge of Holz and Chow (1978 prices)				Capital Stock, Holz (2006), Table 19		Capital Stock, Holz (2006), Table 20	
year	Investment	Capital	Agric capital	Non-ag capital	2000 prices	1978 prices	Total	Primary
1952	0.1	52.6	22.9	29.7				
1953	1.8	50.0	19.6	30.4	179.2	50.0		
1954	3.6	49.4	17.3	32.0	219.4	61.2		
1955	2.2	50.5	16.2	34.3	263.6	73.6		
1956	5.8	50.1	15.0	35.2	327.2	91.4		
1957	7.0	53.4	14.6	38.8	393.3	109.8		
1958	27.2	57.7	14.2	43.5	494.2	138.0		
1959	37.8	82.0	17.5	64.6	610.6	170.5		
1960	40.3	115.7	22.6	93.1	736.7	205.7		
1961	3.9	150.2	28.7	121.6	798.2	222.9		
1962	0.1	146.7	28.1	118.6	842.5	235.2		
1963	2.7	139.4	26.7	112.7	897.4	250.6		
1964	15.6	135.1	25.6	109.5	975.9	272.5		
1965	27.8	144.0	26.4	117.5	1085.1	303.0		
1966	34.1	164.6	28.6	136.0	1188.1	331.7		
1967	23.4	190.5	31.4	159.1	1248.0	348.5		
1968	16.0	204.4	33.2	171.1	1296.8	362.1		
1969	31.0	210.1	33.2	176.9	1378.0	384.8		
1970	55.2	230.7	34.8	195.9	1511.8	422.1		
1971	62.4	274.4	39.9	234.4	1638.8	457.6		
1972	63.7	323.0	45.7	277.3	1768.0	493.7		
1973	72.8	370.6	50.8	319.7	1929.5	538.7		
1974	75.7	424.9	54.7	370.1	2101.2	586.7		
1975	90.1	479.3	57.8	421.6	2305.8	643.8		
1976	88.6	545.4	61.2	484.2	2490.6	695.4		
1977	92.3	606.8	63.0	543.7	2716.3	758.4		
1978	107.4	668.8	63.9	604.8	2994.1	836.0	267.5	25.6

Table 19: Capital and Investment, Merge of Holz (2006), Chow (1993), CSY

	Merge of Holz and Chow (1978 prices)				Capital Stock, Holz (2006), Table 19		Capital Stock, Holz (2006), Table 20	
year	Investment	Capital	Agric capital	Non-ag capital	2000 prices	1978 prices	Total	Primary
1978	107.4	668.8	63.9	604.8	2994.1	836.0	267.5	25.6
1979	111.3	742.7	71.8	671.0	3321.2	927.3	291.3	28.1
1980	123.0	816.9	79.5	737.3	3665.9	1023.6	310.5	30.2
1981	121.9	899.1	86.4	812.6	3989.0	1113.8	333.9	32.1
1982	137.1	976.0	95.2	880.7	4343.4	1212.7	356.1	34.8
1983	155.5	1064.2	103.2	961.0	4752.3	1326.9	391.5	38.0
1984	184.6	1166.5	103.5	1063.0	5232.0	1460.8	431.7	38.3
1985	208.4	1292.8	108.5	1184.2	5756.3	1607.2	484.1	40.6
1986	233.9	1436.5	115.2	1321.3	6404.1	1788.1	555.6	44.6
1987	269.0	1598.5	128.6	1469.9	7127.6	1990.1	654.7	52.7
1988	297.0	1787.6	137.9	1649.8	7897.6	2205.1	774.2	59.7
1989	257.2	1995.3	146.9	1848.4	8593.5	2399.4	908.8	66.9
1990	265.6	2152.7	145.0	2007.7	9316.8	2601.3	1043.5	70.3
1991	312.5	2310.6	141.8	2168.9	10088.2	2816.7	1204.1	73.9
1992	405.0	2507.6	144.0	2363.5	10955.8	3059.0	1312.5	75.4
1993	549.8	2787.2	155.8	2631.4	11927.1	3330.2	1443.7	80.7
1994	592.9	3197.7	176.6	3021.1	13055.1	3645.1	1608.2	88.8
1995	629.0	3630.7	194.6	3436.1	14406.2	4022.4	1941.2	104.0
1996	680.5	4078.1	207.0	3871.1	16078.5	4489.3	2345.6	119.1
1997	723.8	4554.7	215.7	4339.1	17888.4	4994.6	2855.0	135.2
1998	803.5	5050.8	218.0	4832.8	19783.7	5523.8	3207.2	138.4
1999	869.7	5601.8	222.6	5379.2	21883.4	6110.1	3493.6	138.8
2000	945.0	6191.4	227.0	5964.3	24145.5	6741.7	3567.5	130.8
2001	1032.9	6826.8	237.5	6589.3	26483.0	7394.3	3733.5	129.9
2002	1186.6	7518.4	249.5	7268.9	29090.4	8122.3	3871.0	128.4
2003	1418.0	8329.1	273.8	8055.3	31944.7	8919.3		
2004	1614.4	9330.7	302.2	9028.4	35269.1	9847.5		
2005	1771.0	10478.6	330.4	10148.1	38933.4	10870.6		
2006	2021.4	11725.6	360.3	11365.3				
2007	2219.5	13160.7	392.8	12767.9				
2008	2537.8	14722.1	428.2	14294.0				
2009	3123.3	16523.8	481.1	16042.7				
2010	3432.3	18820.9	552.9	18268.0				
2011	3748.9	21312.2	623.1	20689.1				
2012	4073.0	23995.5	697.3	23298.2				

Table 20: Expenditure by sector, CSY1987

	Consumption Expenditure (0.1 billion yuan)					non-ag	non-ag
year	total	resident	agricultural	Non-agricultural	society	price	real expend.
1952	477	434	298	136	43	1.97	69.17
1953	559	508	332	176	51	1.59	110.81
1954	570	527	348	179	43	1.52	118.11
1955	622	575	389	186	47	1.52	122.60
1956	671	613	397	216	58	1.33	162.98
1957	702	649	412	237	53	1.34	177.04
1958	738	683	435	248	55	1.18	210.11
1959	716	641	339	302	75	1.08	278.70
1960	763	683	346	337	80	1.04	323.05
1961	818	755	418	337	63	1.24	272.69
1962	849	781	459	322	67	1.29	250.31
1963	864	793	487	306	71	1.25	245.30
1964	921	841	539	302	80	1.22	246.79
1965	982	895	581	314	87	1.17	267.45
1966	1065	969	637	332	96	1.13	292.58
1967	1124	1026	679	347	98	1.17	296.85
1968	1111	1020	670	350	91	1.17	297.98
1969	1180	1068	705	363	112	1.07	338.68
1970	1258	1145	770	375	113	1.02	368.49
1971	1324	1195	804	391	129	1.01	386.24
1972	1404	1263	824	439	141	1.01	435.87
1973	1511	1364	898	466	147	1.01	462.85
1974	1550	1396	915	481	154	1.01	475.75
1975	1621	1450	946	504	171	0.99	509.62
1976	1676	1502	965	537	174	0.98	547.38
1977	1741	1553	974	579	188	1.00	580.82
1978	1888	1673	1043	630	215	1.00	630.00

Table 21: Defense Spending (CSY, SIPRI)

year	Defense as Share of GDP	year	Defense as Share of GDP	year	Defense as Share of GDP
1952	0.067	1972	0.075	1992	0.014
1953	0.069	1973	0.063	1993	0.012
1954	0.059	1974	0.057	1994	0.011
1955	0.082	1975	0.057	1995	0.010
1956	0.069	1976	0.055	1996	0.010
1957	0.061	1977	0.056	1997	0.010
1958	0.045	1978	0.056	1998	0.011
1959	0.047	1979	0.066	1999	0.012
1960	0.048	1980	0.053	2000	0.012
1961	0.050	1981	0.043	2001	0.013
1962	0.062	1982	0.041	2002	0.014
1963	0.066	1983	0.042	2003	0.014
1964	0.063	1984	0.036	2004	0.017
1965	0.063	1985	0.032	2005	0.014
1966	0.064	1986	0.029	2006	0.013
1967	0.056	1987	0.026	2007	0.014
1968	0.067	1988	0.024	2008	0.014
1969	0.078	1989	0.015	2009	0.014
1970	0.075	1990	0.016	2010	0.013
1971	0.082	1991	0.015	2011	0.013
1972	0.075	1992	0.014	2012	0.012

Table 22: Foreign Trade by Sector (CSY, Fukao Kiyota Yue (2006))

	Share of Agric goods in		Sectoral Trade (100mil yuan)			Share of Agric goods in		Sectoral Trade (100mil yuan)	
year	Exports	Imports	Export of Agric.	Import of Non-ag.	year	Exports	Imports	Export of Agric.	Import of Non-ag.
1952	0.339	0.020	8.42	18.82	1978	0.183	0.218	-10.13	9.67
1953	0.326	0.023	10.31	21.61	1979	0.178	0.210	-13.27	17.93
1954	0.354	0.040	12.35	17.05	1980	0.173	0.202	-13.39	14.21
1955	0.340	0.028	14.82	27.22	1981	0.167	0.193	-9.55	-9.45
1956	0.331	0.022	17.27	14.57	1982	0.163	0.228	-14.35	-70.65
1957	0.283	0.018	14.51	10.01	1983	0.158	0.091	30.84	14.34
1958	0.334	0.028	20.67	15.37	1984	0.153	0.068	46.71	86.71
1959	0.305	0.011	23.03	16.13	1985	0.148	0.045	63.58	512.48
1960	0.487	0.016	29.78	31.58	1986	0.141	0.052	74.26	490.46
1961	0.143	0.291	-5.67	-10.37	1987	0.135	0.060	100.46	244.66
1962	0.159	0.367	-4.91	-18.21	1988	0.128	0.068	85.87	374.27
1963	0.211	0.339	-1.57	-15.87	1989	0.121	0.076	69.87	313.77
1964	0.256	0.332	0.23	-13.07	1990	0.115	0.084	126.09	-285.41
1965	0.251	0.324	-2.06	-9.86	1991	0.110	0.058	222.62	-205.78
1966	0.246	0.316	-3.06	-7.96	1992	0.108	0.049	289.15	56.15
1967	0.241	0.308	-2.27	-7.67	1993	0.104	0.028	377.48	1078.88
1968	0.235	0.299	-1.68	-8.38	1994	0.095	0.043	559.53	97.83
1969	0.230	0.291	0.02	-12.58	1995	0.079	0.069	221.97	-1181.73
1970	0.225	0.283	-3.10	-3.80	1996	0.079	0.057	340.07	-678.93
1971	0.220	0.275	0.65	-15.45	1997	0.070	0.044	536.11	-2818.09
1972	0.215	0.267	0.71	-18.19	1998	0.064	0.039	524.94	-3072.56
1973	0.209	0.259	-2.33	-15.63	1999	0.058	0.031	511.25	-1912.15
1974	0.204	0.250	-9.83	3.57	2000	0.053	0.027	583.24	-1412.36
1975	0.199	0.242	-7.28	-2.88	2001	0.052	0.025	629.84	-1235.36
1976	0.194	0.234	-4.18	-9.68	2002	0.048	0.025	699.60	-1818.00
1977	0.188	0.226	-3.70	-10.60	2003	0.043	0.023	762.68	-1329.62
1978	0.183	0.218	-10.13	9.67	2004	0.034	0.025	522.49	-2145.01
					2005	0.031	0.021	854.02	-7520.38
					2006	0.028	0.019	986.50	-13233.84
					2007	0.027	0.021	935.01	-19328.49
					2008	0.024	0.023	588.77	-20279.65
					2009	0.029	0.024	695.20	-12716.12
					2010	0.028	0.023	724.09	-11599.45
					2011	0.028	0.025	631.86	-9447.34
					2012	0.027	0.029	191.15	-14367.14

added produced (YM) plus imported (ImM) is used either for consumption (CM), investment (Inv) or defense spending (GM). All values in Table 23 are in constant prices in 100 million of 1978 yuan.

The left panel of Table 25 presents total capital stock (K) broken down by sector: agriculture (KA), non-agriculture (KM), in turn broken down into state (KS) and private (KP) non-agriculture. Like value added, the capital stock is measured in 100 million of 1978 yuan. The central panel of Table 25 presents total employment (N) split into: agriculture (NA), non-agriculture (NM), in turn split into state (NS) and private (NP) non-agriculture. Employment, as well as total population (POP), are measured in million persons. The right panel of Table 25 presents the index of relative prices of agricultural and non-agricultural goods (pA/pM) and the ratio of wages in agriculture to wages in non-agriculture (wA/wM). The index of relative prices is normalized to 1 in 1978.

1.8 Prominent Alternative Data Sources

To check the validity of the break down of capital stock by sector for the pre-reform period, we construct sectoral capital series using provincial data on investment in fixed assets by type of unit from the the China Compendium of Statistics 1949-2008 (Table 8). For 5 provinces (Fujian, Hunan, Jilin, Shanghai, Shanxi), the data on rural and urban investments go back to 1950; in case of Tianjin, they start in 1956. We attributed all the fixed asset investments of collectively-owned units in rural areas to the the agricultural sector and all fixed asset investments in other units in rural areas and all units in urban areas - to the non-agricultural sector. This gave us data on investment by sector by province. We aggregated data on agricultural and non-agricultural investment for the available provinces. We found that the share of agricultural investment in total investment from this provincial dataset traces very closely the series obtained from Chow as described above. The similarity is illustrated in Figure 1.

As another robustness check for the level of agricultural capital we employ data from Tang (1984), who reports farm capital in 1952 yuan, as shown in Table 27. Figure 2 compares the paths of farm capital according to Tang (1984) with our baseline series.

In Table 11 we also report indexes of agricultural and industrial goods prices advocated by Young (2003). These are the General Purchasing Price Index for Farm Products and the Ex-Factory Price Index for Industrial Products, available from the CSY for various years. For

Table 23: Value Added by Sector and by Use

year	GDP	YA	CA	exA	YM	CM	Inv	ImM	GM
1952	77.33	60.39	58.92	1.47	16.94	12.60	0.08	0.96	5.21
1953	89.41	61.53	59.87	1.66	27.88	19.85	1.83	-0.02	6.17
1954	93.17	62.57	60.61	1.95	30.61	21.48	3.58	-0.02	5.52
1955	99.55	67.52	65.17	2.36	32.03	21.67	2.17	-0.02	8.16
1956	114.51	70.66	67.94	2.73	43.85	30.09	5.81	-0.03	7.90
1957	120.31	72.84	70.40	2.44	47.47	33.14	6.95	-0.03	7.34
1958	145.88	73.16	69.80	3.36	72.72	38.90	27.19	-0.05	6.56
1959	158.74	61.55	57.89	3.66	97.19	51.84	37.81	-0.07	7.46
1960	158.23	51.47	47.01	4.46	106.76	58.80	40.29	-0.08	7.60
1961	115.00	52.22	51.69	0.52	62.78	52.25	3.94	-0.84	5.75
1962	108.55	54.59	54.04	0.55	53.96	45.72	0.09	-1.42	6.73
1963	119.63	60.76	60.15	0.61	58.87	47.01	2.70	-1.27	7.90
1964	141.47	68.62	67.93	0.69	72.85	47.29	15.58	-1.07	8.91
1965	165.57	75.26	74.51	0.75	90.31	51.25	27.79	-0.84	10.43
1966	183.33	80.70	79.89	0.81	102.63	56.07	34.13	-0.70	11.73
1967	172.88	82.22	81.40	0.82	90.65	56.88	23.43	-0.66	9.68
1968	165.81	80.90	80.09	0.81	84.91	57.10	15.99	-0.71	11.11
1969	193.82	81.58	80.78	0.82	112.24	64.90	31.05	-1.17	15.12
1970	231.42	87.87	86.99	0.88	143.55	70.61	55.21	-0.37	17.36
1971	247.73	89.53	88.63	0.90	158.21	74.01	62.35	-1.53	20.31
1972	257.06	88.73	87.84	0.89	168.33	83.52	63.72	-1.81	19.28
1973	277.26	96.72	95.74	0.97	180.54	88.69	72.83	-1.55	17.47
1974	283.66	100.67	99.66	1.01	182.99	91.01	75.69	-0.13	16.17
1975	308.32	102.72	101.69	1.03	205.60	97.65	90.08	-0.29	17.57
1976	303.32	100.90	99.90	1.01	202.42	96.14	88.61	-0.99	16.68
1977	326.43	98.67	97.68	0.99	227.76	116.09	92.33	-1.06	18.28
1978	364.52	102.75	101.73	1.03	261.77	133.77	107.39	-0.19	20.41

Table 24: Value Added by Sector and by Use

year	GDP	YA	CA	exA	YM	CM	Inv	ImM	GM
1978	364.52	102.75	101.73	1.03	261.77	133.77	107.39	-0.19	20.41
1979	392.13	109.06	110.20	-1.14	283.07	147.71	111.30	1.82	25.88
1980	422.87	107.44	108.49	-1.05	315.44	171.41	123.02	1.41	22.41
1981	445.05	114.94	115.65	-0.70	330.11	188.18	121.85	-0.94	19.14
1982	485.35	128.19	129.23	-1.03	357.16	193.09	137.05	-7.12	19.90
1983	538.03	138.87	136.70	2.16	399.16	222.36	155.50	1.44	22.74
1984	619.68	156.75	153.59	3.16	462.93	264.22	184.58	8.21	22.34
1985	703.13	159.64	155.69	3.96	543.48	355.99	208.38	43.17	22.29
1986	765.33	164.94	160.55	4.39	600.39	383.99	233.86	39.33	21.88
1987	853.98	172.70	167.33	5.37	681.28	408.85	269.02	18.89	22.29
1988	950.31	177.09	173.16	3.93	773.22	479.63	297.04	25.89	22.44
1989	988.93	182.54	179.55	2.99	806.39	554.23	257.20	19.88	14.83
1990	1026.89	195.92	191.04	4.88	830.98	531.54	265.57	-17.43	16.43
1991	1121.15	200.62	192.26	8.36	920.53	579.74	312.45	-11.52	16.82
1992	1280.81	210.05	199.70	10.35	1070.76	650.67	405.02	2.86	17.93
1993	1459.67	219.92	208.00	11.92	1239.74	719.56	549.81	47.15	17.52
1994	1650.60	228.72	215.35	13.37	1421.88	814.43	592.90	3.60	18.16
1995	1830.93	240.16	235.77	4.39	1590.77	904.83	628.99	-38.63	18.31
1996	2014.18	252.41	246.29	6.12	1761.77	1040.18	680.52	-20.93	20.14
1997	2201.43	261.24	251.55	9.70	1940.19	1109.65	723.79	-84.73	22.01
1998	2373.88	270.39	260.81	9.58	2103.50	1180.98	803.53	-92.88	26.11
1999	2554.77	277.96	268.34	9.62	2276.81	1318.36	869.68	-58.12	30.66
2000	2770.17	284.63	273.52	11.11	2485.54	1465.67	944.97	-41.66	33.24
2001	3000.10	292.60	280.92	11.68	2707.50	1599.93	1032.94	-35.63	39.00
2002	3272.57	301.08	288.35	12.74	2971.49	1687.01	1186.62	-52.05	45.82
2003	3600.66	308.61	295.07	13.54	3292.05	1786.65	1418.04	-36.96	50.41
2004	3963.78	328.05	320.05	8.00	3635.73	1897.60	1614.43	-56.32	67.38
2005	4412.09	345.21	332.06	13.15	4066.88	2045.93	1770.99	-188.19	61.77
2006	4971.39	362.47	347.60	14.87	4608.92	2205.69	2021.38	-317.22	64.63
2007	5675.46	376.04	363.76	12.28	5299.42	2568.64	2219.46	-431.86	79.46
2008	6222.27	396.27	389.35	6.92	5826.00	2779.67	2537.77	-421.44	87.11
2009	6795.60	412.85	404.70	8.15	6382.76	2898.13	3123.28	-265.52	95.82
2010	7505.54	430.48	422.79	7.69	7075.06	3315.90	3432.35	-227.34	99.47
2011	8203.54	448.78	442.81	5.97	7754.77	3729.44	3748.93	-172.13	104.27
2012	8831.31	469.19	467.48	1.71	8362.12	3924.21	4072.96	-257.50	107.46

Table 25: Capital and Labor Input by Sector, Relative Prices and Wages

year	K	KA	KM	N	NA	NM	POP	pA/pM	wA/wM
1952	52.58	22.91	29.67	241.8	202.0	39.8	574.82	0.291	0.839
1953	50.03	19.65	30.38	249.2	207.0	42.2	587.96	0.390	0.870
1954	49.36	17.35	32.02	254.7	211.8	42.9	602.66	0.417	0.882
1955	50.47	16.17	34.30	260.5	216.9	43.6	614.65	0.415	0.860
1956	50.12	14.96	35.17	268.5	216.3	52.2	628.28	0.478	0.811
1957	53.43	14.63	38.80	277.3	225.3	52.1	646.53	0.445	0.779
1958	57.71	14.17	43.54	310.3	180.7	129.6	659.94	0.521	0.851
1959	82.02	17.46	64.56	305.3	189.8	115.5	672.07	0.581	0.773
1960	115.73	22.61	93.12	301.9	198.5	103.4	662.07	0.640	0.672
1961	150.23	28.66	121.57	298.5	230.4	68.2	658.59	0.690	0.650
1962	146.66	28.06	118.60	302.3	248.2	54.1	672.95	0.651	0.636
1963	139.42	26.74	112.68	310.8	256.3	54.5	691.72	0.662	0.629
1964	135.15	25.62	109.53	323.6	266.0	57.6	704.99	0.672	0.628
1965	143.97	26.43	117.55	334.5	272.9	61.5	725.38	0.743	0.637
1966	164.56	28.61	135.96	347.7	283.5	64.3	745.42	0.774	0.645
1967	190.47	31.39	159.08	359.5	293.6	65.9	763.68	0.750	0.648
1968	204.38	33.23	171.15	372.3	304.1	68.3	785.34	0.771	0.645
1969	210.15	33.20	176.95	387.6	316.4	71.3	806.71	0.850	0.647
1970	230.69	34.77	195.92	401.7	324.5	77.2	829.92	0.895	0.660
1971	274.37	39.94	234.42	415.6	331.3	84.3	852.29	0.920	0.688
1972	323.00	45.68	277.33	418.3	330.0	88.3	871.77	0.934	0.654
1973	370.57	50.83	319.75	427.6	336.7	90.9	892.11	0.940	0.685
1974	424.88	54.74	370.14	436.0	340.9	95.1	908.59	0.937	0.755
1975	479.32	57.77	421.55	445.3	343.6	101.6	924.20	0.964	0.727
1976	545.43	61.20	484.23	453.1	343.5	109.6	937.17	0.986	0.736
1977	606.77	63.03	543.73	459.4	342.3	117.1	949.74	0.966	0.740
1978	668.76	63.91	604.85	468.4	330.4	138.1	962.59	1.000	0.747

Table 26: Capital and Labor Input by Sector, Relative Prices and Wages

year	K	KA	KM	N	NA	NM	POP	pA/pM	wA/wM
1978	668.76	63.91	604.85	468.4	330.4	138.1	962.59	1.000	0.747
1979	742.71	71.76	670.95	479.7	334.8	144.9	975.42	1.181	0.776
1980	816.88	79.54	737.34	494.0	339.6	154.4	987.05	1.269	0.796
1981	899.05	86.45	812.61	510.4	347.6	162.8	1000.72	1.344	0.814
1982	975.95	95.25	880.71	526.2	358.5	167.7	1016.54	1.397	0.818
1983	1064.21	103.19	961.02	541.2	363.0	178.1	1030.08	1.427	0.826
1984	1166.50	103.53	1062.97	558.1	357.4	200.7	1043.57	1.398	0.779
1985	1292.75	108.52	1184.23	575.5	359.2	216.3	1058.51	1.353	0.753
1986	1436.49	115.20	1321.29	591.5	360.5	231.0	1075.07	1.356	0.778
1987	1598.52	128.62	1469.90	607.4	364.4	243.1	1093.00	1.445	0.773
1988	1787.62	137.86	1649.76	622.4	369.4	253.0	1110.26	1.510	0.721
1989	1995.27	146.88	1848.40	635.6	381.7	253.9	1127.04	1.481	0.706
1990	2152.71	145.03	2007.68	647.5	389.1	258.4	1143.33	1.578	0.708
1991	2310.65	141.80	2168.85	654.9	391.0	263.9	1158.23	1.491	0.695
1992	2507.57	144.05	2363.52	661.5	387.0	274.5	1171.71	1.420	0.663
1993	2787.21	155.76	2631.45	668.1	376.8	291.3	1185.17	1.384	0.594
1994	3197.66	176.59	3021.07	674.6	366.3	308.3	1198.50	1.541	0.610
1995	3630.67	194.55	3436.12	680.7	355.3	325.4	1211.21	1.652	0.630
1996	4078.13	207.04	3871.09	689.5	348.2	341.3	1223.89	1.711	0.642
1997	4554.75	215.69	4339.06	698.2	348.4	349.8	1236.26	1.662	0.657
1998	5050.80	218.03	4832.78	706.4	351.8	354.6	1247.61	1.657	0.595
1999	5601.79	222.62	5379.17	713.9	357.7	356.3	1257.86	1.615	0.568
2000	6191.38	227.03	5964.35	720.9	360.4	360.4	1267.43	1.549	0.542
2001	6826.78	237.49	6589.29	728.0	364.0	364.0	1276.27	1.556	0.517
2002	7518.38	249.45	7268.92	732.8	366.4	366.4	1284.53	1.572	0.505
2003	8329.08	273.77	8055.31	737.4	362.0	375.3	1292.27	1.565	0.482
2004	9330.66	302.24	9028.42	742.6	348.3	394.3	1299.88	1.714	0.460
2005	10478.56	330.44	10148.12	746.5	334.4	412.1	1307.56	1.625	0.441
2006	11725.62	360.28	11365.34	749.8	319.4	430.4	1314.48	1.590	0.435
2007	13160.72	392.80	12767.93	753.2	307.3	445.9	1321.29	1.701	0.430
2008	14722.15	428.16	14293.98	755.6	299.2	456.4	1328.02	1.767	0.427
2009	16523.81	481.12	16042.69	758.3	288.9	469.4	1334.50	1.782	0.438
2010	18820.90	552.95	18267.95	761.1	279.3	481.7	1340.91	1.845	0.450
2011	21312.20	623.08	20689.12	764.2	265.9	498.3	1347.35	1.928	0.459
2012	23995.52	697.33	23298.19	767.0	257.7	509.3	1354.04	2.001	0.444

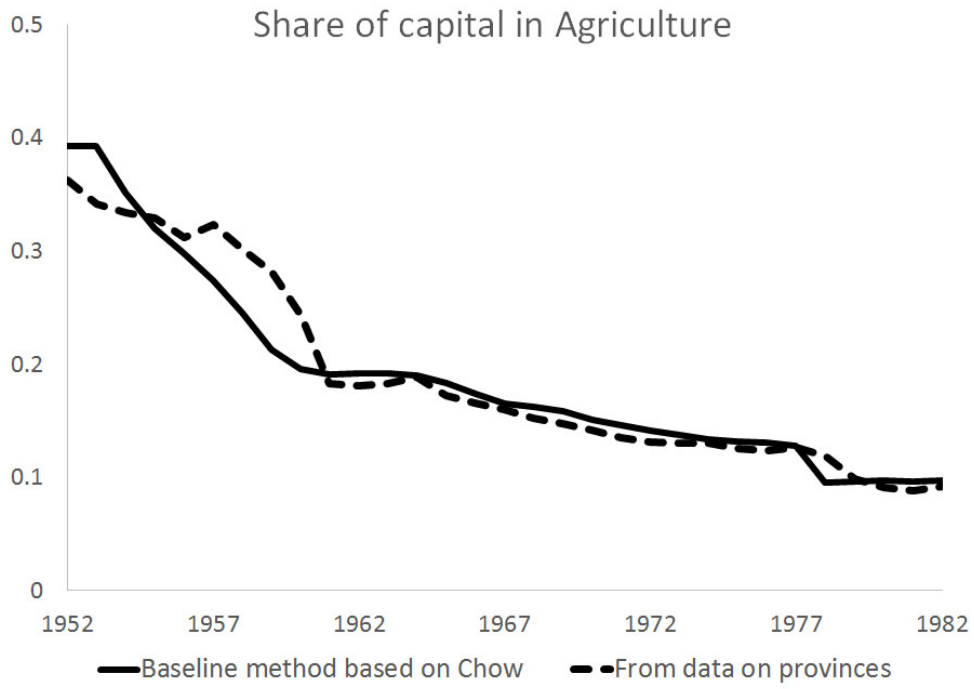

Figure 1: Alternative Series Sectoral Capital Stock

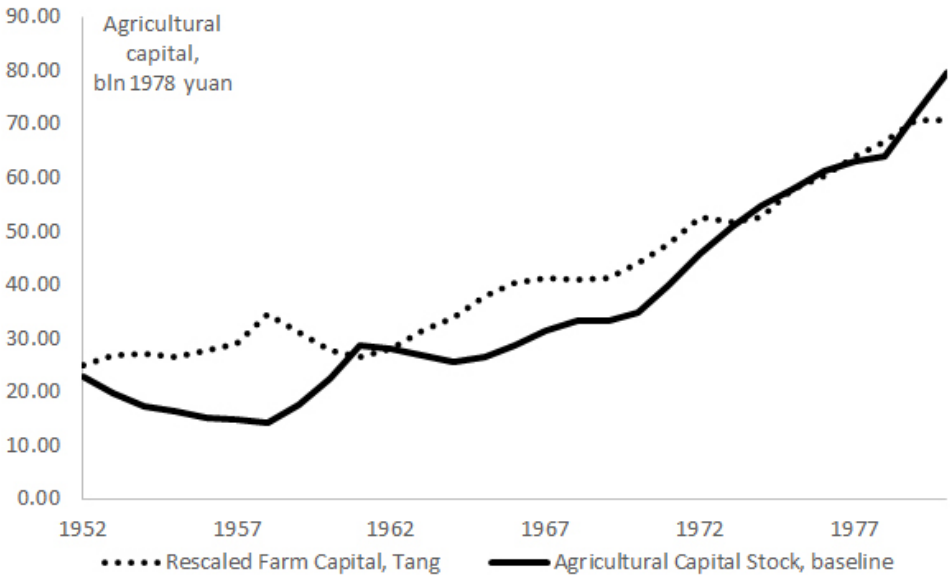

Figure 2: Alternative Series Sectoral Capital Stock

Table 27: Farm Capital (CSY, Tang (1984))

year	Farm Capital bln 1952 yuan	GDP deflator index	Farm Capital bln 1978 yuan	Agricultural Capital Stock bln 1978 yuan
1952	11.292	0.88	25.03	22.91
1953	12.024	0.92	26.65	19.65
1954	12.166	0.92	26.97	17.35
1955	11.885	0.91	26.35	16.17
1956	12.43	0.90	27.55	14.96
1957	13.084	0.89	29.00	14.63
1958	15.532	0.90	34.43	14.17
1959	14.014	0.91	31.07	17.46
1960	12.455	0.92	27.61	22.61
1961	11.887	1.06	26.35	28.66
1962	12.604	1.06	27.94	28.06
1963	14.132	1.03	31.33	26.74
1964	15.308	1.03	33.93	25.62
1965	17.103	1.04	37.91	26.43
1966	18.106	1.02	40.14	28.61
1967	18.542	1.03	41.10	31.39
1968	18.399	1.04	40.79	33.23
1969	18.519	1.00	41.05	33.20
1970	19.893	0.98	44.10	34.77
1971	21.468	0.98	47.59	39.94
1972	23.697	0.98	52.53	45.68
1973	23.28	0.99	51.61	50.83
1974	23.77	0.99	52.69	54.74
1975	26.06	0.98	57.77	57.77
1976	27.19	0.98	60.27	61.20
1977	28.85	0.99	63.95	63.03
1978	30.1	1.00	66.72	63.91
1979	31.92	1.04	70.76	71.76
1980	31.833	1.07	70.57	79.54

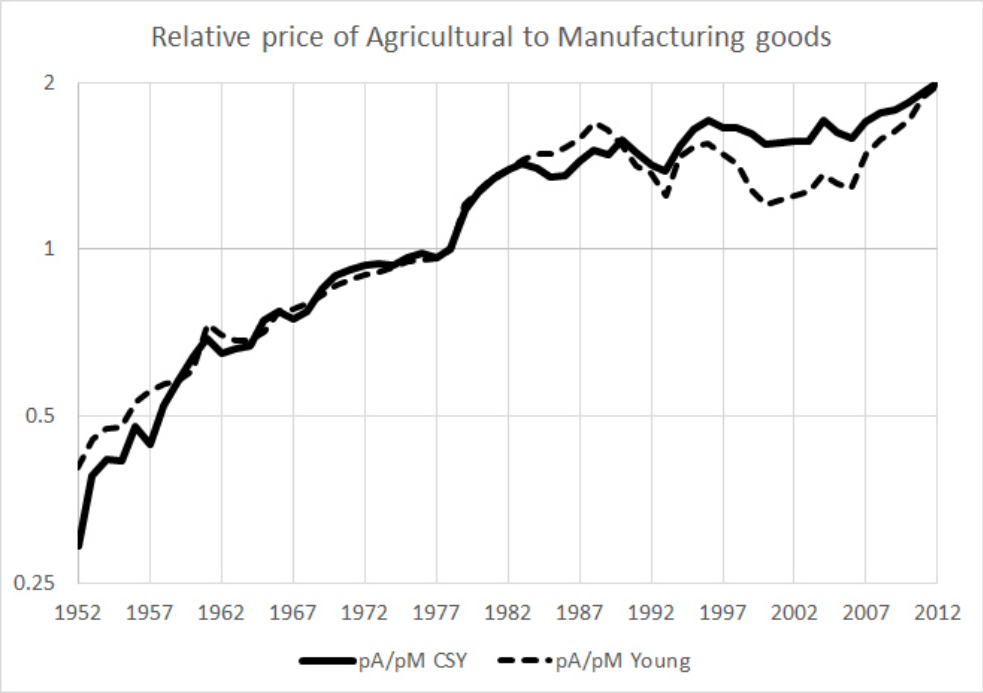

Figure 3: Alternative Series Sectoral Capital Stock

pre-1978 values we also use Chow (1987) who cites CSY 1981. The path of the relative prices is extremely close to the relative value added deflator series from the CSY for the pre-reform period, as shown in Figure 3.

As a robustness check for our wage series, we use the data on the labor share from Bai and Qian (2010) reported in Table 13. Figure 4 compares the ratios of agricultural to non-agricultural wage rates computed for staff and workers from the CSY (our baseline estimate) and inferred from the labor shares reported by Bai and Qian (alternative estimate) for the overlapping period 1978-2007. From Figure 4 we conclude that the ratio of agricultural to non-agricultural staff and worker wages follows the same trend as the ratio of labor remuneration in agriculture per agricultural worker to labor remuneration in non-agriculture per non-agricultural worker.

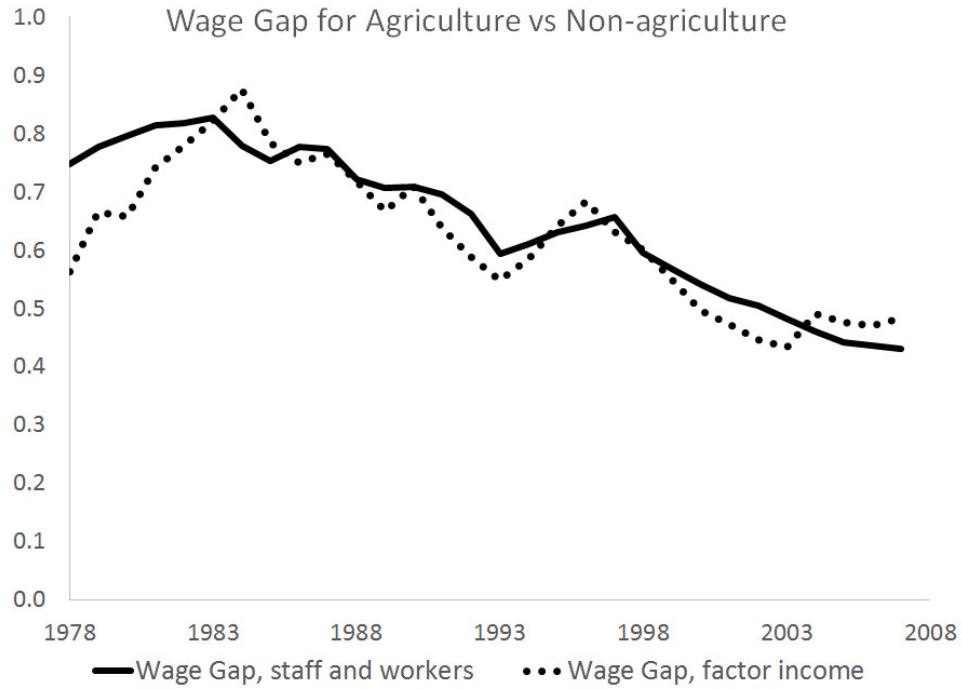

Figure 4: Alternative Series for Wages

1.9 Data for direct evidence calibration

In this section we report the data series used as direct evidence for the construction of proxies for components of the distortions, and the implied proxies. Table 28 shows direct evidence and proxies for the consumption component, Table 29 for the production component of labor distortion, Table 30 for the non-consumption component of capital distortion, Table 31 for the investment distortion. These data and the sources are discussed at length in Section 5.2 of main text and presented in Figure 4 there.

Table 28: Direct evidence for consumption component of labor distortion

source	authors' computations			Niu et al. (1991)	Sheng (1993b)
year	Consumption distortion	Niu et. al. value	Free market vs list price	State price below real value	Free market/State List Price
1952	3.38	3.07	2.77	16.4	139
1953	2.90	2.90	2.90	20.78	132.6
1954	3.02	2.87	2.93	21.79	131.5
1955	3.27	2.89	2.90	21.22	132.8
1956	2.98	2.78	3.00	24.29	128.6
1957	2.76	2.36	3.06	35.68	125.9
1958	2.63	2.70	2.90	26.47	133
1959	1.36	1.19	2.91	67.44	132.3
1960	0.67	0.67	2.63	81.68	146.7
1961	1.38	2.18	0.93	40.68	412.8
1962	1.52	2.30	1.43	37.26	270
1963	1.95	2.25	1.68	38.54	229
1964	2.48	2.06	2.83	43.71	136
1965	2.99	2.04	2.75	44.49	140
1966	3.17	1.87	2.73	49.02	141
1967	3.08	2.26	2.69	38.39	143
1968	3.01	2.47	2.69	32.65	143
1969	2.76	2.09	2.71	43.03	142
1970	3.07	1.72	2.71	53.15	142
1971	2.94	1.63	2.50	55.43	154
1972	2.55	1.59	2.31	56.6	167
1973	2.85	1.66	2.20	54.63	175
1974	2.98	1.82	2.18	50.43	177
1975	2.87	1.69	2.09	54.01	184
1976	2.61	1.90	2.03	48.27	190
1977	2.27	1.57	2.15	57.09	179
1978	2.32	1.51	2.28	58.87	169

Table 29: Direct evidence for production component of labor distortion

source:	Ash (2006), Table 3		Authors' computations			Imai (2000), Table 3	
year	Gross procurement	Rural grain supply	Procurement distortion	Production distortion	Terms of trade distortion	Obs	Zero tax
1952	33	139	5.85	5.22			
1953	47.46	130.95	4.89	6.31			
1954	51.81	137.94	4.79	6.50			
1955	50.75	147.76	5.04	6.22			
1956	45.44	164.05	5.55	5.55			
1957	48.04	161.18	5.39	6.28			
1958	58.76	155.93	4.78	2.88			
1959	67.41	122.11	3.44	4.39			
1960	51.05	112.96	4.21	5.32			
1961	40.47	110.7	4.87	4.87			
1962	38.15	128.69	5.40	5.64			
1963	43.97	139.37	5.26	5.51			
1964	47.43	155.65	5.34	5.83	5.83	66.6	94.9
1965	48.68	160.94	5.36	5.81	6.23	73.6	112.1
1966	51.58	175.76	5.42	5.95	6.36	76.8	119.4
1967	49.36	180.08	5.57	5.40	5.73	74.5	104.3
1968	48.7	171.19	5.49	4.98	5.34	76.7	100.1
1969	46.68	177.14	5.65	5.91	5.86	84.5	121.1
1970	54.44	197.94	5.57	6.44	6.33	89.1	137.8
1971	53.02	210.32	5.74	6.61	6.35	91.4	141.9
1972	48.3	206.56	5.88	6.32	5.94	93.1	135.2
1973	56.12	223.94	5.75	6.41	6.08	93.7	139.3
1974	58.07	231.3	5.75	6.68	6.06	93.4	138.3
1975	60.86	240.58	5.74	6.50	6.17	96.3	145.1
1976	58.25	245.59	5.86	5.97	5.75	98.5	138.5
1977	48	250	6.20	6.58	5.73	96.6	135.2
1978				5.79	5.54	100	135.4

Table 30: Direct evidence for non-consumption component of capital distortion

source	authors' calculations			Sheng (1993b), Table 6.4	Zhang Zhao (2000), Table 9	authors' calculations	
year	Non-cons. component	Infrastr. inv. in ag./ag. product	Implied distortion	value of capital construction	State ag. infrastructure inv.	Implied capital	Ag. product
1952	1.59	0.150	1.53	0.65	0.384	43.2	346.0
1953	1.61	0.166	1.33	0.79	0.577	41.6	381.4
1954	1.36	0.083	1.24	0.41	0.487	40.0	395.5
1955	1.15	0.117	1.11	0.62	0.571	38.6	424.8
1956	1.18	0.216	1.04	1.21	1.363	38.0	447.9
1957	1.18	0.234	1.05	1.27	1.093	37.2	433.9
1958	1.33	0.498	1.04	2.80	3.026	38.4	449.9
1959	1.57	0.750	1.25	3.63	2.991	39.4	387.2
1960	1.69	1.161	1.50	4.99	4.543	42.0	343.8
1961	0.88	0.320	1.13	1.78	1.235	41.2	445.1
1962	0.77	0.252	1.07	1.44	0.867	40.0	457.2
1963	0.74	0.370	0.97	2.32	1.848	39.8	502.0
1964	0.79	0.400	0.88	2.82	2.617	40.4	564.0
1965	0.78	0.295	0.76	2.42	2.351	40.8	656.9
1966	0.74	0.276	0.71	2.44	2.37	41.1	708.5
1967	0.62	0.256	0.70	2.31	2.208	41.3	720.6
1968	0.57	0.152	0.67	1.39	1.223	40.4	732.8
1969	0.65	0.215	0.66	2.00	1.792	40.2	742.8
1970	0.69	0.263	0.62	2.63	2.252	40.4	800.4
1971	0.70	0.308	0.61	3.21	3.327	41.7	833.7
1972	0.72	0.343	0.63	3.58	3.147	42.8	834.8
1973	0.68	0.351	0.59	4.02	3.748	44.4	915.6
1974	0.61	0.334	0.59	3.98	3.697	45.9	953.7
1975	0.61	0.343	0.59	4.20	3.556	47.1	979.8
1976	0.55	0.365	0.61	4.45	3.991	48.8	975.7
1977	0.59	0.377	0.64	4.48	3.598	49.9	950.6
1978	0.58	0.440	0.63	5.65	5.114	52.5	1027.5

Table 31: Direct evidence for investment distortion

source	authors' calculations			Naughton (1987a) Table III-2	
year	investment distortion	Naughton shortfall	Naughton money shift	shortfall	money shift
1953	1.14				
1954	1.21				
1955	0.95				
1956	1.20	1.13		2.56	
1957	1.23	0.98	1.00	-12.14	-1.78
1958	1.04	1.07	1.04	-2.91	-0.37
1959	1.09	1.02	1.11	-8.31	1.90
1960	1.19	1.19	1.19	9.21	4.79
1961	1.28	1.14	1.26	3.55	7.12
1962	1.02	1.03	1.06	-7.00	0.36
1963	1.12	1.07	1.04	-3.38	-0.28
1964	1.08	1.06	1.04	-3.57	-0.39
1965	1.06	1.06	1.10	-3.57	1.64
1966	1.09	1.06	1.14	-3.57	3.02
1967	1.08	1.13	1.14	2.94	2.88
1968	0.99	1.07	1.08	-2.66	0.99
1969	1.06	1.10	1.13	0.26	2.65
1970	1.08	1.02	1.04	-7.70	-0.50
1971	0.99	1.03	1.11	-6.98	2.03
1972	1.04	1.08	1.09	-2.06	1.24
1973	1.05	1.03	1.05	-7.11	0.16
1974	1.00	1.07	1.03	-3.01	-0.73
1975	1.06	1.07	1.06	-3.44	0.30
1976	0.87	1.11	1.11	0.77	1.97
1977	0.91	1.02	0.99	-7.70	-2.16
1978	0.96	1.01	1.05	-8.55	0.07

2 Computation of Accounting Wedges

2.1 Formulas

Here we first present the formulas to compute the accounting wedges. For the sake of simplicity, we redefine production shares as $\alpha_{K,i} = \alpha_i$, $\alpha_{N,i} = \beta_i$, where $i = A, M$. Then the accounting wedges and their components are as follows:

1. Consumption component of the labor distortion

$$\tau_t^C = \frac{\dot{(1-\eta)}}{\eta} \frac{p_{A,t}}{p_{M,t}} \frac{C_t^A - \gamma^A}{C_t^M},$$

2. Production component of the labor distortion:

$$\tau_t^P = \frac{\beta_M}{\beta_A} \frac{Y_t^M}{N_t^M} \frac{N_t^A}{Y_t^A} \frac{w_t^A}{w_t^M} \frac{p_{M,t}}{p_{A,t}},$$

3. Mobility component of labor distortion:

$$\tau_t^M = \frac{w_t^M}{w_t^A},$$

4. Non-consumption component of capital distortion:

$$\tau_t^R = \frac{\alpha_M}{\alpha_A} \frac{Y_t^M}{K_t^M} \frac{Y_t^A}{K_t^A} \frac{p_{M,t}}{p_{A,t}},$$

5. Manufacturing TFP:

$$X_t^M = Y_t^M / \left(K_t^M\right)^{\alpha_M} / \left(N_t^M\right)^{\beta_M},$$

6. Agricultural TFP:

$$X_t^A = Y_t^A / \left(K_t^A\right)^{\alpha_A} / \left(N_t^A\right)^{\beta_A},$$

7. Investment distortion:

$$\tau_{K,t} = \beta \frac{C_t^M}{C_{t+1}^M} \left(\alpha_M \frac{Y_{t+1}^M}{K_{t+1}^M} + 1 - \delta\right),$$

8. Agricultural exports as share of agricultural output:

$$x_t = E_t^A / Y_t^A,$$

9. Non-agricultural exports and agricultural exports terms of trade factor:

$$q_t = -E_t^M / E_t^A,$$

10. defense spending as fraction of non-agricultural production:

$$g_t = G_t / Y_t^{\mathrm{M}}.$$

Using the data presented in the previous section and the parameters shown in Table 32 it is straightforward to compute the accounting wedges.

Table 32: Parameters

Parameter	Description	Value
$\alpha_{K,A} = \alpha_A$	Factor shares	0.14
$\alpha_{N,A} = \beta_A$	of the	0.55
$\alpha_{K,M} = \alpha_M$	production	0.3
$\alpha_{N,M} = \beta_M$	functions	0.7
γ^A	Subsistence level	54
η	Asymptotic share	0.15
β	Discount factor	0.96
σ	Elasticity of substitution	1.0
δ	Depreciation	0.05

2.2 Factorization of distortions and their components

Then, we analyze the components of distortions as well as factors they are comprised of. In Figure 5 we show three factors that comprise the consumption distortion: the variation due to change in real agricultural consumption, the variation due to change in real manufacturing consumption, and variation due to change in relative prices. It follows that the expansion of non-agricultural consumption significantly reduces the consumption distortion over the course of the pre-reform period, while the expansion of the agricultural consumption increases it, and so does the appreciation of agricultural goods relative to non-agricultural goods. The abrupt drop in the consumption component during the GLF is explained by the drop in agricultural component approaching subsistence. A similar picture is obtained if the distortions of the prices by sector relative to marginal utility by sector are compared. The distortion of each price from marginal utility changes slowly over time, although both increase at a largely the same rate, so the consumption component is at a similar level at the beginning and the end of the pre-reform period.

Finally, we look at how the components of distortions change if we use alternative calibrations and data series. Most important is the behavior of the consumption distortion. Figure 6 shows the paths of the consumption distortion, if 1) instead of value added deflators we

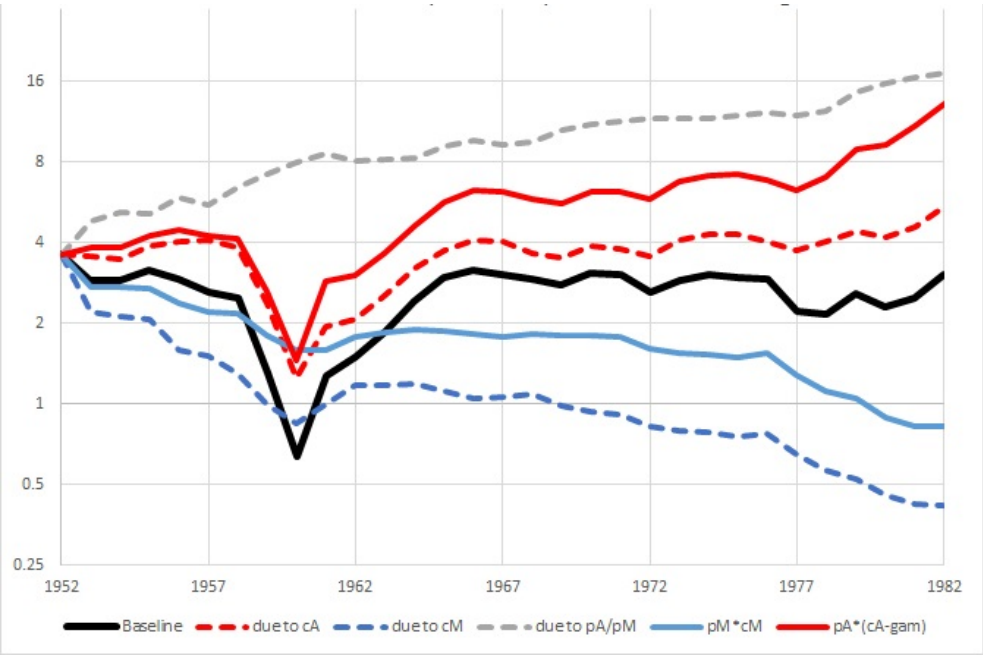

Figure 5: Factors in the Consumption Component of Labor Distortion

used Young's (2003) prices, 2) if we did not use non-agricultural consumption data from Sheng (1993) and CSY and instead computed it as the residual from value added and investment, 3) if we varied the subsistence level from its lowest value of zero to its highest possible value, implying that the economy reaches subsistence during the famine in 1960.

We find that the change in the prices series is barely noticeable. The change to the way in which consumption in manufacturing is computed as a residual from value added and investment - increases the distortion substantially during the first-five-year-plan, but has little effect in other periods. This initial bias was the reason we decided to use direct data on consumption, instead of computing it indirectly.

Finally, we find that even extreme changes in the subsistence level only lead to parallel shifts in the level of the consumption distortion but do not significantly alter its dynamics. In addition, if we relax the Cobb-Douglas assumption for preferences and instead assume a constant elasticity of substitution of $\sigma = 0.5$ we find that the fluctuations in the distortions are amplified noticeably, but the overall pattern of the change in the consumption distortion remains the same. Intuitively, when consumption goods are less substitutable, it takes a larger distortion to incentives to rationalize the same size of shift in relative consumption. Considering

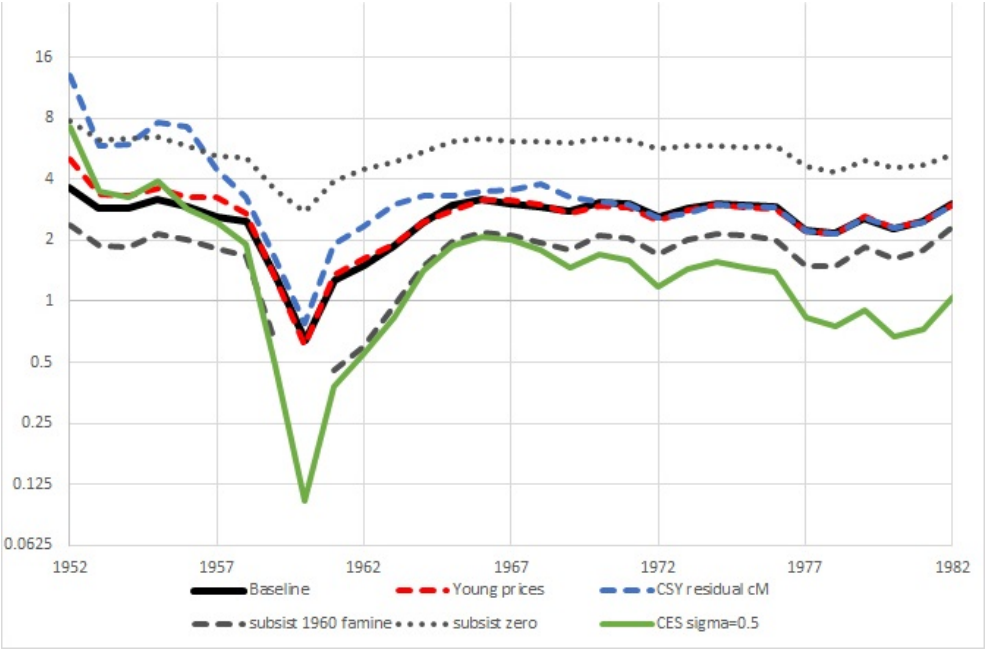

Figure 6: Alternative Series and the Consumption Component

the fact that now an amplified distortion affects consumption in a muted way (as the demand elasticity is now lower), the effects of changes in the distortions will be larger in this alternative calibration.

We also carried out sensitivity analysis with respect to alternative data with respect to consumption of both the agricultural and manufacturing goods from various sources, including Howe (1978), Sheng (1993a) and his source, the CSY (1989), and on investment from various sources including Chow (1993), Holz (2006) and various components from the various CSY. We found that all of these sources are consistent with one of two pictures, that is either our baseline if we use consumption data as the primary source (Howe, Sheng, CSY), or with our old series if investment is used as the primary source (Chow, Holz, CSY). However, as shown in Figure 7, some of the alternative consumption series that we considered also imply negative investment rates, which are implausible. Thus, we have chosen to use the manufacturing consumption data from the CSY as the primary source as it gives a more reliable data for the consumption distortion and at the same times implies plausible investment rates.

In Figure 8 we show three factors that comprise the production component: the variation due to change in agricultural marginal product of labor, the variation due to change in manufac-

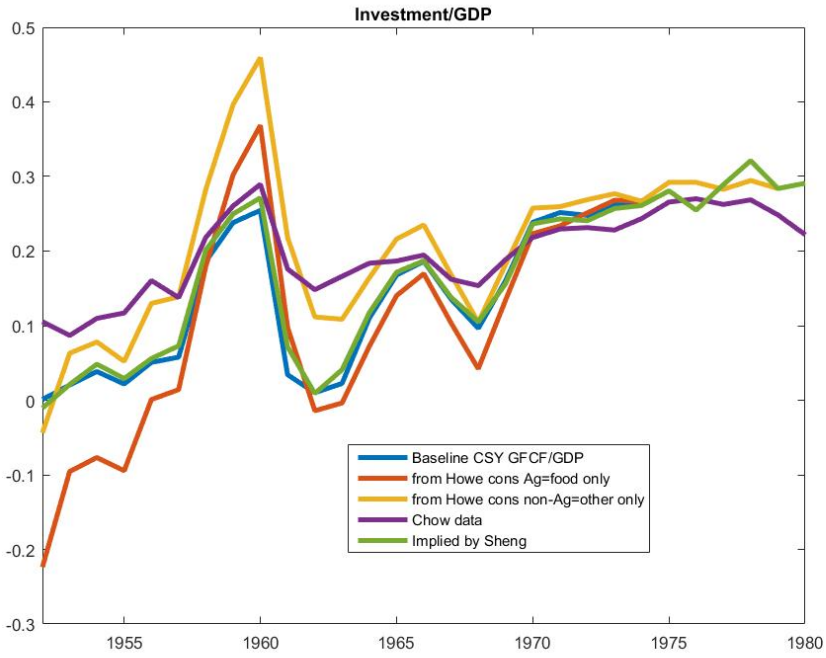

Figure 7: Investment to GDP ratio implied by various sources

turing marginal product of labor, and variation due to change in relative wages. It follows that nominal productivity growth in the agricultural sector significantly reduces the production component over the course of the pre-reform period, while the growth in nominal non-agricultural consumption increases it. The change in the relative wages plays quantitatively a small role in the behavior of the production component. We can also compare the inverses of the shares of revenue going to labor income in each sector, which has the interpretation of a gross markup. We observe that the markups in both sector rise over the course of the pre-reform period.

Interestingly, during the periods of swings to the left, consistent with centralization, disincentives and overall disruptions to production, the government favored more the interests of the workers in the non-agricultural sector (a lower markup means higher wage bill and vice versa) and the production component of the distortion decreased. Examples of such policies included exceptional inefficiency of backyard furnaces, poor management of agriculture under the commune system, condemnations of managers who instituted incentives as class enemies during the Cultural Revolution. On the other hand, periods of swings to the right are associated with decentralization, focus on private incentives, and technocratic management of the

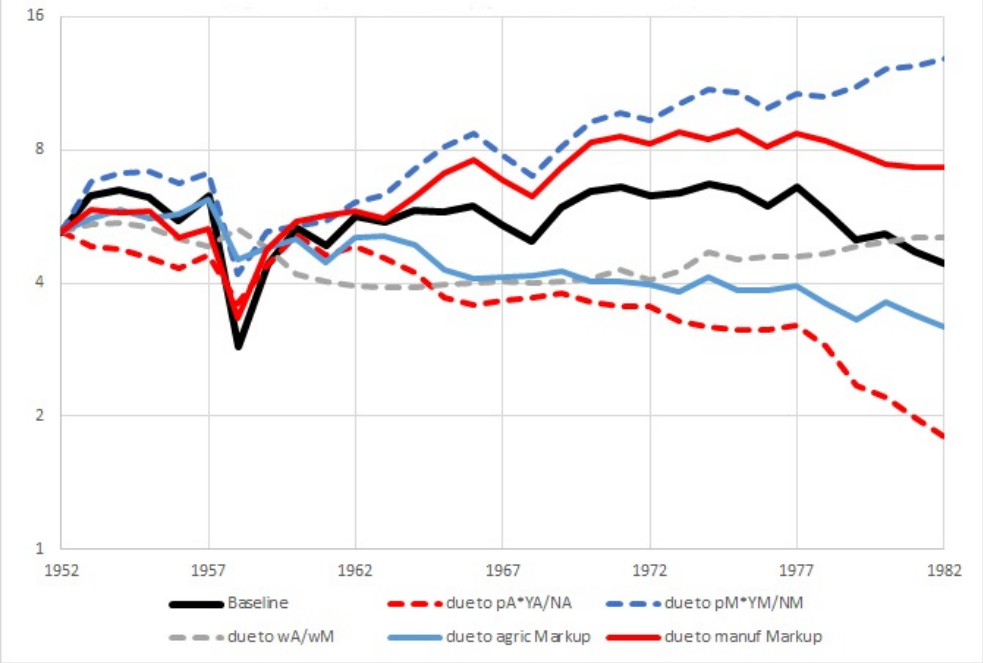

Figure 8: Factors and Alternative Series in the Production Component

economy, which all favor peasants in the agricultural sector (by lowering their markup, and hence increasing the share of the wage bill) and lead to an increased production component of the labor distortion. Thus, we think we have can argue that the political cycle and the related power struggle is the "institution" that drives the relative markups and hence the production component of the labor distortion.

In Figure 9 we show two factors that comprise the non-consumption component of the capital distortion: the variation due to change in agricultural marginal product of capital and the variation due to change in manufacturing marginal product of capital. It follows that nominal productivity growth in the agricultural sector is roughly flat over the whole period, while the growth in nominal non-agricultural productivity decreases the capital distortion. We also see what would have happened with the capital distortion we used Young prices (virtually nothing), and if we used Tang's value of farm capital for total agricultural capital - the increase in the distortion during the 1950s would have been larger, but the overall decline after that would have been similar to our baseline.

In Figure 10 we show two factors that comprise the investment distortion: the growth rate of per capita consumption and the return to capital in the non-agricultural sector. We

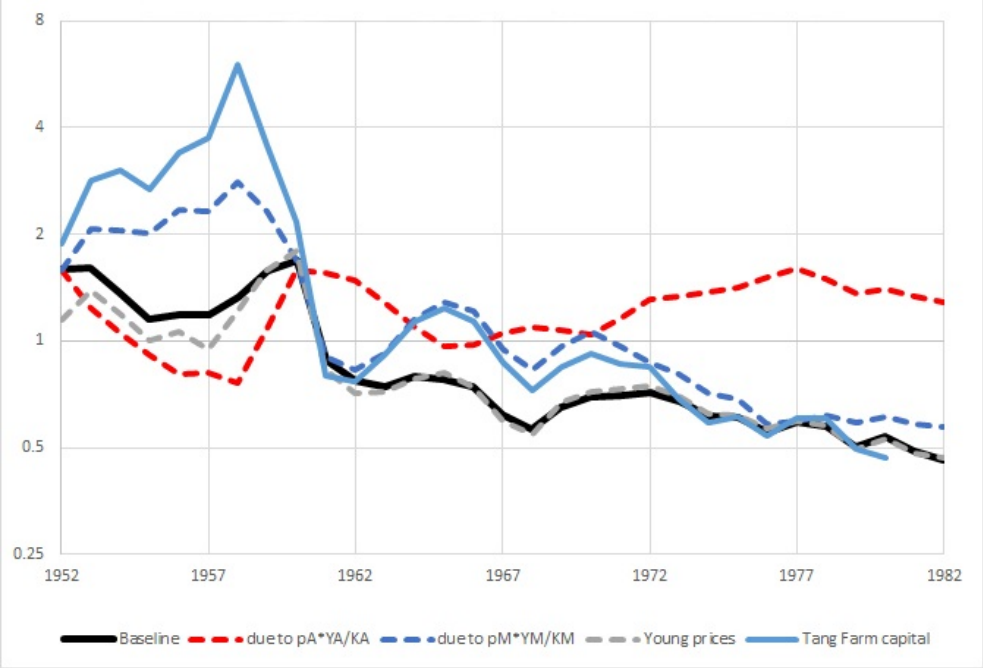

Figure 9: Factors and Alternative Series in the Capital Distortion

find that most of the short-run variations (noise) are explained by the erratic growth rate of consumption, while most of the overall downward trend in the distortion is explained by the reduction in the return to capital in the non-agricultural sector. We also construct the investment distortion using alternative capital series. First is if we took investment directly from the CSY and computed consumption as the residual, we would get much larger variations in the investment distortion, which still has an overall downward trend and a spike during the Great Leap Forward. The difference made by Tang's farm capital is a lot smaller in a similar exercise.

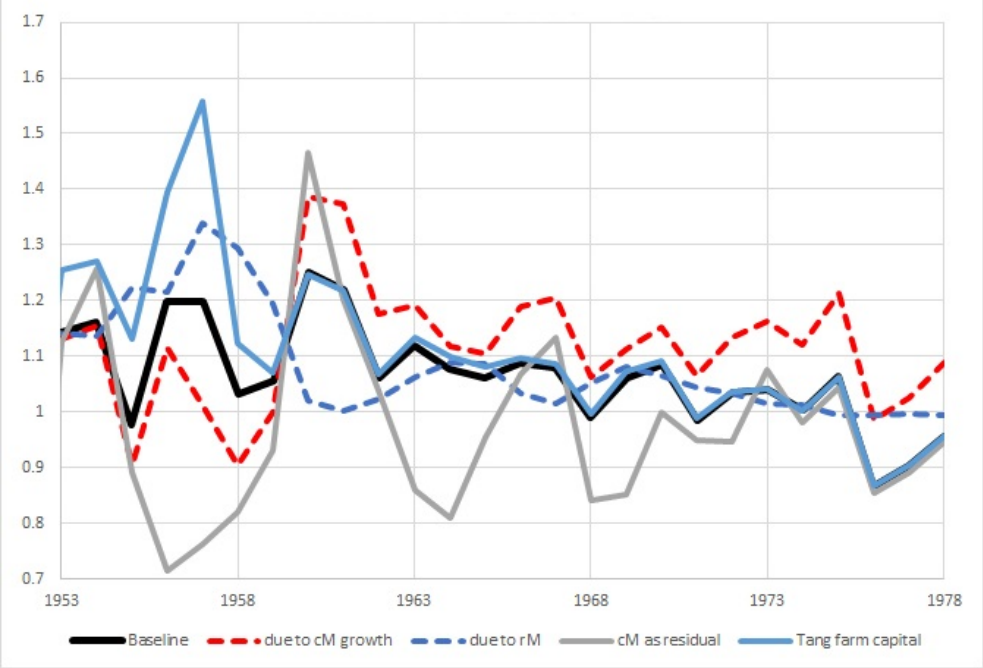

Figure 10: Factors and Alternative Series in the Investment Distortion

3 Models for Direct Evidence

3.1 Model of the consumption component

Consider a simple static economy:

$$\begin{aligned} \max U(c_A, c_M) + k, & \\ p_A c_A + p_M c_M + k \leq W, & \qquad [\lambda] \\ p_A c_A \leq p_A \bar{c}_A, & \qquad [\lambda_A] \\ p_M c_M \leq p_M \bar{c}_M. & \qquad [\lambda_M] \end{aligned}$$

Here, k is the linear consumption good that can be thought of as either money or capital, p_A and p_M are the observed retail prices (set by the government) and $\bar{c}_A$,$\bar{c}_M$ are the set rations of each good.

The first-order conditions imply:

$$\begin{aligned} U'_{c_A} &= p_A (1 + \lambda_A), \\ U'_{c_M} &= p_M (1 + \lambda_M), \\ \lambda &= 1. \end{aligned}$$

Suppose we observe the price on the free market for agricultural goods p^a_{fm}. This price is the shadow cost of the rationing and thus is equal to $p^a_{fm} = p_a (1 + \lambda_a)$. Then

$$U'_{c_A} = p_a (1 + \lambda_a) = p^a_{fm},$$

$$\frac{U'_{c_A}}{p_A} = \frac{p^A_{fm}}{p_A}.$$

The consumption component is defined as

$$\frac{U'_A / p_A}{U'_M / p_M}.$$

We do not have information on the free markets of the manufacturing goods, but we do have the information on the price of the free markets of the agricultural goods (and on the ratio of the free market price to the state list price). Thus we can find what portion of the consumption component change can be accounted for by the change in

$$\frac{U'_{c_A}}{p_A} = \frac{p^A_{fm}}{p_A}.$$

When $\frac{p^A_{fm}}{p_A}$ increases (the rationing of the agricultural goods becomes tighter), the consumption component of the distortion decreases (as the relative distortion of manufacturing goods decreases).

The data on the market price as a percentage of the list price for 1952-1961 is constructed by Sheng (1993b) and from 1962-1978 is from China Trade and Price Statistics (1989). For the year where both of the series overlap, 1961, we take the data from Sheng (1993b) for consistency. We briefly summatize the data. The ratio $\frac{p^A_{fm}}{p_A}$ is 1.32 in 1952, increases dramatically to 4.13 in 1961[2], falls to 1.36 in 1964 and rises to 1.69 in 1978. With regard to the quantity of the transactions on the free markets there are two soures of data. First, Zhang and Zhao (2000, Table 5) report purchase of agricultural products by user; we use the proportion sold to Non-Agricultural Domestic Consumers that excludes the goods sold to the State commercial, industrial, and other departments. This share of transactions varies between 1 and 15 percent, but on average accounts for about 6 percent of transactions. The second source of data is the volume of transactions in pre-1978 free markets is Naughton (1986, Table E1, p. 233) for 1965 and 1974-1978. Naughton reports that between 6 and 11 percent of all agricultural transactions were at free market prices.

The constructed consumption component can be calculated as follows:

$$\tau^c_{fm} = \tau^c_t \frac{\frac{p^A_{fm,1953}}{p_{A,1953}}}{\frac{p^A_{fm,t}}{p_{A,t}}}.$$

The second method for providing evidence for the change in the degree of shorthages is using the data by Niu et al. (Table 7 in Zhang and Zhao 2000). They construct an estimate by which the state purchasing price is below "real value" for agricultural products. Despite the fact that these estimates are based on the Marxist labor theory of value, still a broad comparison of the trends is still useful.[3] We convert these estimates to find the "real value" of agricultural goods as percentage of the list price that parallel the discussion above of the free market to the list prices. The "real value" is 1.196 in 1952, increases dramatically to 5.45 in 1961, falls to 1.68 in 1961 and rises to 2.43 in 1978. Then we construct the implied consumption component of the distortion. This constructed component of the distortion is virtually identical with our

[2]China Trade and Price Statistics (1989) gives the value of 3.20 for 1961.

[3]See an extensive discussion of the Chinese estimates of the degree of underpricing of the agricultural goods ("the value scissors" as contrasted to the "price scissors" which measure the terms of trade between the sectors) in Sheng (1993a, Chapters 2 and 5).

consumption component, and matches remarkably well the fall in the distortion during 1959-1960, then recovers earlier, in 1961, and then decreases gradually resulting in the distortion of 1.5 in 1978. Again, despite the differences in methodology, the pattern of changes in the constructed consumption component and model-based consumption component as well as with the constructed consumption component from the free market prices is remarkable.

3.2 Modeling policies affecting TFP

First, consider a basic model of incentives. An economic agent (a farmer or an enterprise) can exert effort to increase its productivity X. Higher productivity results in higher output (or profit) y. The cost of effort is not observable while the output is. The cost function is well behaved ($c' > 0, c'' > 0$). The strength of incentives is measured in the output share ξ retained by the agent. If there are no incentives, $\xi = 0$. If incentives are strong, then $\xi = 1$. The agent maximizes $\xi y - c(y)$. The first order condition is $c'(y) = \xi$. Output (and, therefore, TFP) increases in the strength of incentives:

$$\frac{dy}{d\xi} = \frac{1}{c''(y(\xi))} > 0,$$

where $y(\xi)$ is the solution to the f.o.c.

Second, consider a model of commune size. Let there be N peasant households. Each household i can exert effort e_i to increase its productivity X_i^A. Higher productivity results in higher output y_i which is combined and then shared across the households with each household getting s_i. Each household maximizes its share net of cost of effort $s_i - c(y_i)$. The cost function is well behaved ($c' > 0, c'' > 0$). The resource constraint is

$$y = \sum_i y_i = \sum_i s_i + z,$$

where z is the amount of output taken by the central government. If each household operates individually and keeps its own marginal output $s_i = y_i - z_i$, the incentives are first best (here, $\sum_i z_i = z$). Each household maximizes $y_i - c(y_i)$, hence the first order condition is $c'(y_i) = 1$. Now assume that all N households are merged into one commune, their output is combined and each household's payoff is based on the joint output y according to a sharing rule $s_i = S_i(y - z)$. The first order condition is $c'(y_i) = S_i'(y - z)$ which cannot be efficient: the resource constraint implies $\sum_{i=1}^N S_i'(y - z) = 1$ (this is the classical moral hazard in teams problem, Holmstrom

(1982)). The symmetric sharing rule is $S_i(y-z) = \frac{y-z}{N}$, in this case the first order condition is $c'(y_i) = 1/N$. As N increases, incentives are suppressed and X_i^A growth declines. We can map the model of commune size to the basic model of incentives — by calculating the strength of incentives ξ. Under the individualistic policy, we have $\xi = \xi^R = 1$. Under the commune policy, $\xi = \xi^L = 1/N$.

The literature has three more broad classes of mechanisms that can lead to increased productivity in periods of individual incentives and lower productivity in periods of centralization. First, the relationship between soft budget constraints and lack of innovation has been studied extensively (including in Chinese context, e.g., Qian and Xu (1998)). This literature argues that soft budget constraints can lead to faster or slower TFP growth depending on assumptions about distribution of revenues and losses across contingencies. Soft budget constraints can result in overinvestment in a TFP-enhancing technology relative to second-best with underinvestment: if there are weak incentives to invest, soft budget constraints can strengthen them.

Second, there is a growing literature on U-form versus M-form hierarchy. Under U-form, enterprise from industry i located in region r reports to the industrial ministry i. Under M-form, all enterprises located in region r report to the regional boss r. The benefit of M-form is that if regional economic shocks are not too different across regions, there is a scope for relative performance evaluation and therefore stronger incentives for regional bosses. In U-form, it is impossible to compare ministry 1 to ministry 2 as they are specialized. This argument is made in Maskin, Qian, and Xu (2000). They compare industrial and regional variances and conditional variances in China and show that M-form provides better incentives — hence implying higher TFP growth under M-form.[4]

Third, as discussed by Lardy (1983) and extensively documented by Lyons (1987), the Chinese development model rested upon a principle of self-sufficiency: between 1957 and 1979 it exhibited a significant tendency towards regional autarky. The restrictions on economic integration lead to non-negligible losses in economic efficiency associated with underutilization of regional comparative advantages, underuse of economies from large-scale production, as well as underaccumulation of physical and human capital. To evaluate the losses due to the underutilization of regional comparative advantages we briefly describe a model of inter-regional

[4] Qian, Roland and Xu (2006) make a similar argument showing that M-form promotes optimal experimentation.

trade along the lines of a standard Heckscher-Ohlin model.

3.3 Model of inter-regional trade and self-sufficiency

We start by describing a model of inter-regional trade along the lines of a standard Heckscher Ohlin model of comparative advantage. Let there be two regions $i \in \{1,2\}$ which each employs labor N^i in the production of two agricultural goods $j \in \{C,G\}$: cotton and grain. Production in region i of good j is given by a standard decreasing-returns-to-scale production function $Y_j^i = A_j^i \left(N_j^i\right)^{\beta_i}$. For simplicity assume that the parameters of the production functions are identical $\beta_G^i = \beta_C^i = \beta$ and that both regions contain the same amount of labor normalized to $N^i = 1$.

We can first describe the production possibility frontier of each region. We combine the production functions with the resource constraint $N_C^i + N_G^i = 1$ to obtain $\left(\frac{Y_C^i}{A_C^i}\right)^{1/\beta} + \left(\frac{Y_G^i}{A_G^i}\right)^{1/\beta} = 1$. There are two regions each with a convex PPF described by this expression as shown in Figure 1. If the productivities with respect to cotton and grain are different in the two regions, then trade between them can be beneficial. Let's say the first region is more productive at cotton and the second is more productive at grain. In this case each region will specialize in the production of what it has a comparative advantage at and exchange the extra produce with the other region to obtain better consumption. If we assume symmetric log utility with respect to both goods, then utility maximization gives us the following first order conditions:

$$\ln\left(Y_G^1 + \Delta G\right) + \ln\left(Y_C^1 - \Delta C\right) + \ln\left(Y_G^2 - \Delta G\right) + \ln\left(Y_C^2 + \Delta C\right) +$$
$$+\lambda_1\left(1 - \left(\frac{Y_C^1}{A_C^1}\right)^{1/\beta} - \left(\frac{Y_G^1}{A_G^1}\right)^{1/\beta}\right) + \lambda_2\left(1 - \left(\frac{Y_C^2}{A_C^2}\right)^{1/\beta} - \left(\frac{Y_G^2}{A_G^2}\right)^{1/\beta}\right) \to max_{Y_j^i, \Delta C, \Delta G}$$
$$\frac{1}{\left(Y_G^1+\Delta G\right)} = \lambda_1 \frac{1}{\left(A_G^1\right)^{1/\beta}} \frac{1}{\beta} \left(Y_G^1\right)^{1/\beta - 1} \qquad \frac{1}{\left(Y_G^2-\Delta G\right)} = \lambda_2 \frac{1}{\left(A_G^2\right)^{1/\beta}} \frac{1}{\beta} \left(Y_G^2\right)^{1/\beta - 1}$$
$$\frac{1}{\left(Y_C^1-\Delta C\right)} = \lambda_1 \frac{1}{\left(A_C^1\right)^{1/\beta}} \frac{1}{\beta} \left(Y_C^1\right)^{1/\beta - 1} \qquad \frac{1}{\left(Y_C^2+\Delta C\right)} = \lambda_2 \frac{1}{\left(A_C^2\right)^{1/\beta}} \frac{1}{\beta} \left(Y_C^2\right)^{1/\beta - 1}$$
$$\frac{1}{\left(Y_G^1+\Delta G\right)} = \frac{1}{\left(Y_G^2-\Delta G\right)} \qquad \frac{1}{\left(Y_C^1-\Delta C\right)} = \frac{1}{\left(Y_C^2+\Delta C\right)}$$

We can combine these to obtain:

$$\left(Y_G^1 + \Delta G\right) = \left(Y_G^2 - \Delta G\right) = \left(Y_G^1 + Y_G^2\right)/2$$
$$\left(Y_C^1 - \Delta C\right) = \left(Y_C^2 + \Delta C\right) = \left(Y_C^1 + Y_C^2\right)/2$$
$$\left(\frac{Y_G^1/A_G^1}{Y_C^1/A_C^1}\right)^{1/\beta} \frac{Y_C^1}{Y_G^1} = \frac{\left(Y_C^1+Y_C^2\right)}{\left(Y_G^1+Y_G^2\right)} = \left(\frac{Y_G^2/A_G^2}{Y_C^2/A_C^2}\right)^{1/\beta} \frac{Y_C^2}{Y_G^2}$$

Recall that also $1 = \left(\frac{Y_C^1}{A_C^1}\right)^{1/\beta} + \left(\frac{Y_G^1}{A_G^1}\right)^{1/\beta} \qquad 1 = \left(\frac{Y_C^2}{A_C^2}\right)^{1/\beta} + \left(\frac{Y_G^2}{A_G^2}\right)^{1/\beta}$.

These equations characterize total production of both goods in both sectors.

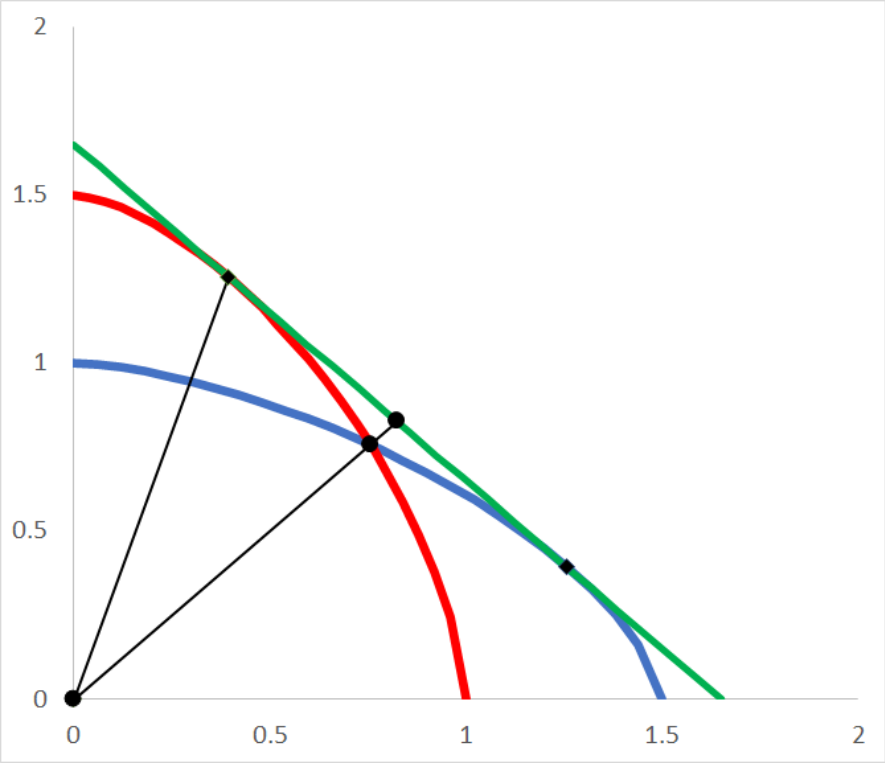

Figure 11: Production possibilities and production in the two regimes

The restriction of self-sufficiency imposed by the central government implies not only autarky (no trade) but also that both regions are required to maintain equal production proportions, namely $Y_j^1/N^1 = Y_j^2/N^2$ for both goods j. Recall that we assumed equal populations, therefore we can denote $Y_j^i = j$. The amount of production can easily be found from the intersection of the two production possibility frontiers:

$1 = \left(\frac{c}{A_C^1}\right)^{1/\beta} + \left(\frac{g}{A_G^1}\right)^{1/\beta}$ $\qquad$ $1 = \left(\frac{c}{A_C^2}\right)^{1/\beta} + \left(\frac{g}{A_G^2}\right)^{1/\beta}$

These two solutions are illustrated in Figure 1 below.

Let us introduce another simplification here assuming symmetry in the more productive sector $A_C^1 = A_G^2 = a$ and normalize the less productive sector to $A_G^1 = A_C^2 = 1$. The self-sufficiency outcome is then $c = g = \left(\left(\frac{1}{a}\right)^{1/\beta} + 1\right)^{-\beta}$. The trade equilibrium is also symmetric $Y_G^1 = Y_C^2 = \left((a)^{\frac{1}{1-\beta}} + 1\right)^{-\beta}$ and $Y_G^2 = Y_C^1 = (a)^{\frac{1}{1-\beta}} \left((a)^{\frac{1}{1-\beta}} + 1\right)^{-\beta}$.

We now need to compare total productivity of the two regimes. In the self-sufficiency regime total production $Y^{ss} = 4\left(\left(\frac{1}{a}\right)^{1/\beta} + 1\right)^{-\beta}$. In the specialization regime total production is: $Y^* = 2\left(1 + (a)^{\frac{1}{1-\beta}}\right)^{1-\beta}$. The total TFP gain equals $Y^*/Y^{ss} = \left(1 + (a)^{\frac{1}{1-\beta}}\right)^{1-\beta} \left(\left(\frac{1}{a}\right)^{1/\beta} + 1\right)^{\beta}/2$.

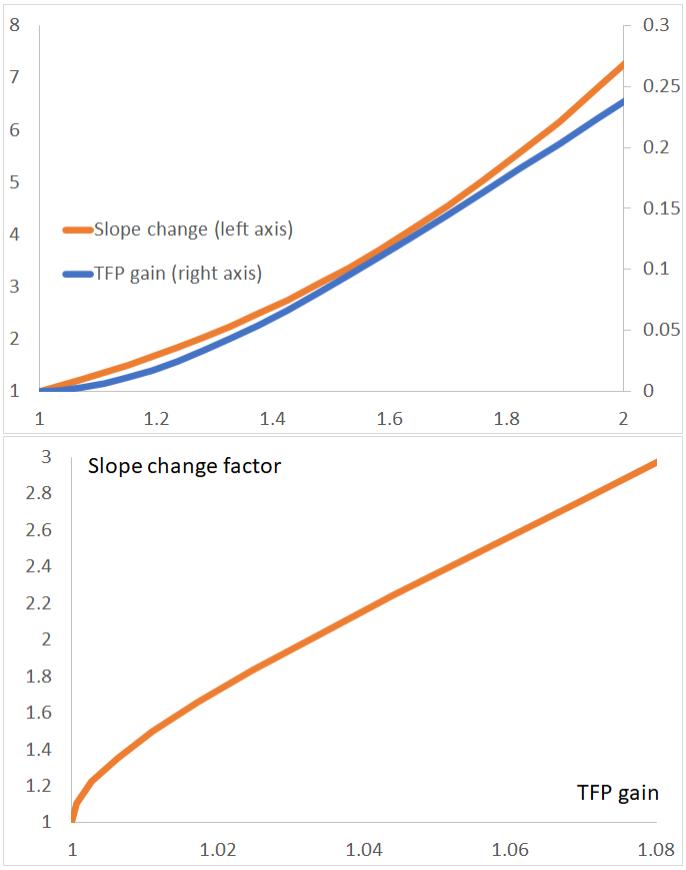

Figure 12: Losses in Agricultural Productivity depending on parameter

The size of this gain depending on parameter a is illustrated in Figure 2. For comparison Figure 2 shows the change in slope between production proportions in the two regimes as illustrated in Figure 1. The second panel of Figure 2 plots the dependence of TFP gain on the slope change factor.

We use this model to evaluate the reduction in agricultural TFP in China's agricultural sector due to the self-sufficiency policy. As documented by Lardy (1983) "the ideology of self-sufficiency was incipient in the formation of communes in the late 1950s... The vision of self-contained rural communities evaporated in the collapse of the Great Leap Forward experiment. ... Yet Mao remained profoundly antagonistic to the concept of specialized production based on comparative advantage. ... Mao's ideas apparently were ignored less easily after 1965... the leadership presumably ... was concerned that the war in Southeast Asia might spill over into China and ... feared a Soviet invasion in the North. The creation of regions that could survive

even if cut off from neighboring provinces and regions became an official policy goal."

Brandt and Rawski write: "for the pre-reform period as a whole, the "price scissors" problem, the uncertainties of securing production inputs from other administrative units, and the difficulty of horizontal coordination mentioned earlier set off a process of "suboptimization" at the local level. Local units pursued local self-sufficiency and induced "backward specialization" (Lyons, 1987). That along with dismal (road) transport resulted in a fragmented economy, a lack of interprovincial trade in final goods, and a center that had weak economic control. Furthermore, the outbreak of the Cultural Revolution ushered in a ten-year period (1966–1976) of political turmoil that further hampered efforts to promote economic integration and further obstructed regional specialization."

Riskin writes: "The other important aspect of self-reliance in agriculture was the policy of 'taking grain as the key link', which was interpreted over the Cultural Revolution decade as meaning local and regional self-sufficiency in grain. ... Stavis (1974) suggests that it was in part meant to reduce income inequalities between rich suburban communes and poor ones in the hinterland by restricting production of high-priced and profitable commodities by the former and encouraging it somewhat among the latter. ... The policy of enforcing local grain self-sufficiency may have had the opposite effect, actually increasing some interregional income differentials. This is because areas with conditions favourable for production of economic crops such as cotton or sugarcane appear to have suffered sharp declines in per capita income when forced to shift land to inefficient production of grain."

The reforms that started in 1978 saw a quick reversal of this pattern, in particular, according to Riskin: "The rural reforms can be broken down into several distinct aspects: (1) substantial purchasing price increases for farm products; (2) increased independence of decision-making authority for the collective; (3) the replacement of a policy of forced local self-sufficiency in grain with one of encouraging diversification and specialization; and (4) rapid decollectivization of the labour and income distribution systems."

We can use regional crop data from this period from Crook (1988) to evaluate the change in the cropping patterns due to the reforms to evaluate the size of distortions prior to the reforms. We focus in particular on the differences in cotton and grain per capita production by region, as discussed in detail in Lardy (1983). The main regions specializing in cotton in 1957 were Hopei, Hupei, Shansi, Sinkiang, Honan, Kiangsu, Shensi, Shantung. Table 2.3 in Lardy (1983)

computes the ratio of cotton to grain yield for these 8 provinces and finds it to be between 0.2 and 0.33 with an average of 0.23. Using data for 1979-84 from Crook (1988) we compute the cotton and grain yields for all 29 provinces. Based on the increase in cotton yield after the reforms we can identify 15 of them that substantially increased cotton yields. These 15 provinces account for 62 percent of sown area and 60 percent of the population in 1979. We find that the average cotton/grain yield ratio for the cotton-specialized provinces grew from 0.14 in 1979 to 0.25 in 1984, while the cotton/grain yield ratio of the non-cotton-specialized provinces declined from 0.091 to 0.076. Thus, the specialization slope increased by a factor of 1.79 in the cotton region and declined by a factor of 1.19 in the non-cotton region.

Taking the geometric average of these two slope changes (1.46) we can infer from our model-based calculations that the TFP gain from the reform is between 0.5 percent (if we combine the elasticity of both labor and land and use 0.85) and 1.1 percent (if we take into account only labor's elasticity of 0.65). If we use the maximum slope change of 1.79 the estimate range would increase to between 1 and 2.5 percent. One rather unrealistic way that the estimate could increase substantially is if labor could not be reallocated and only land was reallocated between cotton and grain production. In that case (assuming an elasticity of 0.2) a slope increase of 1.46 would translate into a TFP gain of 7.5 percent.

There have been a large number of studies evaluating the effects of self-sufficiency in agriculture on agricultural productivity.

Lin (1989) estimates that the increase in nongrain crops in 1978-84 due to the removal of the self-sufficiency policy resulted in only about a 1 percent increase in total factor productivity. Lin (1992) concludes that gains and losses of regional comparative advantage can explain only a small portion of the changes in total factor productivity in 1952-88, and much of the decline in total productivity needs to be explained by reasons other than the loss of regional comparative advantage. He cites McMillan, Whalley, and Zhu (1989) who find that the change from the production team system to the household responsibility system between 1978 and 1984 increased total factor productivity by 32 percent.

Lin and Wen (1995) argue using provincial data that the impacts of changes in the cropping patterns due to the self-sufficiency policy on land productivity were very small (relative to the change due to collectivization), and in most years the impacts were positive rather than negative. They estimate that land productivity changed at most by 2 percent in some years

as a result of this policy. Thus, existing studies tend to agree with our estimate that the majority of the decline in agricultural TFP was due to collectivization and the recovery in TFP during the first years of the reforms was associated with the change from the production team system to the household responsibility system, with only a small contribution from increased specialization.

3.4 Model of regional misallocation and the effects of the Third Front

We start by describing a model of regional misallocation along the lines of Jones (2011). Let there be two regions where industrial production takes place which we call the west (W) and the rest (R). Production in each region is given by a standard constant-returns-to-scale production function $Y^i = A^i \left(K^i\right)^{\alpha_i} \left(N^i\right)^{1-\alpha_i}$. For simplicity assume that the parameters of the production functions are identical $\alpha_R = \alpha_W = \alpha$ and that both regions produce the same type of manufacturing good, so that total industrial production is given by $Y = Y^W + Y^R$. Let us assume that a fraction ρ of the labor force resides in region W and fraction $1-\rho$ in region R. That is, $N^R + N^W = N$ and $N^W = \rho N$. We assume that labor is immobile but the total amount of capital K can be freely reallocated between two sectors.

The first economic question is which proportion of capital x should be allocated to region W to maximize total industrial production. The answer can be obtained by solving an optimal problem:

$\max_{K^W, K^R} \left(A^W \left(K^W\right)^{\alpha} \left(N^W\right)^{1-\alpha} + A^R \left(K^R\right)^{\alpha} \left(N^R\right)^{1-\alpha}\right)$

$s.t. \qquad K^W + K^R = K$

To simplify the analysis we can substitute $K^W = xK$, $K^R = (1-x)K$:

$\max_x \left(A^W (x)^{\alpha} (\rho)^{1-\alpha} + A^R (1-x)^{\alpha} (1-\rho)^{1-\alpha}\right) (K)^{\alpha} (N)^{1-\alpha}$

The first-order condition for x is:

$\alpha A^W (x)^{\alpha-1} (\rho)^{1-\alpha} - \alpha A^R (1-x)^{\alpha-1} (1-\rho)^{1-\alpha} = 0$

which can be simplified to $\frac{x}{1-x} = \frac{\rho}{1-\rho} \left(\frac{A^W}{A^R}\right)^{\frac{1}{1-\alpha}}$ and $x = \frac{\frac{\rho}{1-\rho}\left(\frac{A^W}{A^R}\right)^{\frac{1}{1-\alpha}}}{1+\frac{\rho}{1-\rho}\left(\frac{A^W}{A^R}\right)^{\frac{1}{1-\alpha}}}$.

Note that if productivities of the two regions are identical, then it is optimal to allocate capital to the regions in the same proportions as labor.

The second economic question is how much industrial production is lost if capital is allocated inefficiently to the two regions. We can answer this question using the same notation. Assuming

identical technology $A^R = A^W = A^*$, the optimal amount of total production is given by:

$$Y^* = \left(A^* (x)^\alpha (\rho)^{1-\alpha} + A^* (1-x)^\alpha (1-\rho)^{1-\alpha}\right) (K)^\alpha (N)^{1-\alpha} =$$
$$= \left(\rho A^* + (1-\rho) A^*\right) (K)^\alpha (N)^{1-\alpha} = A^* (K)^\alpha (N)^{1-\alpha}$$

The aggregate loss of inefficiency if a fraction x of capital are chosen for arbitrary regional productivity changes due to reallocation is captured by:

$$\frac{Y}{Y^*} = \frac{A^W}{A^*} \rho \left(\frac{x}{\rho}\right)^\alpha + \frac{A^R}{A^*} (1-\rho) \left(\frac{1-x}{1-\rho}\right)^\alpha$$

We want to use this model to evaluate the reduction in manufacturing productivity due to the massive reallocation of heavy industry investment towards the inland regions of China due to the policies known as the "Third Front". According to Ishikawa (1983) "huge-scale investment took place associated with the construction in the interior, with the aim of building national defense and its supporting industries ... (and) the amount of capital construction investment spent on this was reported to have reached about half the national total capital construction investment for 1964-75." Moreover, Ishikawa reports that "locational conditions were bad and linkages between the factories constructed were only poorly developed; hence the effectiveness of the investment was very low." According to Naughton (1988) "the proportion of total national capital construction that went to the Third Front during the ... Third Five-Year Plan (1966-70) and Fourth Five-Year Plan (1971-75) ... (were respectively) 52.7% and 41.1%." Ma and Wei (1997) based on somewhat more reliable data estimate that the western regions associated with the Third Front temporarily increased their share of total state investment in capital construction from 23% to 37% in the years 1965-71 at the expense of the eastern regions.

Fan and Zou (2020) report that the provinces associated with the Third front accounted for 6 percent and 9 percent of China's industrial output in 1964 and 1979 respectively and for 20 percent of China's population in 1964. These parameters are sufficient to calibrate the sizes of labor and capital inputs as well as relative productivities in the two regions to compute the losses due to misallocation. There are two additional sources of losses however that we need to take into account.

First, Fan and Zou (2020) study long-run changes in regional plant productivity and estimate that the effect of misallocation of resources on the productivity of plants in the TF area was approximately 20%. This estimate echoes Naughton's (1988) calculation that the loss in industrial productivity in Third Front plants was on the order of 10-15 percent. Second, all of the sources we have mentioned argue that there was massive waste of resources in the

	reallocation	waste	productivity	total
1964	0.0	0.0	0.0	0.0
1965	0.2	-0.7	-1.4	-1.9
1966	-0.1	-1.1	-1.7	-2.8
1967	-0.5	-1.3	-1.8	-3.6
1968	-0.8	-1.3	-1.9	-4.0
1969	-1.0	-1.4	-1.9	-4.3
1970	-1.2	-1.5	-2.0	-4.7
1971	-1.6	-1.5	-2.1	-5.2
1972	-1.3	-1.2	-2.2	-4.7
1973	-1.1	-1.0	-2.2	-4.3
1974	-0.9	-0.8	-2.2	-3.9
1975	-0.8	-0.7	-2.2	-3.7
1976	-0.7	-0.6	-2.2	-3.4
1977	-0.6	-0.5	-2.2	-3.3
1978	-0.5	-0.4	-2.2	-3.1

Table 33: Losses in Industrial Productivity due to Third Front policies

process of investment into Third Front projects. Thus, we can summarize the effects of Third Front policies in three main impacts: 1) 14% of industrial investment was reallocated towards western regions in 1965-71; 2) a significant part of that additional investment was wasted; 3) productivity of western plants was permanently reduced by up to 20%.

We calibrate the parameters of the regional productivity, capital and labor inputs based on total manufacturing inputs and outputs in 1964 and estimates mentioned above. We then compute and compare paths of industrial production, if none of the three impacts happened, if only reallocation (1) happened, or only waste (2), or only productivity loss (3) happened, as well as the combined loss due to all three impacts. The resulting loss in industrial production is presented in Table 1.

The direct effect on productivity plays the largest role accounting for 2.2% loss in the long run. The effect of waste gradually reaches 1.5% in 1971 and then diminishes back to zero over time. The effect of reallocation also reaches approximately 1.6% in 1971 and then gradually falls back to zero. Thus, the overall loss in industrial productivity due to Third Front policies reaches a peak of 5.1 in 1971 and then falls off to 2.2 in the long run as shown in Figure 1, with the average effect over the period 1964-78 being approximately 3.8%.

We use these estimates to calibrate a drop in manufacturing TFP due to Third Front policies. We assume these losses were relative to the assumed trend in manufacturing TFP in

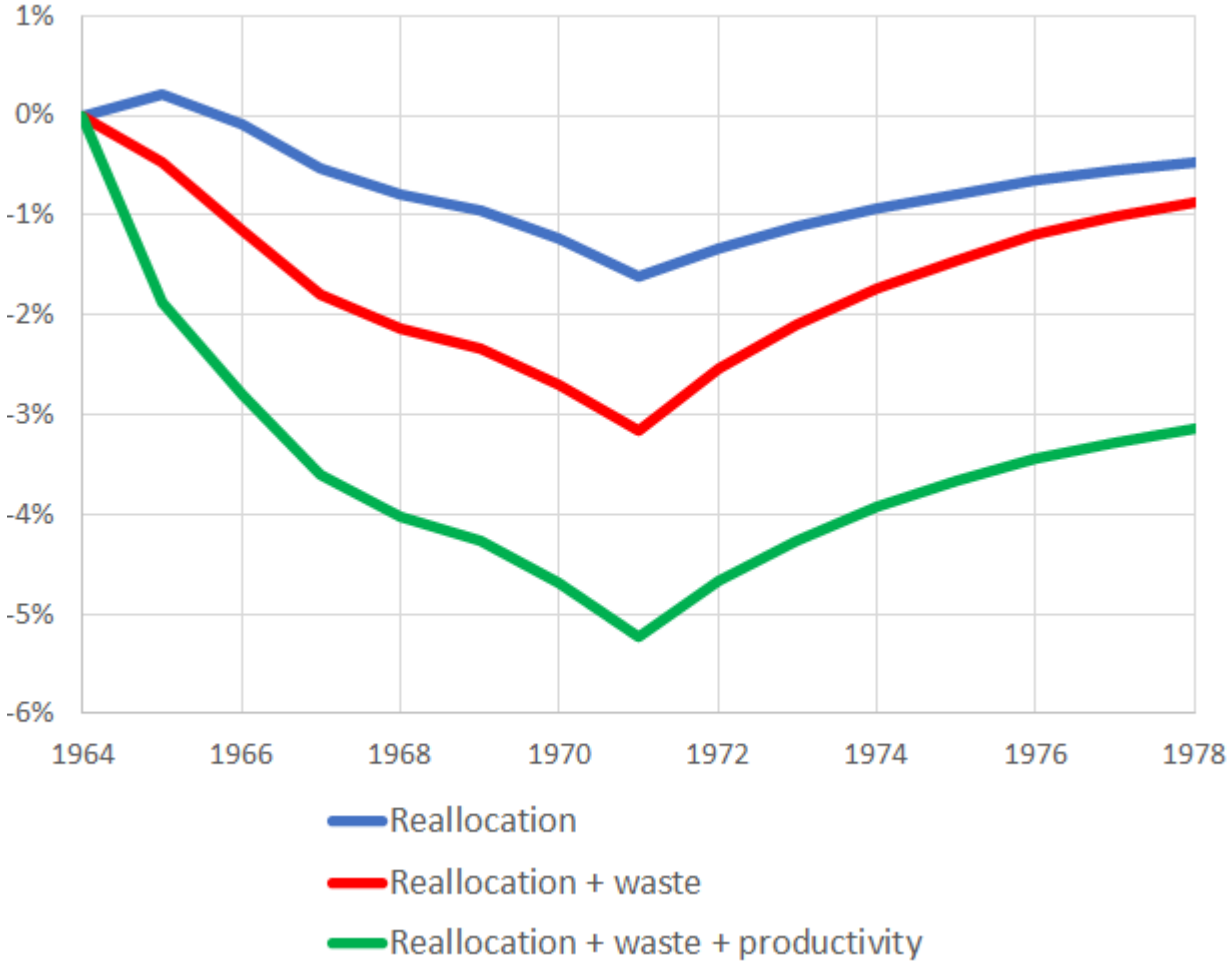

Figure 13: Losses in Industrial Productivity due to Third Front policies

1965-78.

3.5 Summary of calibration

Table 14 summarizes the policies that we calibrate, the distortions and TFPs that they affect, the time periods that when policies take place, the models that we use to evaluate them and the data sources for each calibration.

4 Summary of related literature on the political cycle

There is also a large literature which describes shifts between the left-wing and the right-wing policies during Mao's reign and provides the context for the right-left policy development cycle. The literature on the policy cycle in communist China starts with the work of Skinner and Winckler (1969) who describe a model in which the society moves between the liberal phase with reliance on remuneration and the radical phase with reliance on exhortation and coercion. An important study of the economy of China by Chu-yuan Cheng starts with the analysis of ideological background of Mao and views growth and economic development through the "Struggle between two lines" – the Maoists and the pragmatists (such as Zhou Enlai, Liu Shaoqi, Deng Xiaopin, and Sun Yefan) with the divergent views on "incentives and the path to modernization." The book concludes "Of all the factors affecting the Chinese economy, the primacy of ideology probably has had the most profound impact" (Cheng 1982). Perhaps the most influential view of the Chinese policy cycle is due to Alexander Eckstein (1977): "the policy cycle revolves around [the regime's commitment to the Maoist vision of] resource mobilization–production nexus on the one hand, and the dichotomy between model Communist Man and Economic Man on the other. Consequently, the dilemma facing the regime is that precisely the kind of measures imposed to mobilize resources tend to (a) produce strong disincentive effects, and (b) lead to losses in productive efficiency."

The policies of the mobilization phase "may take a variety of forms, depending on what period in Communist China's economic history we are considering". Yet their general features are: (1) designed to raise the level of extraction from the countryside; (2) curtail the scope of private industry and commerce; (3) "general lessening of reliance on material incentives in both agriculture and industry". These policies "tend to have strong disincentive effects ... aggravated by the fact that frequently, if not invariably, these policies are accompanied by the

Policy	TFP/distortion	Type	Time period	Model	Data sources
First Five-Year Plan	$X^A \uparrow$,$X^M \uparrow$	Right	1952-57	incentives	Eckstein (1977), Lardy (1987a)
Great Leap Forward	$X^M \downarrow$	Left	1958-61	incentives	Eckstein (1977)
collectivization	$X^A \downarrow$	Left	1960	commune size	Lardy (1983), Lyons (1987),
				self-sufficiency	Crook (1988), McMillan et al (1989)
	$\tau^C \downarrow\uparrow$	Left,Right	1958-78	rationing	Niu et al. (1991), Sheng (1993b),
				shortages	Zhang and Zhao (2000), Naughton (1986)
	$\tau^P \downarrow\uparrow$	Left.Right	1958-78	procurement	Ash (2006), Li and Yang (2005), Imai (2000)
	$\tau^R \uparrow\downarrow$	Left, Right	1955-75	construction spending	Sheng (1993a), Zhang and Zhao (2000)
Agriculture First	$X^M \uparrow$	Right	1962-66	material incentives	Jefferson and Xu (1991), Lin (2013),
Third Front	$X^M \downarrow$	Left	1964-75	regional	Naughton's (1988), Ma and Wei (1997),
				misallocation	Fan and Zou (2021)

Table 34: Summary of policies, their effects, periodization, models used and data sources

introduction of some new institutional forms ... [which are] in themselves disruptive". The cumulative negative effect on the economy "forces the regime to shift its policy mix" to the right-wing policies broadly characterized as: (1) "easing the pressures on the peasantry, that is, more favorable prices, greater scope of the private plots, greater scope of the rural markets, and less control of labor allocation and mobilization"; (2) encouraging "capitalist tendencies" – increased reliance on material and financial incentives.

Eckstein (1977, p. 42-43 and 46-48) summarizes that "policy differences ... revolve around two basic issues: the desired or feasible rate and character of economic growth and the role of the market or of centralized versus decentralized patterns of decision making in allocating resources". Another evidence is "the ever present controversy best dramatized by the slogan that pits "Red" versus "Expert" where the group of "counselors of caution", "the planners, economists, and technocrats" were "locked in debate with the more political and radical elements identified with Mao" "at all the crucial policy turns, such as those relating to collectivization, the Great Leap, the Agriculture First Policy, and the Cultural Revolution". Cheng (1982, p. 323-324 and Chapter 9-10 for a detailed analysis) summarizes "Generally speaking, periods of radical experimentation were succeeded by periods of retreat and adjustment ... economic policy changes in China have been closely tied to leadership changes".

Additionally, Nathan (1976, p.723-724) reviewing the literature argues that the research on policy cycle identifies the following general features of the left-wing and right-wing policies. "In agriculture, a rightist line involves a greater appeal to selfish, materialistic motives on the part of peasants in the form of free markets, private plots, piece-work rates, a greater flow of consumer goods to the countryside, decentralization of management to the team level, smaller state procurement from the harvest, and greater state investment in agriculture through fertilizer and mechanization ... Thus a right line in agriculture is connected to a right line in industry (balanced, planned investment and centralized management; greater technical sophistication; slower, more stable growth; reliance on material incentives to both workers and managers)".[5] "A leftist line involves greater appeal to self-sacrificing mobilizational or ideological motives, and hence a reduction in the role of free markets and private plots, the politicization of remuneration systems, recentralization of decision-making to the brigade or commune level, higher state

[5]Nickum (1978) argues that substantial part of state infrastructure investment in agriculture (investment in "land-augmenting fixed capital") was carried out by agricultural labor in off-peak seasons; this is consistent with the rightist line's pragmatic approach to resource allocation.

procurement, and reduced state subvention of fertilizer and mechanization ... Similarly, a left line in agriculture is associated with left lines in other policy areas: a more rapid but inefficient, decentralized growth of a less sophisticated industrial sector with greater worker participation in management and more reliance on ideological incentives; subordination of intellectuals and technicians to political cadres and the masses".[6]

For the analysis of the political development cycle we now classify 1953-78 into periods of right-wing and left-wing policies. We follow Eckstein (1977) to classify the following major periods: the technocratic First Five Year Plan (1953-1957) as mostly the right-wing strategy;[7] the Great Leap Forward (1958-1961) as the left-wing strategy; the retrenchment and recovery period and the Agriculture First policy in the early 1960s (1962-1966)[8] as the right-wing strategy. We classify the period of 1967-1972 as the left-wing policy, when the "Cultural revolution" policies were started and the military was tasked with restoring order in the country and rebuilding economy under Lin Biao. We classify the period of 1973-1975 as the right-wing policy under the premiership of Deng Xiaopin (Cheng (1982)). We classify the period of the struggle for power 1976-1977 as left-wing policy starting with the rule of the ultra-leftist Gang of Four and ending with the restoration of Deng in July 1977 and with affirmation of the modernization program at the Fifth National People's Congress in February 1978.[9]

5 Counterfactual simulations

5.1 Mean and trend consistent right-wing and left-wing policy packages

To understand the effects of fluctuations on welfare we approximate the effects of "average" or "trend" policies in different ways: we take the mean over the whole period, or a subperiod starting in 1958, we take a linear trend and a Hodrick-Prescott trend. Thus, here we consider three additional versions of taking the "average" or trend: sample mean, linear trend, HP-filtered trend. Since the overall length of right periods is longer than that of left periods, and

[6] More broadly, see the debate of Nathan (1976) and Winckler (1976) on the policy cycle.

[7] We omit the period of collectivization of 1955-1956 in this classification as it was rather mild and "limited the disorder and destruction of economic resources" (Teiwes 1987, p.111) as well as affecting primarily agriculture.

[8] See also Riskin (1987, p. 163-169) and Selden (1979, p.105 and Table 16, p.154-155).

[9] Our classification is broadly consistent with the textbook treatment of Naughton (2007) who considers Economic Recovery (1949-52), the Twin Peaks of the First Five-Year Plan (1953-1956), Great Leap Forward (1958-1960), Crisis and "Readjustment" (1961-1963), Launch of the Third Front (1964-66), the Cultural Revolution (1967-69), the Maoist Model: a New Leap (1970-1972), Consolidation and Drift (1972-76), and the Leap Outward and End of Maoism (1978-). See also a book-length study of the cycles in Chinese foreign economic policy (Reardon 2015).

to remove the influence of a low value for capital in 1953, we take the average over the subperiod 1958-1978 in addition to considering the whole period. All of these approaches make sure that we consider various paths of TFPs and distortions which preserve their average values with or without policy fluctuations. We approximate right-wing policies by increasing TFPs and distortions by one average absolute deviation, and left-wing policies by reducing TFPs and distortions by as much. We then compute the effects of synchronous cycles by switching the levels synchronously based on historical periodization. Moreover, for the mean and linear trend versions, instead of average absolute deviations, we consider averaging each TFP and distortion separately over periods considered right-wing and left-wing by historians. To do that, we regress a TFP or distortion on a constant, time (if taking linear trend into account), and a dummy variable representing whether the period historically was considered as characterized by left-wing policies. A fitted series with the dummy variable set to zero represents average right-wing policies, and with the dummy variable set to one - represents left-wing policies. Note that while historical cycle turning points correspond to changes in the derivative of a TFP or distortion, we are attempting to measure differences in levels. Since it takes time for a change in derivative to lead to a change in the level, we use dummies of historical policy periods with a lag of 1-2 years.

Altogether, we consider seven alternative specifications for TFPs, consumption, production, and capital distortions: 1) mean over 1953-78; 2) mean over 1958-78; 3) mean with dummy based on historical cycles; 4) linear trend over 1958-78; 5) linear trend with dummy based on historical cycles; 6) HP-filtered trend over 1953-78 applied to 1958-78. In addition, we construct a seventh "realistic" specification of policy packages, which does not preserve sample averages for TFPs and distortions, but reflects our interpretation of what consistent right-wing and left-wing policies would have likely implied in practice. In each specification, we assume that all the remaining distortions follow the same paths as in the baseline calibration.

For each of the five specifications, we compute welfare gains by comparing the baseline path calibrated from direct evidence with: 1) the path if right-wing policy package is adopted starting in 1958; 2) the path if left-wing policy package is adopted starting in 1958; 3) the average between right-wing and left-wing policy packages is adopted; 4) the right-wing policy package is adopted in right subperiods and left-wing policy package is adopted in left subperiods based on a unified chronology described in Section 2; 5) the path of each TFP and distortion switches

Table 35: Welfare costs of fluctuations.

	Mean	Mean 58-78	M. Hist.	Linear	L. Hist.	HP	Realistic
Agricultural TFP	1.0	2.0	2.3	2.6	3.3	2.5	5.8
Non-agricultural TFP	10.6	8.7	5.8	2.6	2.8	2.7	8.4
Consumption	-0.3	-2.1	-3.3	-1.1	-2.6	0.0	-3.0
Production	-2.1	-1.4	-0.6	1.3	1.2	0.4	4.4
Non-consumption	-0.4	-1.0	-0.4	0.1	0.0	0.0	0.8
Average	7.7	4.3	2.1	4.9	3.9	5.0	15.0
Right-wing	11.9	7.6	0.5	3.8	3.1	3.2	17.6
Left-wing	1.3	-1.0	3.8	5.5	4.5	6.4	10.5
Synchronous	8.5	2.7	2.4	4.6	3.8	5.3	14.1
Asynchronous	1.9	0.4	1.3	1.4	1.5	2.6	1.1
Select sub-periods	0.6	-0.7	-1.3	-0.1	-6.0	-0.3	6.4

Notes: This table reports consumption equivalents of welfare gains or losses in various counterfactual simulations compared with the baseline direct evidence calibration. Welfare is computed as discounted utility of consumption over the period defined in the counterfactual. Five columns represent five models of average or trend for TFPs and distortions: 1) mean over the period 1953-78; 2) mean over the period 1958-78; 3) mean with dummy based on historical cycles; 4) linear trend; 5) linear trend with dummy based on historical cycles; 6) Hodrick-Prescott trend; 7) realistic calibration of consistent policies. Row 6 labeled "Average" shows the welfare gain in absense of fluctuations. Rows 1 through 5 decompose row 6 into the contributions of TFPs and distortions. Rows 7 and 8 show the welfare gains of consistent right-wing and left-wing policies for each model. Rows 9 and 10 report welfare gains from having synchronous or asynchronous fluctuations around each model of average or trend. Row 11 shows welfare gains from a simulation where TFPs and distortions take trend values for all periods except select sub-periods where they take values calibrated from direct evidence. The difference between rows 6 and 11 shows the effect of asynchronous fluctuations in select sub-periods. All welfare gains are reported in percentage points of consumption.

asynchronously between right-wing policy and left-wing policy based on its own chronology of being above or below "average" or trend. We also decompose the welfare gains in each "average" path into contributions of TFPs and distortions. The results are presented in Table 35.

We find that the total welfare gains in absense of fluctuations (while preserving the means of TFPs and distortions) are between 2.1 and 7.7 percent of lifetime consumption. A substantial part of these gains are accounted for by differences in TFPs, much less by distortions. In most cases, consistent right policies, as well as consistent left policies, produce welfare gains of similar magnitude. Moreover, having synchronous political cycles based on historical periodization also generates similar welfare gains. In constrast, asynchronous fluctuations in TFPs and distortions with timing of shifts between left-wing and right-wing policies based on individual histories of each TFP or distortion, nearly reproduces the low welfare path that we get in the baseline calibrated from direct evidence. This demonstrates that the source of the welfare losses is the asynchrony in timing of effects of policies on different TFPs and distortions. In the last column of Table 35, we show the effects and decomposition of a more realistic set of counterfactuals

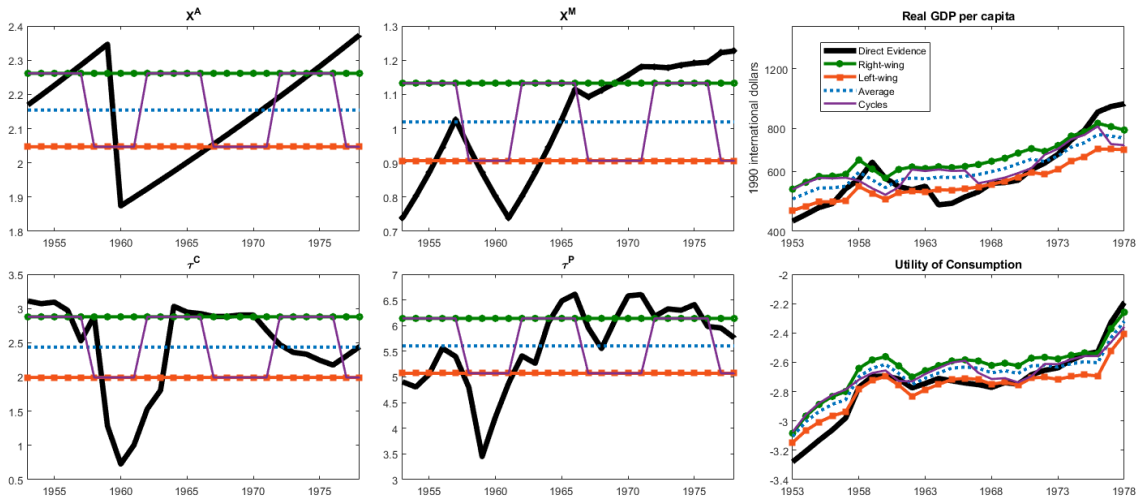

Figure 14: Simulations with average policies as mean 1953-78

for right-wing and left-wing policies. While these counterfactuals have larger overall welfare effects, with larger contributions from both TFPs and distortions, they are also fully accounted for by the asynchronous effects of the policy cycle. These simulations are also shown in Figures 14-19 and 21. In each of the five cases the "average" policies, the right-wing, the left-wing, and even the synchronous switches between them yield a substantial increase in welfare.

To approximate asynchronous switches we switch a TFP or distortion to right-wing when the calibrated series is above "average", and to left-wing when it is below. Results shown in Figure 20 demonstrate that now in each of the four cases the counterfactuals yield welfare very similar to the basline calibration. This clearly demonstrates that costs of fluctuations are due to their timing asynchrony, but not due to outliers, not due to nonlinearity, and not due to large variance.

5.2 Realistic right-wing and left-wing policy packages

As we already mentioned, we construct a fifth "realistic" specification of policy packages, which does not preserve sample averages for TFPs and distortions, but reflects our interpretation of what consistent right-wing and left-wing policies could have likely implied in practice. For the right-wing policy package we assume that TFPs in both sectors grow at constant rates from 1958 onward towards their post-reform levels and both components of the labor distortion remain fixed at their 1958 level until 1983. For the left-wing policy package we assume that

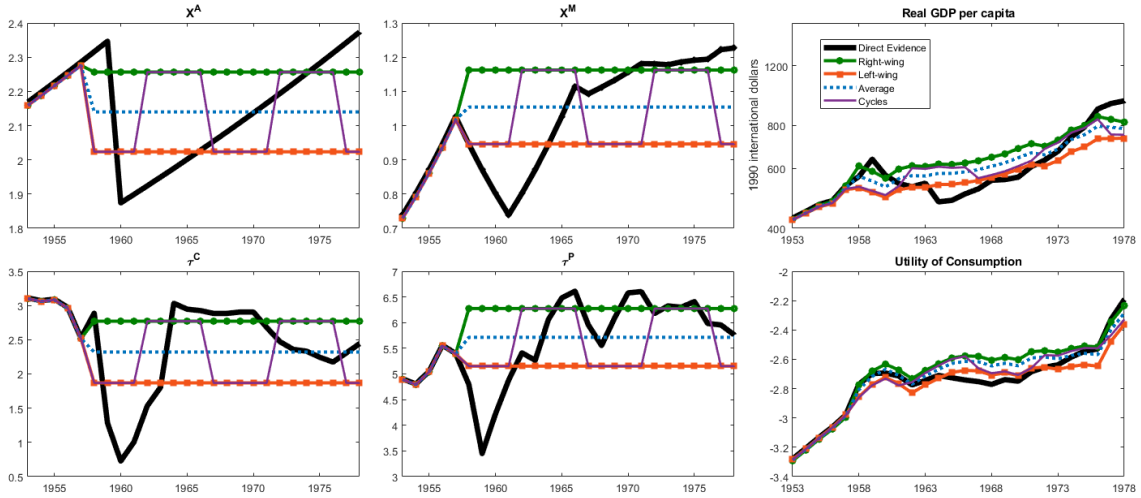

Figure 15: Simulations with average policies as mean 1958-78

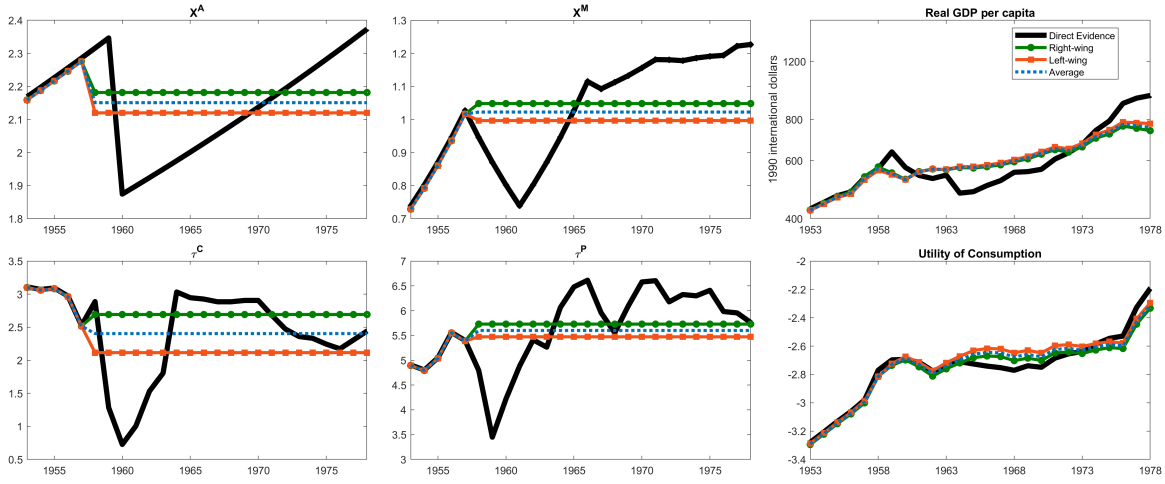

Figure 16: Simulations with historical averages of policies by regime, no trend

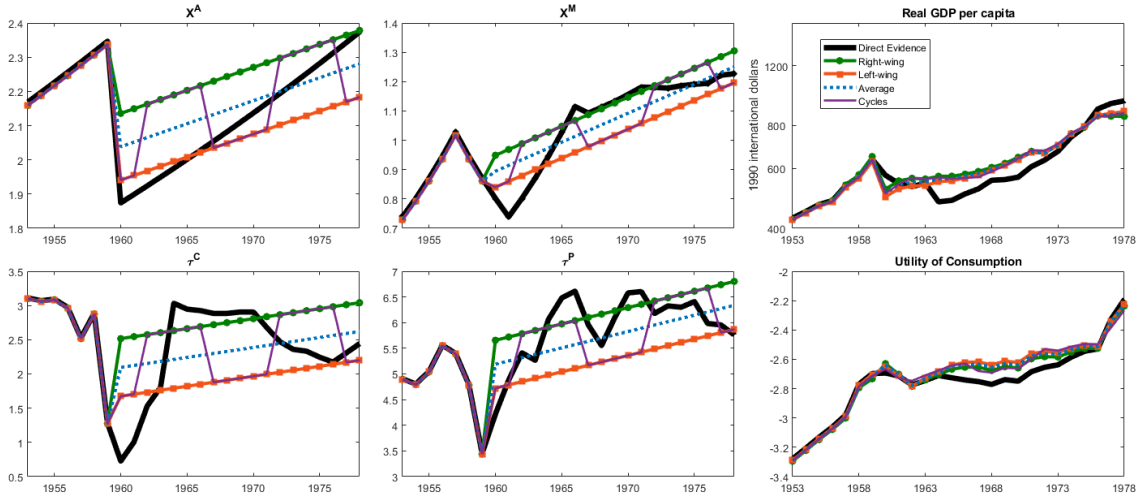

Figure 17: Simulations with average policies as linear trend

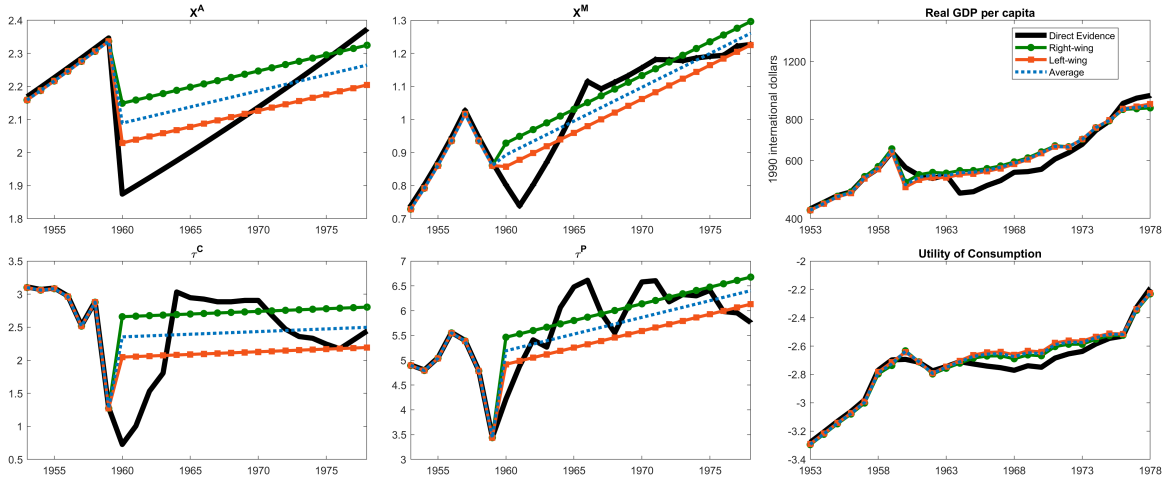

Figure 18: Simulations with historical averages of policies by regime, linear trend

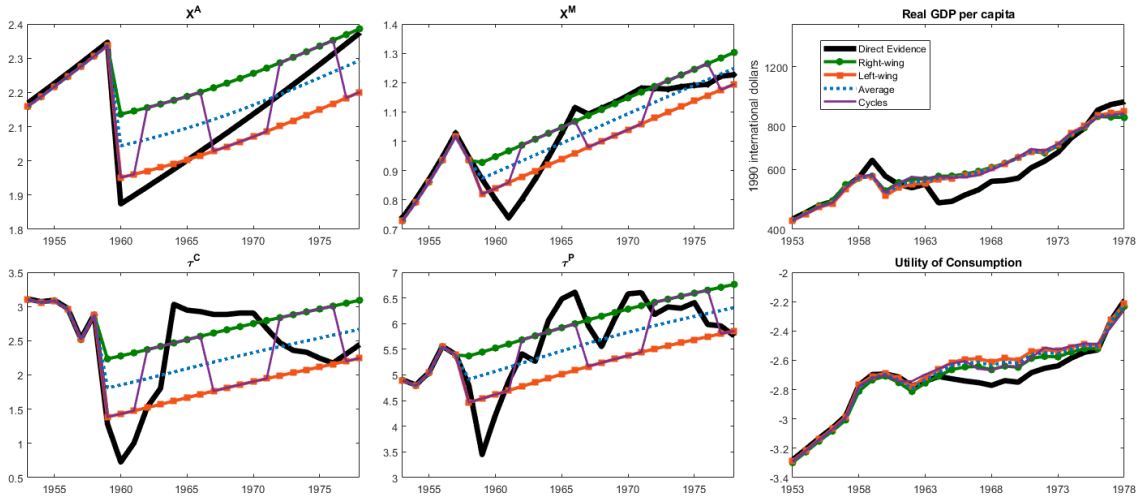

Figure 19: Simulations with average policies as Hodrick-Prescott trend

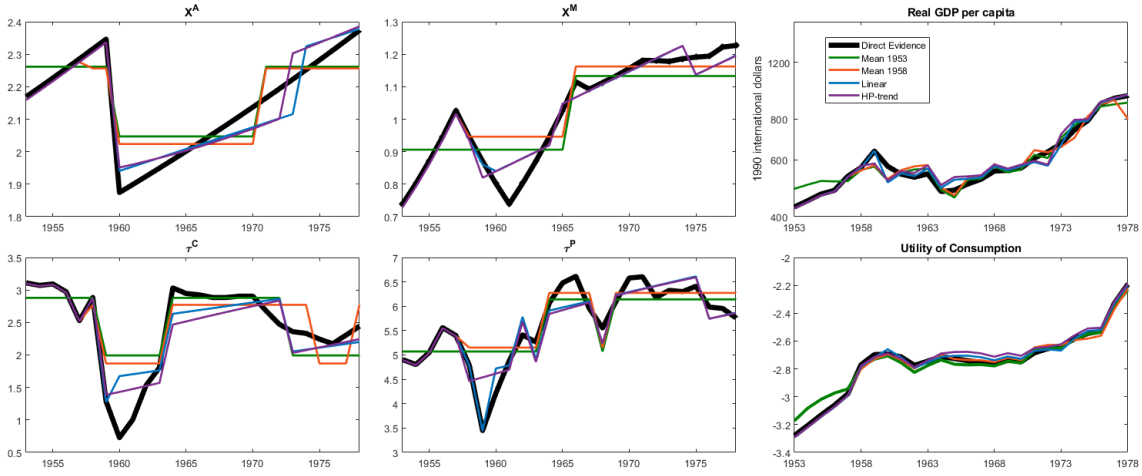

Figure 20: Simulations with asyncronous cycles

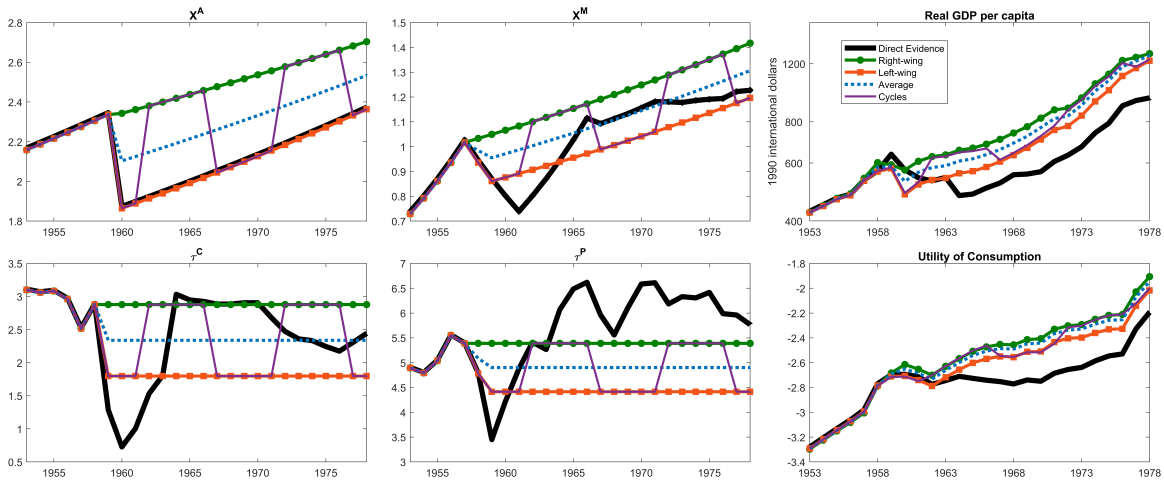

Figure 21: Simulations with realistic right-wing and left-wing policies

both the consumption and production components of the labor distortion decline in 1959 by half the size of their maximum drop during the GLF period, and stay at this reduced level until 1983, manufacturing TFP also drops by half its calibrated GLF decline and then grows at a constant rate between 1959 and 1978, agricultural TFP follows its path calibrated based on direct evidence, the non-consumption component of the capital distortion remains fixed at its 1958 level until 1983.

The resulting series as well as GDP and welfare are shown in Figure 21. Here the welfare gains are larger mainly because average TFP in the right-wing simulation is above sample average, and average distortions in left-wing simulation is below sample average. However, the result that both packages, as well as synchronous switches between them, yield a significant improvement in GDP and welfare - is preserved. Figure 22 demonstrates that asynchronous cycles, on the other hand, destroy most of these gains.

5.3 Effect of risk and heterogeneity

From Table 35 one might draw the conclusion that the leftwing policy regime was better than the right-wing regime, since it produced higher average welfare gains. We consider two possible biases that might affect this conclusion. First, policy variability, inherent to the left- and right-wing policy regimes, was different. In particular, policy variability was much higher in the left-wing regime, implying higher welfare losses from policy variability in the left-wing regime. To investigate this proposition, we have conducted a set of additional counterfactual simulations.

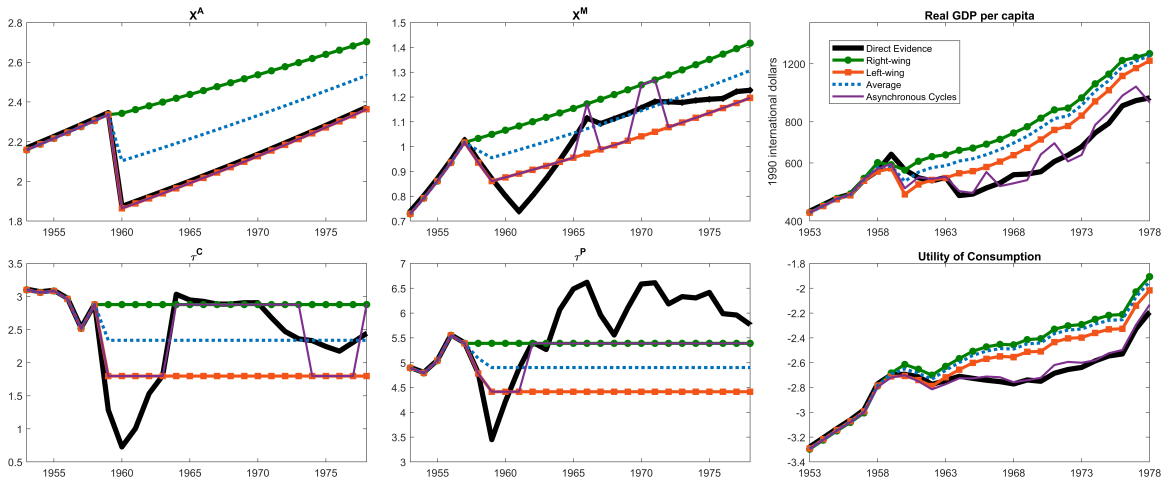

Figure 22: Simulation with realistic policies and asyncronous cycles

In each simulation on top of the average policies inherent to a regime, we introduced policy variability in the TFPs and distortions representative of fluctuations in that policy regime. The new counterfactuals preserved the average values of each TFP and distortion as in a consistent policy regime, but fluctuated around it drawing with replacement from the actual values in that policy regime. Thus, in the simulations we preserved the mean, variance, distribution and correlation structure between deviations in TFPs and distortions in each policy regime. We consider the welfare averaged across 100 such simulations as the "risky" welfare path. We illustrate the risky paths of TFPs and distortions as well as the implied paths of GDP and welfare, in right-wing and left-wing "risky" policy regimes, as well as the average paths, in Figures 23-25. The results reported in row 7 of Table 2 in the main text, labeled "Total + Risk" show that policy variability indeed affects the welfare gains differently in different regimes, reducing them in the left-wing regime with higher policy variability. However, the effect of risk on welfare gains is relatively small.

The second potential source of bias in welfare comparisons is income and consumption heterogeneity. To account for these, we expand the model by assuming that instead of a representative agent there are two types of agents which differ in their income. We compute the share of sectoral consumption that each type would be able to afford and consume given the income inequality, and re-compute the weighted welfare function for each simulation using the new consumption values. This is possible because the demand functions for both goods are linear in income and so the aggregation of heterogeneity does not change the aggregate

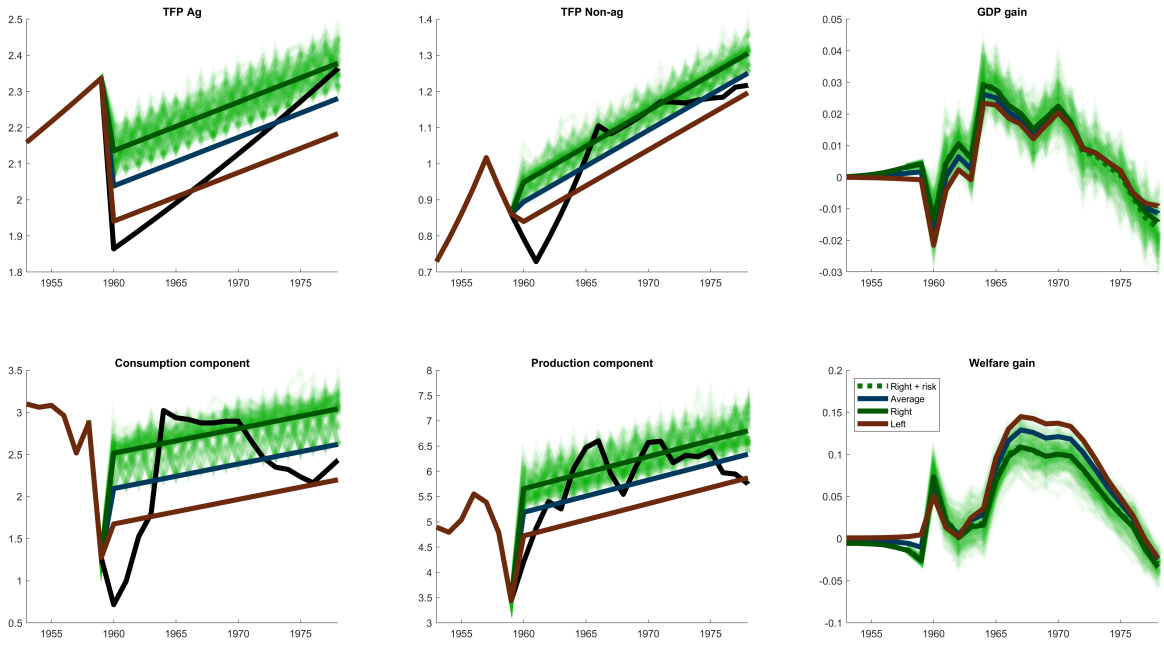

Figure 23: Simulations with policy variability in right-wing regime

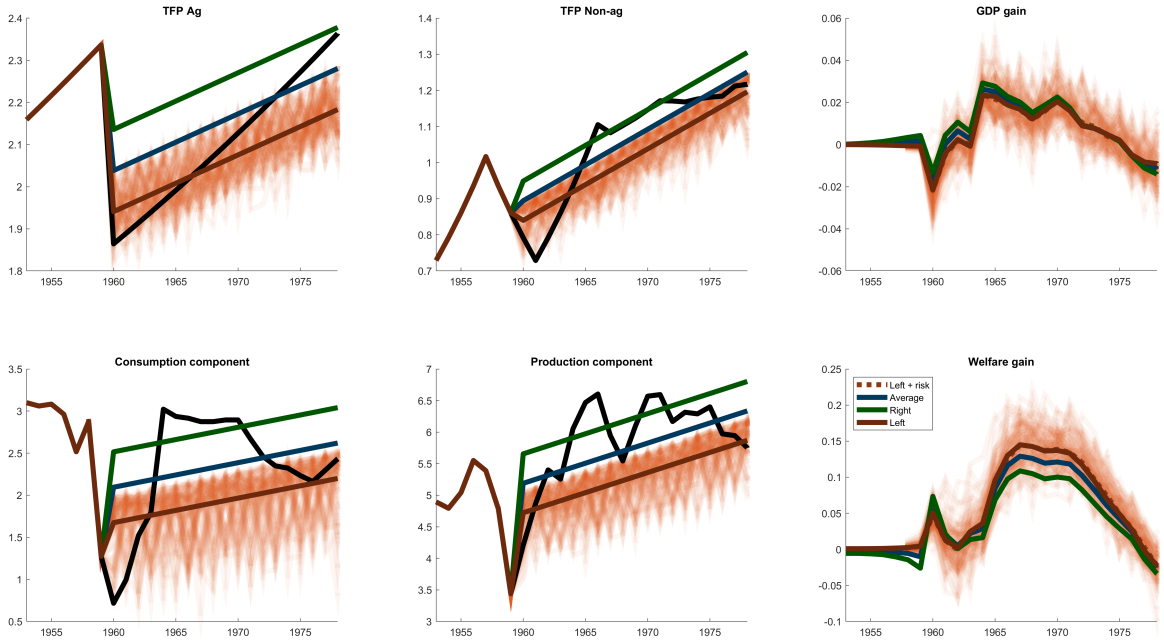

Figure 24: Simulations with policy variability in left-wing regime

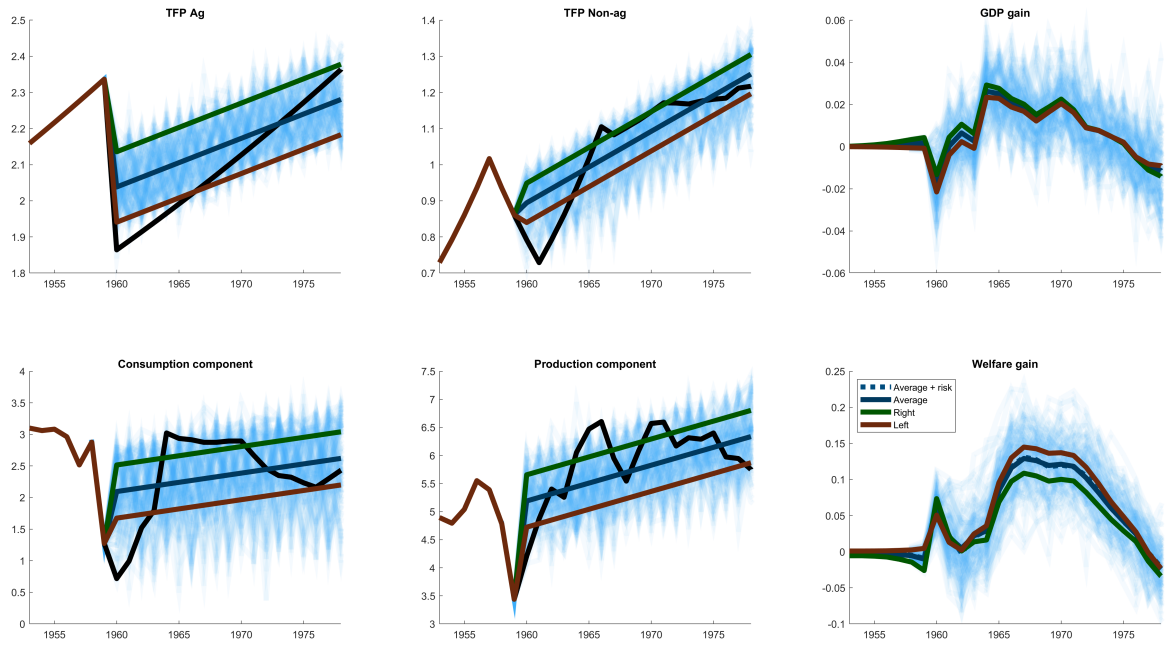

Figure 25: Simulations with policy variability around average

simulation. The expanded model is presented below. We assume that there are 2 types of equal population size with a 4-fold difference in income, which approximates the actual amount of inequality consistent with a gini coefficient of 0.3 observed in China in the 1970s (Xie, Zhou, PNAS 2014).

We find that the effects of consumption heterogeneity are much larger when the economy is closer to the subsistence level. As shown in row 8 of Table 2 in the main text, the welfare effects of right-wing policies relative to the actual path increase the most, while the effects of left-wing policies which are closer to the actual path change less. Accounting for the combined effects of risk and consumption heterogeneity essentially reverses the welfare comparisons, implying a 6.6% welfare gain from right-wing policies and a 4.4% welfare gain from left-wing policies, as shown in row 9 of Table 2 in the main text. The utility paths for all of these scenarios are shown in Figure 26.

5.4 Effect of sub-periods on welfare

To illustrate further the asynchronous effects of the policy cycle, we construct an index which measures the asynchrony of the effects of policies. In any given period, this index counts with a positive weight the number of TFPs and distortions that affect welfare positively (TFPs are

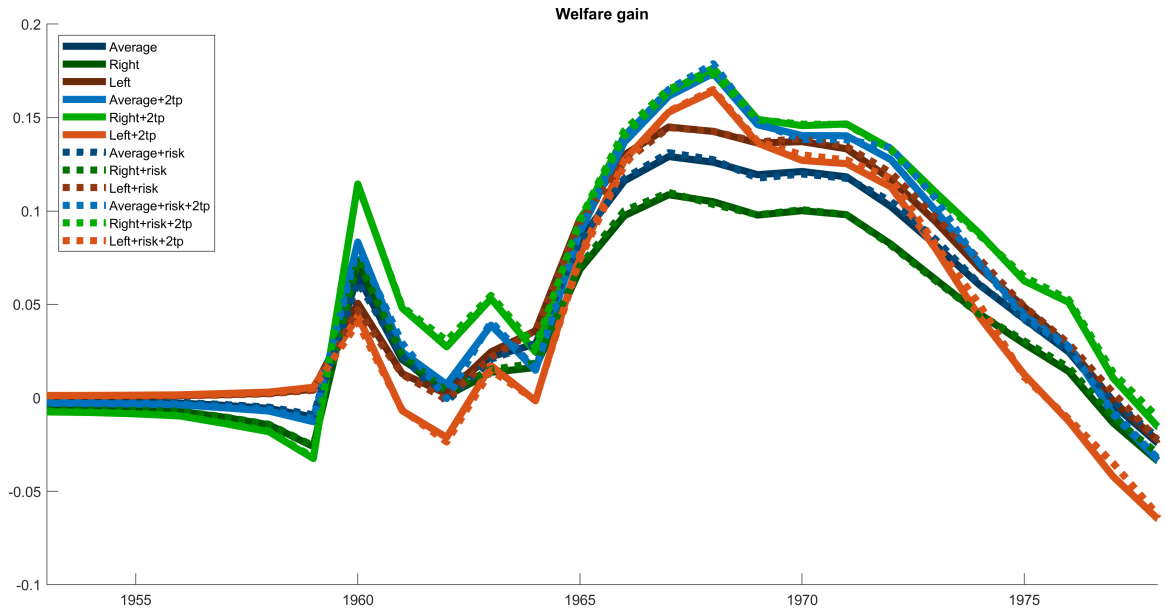

Figure 26: Effects on welfare of risky policy regimes and heterogeneity

above average, distortions are below average), and counts them with a negative weight if they affect welfare negatively. The index can take values between -1, if all four components have negative effects, and +1, if all four have positive effects. In Figure 27 we show the asynchrony indexes for each of the five specifications, as well as their average. The asynchrony index is not materially different from zero for most periods, except two subperiods: 1964-67 and 1969-70. These years correspond to relatively benign periods in China's history when the economy recovered from the Great Leap and then from the disturbances of the Cultural Revolution. To see the welfare effects of asynchrony in these periods, for each specification, we compute counterfactuals in which TFPs and distortions take "average" values in all periods, except these relatively benign subperiods, in which they jump to values calibrated using direct evidence. Remarkably, as shown in the last row of Table 35, the switches only in these subperiods on average account for more than 90 percent of welfare losses from policy fluctuations.

One can notice that in these periods agricultural TFP is reduced, manufacturing TFP is largely unchanged, distortions are increased. Figure 28 shows that in all five specifications the welfare gains from policy stability are completely destroyed by this small change.

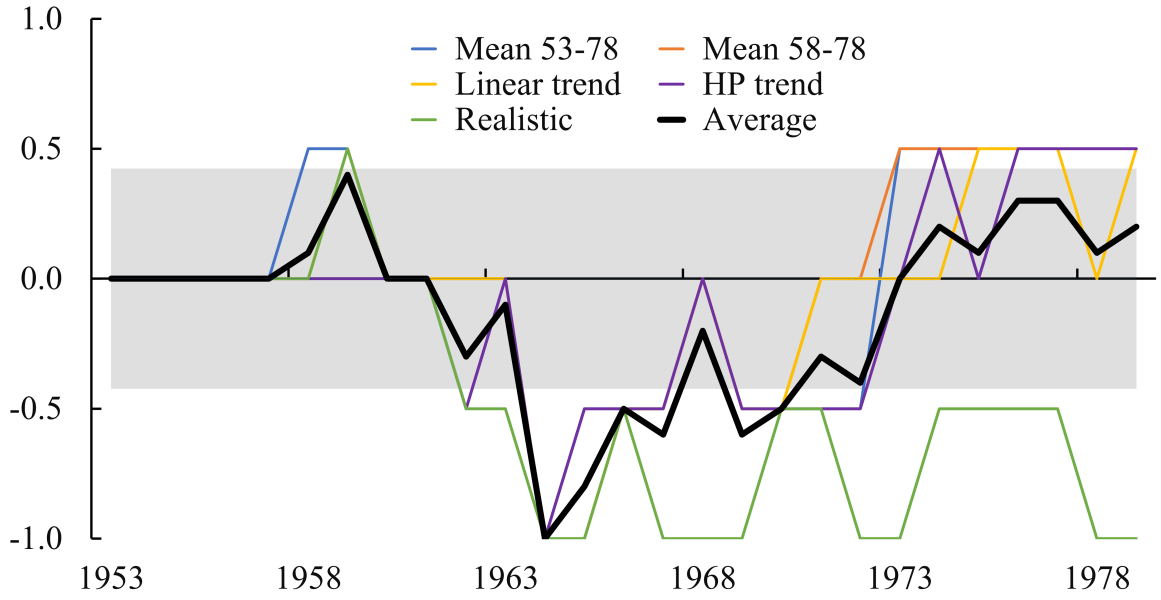

Figure 27: Asynchrony index for China 1953-78.

Notes: Figure plots asynchrony indexes for the period 1953-78. Asynchrony indexes are computed as the sum of contributions from TFPs and components of labor and capital distortions. A contribution of TFP is +1 if it is above average or trend, -1 otherwise. A contribution of a distortion is +1 if it is below average or trend, -1 otherwise. Figure plots the asynchrony index for five simulations with different models of average or trend for TFPs and distortions: 1) mean over the period 1953-78 (blue); 2) mean over the period 1958-78 (orange); 3) linear trend (yellow); 4) Hodrick-Prescott trend (purple); 5) realistic calibration of alternative policies (green). The solid black line shows the average of all five indexes. The grey shaded area shows the confidence band for the hypothesis that the average index is not different from zero. Therefore, sub-periods 1964-67, and 1969-70 are considered as having asynchronous effect.

5.5 Deng's policy package and first-best counterfactual

Here we present in graphical form the simulation of Deng's policy reforms starting in 1958, and a First Best simulation where TFPs follow their respective trends and all distortions are eliminated in 1958. Both simulations produce humongous welfare and GDP gains, speed up industrialization and structural transformation.

5.6 Comparison with the Soviet Union

The Soviet Union embarked on a modernization experiment in 1928 and China followed suit under Soviet guidance in 1957. We can compare the paths of TFPs and distortions using data from Cheremukhin et. al. (2017). In Figure 30 we overlay the TFPs and distortions of the Soviet Union rescaling 1928 values to match values for China for 1957. Both the production and consumption component were reduced quite noticeably through introduction of communes/collectives and procurement of grain. Both countries heavily redistributed resources

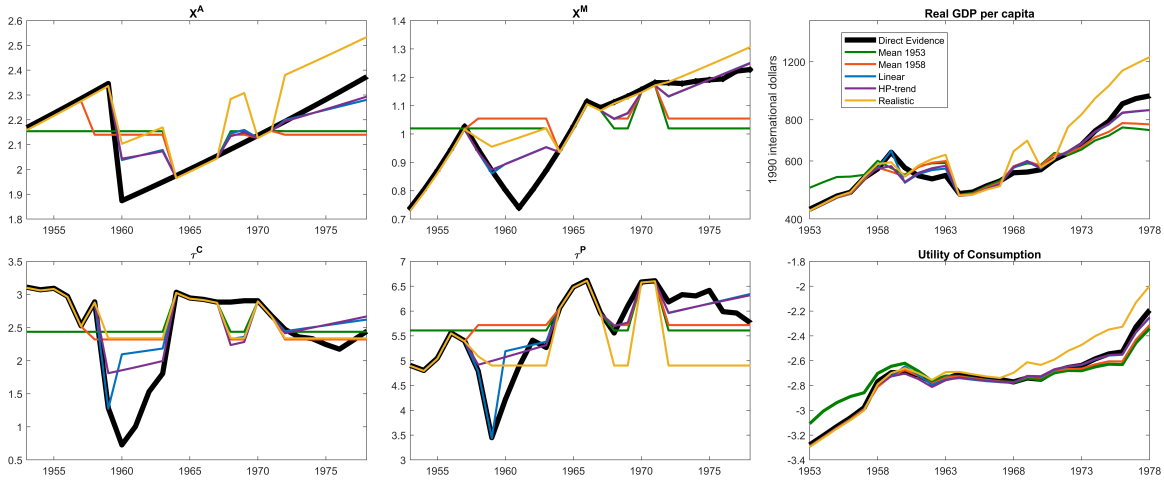

Figure 28: Simulations with switches in select sub-periods

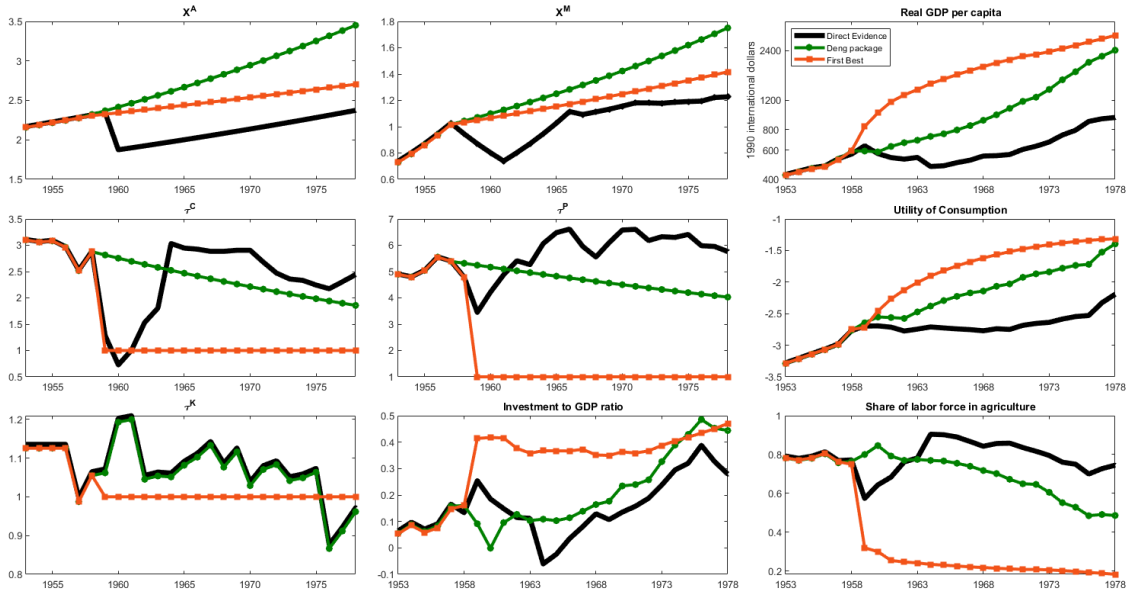

Figure 29: Simulations of Deng's policy package and First Best policies

towards manufacturing sector and focused investment in heavy industry which is reflect in the capital and investment distortions. As a consequence of this reorganization and stress, productivity fell in both agriculture and manufacturing in both countries. There are also noticeable differences. Agricultural TFP declined much more in China, while manufacturing sector in China performed relatively well compared with its Soviet counterpart. However, the biggest difference can be seen in the production component of the labor distortion: procurement in China was curtailed very quickly, while in the Soviet Union it remained and in addition soft budget constraints were introduced which kept the production component low forever. This accounts for most of the differences in the outcomes.

In Figure 31 we compare the results of a simulation where Soviet distortions are applied to China. As many of the policies employed by China were quite similar to those in the USSR, the paths of the economies also follow similar paths: GDP growth slows down at the peak of the policies, investment receives a large boost, a large number of people are moved from rural to urban areas and switch from agriculture to manufacturing sector. However, while large structural transformation occurs and stays in place in the Soviet Union, it is quickly and fully reversed in China, where by 1963 all of the peasants essentially move back to the countryside. This is the result of the reversal of policies affecting the production component of the labor distortion. This difference is closely related with the political development cycle that we study in this paper. For political reasons (namely that China's Communist party is primarily a party of the peasants, while Soviet Communist party is primarily the party of the workers) Mao's hands were essentially tied after the disaster of the Great Leap Forward. He had to reverse the policies of the GLF in order to retain power, and could only implement smaller left-wing policy changes such as during the Cultural revolution.

6 Sensitivity analysis

Our first main result is that in cases of stable left-wing policies, stable right-wing policies, or average of the two, GDP would have increased, agricultural labor share would have declined and welfare would have improved. The second main result is that these large effects are driven by asynchronous policy fluctuations amplifying negative effects in particular subperiods. In Table 34 we present these results all together and show their joint sensitivity to all the assumptions we made, regarding parameterization, calibration, data sources, and assumptions about

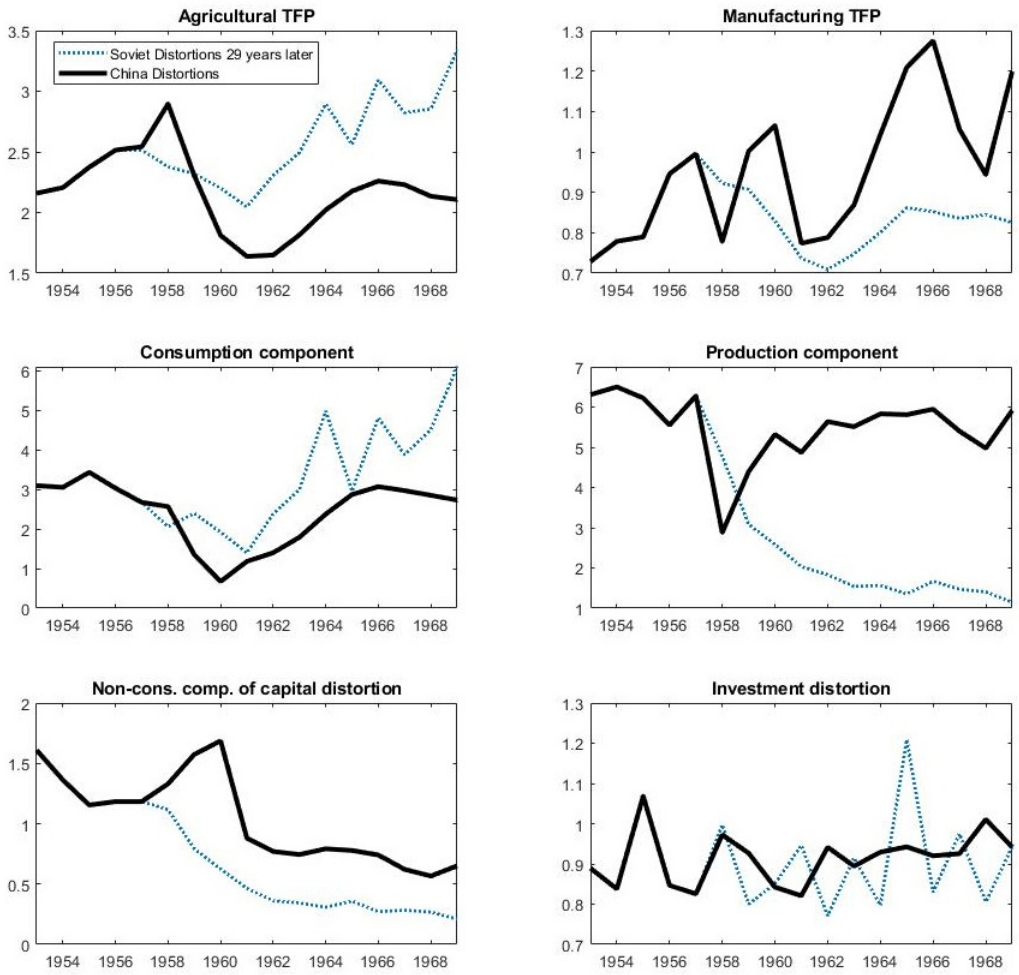

Figure 30: China vs Soviet TFPs and distortions, renormalized with a 29 year lag

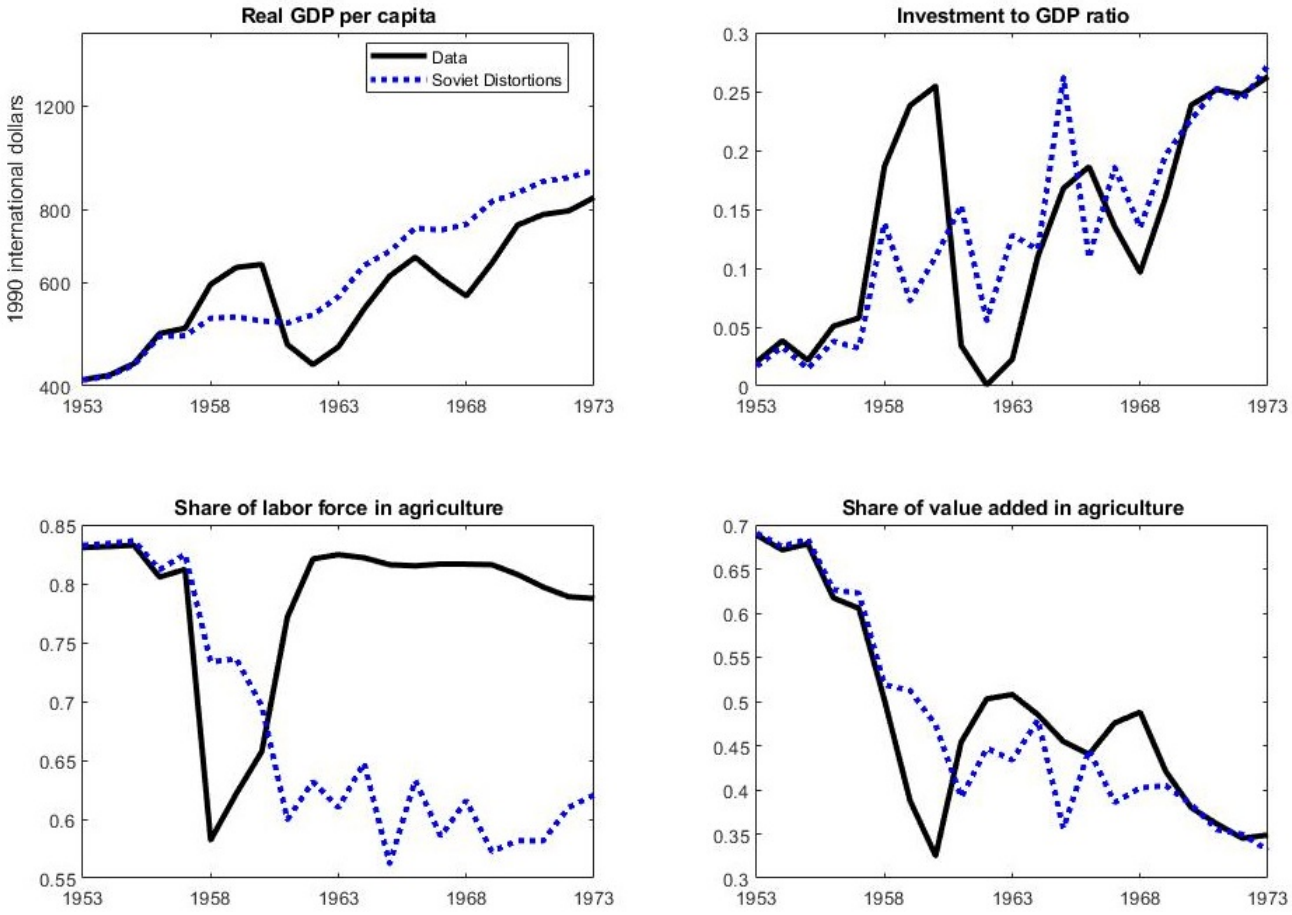

Figure 31: China vs Soviet TFPs and distortions, renormalized with a 29 year lag

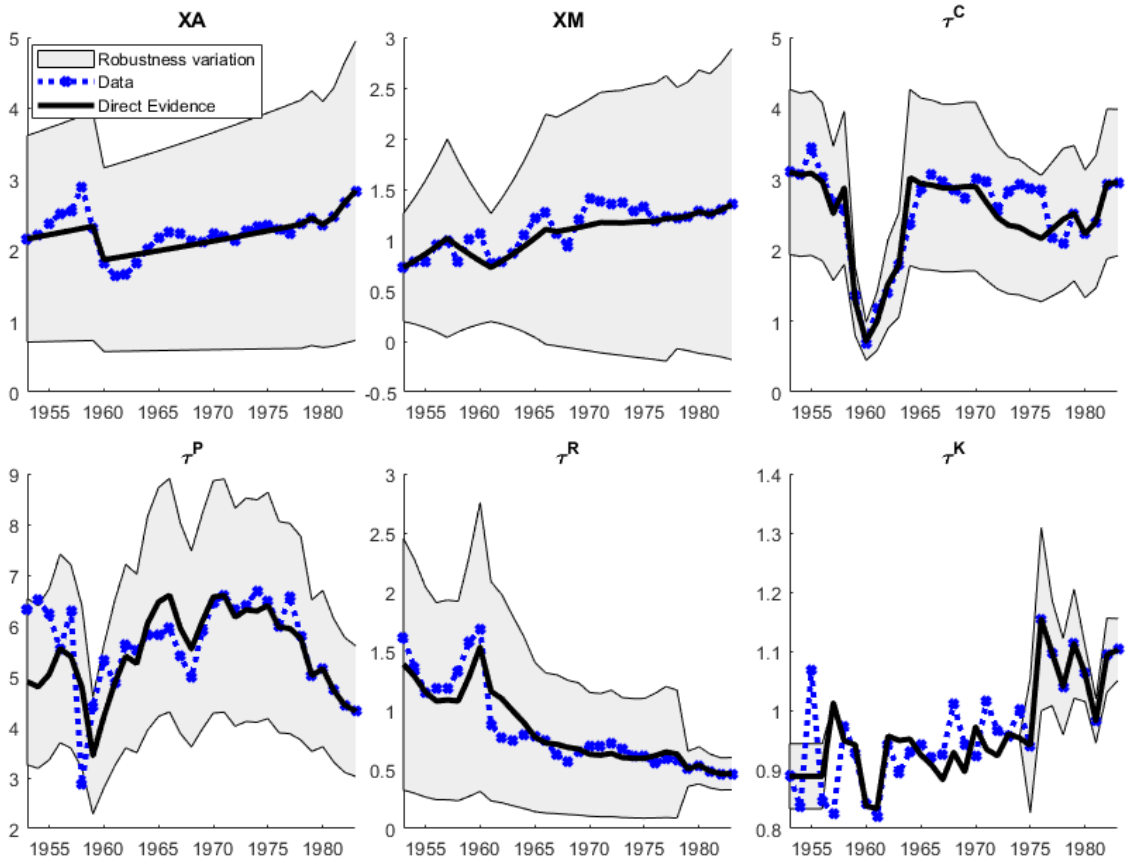

Figure 32: Uncertainty over TFPs and distortions.

counterfactuals. Tables 36-39 we show sensitivity of other results, as well as Tables 2 and 4 from the main text to overall uncertainty with respect to paremeters, calibration, data and other judgement calls. Resulting uncertainty over TFPs and distortions, as well as aggregate series is shown in Figures 32 and 33.

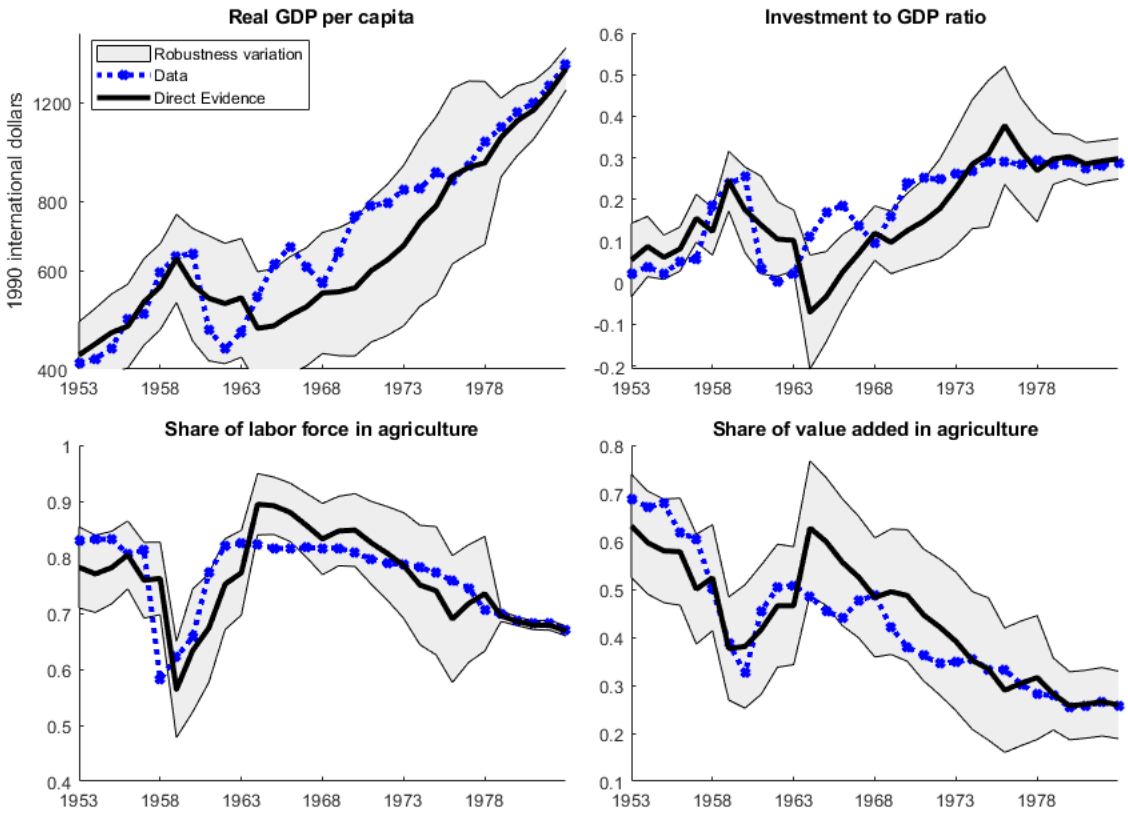

Figure 33: Uncertainty over aggregate series.

	Mean	Mean 58-78	Linear	HP Trend	Realistic
GDP gain left-wing	0.4	3.1	9.2	11	25
	(7.2)	(6.0)	(5.3)	(5.8)	(10)
GDP gain right-wing	15	16	11	12	28
	(3.4)	(3.0)	(2.5)	(2.3)	(8.4)
GDP gain average	8.8	10	9.9	11	27
	(3.4)	(2.2)	(3.0)	(3.2)	(8.6)
GDP effect of subperiods	6.1	7.7	7.8	8.8	19
	(3.0)	(2.2)	(2.4)	(2.6)	(6.1)
Ag. labor share change left-wing	-7.0	-7.3	-6.8	-7.5	-15
	(1.8)	(1.6)	(1.3)	(1.4)	(3.7)
Ag. labor share change right-wing	-2.5	-2.6	-1.7	-2.1	-5.5
	(1.1)	(0.6)	(0.7)	(0.6)	(3.3)
Ag. labor share change average	-4.7	-4.9	-4.1	-4.5	-9.7
	(1.1)	(0.7)	(0.6)	(0.7)	(3.4)
Ag. labor share effect of subperiods	-2.3	-2.6	-2.5	-2.8	-5.3
	(0.6)	(0.3)	(0.3)	(0.4)	(1.8)
Welfare gain left-wing	0.9	-1.2	5.3	6.4	132
	(3.0)	(1.8)	(1.9)	(2.2)	(5.0)
Welfare gain right-wing	11	7.1	4.0	3.4	16
	(7.5)	(6.6)	(3.1)	(3.2)	(7.0)
Welfare gain average	7.2	4.0	4.9	5.1	15
	(3.8)	(3.2)	(1.4)	(1.3)	(5.3)
Welfare gain effect of subperiods	7.1	5.0	4.8	5.4	8.9
	(1.1)	(0.9)	(1.2)	(1.3)	(2.5)

Table 36: Sensitivity of main results

	parameters	calibration	data	cnt-fct	all	gain
Manufacturing TFP	74	11	6.1	0	76	-
Agricultural TFP	47	4.8	13	0	50	-
Consumption component	39	26	14	0	49	-
Production component	84	53	12	0	97	-
GDP	6.0	8.6	5.8	0	13	-
Agricultural labor share	1.8	2.8	1.5	0	3.9	-
Welfare	7.0	10	16	0	20	-
GDP left-wing	5.1	4.7	2.5	5.6	9.6	27
GDP right-wing	3.3	5.5	2.3	0	7.5	27
GDP Deng	4.3	4.9	3.4	0	7.9	75
Ag. labor share left-wing	1.0	2.5	0.6	2.2	3.4	-13
Ag. labor share right-wing	1.0	2.4	0.7	0	2.9	-2.8
Ag. labor share Deng	1.4	2.0	1.0	0	2.8	-20
Welfare 1975 left-wing	4.6	5.0	2.0	6.4	10.0	29
Welfare 1975 right-wing	4.4	6.3	1.9	0	8.5	30
Welfare 1975 Deng	5.2	5.5	2.7	0	8.6	81

Table 37: Sensitivity of other results to main assumptions (log points).

	Mean	Mean 58-78	Linear	HP Trend	Realistic
Ag. TFP	1.0	2.0	2.6	2.5	5.8
	(0.6)	(0.6)	(0.8)	(0.7)	(1.7)
Man. TFP	10.6	8.7	2.6	2.7	8.4
	(3.1)	(2.5)	(0.7)	(0.7)	(1.4)
Consumption	-0.3	-2.1	-1.1	0.0	-3.0
	(1.2)	(0.8)	(0.7)	(0.7)	(3.6)
Production	-2.1	-1.4	1.3	0.4	4.4
	(1.6)	(0.9)	(0.4)	(0.4)	(3.3)
Capital	-0.4	-1.0	0.1	0.0	0.8
	(0.3)	(0.3)	(0.2)	(0.1)	(0.4)
Average	7.7	4.3	4.9	5.0	15.0
	(3.8)	(3.2)	(1.4)	(1.3)	(5.3)
Right	11.9	7.6	3.8	3.2	15.9
	(7.5)	(6.6)	(3.1)	(3.2)	(7.0)
Left	1.3	-1.0	5.5	6.4	12.6
	(3.0)	(1.8)	(1.9)	(2.2)	(5.0)
Synchronous	8.5	2.7	4.6	5.3	14.7
	(4.8)	(2.6)	(1.3)	(1.2)	(5.1)
Asynchronous	1.9	0.5	1.4	2.5	2.5
	(1.8)	(2.7)	(1.2)	(1.2)	(4.3)
Select sub-periods	0.3	-0.9	-0.1	-0.5	6.1
	(4.1)	(3.7)	(1.6)	(1.7)	(3.5)
Difference	7.4	5.2	4.9	5.5	8.9
	(1.1)	(0.9)	(1.2)	(1.3)	(2.5)

Table 38: Welfare costs of fluctuations: Sensitivity to overall uncertainty

	Left	Right	Deng 1958	First Best
Ag. TFP	0	9.3	14.6	6.5
	-	(3.5)	(3.6)	(1.9)
Man. TFP	-0.2	14.8	22.6	10.3
	(1.0)	(3.5)	(4.1)	(2.1)
Consumption	4.2	-8.6	-3.8	11.0
	(4.3)	(6.5)	(3.6)	(3.3)
Production	7.3	0.7	4.9	23.9
	(6.0)	(3.0)	(2.6)	(4.6)
Mobility	0	0	0	8.3
	-	-	-	(0.6)
Capital	1.1	0	0	0.5
	(1.1)	-	-	(1.9)
Investment	0	0	0	6.9
	-	-	-	(1.1)
Total	12.3	16.3	38.2	67.2
	(8.4)	(7.1)	(6.7)	(8.7)

Table 39: Decomposition of welfare gains from alternative policies: Sensitivity to overall uncertainty

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