THE POLITICAL DEVELOPMENT CYCLE: THE RIGHT AND THE LEFT IN PEOPLE'S REPUBLIC OF CHINA FROM 1953

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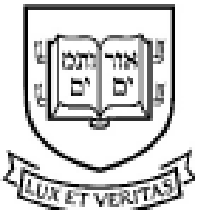

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The Political Development Cycle:

the Right and the Left in People's Republic of China from 1953*

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Abstract

We quantify the effects of the political development cycle – the fluctuations between the left (Maoist) and the right (pragmatist) development policies – on growth and structural transformation of China in 1953-1978. The left policies prioritized structural transformation towards non-agricultural production and consumption at the cost of agricultural development. The right policies prioritized agricultural consumption through slower structural transformation. The imperfect implementation of these policies led to large welfare costs of the political development cycle in a distorted economy undergoing a structural change.

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1 Introduction

The political business cycle, the concept introduced by Nordhaus (1975) and expanded, among many others, by Rogoff (1990), Alesina et al. (1997) and Drazen (2000), is one of the classical topics in economics and in political science. Shifts in policies when parties or politicians are elected or replaced constitute an important source of business cycle fluctuations in an economy. In this paper, we argue that the political development cycle – fluctuations of political power of policymakers who have differing approaches to economic development – may significantly affect growth and structural transformation of an economy.

We study the Chinese economy from 1953, three years after the founding of the People's Republic of China, to 1978, the start of the reform period.[1] The scholars of China (for example, Skinner and Winckler (1969), Cheng (1982, Chapter 2; p. 38, 51) and Eckstein (1977, p. 62-63)) have argued that one of the defining features of the policies during that period was a pronounced political cycle within which there were substantial changes in development policies. These fluctuations were driven by shifts between left-wing (Maoist) and right-wing (pragmatist) economic policies. We provide direct empirical evidence for these policies and quantify the effects of the political development cycle in a dynamic general equilibrium model of the Chinese economy.

First, we estimate the extent to which the right-wing and left-wing development policies differed and show that this difference was quantitatively significant. Left-wing policies prioritized structural transformation towards non-agricultural production and consumption at the cost of agricultural development and resulted in lower overall frictions but also lower TFP. Right-wing policies prioritized agricultural consumption over structural transformation and resulted in higher TFP but also higher overall frictions. Second, we show that implementation of either the idealized left-wing or the idealized right-wing policies would result in a sizable welfare and GDP gain. Third, we find that

[1] Our analysis takes as an initial point the year of 1953 when the systematic collection of detailed economic statistics started.

the implementation of these policies in practice led to periods with both low TFP and high distortions that accounted for the bulk of welfare losses.

Overall, the political development cycle in China had substantially larger effects than those typically found for the more muted political business cycles in developed economies. For example, Drazen (2000) concludes that there are clear partisan and electoral cycle effects on economic activity in the U.S. that lead to welfare losses smaller in magnitude than overall effects of business cycles, which in turn are estimated on the order of 0.2 percent of GDP. By contrast, the welfare costs of the political development cycle that we estimate are on the order of 5-10 percent of GDP.

We analyze a two-sector (agricultural and non-agricultural) neoclassical model with distortions or misallocations. Following Restuccia and Rogerson (2017) and Restuccia (2019), we proceed with the direct approach to causes and consequences of misallocation. The essence of this approach is to measure the specific policies or institutions that may be sources of misallocations and TFP differences and assess their consequences within a quantitative model. We thus build on the historical, political science, and economic history literature to directly identify important development policies, empirically measure the distortions that these policies create, and then quantify the effects of these policies within a macroeconomic model. An important challenge for the literature on the direct approach to misallocation that Restuccia and Rogerson (2017) and Restuccia (2019) identify is that the literature has not generally been able to show that a relatively small set of factors can account for a quantitatively sizable part of distortions and TFP behavior. One important contribution of our paper is to show that one key mechanism – the political development cycle – and several salient policies that are identified by the scholars of China and that we directly empirically measure make important quantitative contributions to growth and structural transformation.

We start by constructing a comprehensive dataset that allows the application of the neoclassical macroeconomic model of growth and structural change to study this period of Chinese development. We provide consistent data series for sectoral output,

capital and labor, wages, deflators, and relative prices as well as defense spending and international trade variables.

We then quantify a set of policies that the scholars of China identified as central to economic performance in that period. For each policy we describe a model which allows us to link a theoretical distortion in the model to a specific measurable quantity related to that policy. We provide quantitative micro evidence for each of the policies and use this direct evidence to construct a calibrated path for each distortion in the quantitative model. Thus, we construct a calibrated economy where only the distortions and the TFP effects linked to estimated policies play a role, and other fluctuations in distortions and TFPs are absent.

Based on the historical evidence, we view the policy debate between right-wing and left-wing policymakers through the lens of four questions: 1) How much resources to divert from consumption to investment? 2) In which proportions to sacrifice agricultural and non-agricultural consumption? 3) Which type of capital to build up? 4) How to organize production and incentivize workers and peasants? Each question was answered by specific policies, enacted, and sometimes altered later, which we calibrate based on quantitative direct evidence.

A useful way to summarize the effects of a calibrated policy is by considering the distortions it introduces and the effects it has on the sectoral TFPs in an otherwise standard neoclassical two-sector model. First, the policy of diverting resources resulted in a general scarcity of consumption goods and produced the investment distortion. Both wings of the policy debate agreed on the need to industrialize as fast as possible. Second, the policies of rationing and procurement of agricultural goods pursued by the left wing disproportionately sacrificed agricultural consumption that resulted in distorted allocations of labor across sectors. Third, the policy of prioritizing construction and heavy industry pursued by the right wing resulted in a distorted allocation of capital across sectors. Fourth, the left wing pushed for collective production and centralized control, while the right wing argued for some decentralization and a focus on material

incentives. Finally, we model and calibrate a number of salient policies that affected the sectoral TFPs, such as incentives, communes, self-sufficiency, centralization, and the Third Front initiative. Overall, the differences in the priorities coupled with the shifts in power resulted in the political development cycle driven by the left-wing and the right-wing policy packages.

We then use a dynamic general equilibrium model of growth and structural transformation with the directly estimated policies to evaluate the effects of the policy development cycle. As a benchmark, we evaluate the economy if only the idealized right-wing or only the idealized left-wing policy package was implemented. The difference is that the left-wing policy path prioritizes structural transformation towards non-agricultural production and consumption at the cost of agricultural development while the right-wing policy path prioritizes agricultural consumption through slower structural transformation. Both idealized policies achieve increases in investment, GDP and welfare starting from 1970. The left-wing package achieves larger structural transformation at the short-term cost of GDP and welfare in the 1958-1965 period. While the idealized left-wing policies somewhat surpass the idealized right-wing policies in terms of welfare, this finding is reversed when considering income disparities and, especially, the welfare effects at incomes closer to subsistence. We show that each of these idealized paths significantly outperforms the actual path of the economy. A similar conclusion is reached if the idealized right-wing and left-wing policies fluctuate with switches driven by the historical periodization. We then argue that the actual implementation of right-wing and left-wing policies differed substantially from their idealized versions. In an idealized economy, effects of policies on TFPs and distortions tend to affect the economy in opposite directions, partially balancing each other. In practice, implemented policies affected TFPs and distortions asynchronously, and resulted in a number of periods with the double burden of both low TFP and high distortions. We show that this imperfect implementation of policies accounts for a large part of the welfare losses.

Although our primary focus is on the pre-1978 period, we also provide a concise

analysis of the post-1978 reform period. We infer that the main reforms promoted by Deng and subsequent leaders were to bolster TFP growth combined with policies that led to gradual reduction in production and consumption components of the labor distortion. We conduct a counterfactual exercise highlighting how the economy could have evolved if the post-1978 reforms were implemented in 1958. We find that Deng's policy package substantially outperforms not only the baseline but both the right-wing and the left-wing policy packages in terms of GDP, welfare, and structural transformation. Nevertheless, even Deng's policy package falls far short compared with an immediate removal of all distortions.

Related literature Restuccia and Rogerson (2017) and Restuccia (2019) identify two main related approaches – the indirect and direct approach. The indirect approach follows influential studies of Restuccia and Rogerson (2008) and Hsieh and Klenow (2009) and aims to identify the extent and the effects of misallocation without identifying the underlying source of the misallocation. We follow the direct approach which analyzes the effects of a specific mechanism, the policy development cycle. Restuccia and Rogerson (2017) argue that, even taken together, the effects from the studies using the direct approach are small compared to the indirect effects. On the contrary, we show that the political development cycle leads to quantitatively large effects comparable to those identified by the indirect approach.

We are aware of only one strand of papers dedicated to model-based macroeconomic analysis of the 1953-1978 period by Chow (1985, 1993) and Chow and Li (2002) whose work mainly focuses on data issues, but none takes a comprehensive macroeconomic view as we do in this paper. We build instead on the body of literature by the scholars of China who uncovered a broad variety of historical, institutional, policy, and political effects on the economy in the pre-reform and reform periods. These include Eckstein (1977), Lardy (1983), Naughton (1986, 1987, 1988), and Lyons (1987), among many others. Our paper fills an important gap by quantifying a number of salient policies studied in this literature in a modern macroeconomic model of growth and structural

transformation.

There is a large body of macroeconomic research on China's economy in the post-1978 period with only limited macroeconomic analysis of the pre-reform period. On the macro side, prominent existing models of China's economy during and after the reforms include the landmark book edited by Brandt and Rawski (2008), a quantitative analysis of China's post-1978 structural transformation and sectoral growth accounting by Brandt, Hsieh, and Zhu (2008), Brandt and Zhu (2010), and Dekle and Vandenbroucke (2010, 2012), growth accounting by Young (2003) and Zhu (2012), a model of growing like China of Song, Storesletten, and Zilibotti (2011), a model of transformation of the state-owned firms by Hsieh and Song (2015), a study of misallocation in India and China by Hsieh and Klenow (2009), a study of growth and inflation measurement by Nakamura, Steinsson, and Liu (2016), and a Mandarin model of growth of Xiong (2018).

2 Data

We acknowledge that there is a large range of uncertainty about the data and concerns about its reliability (Sinha (1975), Rawski (2001) and Maddison and Wu (2008)). The data issue is most acute during the period of the Great Leap Forward when the statistical collection and analysis were significantly disrupted (see discussions in Rawski (1976) and Holz (2014a)). At the same time, the data is not necessarily unreliable. Holz (2003) argues for the satisfactory quality of the data and cites the findings of a number of key Chinese economic data experts. A similar conclusion is reached by Chow (2006) who at the same time recommends to exercise caution working with the official data.

Our two main sources of data on China national accounts are the yearly "China Statistical Yearbooks" (CSY) and the "60 Years of New China" (60Y). The second source aggregates data from previous publications for the years 1949-2009 and is also closely related to a book on pre-1996 statistics compiled by Hsueh and Li (1999), "China's national income 1952-1995" (HL). We use nominal value added by sector and the growth

rate of real value added by sector to construct indices of real value added in the agricultural (primary) sector and the non-agricultural (secondary and tertiary) sector in 1978 prices. The same sources allow us to estimate the relative prices of agricultural goods to non-agricultural goods by taking the ratio of price deflators in the two sectors. The price deflator in each sector is computed as the ratio of nominal to real value added in that sector. The ratio of price deflators equals 1 in 1978 by construction. We use gross fixed capital formation in current prices which serves as our measure of nominal investment. We convert investment (as well as other components of GDP) from nominal to real values using the GDP deflator. 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. We eliminate the influence of this issue on the calibrated levels of the capital and labor distortions by augmenting our estimates with data on non-agricultural consumption expenditure from CSY, Table 2.19. Data on non-agricultural consumption for the 1952-74 period is converted to 1978 yuan using the non-agricultural value added deflator, and investment is computed as the residual for the same period. We discuss alternative data sources and the reasons behind this choice in the online appendix.

We use Holz (2006), Tables 19 and 20 on pages 159-161, as our main source for the aggregate and sectoral capital stock. 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 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, with two minor differences: Holz computes capital in constant 2000 prices and uses a variable depreciation rate which ranges between 3 and 5 percent.

We also use data from Holz (2006) to divide the aggregate capital stock into capital used in the agricultural and non-agricultural sectors. This sectoral division of capital stock is only available for 1978. For earlier years, we use the data on sectoral investment

from Chow (1993) to estimate the composition of capital stock by sector. 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 estimate sectoral capital stock for 1953-1978. We allocate the total real capital stock in 1978 prices by sector using the relative proportions implied by Chow's data. We have also constructed data on the sectoral capital stocks using provincial data; the results are consistent with our main series. Another alternative series is farm capital from Tang (1984), which we discuss together with provincial data in the online appendix.

For labor input, we use data on population, employment and its composition from the two primary sources (60Y, CSY). We adjust the employment numbers prior to 1990 using the procedure proposed by Holz (2006), Appendix 13, page 236. The correction addresses the reclassification of employed workers that was made by the NBS in 1990.

For data on wages by sector we use average wages for staff and workers in the agricultural and non-agricultural sectors. The pre-1978 data come from CSY for year 1981. One issue with these data is that the wages of staff and workers may not be the same as labor remuneration for workers. Staff and workers are concentrated in non-agriculture, and to the extent that they are in agriculture, they are likely to be in state farms.[2] We address this concern by computing the ratio of labor remuneration in non-agriculture to agriculture from Bai and Qian (2010). We find that the ratio of two series behaves similarly for the overlapping time period.

Our primary source of data on sectoral price indexes is the CSY. We use sectoral value added deflators obtained earlier when computing real value added by sector. We consider an alternative source of data on relative prices, Young (2003), in our sensitivity analysis.

The data on defense spending comes from HL and CSY which jointly cover the 1952-1995 period and report nominal defense spending in yuan. We obtain an estimate of real defense spending in 1978 prices multiplying the share of defense in GDP by real GDP.

[2]See, for example, Holz (2014b) for detailed data.

The main source for data on sectoral exports and imports is Fukao, Kiyota, and Yue (2006). Fukao et al. report data on China's exports and imports by commodity at the SITC-R 2-digit level for 1952-1964 and for 1981, obtained from the "China's Long-Term International Trade Statistics" database. Using data from Fukao et al. (2006), 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 1965-1978 period, to our knowledge, there is no available data on trade by sector as the economy was essentially closed to foreign trade. We linearly interpolate the ratios of net export to value added by sector for this intermediate period.

We convert real GDP per capita in 1978 prices to 1990 international dollars using Maddison's estimates implying 785 dollars of 1990 per person for the year 1978. We then apply real GDP growth rates (at constant 1978 prices) to construct real GDP per capita in international dollars for other years in the 1952-2012 period.

We now summarize the data. In 1950, China was a poor, heavily agricultural country. The Chinese economy in 1953-1978 grew rapidly, as shown in Figure 1, with a 5.6 percent average rate of growth of real GDP (3.6 percent per capita). Agricultural value added grew at 2.1 percent while manufacturing value added grew at 9.0 percent per year. PRC's economy industrialized considerably, as investment's share of GDP grew from 5 percent in 1953 to nearly 30 percent in the late 1970s. However, the economy did not experience structural transformation. In 1953, the primary occupation for 83 percent of the working-age Chinese population was agriculture. This fraction declined very slowly (with the exception of the brief period during the GLF when about 20 percent of the labor force temporarily moved from agriculture to manufacturing) and the ensuing Agriculture First policy that reversed the flow, remaining above 80 percent until 1970 and declining to 75 percent in 1977. The role of agriculture in GDP declined much faster, with 68 percent of value added produced in agriculture in 1953 and only 30 percent in

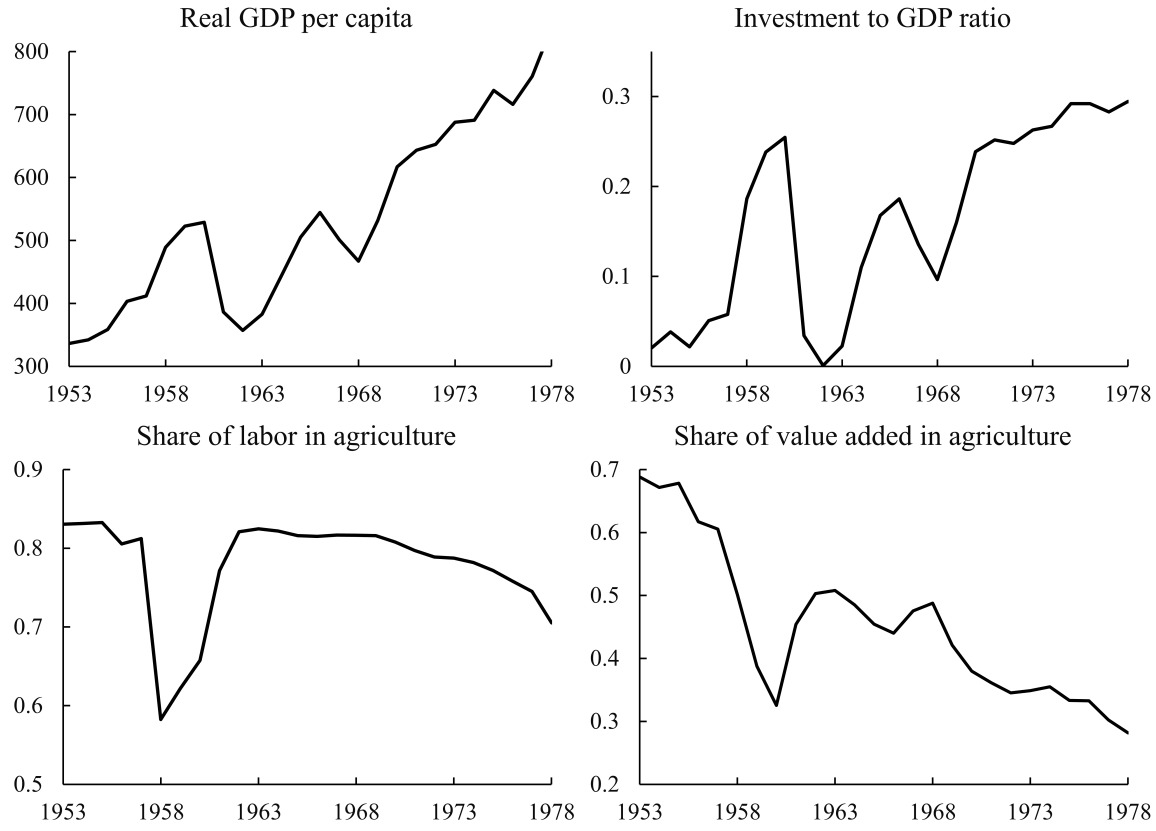

Figure 1: Macroeconomic indicators of People's Republic of China, 1953-78

Notes: Top left panel plots real GDP per capita in 1990 international PPP dollars. Top right panel plots the ratio of investment to GDP. Bottom left panel plots the share of labor force in the agricultural sector. Bottom right panel plots the share of value added in agriculture. All plots show annual data for the period from 1953 to 1978.

1977 (with a similarly brief downward shift during the GLF). International trade was insignificant – China's net export of agricultural production was only 3 percent prior to the GLF and declined to zero after 1960.[3] The imports of non-agricultural goods constituted an even smaller fraction of non-agricultural value added in the same period. Defense spending was a large component of manufacturing production accounting for 6 percent of GDP.

[3]Chinn (1981) points to growing "calorie arbitrage" in 1961-1976 when China exported rice and imported wheat gaining net positive calories with zero net agricultural exports. However, Chinn's estimates suggest that even by the end of this period, the calorie arbitrage was only in the range of 0.2 percent of China's GDP.

3 Model

3.1 Two-sector neoclassical model

We consider a standard two-sector (agricultural (A) and non-agricultural (M)) neoclassical model.[4] The preferences are given by:

$$\sum_{t=0}^{\infty} \beta^t U\left(C_t^A, C_t^M\right),$$

where

$$U\left(C_t^A, C_t^M\right) = \left[\eta^{\frac{1}{\sigma}} \left(C_t^A - \gamma^A\right)^{\frac{\sigma-1}{\sigma}} + (1-\eta)^{\frac{1}{\sigma}} \left(C_t^M\right)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}},$$

C_t^A and C_t^M are per capita consumption of agricultural and non-agricultural goods; $\gamma^A \geq 0$ is the subsistence level of consumption of agricultural goods; η is the long-run share of agricultural expenditure in consumption. The discount factor is $\beta \in (0,1)$, and σ is the elasticity of substitution between the two consumption goods. Each agent is endowed with one unit of labor services that he supplies inelastically.

Output in sector $i \in \{A, M\}$ is given by: $Y_t^i = F_t^i\left(K_t^i, N_t^i\right) = X_t^i \left(K_t^i\right)^{\alpha_{K,i}} \left(N_t^i\right)^{\alpha_{N,i}}$, where X_t^i, K_t^i, and N_t^i are, respectively, total factor productivity, capital stock, and labor in sector i. The capital and labor shares $\alpha_{K,i}$ and $\alpha_{N,i}$ satisfy $\alpha_{K,i} + \alpha_{N,i} \leq 1$. Land is available in fixed supply, and its share in production in sector i is $1 - \alpha_{K,i} - \alpha_{N,i}$. We denote by $F_{K,t}^i$ and $F_{N,t}^i$ the derivatives of F_t^i with respect to K_t^i and N_t^i.

The total population in period t is denoted by N_t, and is exogenous. The feasibility constraint for labor is $N_t^A + N_t^M = \chi_t N_t$, where χ_t is an exogenously given fraction of working age population. New capital I_t can be produced only in the non-agricultural sector. The aggregate capital stock satisfies the law of motion $K_{t+1} = I_t + (1-\delta) K_t$, where δ is the depreciation rate. Denoting by K_t^A and K_t^M the capital stock in agriculture and manufacturing, the feasibility condition for intersectoral capital allocation is $K_t^A +$

[4] This setting is in line with the models of structural change of Caselli and Coleman (2001), Kongsamut, Rebelo and Xie (2001), Stokey (2001), Ngai and Pissarides (2007), Hayashi and Prescott (2008), Acemoglu and Guerreri (2008), Buera and Kaboski (2009, 2012), Herrendorf, Rogerson and Valentinyi (2014), and Cheremukhin et al. (2017).

$K_t^M = K_t$. Net exports of agricultural and manufacturing goods, E_t^M and E_t^A, and government expenditures on manufacturing goods, G_t^M, are exogenous. The feasibility conditions in the two sectors are $N_t C_t^A + E_t^A = Y_t^A$, and $N_t C_t^M + I_t + G_t^M + E_t^M = Y_t^M$.

The efficient allocations in this economy satisfy three first order conditions: the intra-temporal labor allocation condition across sectors:

$$1 = \frac{U_{M,t}}{U_{A,t}} \frac{F_{N,t}^M}{F_{N,t}^A}, \tag{1}$$

the intra-temporal capital allocation condition across sectors:

$$1 = \frac{U_{M,t}}{U_{A,t}} \frac{F_{K,t}^M}{F_{K,t}^A}, \tag{2}$$

and the inter-temporal condition:

$$1 = \left(1 + F_{K,t+1}^M - \delta\right) \beta \frac{U_{M,t+1}}{U_{M,t}}, \tag{3}$$

where $U_{i,t}$ is the marginal utility with respect to consumption of good i in period t.

Consistent with the literature (e.g., Hayashi and Prescott (2008)), we set the shares of capital and labor in the non-agricultural sector to $\alpha_{K,M} = 0.3$ and $\alpha_{N,M} = 0.7$. We set the shares of capital and labor in the agricultural sector to $\alpha_{K,A} = 0.14$ and $\alpha_{N,A} = 0.55$.

For our baseline preference parameters σ, η, and γ_A we choose the values at the higher ends of the ranges used in the literature; lower values would make our results stronger. In particular, for our baseline preference specification we chose a commonly used Stone-Geary specification which sets $\sigma = 1$. Parameter η measures the long run share of agricultural consumption and we set it to 0.15. We set the subsistence level to 54 yuan per capita per year in 1978 prices. We estimate this number using the purchase price of 0.172 yuan per kg of unhulled rice in 1957 (Swamy 1969, Table 5), convert it to 1978 prices using the state list price index (Zhang and Zhao 2000, Table 7) to arrive at the 215 kg of rice per year. This corresponds to the 1587 kcal average

daily rural per capita energy intake, the lowest in 1952-1978 period (Ash 2006, Table 6). This subsistence level accounts for 53 percent of agricultural consumption per capita in 1953. We discuss in the appendix how our main results change in response to alternative calibrations of the subsistence parameter, as well as other parameters. We choose the initial capital stock to match the observed level of capital in 1952. The discount factor β is set to 0.96 and depreciation rate δ is set to 0.05, consistent with the annual frequency of the data. Finally, for χ_t, the paths of both the population and the labor force are assumed to change exogenously as in the data.

3.2 Calibrating and quantifying policies

In this section, we provide detailed modeling and quantification of the most salient right-wing and left-wing policies. We start with the main features of the policies that are identified by the historical, political science, and economics literature on China. We then provide models that formalize these features, link the policies to a specific measurable quantity in the model and then provide direct evidence for that measure.

A useful way to organize the description of the policies is to focus on the distortions or the wedges that they introduce in the first order conditions (1)-(3) of the baseline model. In contrast to the wedge accounting methodology (Chari, Kehoe and McGrattan (2007), Cole and Ohanian (2004), Cheremukhin et. al. (2017)), we do not seek to back out wedges from the data and thus to match or account for the data fully. Instead, we directly empirically estimate several salient polices and show how they result in the corresponding distortions.

We introduce three distortions $\tau_{W,t}$, $\tau_{R,t}$, and $\tau_{K,t}$ as the right-hand sides of expressions (1), (2), and (3). We also study components of the distortions. Let $p_{i,t}$ and $w_{i,t}$ denote the prices of goods and wages in a competitive equilibrium. The right-hand side of the intra-temporal optimality condition for labor (1) can be re-written as a product of three terms, to which we refer as *consumption*, *production,* and *labor mobility*

components:

$$\frac{U_{M,t}}{U_{A,t}}\frac{F^M_{N,t}}{F^A_{N,t}} = \underbrace{\frac{U_{M,t}/p_{M,t}}{U_{A,t}/p_{A,t}}}_{\text{consumption component}} \times \underbrace{\frac{p_{M,t}F^M_{N,t}/w_{M,t}}{p_{A,t}F^A_{N,t}/w_{A,t}}}_{\text{production component}} \times \underbrace{\frac{w_{M,t}}{w_{A,t}}}_{\text{labor mobility component}}. \tag{4}$$

In the competitive equilibrium decentralizing the efficient allocation, all three components are equal to one. In the distorted competitive equilibrium the deviation of each term from one represents the friction in the respective market. The first, consumption component is the friction in the optimality condition of consumers. The second, production component is the friction in the optimality condition of competitive, price-taking firms. The third, mobility component measures frictions in labor allocation between sectors, conditional on the relative wages. An analogous decomposition can be done for the intersectoral capital distortion (2). As there is no reliable data on interest rates in each sector, we decompose the intratemporal capital distortion only in two components, *consumption* and *non-consumption components*.

$$\frac{U_{M,t}}{U_{A,t}}\frac{F^M_{K,t}}{F^A_{K,t}} = \underbrace{\frac{U_{M,t}/p_{M,t}}{U_{A,t}/p_{A,t}}}_{\text{consumption component}} \times \underbrace{\frac{p_{M,t}F^M_{K,t}}{p_{A,t}F^A_{K,t}}}_{\text{non-consumption component}}.$$

Note that the consumption component is common for the labor and capital distortions. We now directly calibrate policies and their corresponding distortions.

Rationing and goods shortages: Consumption component of the capital and labor distortions

The Chinese economy featured a number of important distortions that affected consumption choices. Prices for most of the goods were set by the state, many goods were rationed, and shortages were widespread. In the online appendix we describe a simple model of consumer choice given prices set by the government where consumers are subject to goods rationing. This model shows that the consumption distortion $\frac{U'_A/p_A}{U'_M/p_M}$ can be

measured using the ratio of the prices on the free market to the state-set prices $\frac{p^A_{fm}/p_A}{p^M_{fm}/p_M}$ thus measuring the shadow cost of rationing. For this logic to apply, it is important that the allowed trades on the free market are sufficiently small or that trading imposes some additional costs. If, on the contrary, the consumer can purchase freely additional goods on the free market, then there is no additional distortion.

We do not have information on the free markets of manufacturing goods, but we do have the information on the price of the free markets of agricultural goods (and on the ratio of the free market price to the state list price). Thus, we can find the portion of the consumption component change that can be accounted for by the change in the ratio of the free market price to the list price.[5] When 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 it is available 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. The ratio $\frac{p^a_{fm}}{p_a}$ is 1.32 in 1952, increases dramatically to 4.13 in 1961,[6] falls to 1.36 in 1964 and rises to 1.69 in 1978. With regard to the number of the transactions on the free markets, there are two sources of data. First, Zhang and Zhao (2000, Table 5) report the 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. 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. Both are consistent with aggregate data on sectoral consumption. According to both sources, the share of goods transacted at official prices varies in the 90-95 percent range. The second method for providing evidence for the change in the degree of shortage is using the data by Niu et al. (1991, Table 7 in

[5]The fact that we capture a large part of the observed overall variation in the distortion with only data on agriculture suggests that rationing of manufacturing goods was a less important source of distortion.

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

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, a broad comparison of the trends is still useful. We convert these estimates to find the "real value" of agricultural goods as percentage of the list price that parallels the discussion 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.

Since both of these proxies are only indexes capturing the change in the consumption component of the distortion over time, we need to use the aggregate data to infer the absolute level of this component in some base year T_0. Thus, we can construct two proxy series for the direct calibration of the consumption component as $\tau_t^c = \tau_{T_0}^c \left(\frac{p_{fm,T_0}^A}{p_{A,T_0}}\right)\left(\frac{p_{fm,t}^A}{p_{A,t}}\right)^{-1}$. We link both proxies to the absolute level of distortion in 1953 and use the first rescaled proxy for the 1953-60 period, and the second series for the 1961-78 (because it matches more closely the 1978 level of the distortion). Both proxies for the consumption component of the distortion show the fall in the distortion during the Great Leap Forward, the recovery during the Agriculture First policy period, and then a gradual subsequent decrease towards 1978.[7]

Procurement and implicit taxes on production: Production component of the labor distortion

The second set of policies that we consider are driven by procurement and other implicit taxes on production. Consider a simple model of an agricultural firm that has only labor as a factor of production and has to deliver a portion τ of the output to the state. The firm's objective is then given by $(1-\tau)\, p^A F^A(N^A) - w^A N^A$ and the first order condition is given by $\frac{p^A F_N^A}{w^A} = \frac{1}{1-\tau}$. Hence, τ is a standard tax on output: when it rises, agriculture becomes less attractive compared to manufacturing and the production component of

[7] A limitation of the representative agent model is that it does not capture that for the Great Leap Forward the subsistence constraints may be violated at least for some portion of the population as evidenced in, for example, Meng, Qian, and Yared (2015).

the labor distortion decreases. Similarly to the previous subsection, we do not have micro data for the manufacturing sector, but we can use the data for agricultural sector to compute the agricultural part of the production component of the labor distortion, $\frac{p_A F_N^A / w_A}{p_M F_N^M / w_M}$.[8] We use two methods to proxy for this distortion.

Lardy (1983, p. 18-20 and Lardy 1983b) argues that procurement of agricultural products by the state was an implicit tax on agriculture and a major instrument of the policy cycle. Similarly, Li and Yang (2005) show empirically that excessive procurement was second only to diversion of resources from agriculture in explaining the collapse of the agricultural output during the Great Leap Forward. We use state procurement of agricultural goods to proxy for the degree of such implicit tax. Specifically, we use data from Ash (2006, Table 3) and Li and Yang (2005, Table 1) to measure the distortion as one minus the ratio of gross procurement of grain to rural grain supply. As the second method, we use the results from Imai (2000, Table 3) who measures price and wage distortions associated with implicit taxation of labor in the non-agricultural sector. Using this method, measuring the ratio of terms of trade under the assumption of zero implicit tax and the actual terms of trade is equivalent to measuring the production component of the labor distortion.

We combine the two methods to calibrate the production component of the labor distortion in the model. As in the previous subsection, both series are indexes capturing the change in the production component over time, so we use the aggregate data in a base year to calibrate the absolute level of this component. We use base year 1956 for the estimate from Ash (2006) covering the early part of the sample, and 1978 for the estimate from Imai (2000) covering the later part of the sample, and switch from the first estimate to the second in 1964. The resulting calibrated series show the dramatic drop in the production component during the Great Leap Forward and the increase in this component in the subsequent period.

[8] Note that we modeled the tax as proportional to output. Evidence from Meng et al (2015) points that at least some of the procurement was conducted in a lump-sum way. While a lump-sum tax would not result in any distortion, the interaction of it with some other production constraints such as a financial constraint creates a potentially similar distortion.

Mobility restrictions: Mobility component of the labor distortion

The third set of policies we are interested in are the policies that affected the allocation of labor across sectors by affecting the mobility of labor across sectors. The mobility component of the labor distortion is constructed as simply the ratio of wages in the non-agricultural and agricultural sectors. There are three types of historical evidence that points to factors behind the movement in relative wages. First, there were changes in the *hukou* system of registration of urban and rural populations and restrictions on their movement. Second, there were changes in the return to educational capital. Lower returns to education manifest themselves in the lower non-agricultural wage and a lower mobility distortion.[9] Finally, there were policies aimed directly at relocating workers, such as the massive forced resettlement of the urban population to the countryside in 1961-62 (Lardy 1987b, p. 387) or sending about 18 million urban youth to villages during Cultural Revolution and their gradual recall back to the cities (Wu 1994). We use the wage ratio as our proxy for the labor mobility distortion.[10]

Sectoral investment prioritization: Non-consumption component of the capital distortion

The fourth set of important policies affected the allocation of capital across sectors by favoring or disfavoring capital allocation in agriculture. These policies result in the non-consumption component of the capital distortion and we proxy them using the data on state investment in agricultural infrastructure construction (Sheng (1993a, Table 6.4) and Zhang and Zhao (2000, Table 9)). Sheng (1993a, p. 120, p. 132) describes this variable as a "value indicator of capital construction". As the first component of our direct measure, we use agricultural infrastructure construction spending as a share of non-agricultural value added. To evaluate the effect of infrastructure spending on the

[9] Cheng and Selden (1994) provide a detailed account of the origins of this system and Chan and Zhang (1999) a comprehensive history of the *hukou* system. Fleisher and Wang (2005) discuss the determinants of the wage gap.

[10] These data have their limitations since wages were not set competitively, and some of the remuneration was in non-monetary form, with a portion of it including returns on land and investment. The only other source of data that we are aware of is Bai and Qian (2010), which implies a very similar path of relative wages for the overlapping post-1978 period.

non-consumption component of the capital distortion we need to compute the rate of return to capital in agriculture. To do this, we use the perpetual inventory method to construct a proxy for agricultural capital assuming that all the investment comes from infrastructure construction only. We then construct the rate of return to agricultural capital as the production elasticity times the ratio of value added to capital. The proxy for the capital distortion is then the ratio of returns to non-agricultural capital (fixed at its 1953 value) and the rate of return to agricultural capital coming from infrastructure spending.

The proxy we use is consistent with the historical evidence that the economic policies in terms of capital allocation prioritized the industrial sector as shown, for example, in the classification of the evolution of China's development strategies by Cheng who ranks the sectoral priorities (1982, Table 9.3). It is interesting to note the increase in the non-consumption component of the capital distortion during the Great Leap Forward. This can be accounted for by the policy of "walking on two legs" in which the high capital intensity industry was developed alongside the small-scale, labor intensive plants such as backyard furnaces (Eckstein 1977, p. 124). "Agriculture First" strategy most significantly increased chemical fertilizer production, electricity allocation, and the production of small agricultural implements (Eckstein, 1977, p. 60), which can account for the decline of the non-consumption component of the capital distortion. An additional element was the development of the "Third Front", a massive construction program in the inland provinces of the entire industrial base that would not be vulnerable to attacks by the Soviets or Americans (see Naughton 1988).

Investment prioritization: Investment distortion

The fifth set of policies are those that affected investment accumulation. We construct a proxy for these policies for 1953-1973 based on direct evidence from Naughton (1986). In this work, he analyzes the theory of investment cycles in China, under which local governments find it easier to push for high investment during the periods of abundance

of consumer goods than during the periods of shortages and argues that it can quantitatively and empirically account for the behavior of investment.

Naughton (1986) creates two indices that capture the degree of such shortages. The first index is based on a unique dataset, available only for China and not for any other centrally planned economies. After the leadership change in 1978, the Chinese economists were encouraged to criticize economic policy under Mao; as a part of this campaign the data on the difference between the supply of consumer goods and consumers' purchasing power and resulting shortages were released. We use this "general scarcity indicator" index from Table III-2, Column 4 in Naughton (1986).[11]

The second index is based on the consumers' asset holding using income and saving data to measure excess money holdings of the population, whereas the consumers choose to hold higher money balances as opposed to savings during the time of shortages consistent with the model of search for scarce consumer goods. We thus use the monetary shift index Table III-2, Column 5 in Naughton (1986). These two indices show significant similarity when properly rescaled.

We take the average of the two indices to quantify the investment distortion introduced by the policies of investment prioritization. The direct evidence starts in 1956 and ends in 1974 as Naughton (1986) argues post 1973 these indicators start to lose their connection with the investment distortion. For the remaining dates we use the measure of distortion derived from the aggregate data. We calibrate the distortion for the 1953-56 period to the average value derived from the aggregate data. For the 1975-78 period, we use the values derived from the aggregate data. The investment distortion declined substantially in 1976, which may capture expectations of future changes in policies leading to economic reforms and a growth spurt following the death of Mao. We found it important to capture this decline in the investment distortion to meet the terminal conditions of our calibrated simulation.

[11] While both this indicator and the ratio of the free market prices relate to shortages they are different. The former measures the degree of the overall shortage and hence the implicit forced savings – the components relevant to the intertemporal distortion. The latter measures the degree of relative shortage of agricultural to manufacturing goods.

Policies affecting agricultural TFP

Most of the economic policies during that period of China's history affected sectoral TFP. In this section we quantify the effects of the most salient policies of the political development cycle on the sectoral TFPs. The models that we employ for calibrating TFP include a model of material incentives, a model of commune size, a model of self-sufficiency, and a model of regional misallocation. We detail these models in the online appendix and describe their main theoretical insights below. We then convert these theoretical approaches into quantitative measures of productivity changes related to specific policies. In order to do that, we briefly discuss historical narratives describing the forces which led to the most drastic changes in TFP and then describe how we calibrate the paths of TFP based on this evidence as well as additional sector-specific evidence.

The First Five-Year Plan (1952-57) was "an unusually successful program of economic development" (Lardy 1987a, p. 157). Several facts point to the growth of TFP in agriculture during this period. First, the process of collectivization in China preserved to an important extent individual incentives (Kung and Putterman (1997)). Second, more efficient methods of agricultural production were implemented (Nolan (1976), Naughton 2007, Chapter 11). Third, the collectivization led to consolidation in the land plots that led to an improvement in agricultural productivity (Spence 2013, p. 491).

During the Great Leap Forward (1958-1962), TFP in both agriculture and manufacturing fell dramatically. One important overall factor that affected TFP in both agriculture and non-agriculture was the worsening of incentives (Naughton 2007, p. 69; Lardy 1987b, p. 365). In particular, Li and Yang (2005) argue that the most important causal factors in the collapse of agricultural output between 1958 and 1961 were the diversion of resources from agriculture and excessive procurement of grain. In a large range of models of incentives, the effort that an agent provides and its productivity moves together with the size of the rewards such as the share of the output it retains (Martimort and Laffont, 2009). The second main factor was that productivity fell due

to poor management of agriculture under the commune system (Lin 1990, Donnithorne 1987, Chapter 2, Cheng 1982, p.267). The model of communes is the classical moral hazard in teams problem (Holmstrom 1982), where an increase in the size of the team (commune) weakens incentives and thus TFP.

Another important factor was regional self-reliance which intensified significantly after "the famine of 1959-61 demonstrated to government officials as well as to leaders of collective farms that dependence upon outside suppliers can have disastrous consequences" (Lyons (1987), p. 250). 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 Cultural Revolution further obstructed regional specialization.

To evaluate the effects of self-sufficiency policies, we use a classic Heckscher-Ohlin model of inter-regional trade. This model identifies two key parameters that affect the losses from the policy: the specialization slope and the production elasticity. We 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 (following the idea of Lardy (1983), Table 2.3). Using data for 1979-84 from Crook (1988) we compute the cotton and grain yields for 29 provinces. Based on the increase in cotton yield after the reforms we can identify 15 of them (accounting for just over half of the population and sown area) that substantially increased cotton yields. 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 increased by a factor of 1.79 in the cotton region and declined by a factor of 1.19 in the non-cotton region. The other parameter that affects the losses due to self-sufficiency policies is the production elasticity with respect to factors of production. It can vary from 0.85 (if only

land could not be reallocated between activities) to 0.2 (if labor could not be reallocated either). Thus, these parametrizations give a range of efficiency loss estimates due to self-sufficiency policies from 0.5 percent (average slope change, high factor mobility) to 7.5 percent (maximum slope change, low factor mobility).

However, since the decline in agricultural TFP due to increased commune size and increased regional fragmentation and the subsequent recovery due to reversal of both policies coincided in timing, it is not necessary for us to estimate their effects separately. We follow Bai and Kung (2014) who argue that one can infer policies by measuring the effects of its reversal. We thus can use the estimates of TFP gains over the 1978-84 period due to the reversal of both policies to calibrate the initial drop during the GLF period.

Based on the historical accounts, as well as our estimates based on prototype models, we can infer that agricultural TFP grew in 1952-57, dropped dramatically around 1960 and then remained on a lower trajectory until the post-1978 reforms. We can also infer the size of the drop to be between 30 and 70 percent. For the calibration, we use the conservative estimate of a one-time 30 percent permanent drop in agricultural TFP in 1960. Thus, we assume that starting from its initial 1953 level (inferred from aggregate data), agricultural TFP grew at a constant rate, then dropped 30 percent in 1960, and then continued growing at the same rate of 1.32 percent annually calculated such as to match the aggregate level reached in 1978.

Policies affecting non-agricultural TFP

Now we turn to historical evidence for manufacturing TFP. Several factors played a role in the growth of TFP in non-agriculture during the First Five-Year Plan (1952-57). First, Soviet assistance in terms of transfer of advanced technology and advisors to help operate it played an important role (Lardy 1987a, p. 178; Eckstein 1977, p. 102; Naughton 2007, p. 66; Rawski, 1979, p. 51). Second, the First Five-Year plan model was a technocratic approach with a sound management model that stressed individual

incentives (Eckstein 1977, p. 89-90; Selden 1979, p. 153).

Several facts point to a fall in manufacturing TFP during the GLF period. First, the collapse of agricultural production led to severe shortages of agricultural materials for textile and food-processing industries. Second, many small-scale plants such as backyard steel furnaces were exceptionally inefficient (e.g., Eckstein, 1977, p. 124 and Selden (1979, p. 100) for the estimates of the number of these furnaces). Third, the Sino-Soviet split led to the departure of virtually all Soviet advisors and a large number of capital-goods projects had to be suspended (Eckstein, 1977, p. 203; Selden 1979, p. 97).

However, there was a reversal of the manufacturing TFP fall after 1961 consistent with the general "readjustment and consolidation" policies that refocused industrial production to more specific and high productivity projects (e.g., petrochemicals and fertilizers), and to a revival of material incentives (Eckstein, 1977 p. 126). The 1962-1966 period resulted in a fast recovery (when a "greater reliance was placed on material incentives and rewards as a means of motivating workers in the non-agricultural sectors of the system", Eckstein, 1977, p. 61).

Considerable reliance on material incentives during the "Agriculture First" period resulted in Mao's growing concern that it would result in "economism" and "revisionism". This concern played a major role in his decision to launch the Cultural Revolution, which emphasized the role of nonmaterial incentives and reduced material incentives (Eckstein, 1977, p. 62). Despite the exceptional importance of the events of the Cultural Revolution for the country, the economic implications were much more muted (Perkins 1991, pp. 482-483, Naughton 2007, p. 75). The fall in manufacturing TFP in 1967 and 1968 was relatively minor, and agriculture was affected less than manufacturing.

Two additional policies had a pronounced effect on manufacturing productivity: the centralization-decentralization cycle for state-owned enterprises and the Third Front movement. Lin et. al. (2013) documents that decentralization waves in 1957-63 and in 1970-75 contributed to suppressing productivity in the non-agricultural sector.

The Third Front movement was a massive industrial development in China's interior provinces starting in 1964, involving heavy industry, transportation and infrastructure investments motivated by geo-political considerations. The movement of industrial production away from sources of raw materials, distorted production chains and development of un-useful infrastructure wasted resources, thus reducing overall manufacturing productivity. To evaluate the effects on the "Third Front" policies on non-agricultural productivity, we use a two-region model of misallocation along the lines of Jones (2011) that shows how skewing the allocation of resources across regions worsens overall TFP.

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) 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 (2021) 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. We use these parameters to calibrate the sizes of labor and capital inputs as well as the relative productivities in the two regions to compute the losses due to misallocation.

There are two additional sources of losses that we need to take into account. First, Fan and Zou (2021) estimate that the effect of misallocation of resources on the productivity of plants in the TF area was approximately 20 percent, echoing Naughton's (1988) calculation of the loss in industrial productivity of 10-15 percent. Second, there was massive waste of resources in the process of investment into Third Front projects. We compute the combined loss due to all three and estimate that 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, with the average effect over the period 1964-78 being approximately 3.8 percent. We use these estimates to calibrate a drop in manufacturing

TFP due to Third Front policies.

From these considerations we can infer that manufacturing TFP grew rapidly in 1952-57, declined below trend by approximately 30 percent in 1958-61, recovered back to trend in 1961-66 and then grew slowly until 1978. Given the initial and terminal levels of non-agricultural TFP constructed from aggregate data, we approximate this narrative by assuming an identical growth/decline rate for the 1953-66 period such as to hit the trend level in 1966. From the 1966 trend level, we impose the estimated effects of the Third Front and of decentralization from 1970 onwards, which last all the way to the 1978 terminal level.

Although our measures are on purpose very broad in capturing the aggregate behavior of TFP in this period, we can link the calibrated changes in agricultural TFP to policies regulating centralization of decisions (size of communes) as well as self-sufficiency policies, and changes in non-agricultural TFP to weakness of workers' material incentives and overall disorganization due to implementation of left-wing policies as well as specific policies such as two decentralization waves and the Third Front movement.

Summary of calibration of policies

Our quantification of the sectoral productivities and components of distortions gives us all the exogenous variables necessary to construct a path for China's economy in the pre-reform period.[12] In Figure 2, we plot the paths of the sectoral TFPs and distortions that reflect the most important policies of the political development cycle that we discussed. Accounting wedges that are needed to fully account for the aggregate data are also depicted for reference.

[12]The ratios of sectoral net exports to value added, defense spending to non-agricultural value added, as well as population and labor force growth are all measured directly in our dataset and taken as given in the model.

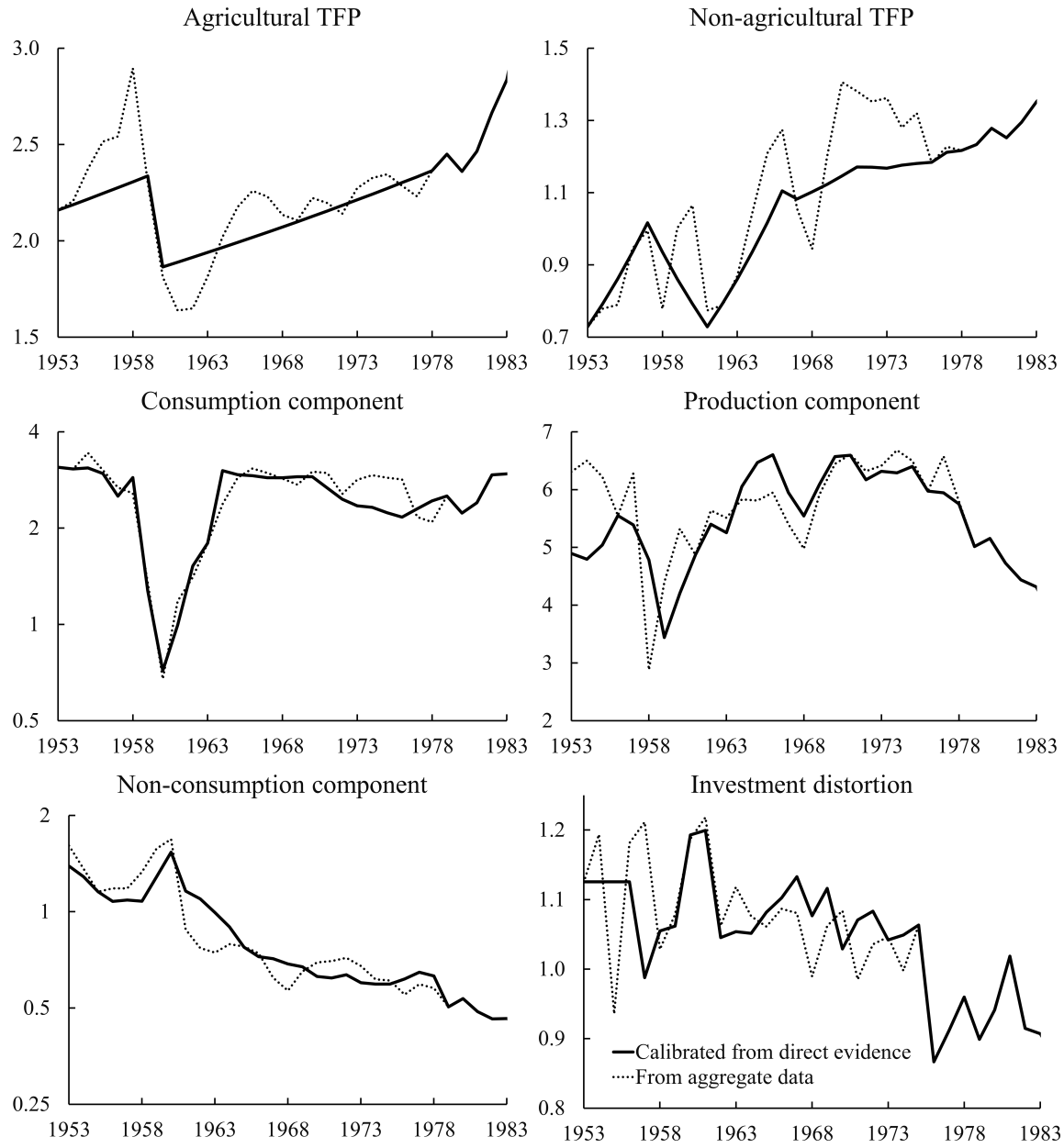

Figure 2: TFPs and distortions calibrated from direct evidence

Notes: Top left panel plots agricultural TFP. Top right panel plots non-agricultural TFP. Middle left panel plots the consumption component common to the labor and capital distortions. The consumption component is shown in logarithmic scale. Middle right panel plots the production component of the labor distortion. The mobility component of the labor distortion is not shown as it is calibrated to be equal to the wage ratio. Bottom left panel plots the non-consumption component of the capital distortion. Higher levels of intersectoral distortions are in favor of the agricultural sector (the marginal value of manufacturing consumption/markup to labor/capital used in manufacturing is higher). Bottom right panel plots the investment distortion. The level of investment distortion above 1 is akin to a tax on capital, the level below 1 represents a subsidy. All plots show annual series for the period 1953-83. In each case, the solid line shows our calibration based on direct evidence for policies and the dotted line shows the series inferred from aggregate data using equations of the model.

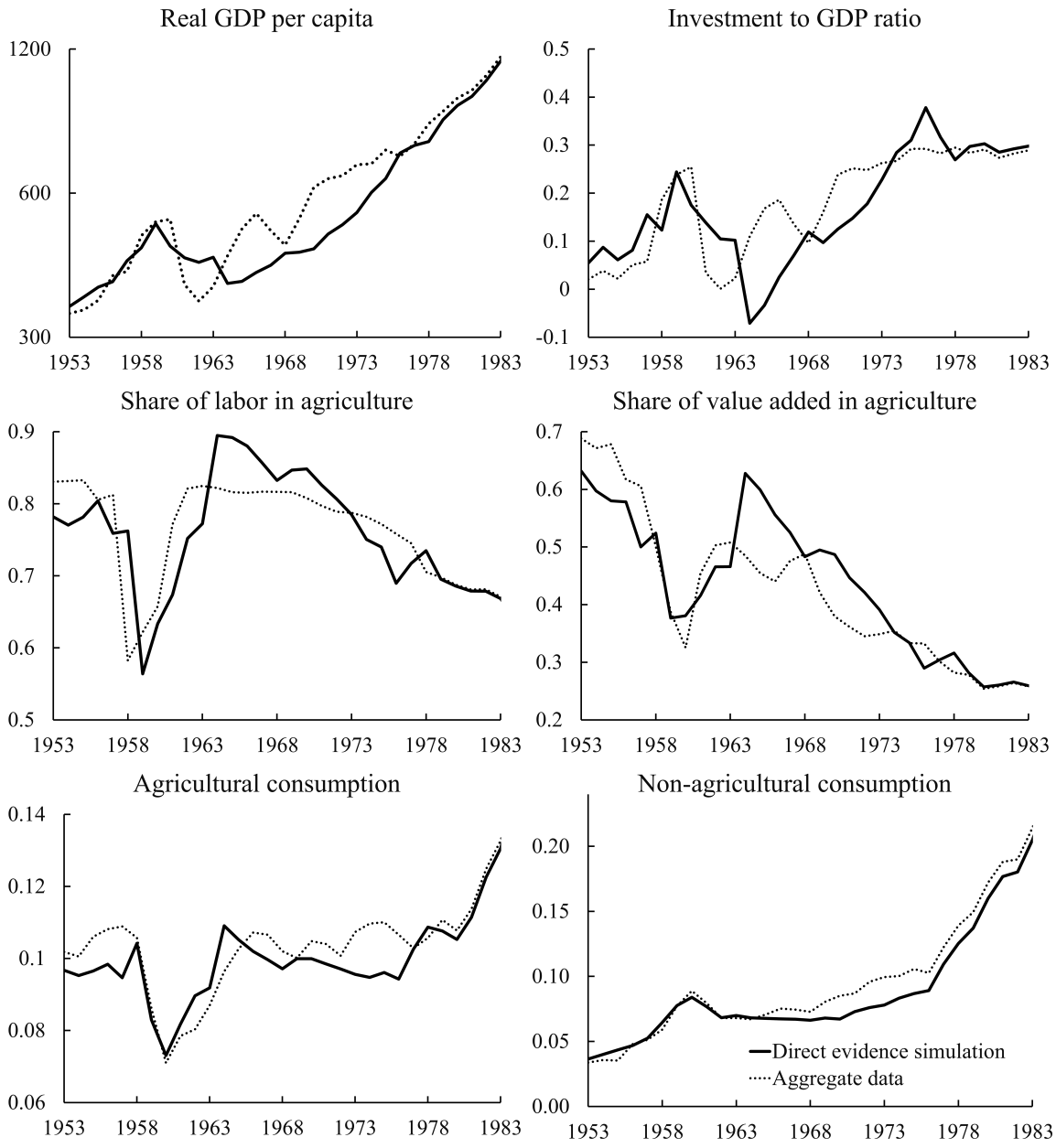

Figure 3: Simulation from direct evidence

Notes: Top left panel plots real GDP per capita in 1990 international PPP dollars. Real GDP per capita is shown in logarithmic scale. Top right panel plots the ratio of investment to GDP. Middle left panel plots the share of labor force in the agricultural sector. Middle right panel plots the share of value added in agriculture. Bottom left panel plots per capita consumption of agricultural goods. Bottom right panel plots per capita consumption of non-agricultural goods. All plots show annual series for the period 1953-83. In each case, the solid line shows the result of the simulation based on our direct evidence calibration of TPFs and distortions and the dotted line shows aggregate data.

4 Analysis of the policy development cycle in the pre-reform period

We now turn to describing the key quantitative driving forces of the policy cycle on growth and structural transformation during the whole pre-reform period and its important subperiods.

4.1 Simulating the effects of policies

In the previous section, we described modeling and quantification of the effects of the most important policies of the political development cycle on the sectoral TFPs and distortions. We now compute the model based on this direct evidence. The paths of simulated GDP, investment, labor share, value-added share, and consumption (compared with aggregate data) are shown in Figure 3.

The simulation correctly captures the main movements in real GDP, investment to GDP ratio, the shares of labor and value added, and consumption in the two sectors. More specifically, the model explains a) the rapid acceleration of economic growth during the First Five Year Plan of 1953-57; b) the industrialization effort manifested by the investment boom and the movement of labor and value added out of the agricultural sector, as well as the corresponding economic decline during the Great Leap Forward of 1958-61; c) the reversal in all the variables during the Agriculture First policy of 1962-66; d) the economic slowdown and movement of value added towards agriculture in the early years of the Cultural Revolution (1967-70); e) the acceleration of economic growth and the shift of labor and capital inputs towards the non-agricultural sector during the premierships of Lin Biao (1970-72) and Deng Xiaoping (1973-75).

4.2 The right-wing and the left-wing policy packages

There is a prominent literature describing shifts between the left-wing and the right-wing policies during Mao's reign and providing the context for the right-left policy development cycle. We summarize this literature in the online appendix and here only discuss periodization 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 a mostly right-wing strategy; the Great Leap Forward (1958-1961) as a left-wing strategy; the retrenchment and recovery period and the Agriculture First policy in the early 1960s (1962-1966)[13] as a right-wing strategy. We classify the period of 1967-1972 as a 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 a right-wing policy under the premiership of Deng Xiaopin (Cheng (1982)). We classify the period of struggle for power 1976-1977 as a 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.[14]

Table 1 shows stark differences between periods of right-wing and left-wing policies regarding the behavior of calibrated distortions and TFP. Generally, left-wing policies led to the reduction of the consumption and production components of the labor distortion, while the sectoral TFPs worsened. The right-wing policies, on the other hand, increased the consumption and production distortions while the TFPs, the non-consumption component of the capital distortion and the investment distortion significantly improved.

The debate that generated the policy cycle can be described as focusing on four main questions. First, how much resources to divert from consumption towards investment? Historical evidence indicates that the goal of industrializing as fast as possible was shared by both right-wing and left-wing policy-makers. The policies to achieve this

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

[14] Our classification is broadly consistent with the textbook treatment of Naughton (2007). See also a book-length study of the cycles in Chinese foreign economic policy (Reardon 2015).

goal focused on diverting as much resources as possible to investment through central planning means. This policy resulted in an overall scarcity of consumption goods and resulted in the investment distortion in the calibrated model.

The second question faced by the policy-makers was what type of consumption to sacrifice, or in which proportions to sacrifice agricultural and non-agricultural consumption. Left-wing policy-makers wanted to sacrifice mainly agricultural consumption, while right-wing policy-makers wanted to sacrifice less of it. The main left-wing policies in this context were rationing and procurement of agricultural goods. In the calibrated model, rationing appears in the consumption component and procurement appears in the production component of the labor distortion.

The third question was what type of capital to build up more. This policy is reflected in the relative importance of construction expenditures and shows up in the non-consumption component of the capital distortion in the calibrated model. The right-wing policymakers wanted to relatively shift resources towards heavy industry compared with the left-wing.

Finally, an important fourth question was how to organize production and incentivize workers and peasants. The left wing of the party wanted collective production and centralized control, while the right wing argued for some decentralization and a focus on material incentives. We have used historical accounts of these policies to calibrate the productivity drop in agriculture associated with the expansion of communes in the country-side, and the swings in non-agricultural TFP around the long-run trend associated with excesses of the Great Leap Forward.

Thus, in our baseline calibrated model, we constructed an economy where only the distortions and sectoral TFPs linked to salient policies, that we empirically estimate and quantify, play a role, and other fluctuations in distortions and TFPs are absent. We therefore identify two policy packages as follows. The left-wing policy package can be summarized as focusing on reducing consumption and production distortions and thus extracting resources from agriculture at the cost of reduced TFP. The right-wing policy

package can be described as focused on fast TFP growth and capital accumulation keeping the barriers to labor allocation in place. We do not include changes in the investment distortion into any of the policy packages because both policy wings were in agreement on the industrialization goal. Our next goal is to quantify the effects of both policy packages and of the policy development cycle.

Table 1: Changes in TFPs and distortions.

	1953-78	Right-wing	Left-wing	Level
Agricultural TFP	9	17	-8	2.1
Non-agricultural TFP	51	76	-25	1.0
Consumption component	-24	83	-107	2.4
Production component	16	41	-24	5.6
Mobilility component	15	0	15	1.4
Non-consumption component	-79	-81	2	0.9
Investment distortion	-16	-18	2	1.06

Notes: This table reports changes in TFPs and components of distortions over period 1953-78. The first column reports overall change from 1953 to 1978. The second column reports the sum of changes over subperiods classified as characterized by right-wing policies. The third column reports the sum of changes over subperiods classified as characterized by left-wing policies. All these changes are reported in log points. For reference, the last column reports average levels of TFPs and distortions for the 1953-78 period. Higher levels of intersectoral distortions are in favor of the agricultural sector (the marginal value of manufacturing consumption/markup to labor/capital used in manufacturing is higher). Note, however, that the absolute levels of intersectoral distortions are affected by calibrated parameters and therefore are less meaningful than changes in distortions. The level of investment distortion above 1 is akin to a tax on capital, the level below 1 represents a subsidy.

4.3 The effects of the right-wing and the left-wing policies

We evaluate the welfare effects of these policy packages, and the fluctuations among them, by constructing and simulating the idealized right-wing and left-wing policies in our model of China's economy. As we established, right-wing policies in general implied higher-than-average TFP in both sectors together with higher-than-average distortions. Left-wing policies, on the contrary, implied lower-than-average TFP together with lower-than-average distortions.[15] Specifically, we calibrate the stylized right-wing and left-wing policies as follows. The right-wing (left-wing) policy package is defined as taking a linear trend path of TFPs and distortions, and then increasing (decreasing) it by its average

[15]We focus on differences in levels here because thinking about different growth rates makes the counterfactual exercises ill-behaved and intractable.

absolute deviation.[16] In the online appendix, we comprehensively describe a number of other possible calibrations for these policies.

We first evaluate the effects on the economy if either the right-wing or left-wing calibrated policies were implemented in every period in 1958-1978.[17] One can view this experiment as answering the question of how the economy would perform if the idealized right-wing or idealized left-wing policies were implemented. Table 2 summarizes the findings. The idealized right- and left-wing polices lead to broadly similar increases in welfare of, respectively, 3.8 and 5.5 percent. While the idealized left-wing policies somewhat outperform the idealized right-wing policies in terms of welfare, we show that this result is reversed when taking into account the effects of risk and income heterogeneity.

We further decompose these welfare gains into the contributions of TFPs and distortions. For the right-wing policies, we find that about sixty percent of the gains from the higher TFP in the agricultural and non-agricultural sector are counterbalanced by the additional welfare costs of the consumption and production distortions. For the left-wing policies, about 20 percent of the gains of lower consumption and production distortions are counterbalanced by the lower non-agricultural and agricultural TFPs. We next evaluate the effect of the political cycle generated by these policies. Specifically, we impose the idealized right-wing policies in the periods identified in the previous section as right-wing and impose left-wing policies in the periods identified as left-wing. The welfare gains of the cycle are 4.6 percent, approximately equal to the average of the right-wing and left-wing policies. These experiments overall estimate the effects of the idealized right-wing and left-wing policies, and the political cycle only determines the timing of the switches of the policy regimes thus representing an idealized policy cycle.

Why was the actual path of the economy much worse than the counterfactual paths

[16] We have also considered separately averaging deviations in left-wing and right-wing policy periods based on the historical periodization, and find very similar results, as shown in the last line of Table 2.

[17] In the online appendix we also calculate paths for the whole period 1953-1978. The reason we start from 1958 as the benchmark is that the 1953-1957 period included a rapid accumulation of capital due to the low initial stock which needs to be additionally controlled for.

Table 2: Welfare costs of left-wing and right-wing policies.

	Right-wing	Left-wing	Cycle	Average	Double burden sub-periods
Agricultural TFP	3.9	-0.2	2.2	2.6	1.6
Non-agricultural TFP	4.9	-1.3	2.2	2.6	3.4
Consumption	-4.6	3.9	-0.9	-1.1	-4.0
Production	-1.0	3.6	1.0	1.3	-0.5
Non-consumption	0.6	-0.6	0.0	0.1	-0.3
Total	3.8	5.5	4.6	4.9	0.1
Total + risk	3.9	5.3		4.8	
Heter. agents	6.6	4.5	5.7	5.8	0.4
Heter. ag. + risk	6.6	4.4		5.9	
Total hist. cycles	3.1	4.5	3.8	3.9	

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. Columns 1 and 2 report welfare gains of consistent right-wing and left-wing policies applied over the period 1958-78. Column 3 reports the welfare effects of cyclical switches between right-wing and left-wing policies based on historical accounts. Column 4 reports the welfare effects the TFPs and distortions computed as average values between right-wing and left-wing policy paths. Column 5 shows welfare gains from a simulation where TFPs and distortions take average values for all periods except select sub-periods with low TFP and high distortions, 1964-67 and 1970-71, where they take values calibrated from direct evidence. Row 6 shows the total welfare gains. Rows 1 through 5 decompose row 6 into the contributions of TFPs and distortions. Rows 7-9 show how the results in row 6 change if we introduce risk (policy fluctuations around each average path) and/or heterogeneous agents (2 types with Gini of inequality 0.3). Row 10 shows the results for policy packages determined by averaging over TFPs and distortions using the historical periodization. The difference between columns 4 and 5 shows the effect of select sub-periods on welfare. All welfare gains are reported in percentage points of consumption.

considered under the idealized policies? We now argue that the actual implementation of the policy packages differed from the idealized packages. In particular, several periods saw simultaneously high distortions (a feature of right-wing policies) and low TFP (a feature of left-wing policies). Specifically, consider two sub-periods 1964-67 and 1970-71. To see the welfare effects of these periods, for both specifications, we compute counterfactuals in which TFPs and distortions take values from the linear trend simulation in all periods after 1958, except these sub-periods, where they jump to values calibrated using direct evidence. The results are shown in the last column of Table 2. Importantly, the switches only in these sub-periods account for essentially all the welfare losses from policy fluctuations compared with a linear trend simulation.[18] When we consider ideal-

[18]In the online appendix, we comprehensively decompose the timing of the implementation of the policies and derive a measure of their asynchronicity that generates such jointly harmful for welfare coincidences of high distortion and low

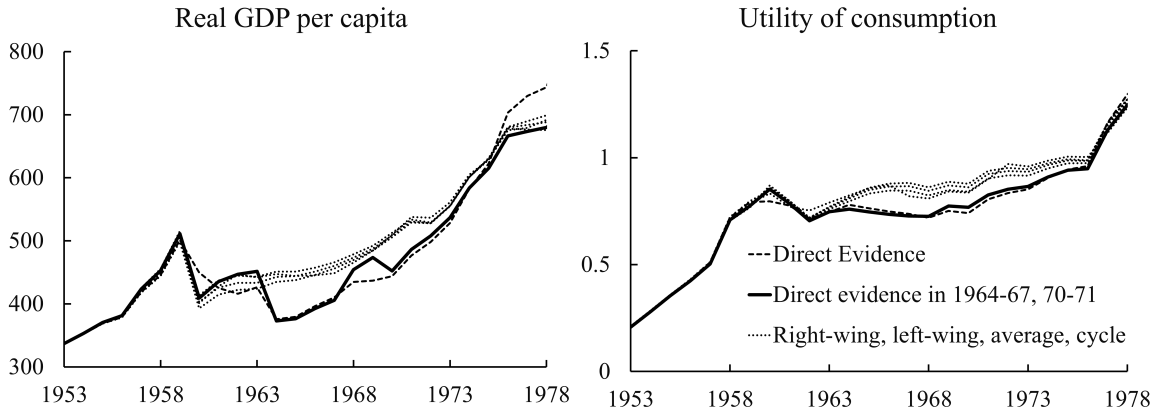

Figure 4: Welfare effects of TFPs and distortions in select sub-periods.

Notes: Left panel plots real GDP per capita in 1990 international dollars. Right panel plots per-period utility of the consumption bundle of the representative consumer. All plots show annual series for the period 1953-78. In each case the dashed line shows our calibration based on direct evidence for policies, the solid line shows the counterfactual where TFPs and distortions deviate from the linear trend towards calibrated values in sub-periods 1964-67 and 1970-71, and the dotted lines show simulations where TFPs and distortions follow linear trends, a consistent right-wing package, a consistent left-wing package and cyclical switches between the two packages based on the historical periodization. We show them all in dotted lines to highlight the similarities in their behavior.

ized right-wing policies, higher TFPs increase welfare but higher distortions decrease it, balancing each other to an important extent. Similarly, when left-wing policies are in effect, the decrease in welfare due to lower TFPs is balanced by the increase in welfare due to lower distortions. When policy shifts are perfectly synchronized across TFPs and distortions, these offsetting effects on welfare can balance each other as it happens under the implementation of the idealized policies. However, if during a switch towards e.g. right-wing policies the implementation is imperfect and there is, for example, a delay between the increase in distortions and the corresponding increase in TFP, then there are periods when both TFPs and distortions simultaneously reduce welfare, rather than counterbalancing each other. Figure 4 demonstrates that indeed the imperfect implementation of policies in the sub-periods that we identified explains the size and timing of GDP and welfare losses relative to a linear trend of TFPs and distortions.[19]

One might wonder why consistent right-wing policies produce a smaller welfare gain than consistent left-wing policies in our baseline results. There are two potentially im-

TFP that justifies the focus on these two periods as well as provide a range of other estimates.

[19]We have also tested if there are periods with high TFPs and low distortions, and found no such periods.

portant factors we abstract from in the baseline. First, the variance of left-wing policies may be larger than that of right-wing policies, which biases the welfare comparison. Second, we are assuming a representative agent, while in an economy with income inequality the poor are much closer to subsistence, more so in the left-wing regime, which can also bias overall welfare comparisons. We correct for each of these biases, separately and in combination, in the bottom rows of Table 2. To correct for policy variability, we average over 100 simulations each drawing random sequences of TFPs and distortions that preserve their means, distributions and cross-correlations as in the baseline. To account for income inequality and the corresponding heterogeneity in consumption, we assume that there are two types of equal population size with a fourfold difference in income, which approximates the actual amount of inequality consistent with a Gini coefficient of 0.3 observed in China in the 1970s (see Xie and Zhou (2014)). 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. We find that the effect of policy risk brings the welfare estimates for the right-wing and left-wing regimes closer to each other, although the effect of risk is small. The effect of heterogeneity, on the other hand, is substantially amplified closer to subsistence. Accounting for the combined effects of risk and consumption heterogeneity essentially reverses the welfare comparison, implying a 6.6% welfare gain from right-wing policies and a 4.4% welfare gain from left-wing policies, as shown in the last row of Table 2.

To summarize, we find that each of the idealized paths - with only right-wing policies, only left-wing policies, the average of the two, and the cyclical fluctuations between the two - is significantly better, both in terms of welfare and GDP growth, than the baseline simulated path of the economy. A left-wing policy path prioritizes structural transformation towards non-agricultural production and consumption at the cost of agricultural development, while a right-wing policy path prioritizes agricultural consumption through slower structural transformation. Both alternative paths achieve similar increases in in-

vestment, GDP, and welfare. We establish that the reason for large welfare losses in the calibrated baseline path is the imperfect implementation of policies which had an asynchronous effect on TFPs and distortions where the economy experienced a double burden of low TFP and high distortions. Finally, while idealized left-wing policies somewhat surpass the idealized right-wing policies in terms of welfare, this finding is reversed when considering income disparities and, especially, the welfare effects at incomes closer to subsistence.

5 Analysis of the post-1978 reforms

While the focus of our paper is on the pre-1978 period, this section provides an overview of the 1978-2012 period. We refer the reader to the working paper of Cheremukhin et al. (2015) for the comprehensive treatment of this period with the detailed description of the data, references to historical evidence, discussion of the policies, and a number of other calculations. The primary area on which we focus in this section is the comparison of the effects of pre-reform policies with those implemented during the reforms. More broadly, the joint analysis of the pre-1978 and post-1978 periods allows us to provide continuity of the treatment of both periods and relate to recent work on the long and persistent effects of history such as Nunn (2008) and Dell (2010).

For perspective, in Table 3 we use aggregate data to compare the changes in TFPs and distortions for four subperiods: Mao 1957-77, Deng 1977-89, Jiang 1989-2002, and Hu 2002-2012. We can infer from Table 3 that the main reforms promoted by Deng and subsequent leaders were fast TFP growth combined with a gradual reduction in production and consumption components of the labor distortion. In other words, these policies led to changes that resembled the best results of both the right-wing and left-wing policies of the pre-1978 period.

We now briefly discuss the associated policies. The growth in agricultural TFP in the 1980s was due to agricultural market liberalization, scaling down of production teams,

increased private incentives, and the transition from collective farming to the household responsibility system. In subsequent periods further market liberalization and price reforms, as well as adopted technological progress and improvements in land contracting and ownership laws, kept agricultural productivity growing.

The growth in manufacturing TFP under Deng was a result of reduced state procurement of investment goods, decentralization of authority over production and investment, increased emphasis on consumer goods manufacturing, introduction of a dual-pricing system and contract management responsibility system. These initial pro-market reforms were continued with the expansion of township and village enterprises, expansion of credit cooperatives, gradual market liberalization, marketization and corporatization of state-owned enterprises followed by their partial or full privatization.

The overall decline in the consumption component of the labor distortion was associated with price liberalization and removal of controls in the markets for consumer durables, energy, and housing. The further decline in the consumption component of the labor distortion is associated with reduced rationing of food (primarily grain) in the pre-2000 period, and with stricter grain import controls imposed during WTO accession in 2000-2006.

The overall decline in the production component of the labor distortion is due to the substantial decline in monopoly markups in the non-agricultural sector associated with de-monopolization and privatization of the non-agricultural sector, as well as the gradual elimination of procurement of agricultural goods.

To understand the scale of these reforms we compare them to the pre-reform period. We envision a counterfactual path of the economy if Deng's reforms were implemented starting in 1958. For that, we import the key parameters of reforms, namely, TFP growth in both sectors and the gradual reduction in consumption and production components of the labor distortions such as to reach their levels achieved in 1989 – by 1978, keeping all other distortions exactly like in the benchmark calibration.

As shown in Table 4, Deng's policy package substantially outperforms not only the

Table 3: Changes in TFPs and distortions 1953-2012.

	Mao	Deng	Jiang	Hu
Agricultural TFP	-13	44	45	49
Non-agricultural TFP	21	36	64	45
Consumption component	-21	-15	-48	0
Production component	5	-49	0	-46
Mobility component	5	5	34	13
Non-consumption component	-69	-16	-10	21
Investment distortion	-28	14	-7	-16

Notes: This table reports changes in TFPs and components of distortions over the period 1953-2012. Columns 1 through 4 report changes over the course of the premierships of Mao Zedong, Deng Xiaoping, Jiang Zemin and Hu Jintao respectively. All changes are reported in log points.

baseline but both the right-wing and left-wing policy packages that we simulated earlier (Table 2). Compared with the benchmark GDP per capita of 785 international 1990 dollars in 1978, Deng's policy package achieves 2000 dollars per capita. Compared with barely any movement of labor out of agriculture under the benchmark (2 percent). Deng's policy package transfers 26 percent of the labor force. Finally, Deng's package improves welfare substantially: consumption of agricultural goods per capita grows 30 percent and consumption of manufacturing goods per capita increases more than threefold. The overall welfare gain is equivalent to a permanent 38 percent increase in consumption, nearly ten times higher than the gains from the left-wing and right-wing policy packages.

As can also be seen from Tables 2 and 4, while the main welfare gains in the left-wing policy package come from the reduction in distortions, in the right-wing policy package and in Deng's package, most of the welfare gains come from higher TFPs. However, the potential reductions in distortions are not taken full advantage of in Deng's package. To estimate the potential of such reductions in distortions we construct a first-best simulation, where TFPs grow at a constant rate from 1958 towards their 1978 levels, but all distortions are fully and immediately removed as of 1958. The last column in Table 4 shows that the overall effect on welfare is significantly larger than from Deng's package, with more than half of the welfare gains accounted for by reductions in distortions.

Table 4: Decomposition of welfare gains from alternative policies

	Deng 1958	First Best
Agricultural TFP	14.6	6.5
Non-agricultural TFP	22.6	10.3
Consumption	-3.8	11.0
Production	4.9	23.9
Mobility	0	8.3
Non-consumption	0	0.5
Investment	0	6.9
Total	38.2	67.2

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 1958-1978. Column 1 reports the welfare effects of Deng's policy package. Column 2 reports the welfare effects of a first best policy regime where TFPs grow at constant rates towards their terminal values, and all distortions are removed abruptly. Row 8 labeled "Total" shows the total welfare gains from each counterfactual simulation. Rows 1 through 7 decompose row 8 into the contributions of TFPs and distortions. All welfare gains are reported in percentage points of consumption.

To summarize, while both stable right-wing policies or stable left-wing policies would have notably improved the well-being of citizens compared with the economy with an imperfectly implemented policy cycle, a hybrid policy combining some of the elements of both policy packages would have done much better. However, even such a path does not utilize the full potential of reduction in distortions.

We now discuss an important qualification to this analysis. We used the same model as for pre-1978 to analyze the post-1978 period. However, the economy has changed significantly and hence the assessment of what we call Deng's policy package may be derived from a sufficiently different model. Rather, the results in this section provide a useful benchmark of what the effects of using the best of both the left-wing and the right-wing policies might have been.

6 Conclusion

We argued in this paper that a political development cycle may have significant effects in a distorted economy that is undergoing a structural transformation. We singled out the

case of China in 1953-1978 – one of the largest development programs in modern history – where the political development cycle was represented by fluctuations in policies between the right and the left. Our main goal of the paper was to quantify the effects of the political development cycle within a macroeconomic model while carefully considering the historical, institutional, and political context of the period.

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Appendix: Sensitivity Analysis

Here we provide an extensive sensitivity analysis of our results. We consider how our main findings are affected by: a) changes in the parameters of the model; b) judgement calls that we made while calibrating the model based on direct evidence; c) decisions made while constructing the data; and d) judgement calls made while constructing counterfactual paths of distortions and TFPs.

We vary each of the eight model parameters $\{\alpha_{K,A}, \alpha_{K,M}, \alpha_{N,A}, \alpha_{N,M}, \eta, \gamma_A, \delta, \sigma\}$ with a standard deviation of 10 percent. The eleven judgement calls which set up the direct evidence calibration include the initial levels of agricultural and non-agricultural TFP, the initial and terminal levels of the consumption and production components of the labor distortion, of the non-consumption component of the capital distortion, and of the investment distortion, as well as the size of the drops in agricultural and non-agricultural TFP. We vary the parameters of the TFP calibration with a standard deviation of 5 percent, the parameters of the investment distortion with a standard deviation of 3 percent, and the remaining parameters with a standard deviation of 10 percent.

We consider the effects of five alternative ways to construct the data: 1) indexes of agricultural and industrial goods prices advocated by Young (2003) instead of sectoral deflators; 2) farm capital from Tang (1984) instead of sectoral capital series from Chow (1993); 3) alternative weighting of the non-agricultural sector in GDP based on 2000 relative prices instead of 1978 prices; 4) using the investment deflator constructed by Perkins and Rawski (2008) instead of the GDP deflator; 5) assuming variable depreciation as in Holz (2006) instead of a constant depreciation rate. We vary the sizes of drops in non-agricultural TFP, the consumption and production components of the labor distortion during GLF in our counter-factual simulation for the left-wing policy package with a standard deviation of 10 percent.

All of these alternative assumptions for parameters, calibration, data construction and counterfactual definitions are at least as large as and generally exceed the true uncertainty a researcher might have.

Table 5 shows how all of these uncertainties applied jointly affect our main results. Our first main result is that in cases of stable left-wing policies, stable right-wing policies, or absense of fluctuations altogether, GDP increases, agricultural labor share declines, and welfare improves. The second main result is that these large effects are largely driven by imperfect implementation of policies amplifying negative effects in particular sub-periods. In Table 5 we repeat these results and report the sensitivity of each number to the joint uncertainty over parameters, calibration, data, and other judgement calls. It is clear from our sensitivity analysis that although one might strongly disagree on the paths of TFPs, distortions and aggregate variables in the baseline calibration, or on how to construct counterfactual simulations, the maximum combined uncertainty from all sources that we might have around our main results typically does not exceed one third of the size of the measured effects. The uncertainty is noticeable, but overall it does not change our main results or conclusions.

In the online appendix, in addition to the linear trend specification of counterfactuals described earlier, we consider foursix alternative specifications of average or trend 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 with dummy based on historical cycles; 53) HP-filtered trend over 1953-78 applied to 1958-78; 64) a calibration that reflects our thoughts on what consistent policy packages could have implied in practice. We report the sensitivity of all our results to these alternative specifications in the online appendix.

Table 5: Sensitivity of main results.

	GDP	Ag. labor share	Welfare
Left-wing policies	9.2	-6.8	5.5
	(5.3)	(1.3)	(1.9)
Right-wing policies	11	-1.7	3.8
	(2.5)	(0.7)	(3.1)
Effect of sub-periods	7.8	-2.5	4.8
	(2.4)	(0.3)	(1.2)

Notes: This table reports gains or losses in GDP, agricultural labor share, and consumption equivalents of welfare in various counterfactual simulations compared with the baseline direct evidence calibration. GDP gains and changes in agricultural labor share are computed as the average differences over the the 1967-72 period. Welfare is computed as discounted utility of consumption over the period defined in the counterfactual. Rows 1 and 2 show gains of consistent right-wing and left-wing policies for each model for GDP, labor share and welfare respectively. Row 3 shows the effect of lower TFPs and higher distortions in select sub-periods 1964-67 and 1970-71 on GDP, labor share and welfare. Gains are reported in percentage points of GDP, labor share and consumption respectively. Below each number we report its overall sensitivity to assumptions on parameters, calibration, data choices and construction of counterfactuals. Sensitivity numbers are standard deviations computed over a large number of simulations with random normal deviations of assumptions from the baseline.