Will China Escape the Middle-income Trap?
A Politico-economic Theory of Growth and State Capitalism*

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Abstract

Is China’s rapid growth sustainable with the current institutions? Will the institution change if the growth slows down? To answer these questions, this paper proposes a theory of politico-economic transition, as follows. In oligarchy, a political elite extracts surplus from the state sector and taxes the private sector. However, to maintain the power, it needs political support from sufficiently many citizens. A “divide-and-rule” strategy is implemented to guarantee such support: the elite gives state workers high wages to turn them into supporters, and it also distorts the capital allocation in favor of the state sector to maintain enough workers in that sector. The consequences are the following: in the short term, the low wage in the private sector helps private firms and aggregate output grow rapidly. In the mid and long term, the capital market distortions slow down the growth. The theory suggests that the economy develops along an endogenous three-stage transition: “rapid growth”, “state capitalism”, and two possible paths in the third stage: “middle-income trap” or “sustained growth”, depending on whether democratization occurs. The theory is consistent with salient aspects of China’s recent development and gives predictions on China’s future development path.

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1 Introduction

China has by now been growing at a stellar rate for over 3 decades. While this is generally acknowledged to be a great historical achievement, there is major controversy on how far in time and scope the Chinese success story can go. The optimists argue that China can provide a new model for growth as an alternative to the liberal democracy growth model - the Washington Consensus. For example, in a debate hosted by The Economist (see also Musacchio and Lazzarini (2012)), Aldo Musacchio argues that China’s hybrid form of capitalism can become a new growth model for the 21st century. In his view, such a model offers three very attractive features: less pronounced recessions, focus on long-term investing and producing world champions. These considerations make him optimistic about the sustainability of China’s future growth, and even about the possibility that China can become a role model for other developing and emerging countries. In contrast, critics predict that the growth rate will soon slow down. For example, Acemoglu and Robinson (2012) argue that China’s extractive political institution is not compatible with innovation and sustainable long-run growth. In their view, although the growth process driven by catch-up, import of foreign technology, and export of low-end manufacturing products may continue for a while, it is deemed to come to a halt as soon as China reaches the living standards of a middle-income country.

The pessimistic perspective of Acemoglu and Robinson raises a number of questions. If growth under the current regime slows down, as they predict, will this trigger changes in the political system? Will unsatisfied citizens oust the oligarchy and allow growth to be resumed under a more democratic system? Or, alternatively, will the oligarchy be able to retain sufficient support even in a low-growth economy? On the one hand, modernization theory suggests that the first scenario is likely to occur. But, then, one can argue that it may have been right for China to adopt its hybrid form of state capitalism to achieve high economic growth in the catch-up stage, and then switch to liberal democracy when state capitalism runs out of steam. The Chinese model, in other words, could be a model of transition, albeit not of long run growth for mature economies. On the other hand, this view may well be overly optimistic: at the time of transition, the political elite may be unwilling to give up state capitalism and stick to power in order to keep control on political power and economic resources, as we see in countries like Venezuela. In
the language of Acemoglu et al. (2006), state capitalism may be appropriate to promote growth at an early stage of development, but may become impossible to reform at a later stage when it becomes a burden on further economic development.

To answer these two questions on China’s growth and political transition, this paper proposes a theory of politico-economic transition. A two-sector dynamic general-equilibrium model is built and calibrated to China’s economy. The theory is consistent with salient aspects of China’s recent developments, including: rapid growth with low wages, large state investments, financial repression on private firms, the support of the middle-class for the government, and so on.

In this theory, a political elite runs the government and is able to extract surplus from state firms and tax the private sector. However, it faces a political constraint, that is, support from sufficiently many citizens. I assume that the government can use the following policy tools to maintain the support: regulating wages in the state sector, and controlling capital allocations in the state and the private sector. ¹ How does the elite use these tools? First, to buy support, it sets the wage high in the state sector. A dual labor market is created. State workers receive high wages and become supporters of the elite. Private worker wages are reduced due to the general equilibrium effect, as follows. Facing high wages, state firms hire less than they could if wages were determined by the market. More workers are pushed to the private sector, and private sector wages are reduced. This “divide-and-rule” strategy gains support from state workers at the cost of private workers. Second, to maintain enough support, the elite manipulates capital allocations between the state and the private sectors. In order to keep enough workers in the state sector, the elite keeps the state sector capital level sufficiently high relative to the private sector, and may restrict the private sector’s access to capital in the financial market, especially when the private sector becomes large. This is because of the trade-off of the private sector to the elite: it contributes tax, but also compete for labor with the state sector. When the private sector capital is small, to extract more tax, the elite encourages its growth and helps it to access more capital. However, when the private sector becomes sufficiently large and reduces the amount of state workers - the supporters of the elite - to the critical level, it turns into a threat, and the elite has to restrain the growth of its capital level and relative size, through financial repression.

Because the government policy in the capital market changes as the private sector grows, the growth pattern also changes accordingly in different stages of development.

¹This means that the government can only use clientelism to gain the support, as in Robinson and Verdier (2013). Other tools, for example, using direct transfer to buy the support, are assumed away, following Acemoglu (2003). More details will be explained in section 3.
More specifically, the economy develops along a three-stage transition, as follows. The first stage is “rapid growth”, during which the GDP share of the private sector grows fast, triggering high reallocation and productivity growth. Private firms benefit from the distorted low wage in the private sector induced by the policy. The government supports privatization as this increases its tax revenue. However, as privatization goes on and the state employment share declines to a critical level, the economy enters the second stage - “state capitalism”. In this stage, the elite over-invests in the state sector to keep the state employment sufficiently high. The government also imposes gradually increasing financial repression to limit the growth of private firms. Growth continues to be high due to large state investment, but the financial repression on private firms causes a slowdown.

As the private sector capital keeps growing (largely through self finance), two possible outcomes emerge. The first is the “middle-income trap”: the state over-investment and financial repression on private firms continue, but due to decreasing return to capital and the capital market distortion, the efficiency loss grows larger. Finally, the growth stops before the output converges to the level in democracy. This happens when the cost of retaining the regime is low, e.g., when the number of supporters needed is small. The other possible outcome is democratization leading to “sustained growth”. In this case, the cost of maintaining enough supporters in the state sector is high, and as the private sector capital grows, the elite finds it too costly to keep investing proportionally in the less efficient state sector, and therefore chooses to democratize. State over-investment and financial repression on private firms both disappear and the economy keeps growing in democracy.

The first two stages in the theory are consistent with the recent development in China. First, the distorted low private sector wage helps private firms and the economy grow rapidly. Between 1995 and 2007, the private employment share increases from 40% to 80% (see more details in section 2). This era of fast privatization implies large efficiency gain and “rapid growth”, as the first stage of the theory. However, afterward, private sector employment share stops growing. Private firms face tighter financial constraints while around 60% of investment and the majority of bank loans are diverted to less productive state firms. This capital market misallocation in favor of state firms implies that the economy is entering the “state capitalism” stage. Second, the middle-class, consisting largely of state sector workers and private entrepreneurs, are the beneficiaries and supporters of the regime. This is because state workers receive high wages, and entrepreneurs benefit from the cheap and abundant labor in the private sector. Chen and Lu (2011) and

\[\text{Hsieh and Klenow (2009) estimate that the total factor productivity (TFP) of state firms is 42% lower than the TFP of domestic private firms.}\]
Tsai (2007) document that the Chinese middle-class, including state employees and private entrepreneurs are “achieving their material interests without pursuing any real freedom”. This phenomenon will be discussed in great details in section 2. Besides the above phenomena, the theory is also useful to understand a few more, including: high capital labor ratio in the state sector, low and decreasing state sector capital return, high and non-decreasing private sector capital return, etc..

The third stage of the transition in the theory provides an answer to the questions on China’s future political and economic developments. The model in this paper, calibrated to China’s economy, predicts that the economy will enter the “middle-income trap”. It is because the government is both economically and politically powerful, and the cost of retaining enough supporters in the state sector is low for the government. On the one side, the government controls abundant financial resource through the banking sector and holds abundant financial asset, including the huge foreign reserve. It is capable of keeping investment high in the state sector and maintain the current level state employment. On the other side, the current state employment share, which is not very large, has been sufficient to provide the support that the government needs and keep the political system relatively stable. In other words, the government is politically powerful and it needs a relatively small supporter base - the state sector. Given these conditions, sufficient support for the regime will continue, and policy distortions will persist, which will eventually slow down the growth before China becomes a rich country.

Is China doomed to fall into the middle-income trap? Are there ways to redirect China to the other development path - “sustained growth”? Many China watchers and researchers have proposed reform plans, including financial reform, state sector reform, political reform, etc., which can help to sustain the growth. However, is the government willing to implement those reforms? Many reforms which are beneficial for growth may not be implemented because they can be harmful for the elite’s interests. To understand the consequences of reforms, I model reforms as changes on model parameters. They lead to different development path and can potentially change the third stage from the middle-income trap to sustained growth. This helps to evaluate how various reforms affect growth and the elite’s interest, and which reforms will face strong resistance from the elite while which are more likely to be implemented. This analysis is useful for predicting China’s future policies and directions of reforms.

Our theory is related to three strands of literature. The first one is on China’s economic growth with resource re-allocation. Song et al. (2011) construct a two-sector growth model to study how the capital and labor reallocation from the state to the private sector leads

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3The state employment share is about 20% in the urban area, according to the statistical yearbook 2014.

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to rapid growth. Brandt and Zhu (2000, 2010) document the contribution of private firms to growth and the government’s strategy to maintain state sector employment. These studies capture some key features in China’s economic growth, including the capital and labor market frictions. However, an important unanswered question lies in the previous research: why are there large labor and capital market frictions and how will they evolve in the future? To answer this question, political economy needs to be modeled, as it is the root for frictions, including the financial constraint on private firms in Song et al. (2011) and the state employment constraint in Brandt and Zhu (2010). This paper provides the micro-foundation for the endogenous evolution of financial constraint, labor market wedge, state employment and so on. It not only helps to understand better the frictions, and more importantly, allows us to predict their future trends. In contrast to the conventional wisdom which believes that these frictions will gradually decline as China’s labor market and financial market become more mature, this paper predicts that they will be persistent and will even increase.

Second, our theory contributes to the study of “middle-income trap”, i.e., the significant slowdown of economic growth when a country’s GDP per capita reaches the middle level. Gill and Kharas (2007) is the first paper that formally uses this term to describe the growth slowdown of emerging economies. After that, this phenomenon attracts high attention in the public (see The Economist 2012 and The Economist 2013). In empirical studies, Eichengreen et al. (2013) document this pattern with data, and then Robertson and Ye (2013) formally propose a statistical definition of a middle income trap, namely, a country’s relative income to the U.S. converges into the range of 8% to 36%. They test the definition with time-serious data find that out of 46 middle income countries, 19 fall into their strict definition of middle income trap. What make it difficult for the middle income countries to become rich? Fatás and Mihov (2009) provide the following argument. Growth from low income to middle income relies more on right policies, while good institutions are necessary for achieving high income. Without improved institutions, rapid growing countries will “hit the wall”. While the discussion on middle-income trap is popular in public and in academia, there are in lack of theoretical frameworks to provide guidelines for it. This paper tries to formally model how an economy can grow rapidly within the extractive institution, why the growth may stop when the economy is at the middle-income level, and how reforms on political institutions can further sustain growth. Moreover, the theory allows us to study under which conditions a country can jump out of the middle-income trap and which reforms are necessary to achieve this.

The third is the literature on the relation between political development and economic development. Acemoglu and Robinson (2012) study how the political institution affects
economic performance in the long run. They argue that the extractive political institution in a non-democratic country is detrimental to economic growth. The modernization theory, originated from Lipset (1959a), discusses how economic development affects political development in the long-run, i.e., the economic development will ultimately lead to political modernization, i.e., liberal democracy. This paper’s contribution to this strand of literature is two-folds. First, it combines both sides of the relations and studies the interactions of them - not only how political institution affect economic development but also how the later determines the former. This is achieved by building a model which integrates political economy, e.g., Acemoglu et al. (2012), into neoclassic growth model, i.e., Song et al. (2011). This way of modeling can be useful for researchers who are interested in both political economy and growth. Second, the theory distinguishes the short-run effect of political institution on economic development from the long-run effect - institutions that help rapid growth in the catch-up stage can be detrimental to growth in the long-run.

The rest of the paper is organized as follows. Section 2 shows important empirical facts on China’s political-economic development that motivate the theory. Section 3 discusses a two-sector dynamic growth model with the three-stage political-economic transition. The first two stages explain important phenomena and puzzles in China’s recent development, while the third stage predicts future politico-economic trend. Section 4 concludes.

2 Empirical Facts on China’s Recent Development

In this section, the following key facts in China’s recent development that motivate the theory are documented: (1) large wage gap between the state and the private sector; (2) low support for democracy from the middle-class; (3) the slow-down and stop of privatization; and (4) financial market wedges between the state and the private firms.

2.1 Large State-Private Wage Gap

China’s rapid growth is accompanied by increasing inequality: the Gini index grows from 0.36 in 1992 to 0.47 in 2010 as in the official report while it is reported to be as high as 0.6 in various survey data. One important contributor to the inequality is the increasing state-private worker income gap. State workers enjoy a wage premium of around 20% to 30%, all the characteristics - age, education, industry, region and so on - being equal, as documented by Ge and Yang (2014). Their result is reproduced in figure 1. If the In contrast,
the wage premia of state workers in Canada, Germany and the U.S. are estimated to be lower than 5% after the 90s. See Melly (2002), Mueller (1998) and Poterba and Rueben (1994).

### 2.2 The Middle-class’s Support for the Regime

Given that the state workers are earning high wages, it is not surprising to see that they are more supportive to the current political system compared to non-state workers, as documented by Chen and Lu (2011). The authors use a survey data of 2810 individuals, collected in three Chinese cities in late 2006 and 2007 to estimate how the individual’s political opinions depend on his/her characteristics, especially the social group identity. They find that state sector workers and the middle-class are less supportive for democratic values. For example, only 24.9% of the middle class support multi-party competition, while 38.7% of the lower-class do. Only 22.9% of the middle class agree demonstration should be allowed, while this number is 35.6% for the lower class.\(^4\) Similar patterns

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\(^4\)The authors define class according to the employment status. Individuals with jobs which usually pay low wages are classified as the lower class, including blue-collar workers, unemployed and self-employed with very little capital. The middle class mainly consist of white-collar workers. They distinguish private entrepreneurs from the middle class, while private entrepreneurs are usually considered an important part of the middle class. The authors also report that private entrepreneurs hold similar political opinions as the middle class.
apply for other questions related to democratic values and institutions. To formally show
the difference between the middle class and the lower class, the authors combine answers
to multiple questions into one index of support for democratic values and institutions using factor analysis. Then they run a regression of this index on individual characteristics, including a dummy for middle-class membership and a dummy for state employment. The coefficients of dummies for middle-class and state employment are both negative (-1.23 and -0.54) and significant at at 1% level. Compared to them, party membership is a weaker predictor, whose coefficient is -0.37 and not significant at 5% level. These suggest that economic interest plays a more important role than ideology. In other words, the middle class, including many state sector workers, are more supportive for the current political system. Another research, Tsai (2007) documents that the Chinese entrepreneurs are “achieving their material interests without pursing any real freedom”, different from “the business classes in historical England, France and the United States” who “have risen up against the government to defend material interests”.

In short, the Chinese middle-class, consisting largely of state workers and private entrepreneurs are not supporters of democracy, on the contrary to the conventional wisdom that the middle-class are the driving force for democratization.

2.3 The Slow-down and Stop of Privatization

If state workers are supporters for the government while many state firms are not productive, does the government allow the state employment to decline? The answer is mixed: initially the government allows the state employment to decline in order to improve the efficiency of the economy, but it does not allow the state employment to be too low, because it is an important supporter base. The decline of state employment and privatization of state firms had been very rapid for a couple of years, after the fifteenth national congress in 1997, which initiated the state firm reform. Unprofitable state firms bankrupted, exited the market, or were bought by private entrepreneurs, while many private firms entered the market and grew rapidly. As the blue line in figure 2 shows, the employment share of state sector in the urban area decline from 53% in 1997 to 28% in 2002, and 22% in 2006. After that, the privatization slows down and the state employment share stagnates at around 20%. If we focus only on the manufacturing, mining and construction, represented by the red line, the trend is similar while the state employ-

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5The survey data contain four dimensions of questions on support of democratic values, including right consciousness, valuation of political liberty, support for participatory norm and support for competitive election. The index for support for democratic values and institutions is the constructed as the single dominant factor using factor analysis.
ment share stops declining at a higher level - around 40%, and even slightly increases after 2011. This so-called “the state advances as the private sector retreats” phenomenon suggests that the privatization and the decline of state employment has come to a halt. Moreover, there is more direct evidence that the government intentionally keep the state sector alive. For example, in the closing announcement of the Third Plenary Session of 18th Chinese Communist Party Central Committee in 2013, it is stated that “China will stick to the dominant role of public ownership, playing the leading role of the state-owned economy, while encouraging, supporting and guiding the non-public sector...”

2.4 Capital Market Wedge between the State and the Private Sectors

How do state firms survive and hire a significant fraction of workers, if they are much less efficient than private firms, as documented Hsieh and Klenow (2009)? Because state firms are in a more advanced position in the financial market compared to private firms. It is easier and cheaper for state firms to get loans from state banks while private firms get much less loans though their capital return is higher. Song et al. (2011) document, as in figure 3, that while state firms finance more than 30% of their investment through bank loans and government budget, this number is less than 10% for private firms. Their result is reproduced in figure 3. Brandt et al. (2012) estimate that the capital wedge, i.e.
the ratio of costs per unit of capital between state and private firms has increased in all the provinces, on average from 4.2 in 1996 to 6.8 in 2007.

Is the capital wedge between state and private firms due to China’s immature financial market so it will decline as the financial market develops over time? Or alternatively, is the capital wedge maintained by the government to keep the state sector large enough, and will the government strategically keep it or even increase it in the future? In the next section, we can study these questions with the help of a general equilibrium growth model with political constraints. Moreover, the model is used to explain and match other facts discussed in this section, including the state wage premium, middle-class’s support for the regime, and the decline of state employment share, and to predict the future trend of these phenomena, and more, including economic growth, political transition, and so on.

3 The Model

This section presents a theory of politico-economic transition to address the questions and to understand the key phenomena discussed above. I build a two-sector dynamic general equilibrium growth model which incorporates political choices of agents to study the interactions between political and economic developments. I first discuss the gen-
eral properties of the model and then study its implications for China with the aid of a calibrated economy.

### 3.1 Preferences and Technology

The model economy is populated by three classes of agents: an elite (e), private entrepreneurs (p), and workers (w). Each class consists of infinitely many members. The population of workers is normalized to measure 1, and the population of the elite members and private entrepreneurs are both assumed to be small and of measure 0.

There are two sectors and two types of firms. State (S) firms produce in the state (S) sector, while private (P) firms in the private (P) sector. There are infinitely many of them. They produce the same final goods using capital and labor and maximize profits. They are different in two aspects. First, ownership: S firms are owned by elite members, while P firms by private entrepreneurs. Second, productivity: S firms are less productive than P firms. Technology of S and P firms are described by the following production functions:

\[
Y_S = (z_S K_S)^{\alpha} L_S^{1-\alpha},
\]

\[
Y_P = K_P^{\alpha} L_P^{1-\alpha},
\]

where \(z_S < 1\), \(K_S, K_P\) are S and P sector capital while \(L_S, L_P\) denote for S and P sector labor, respectively.

The elite provides capital to S firms and entrepreneurs provide capital to P firms. They earn income from the capital returns. They live for infinite periods, and are forward looking. Their instantaneous utility is assumed to be logarithmic and the discount factor is denoted by \(\beta\). Workers provide 1 unit of labor inelastically. For simplicity, I assume that workers live hand-to-mouth and they are myopic, i.e., they consume all the income every period, and in each period they care only about current period income.

The elite has access to the deep pockets of banks. It can borrow from banks and set S sector capital without constraint. An entrepreneur finances part of P firm capital using her asset, and the other part using bank loans. However, she faces a financial constraint: the bank loan can not exceed \(\eta - 1\) fraction of her asset. In other words, the P firm leverage - ratio of capital over net asset - is bounded above by \(\eta\). \(\eta\) is set by the government within an interval: \(\eta \in [\underline{\eta}, \overline{\eta}]\). Furthermore, we assume banks can borrow and lend in the international bond market at the interest rate \(r\) and they compete with each other, so the interest rates for loans to state and private firms are both \(r\), and the interest rates for savings of the elite and entrepreneurs in the bank are also \(r\).
The setting on the financial market is similar with Song et al. (2011), which also assume that the state firms have unlimited access to bank loans while private firms face financial constraints. The key difference is that here I allow the financial constraint - P firm leverage $\eta$ - to be endogenously determined by the government. The government can create barriers for loans to private entrepreneurs, and can directly give administrative instructions to banks (see Brandt and Zhu (2000)). $\underline{\eta}$ is the lower bound of the leverage. For example, $\underline{\eta}$ equals 1 if the strictest policy that the government can set is to order banks not to lend to private entrepreneurs at all, but the entrepreneurs can still finance their investment using their own assets. $\overline{\eta}$ is the highest leverage if the government doesn’t restrict private sector financing at all. The upper bound for the leverage is because of the moral hazard problem, i.e., an entrepreneur with too much loans compared to her asset chooses to steal and run away.\footnote{The logic is similar to Song et al. (2011), and can be stated as follows. Banks want to make sure that borrowers do not just get the loan and run away. Assume that a borrower with asset $s$, after getting loan $l$, can choose to immediately steal $(1 - \overline{\eta}) (l + s)$ and run away. If this happens, the bank can recover the rest $\overline{\eta} (l + s)$. The new level of the asset for this borrower is $(1 - \overline{\eta}) (l + s)$ and it is still in the same period, which means that she can go to other banks to get loan. So the incentive constraint for the worker as the borrower not to steal is $(1 - \overline{\eta}) (l + s) \leq s \Rightarrow l \leq \frac{\overline{\eta}}{1 - \overline{\eta}} s$. We denote $\overline{\eta} = 1 + \frac{\overline{\eta}}{1 - \overline{\eta}}$.}

3.2 Political Systems and the Government

There are two types of political regimes: democracy and oligarchy. In democracy, the government is elected by the majority vote. Hence a representative worker runs the government forever, given workers’ dominating population. Naturally, I assume that the government collects taxes from the ruled groups, i.e., the elite and entrepreneurs, and transfer tax income equally to the ruling group - workers, and the tax rate is $\tau^D > 0$.\footnote{Alternatively, one can endogenize the tax decisions while still getting the equivalent results, as follows. Suppose that the government decides which groups to tax and tax rates, and tax payers can hide their income at the cost of $\tau^D$ fraction of the income. Then, the government optimally tax the elite and the entrepreneurs at the highest rate: $\tau^D$ and transfer the tax income to workers, because it cares only about workers’ current period income. This is a simple way to endogenize tax rates, as used in Acemoglu (2008) and referred as “state capacity” in Besley and Persson (2009).}

The capital and labor markets are competitive. Each entrepreneur decides capital supply to P firms, while each elite member chooses capital supply to S firms. Each worker supply labor to a S or P firm. In other words, democracy implies that in each period, the economy is in a competitive equilibrium given taxes on the elite and entrepreneurs. The distortion in democracy is simply because of the capital tax, while there are no other strategical market distortion in selecting firms. This setting is consistent with Acemoglu (2008).

In oligarchy, the elite controls the government, but it faces a political constraint, that
is, it needs political support from a sufficiently large fraction of workers. Each worker, after being employed by a S or P firm and observing the government policies, decides to support the oligarchy or not based on the expectation on her income in this period. Oligarchy is sustained if more than $L$ fraction of workers choose to support it. If it gets less than $L$ workers’ support, democratization occurs. Moreover, the government collects taxes from entrepreneurs and private firm workers and then transfer to the elite. The tax rate is $\tau > 0$. The capital and labor markets are no longer in a competitive equilibrium - now the government sets S sector minimal wage $w_S$, S sector capital $K_S$, and P sector leverage $\eta$. Given government policies, S firms compete for capital in the S sector, and hire labor obeying the S sector minimal wage to maximize profits. P firms compete for capital in the P sector supplied by entrepreneurs.

Next, let us explain the details and the logic for the settings in oligarchy. First, the micro-foundation for $L$ is based on Acemoglu et al. (2012), as follows: if the elite and their supporters form a coalition which has large enough political power, oligarchy is sustained. More specifically, a coalition of a set of agents holds a corresponding level of political power. If the political power of certain coalition is large enough, it can choose the political system. In this paper, under oligarchy, the elite as the ruling group is granted political power $\omega_e$. Each worker has political power $\omega_w$, and each entrepreneur has $\omega_p$. The aggregate political power of entrepreneurs is 0 given its size of 0. Workers can change the political regime from oligarchy to democracy if and only if they form a coalition of size $L_r$ whose power is larger than $\alpha$, namely $\frac{\omega_w L_r}{\omega_w + \omega_e} > \alpha \iff L_r > \frac{\alpha \omega_w + \omega_e}{\omega_w}$, where $\alpha$ is exogenous. In other words, to sustain the oligarchy, there must be at least $1 - \frac{\alpha \omega_w + \omega_e}{\omega_w}$ workers supporting it, and this size is denoted as $L$. Notice that $L$ captures the relative political power of the elite compared to workers. If the elite is very powerful, it needs only a small fraction of workers as supporters to form a winning coalition. If workers are well-organized and politically motivated, $L$ becomes large. Second, the government sets state capital $K_S$, and private sector leverage $\eta$. In China, the government controls state banks, and thus is able to influence the allocation of loans to private and state firms. It can directly invest in state firms or set barriers for private firms getting financial resource. Or, it can set the market prices different for state and private firms, e.g., providing cheap loans to state firms in certain industries to affect state firm investments. So alternatively but equivalently, one can also model that the government sets the interest rates differently.

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8Similar to the case in democracy, tax decisions can be endogenized. The elite optimally chooses not to tax S workers to make it easier to buy their support. Moreover, it optimally chooses to tax entrepreneurs and P workers at the highest rate $\tau$, if it cares about today sufficiently.

9Notice that we use $\tau$ instead of $\tau^O$, to simply the notation. We drop the superscript $O$ for variables in oligarchy when there is no confusion.
in state and private sectors. The current setting, that the government directly set $K_s$ and $\eta$ is more straightforward.

Notice that in this setting, two important assumptions are made. First, state firms maximize profits in oligarchy and choose employment. The government can only use prices - regulating the wages in the state sector - to influence the state employment but can not directly sets labor in each state firm. This is consistent with China’s reforms on state firms, which gradually delegates powers to firms from central and local governments. State firms are allowed to make operational decisions and are incentivized to maximize the profits because these are good for the efficiency of state firms. Nowadays, state firms are responsible for important decisions including hiring workers, while the government influences their decisions through the price system. Second, the government can not make direct transfer to the ruled groups to buy political support. Though direct transfer seems to be a cheap and attractive way to buy support, in the literature of political economy, it is consider as difficult to implement, for two reasons. One is credibility and commitment problem. Acemoglu (2003) and Acemoglu and Robinson (2005) argue that even if the state promises to make a transfer to the ruled group, the latter, without political power, gets no guarantee that it will eventually receive the transfer. So the promise of transfer is not credible, and transfer can not be used solve all the political conflicts. The other reason is the high cost of government transfer due to local capture. This is supported by empirical evidence. Reinikka and Svensson (2004) document that 87% of the transfer from the central government to local schools in Uganda was not received during 1991-1995 due to local capture. This means that the cost of 1 dollar of transfer is as high as 7.7 dollars. For these two reasons, the government usually builds inefficient “white elephant” projects (see Robinson and Torvik (2005)) to guarantee the economic benefits for certain groups. In our model, state firms can be considered as a special type of “white elephants”.

### 3.3 Equilibrium and Aggregate Dynamics

Given the settings described above, the rest part of this section presents the solution of the model. The dynamic equilibrium consists of infinite periods, and each period can be decomposed into three stages: (1) determination of capital in S and P sectors, (2) political outcome and the equilibrium of the labor market in this period given capital allocation, and (3) decisions on consumption and saving. In this subsection, we first focus on the stage (2) of each period and study the political and economic outcomes given capital allocation.
3.3.1 Equilibrium Given Capital Allocation

In democracy, the labor market is competitive. Wages in S and P firms are the same and are equal to the marginal productivity of labor:

$$w^D = (1 - \alpha) (z_S K_S)^{\alpha} \left( L_S^D \right)^{-\alpha} = (1 - \alpha) (K_P)^{\alpha} \left( L_P^D \right)^{-\alpha}.$$  

A worker’s income equals the wage plus the tax collected from entrepreneurs and the elite:

$$y^D_w = w^D + \tau^D \left( \pi^D_S + \pi^D_P \right) = \left( 1 + \tau^D \frac{\alpha}{1 - \alpha} \right) w^D,$$

where $\pi^D_S$ and $\pi^D_P$ are the capital incomes of the elite and entrepreneurs from S and P sectors, respectively, and $\tau^D$ is the tax rate in democracy. Notice that without loss of generality, I assume that the taxes are on the raw capital incomes but not capital incomes net of depreciation and interest payment, in order to simplify expressions. The transfer to workers is $\tau^D \frac{\alpha}{1 - \alpha} w^D$ simply because the tax base - capital income - is $\frac{\alpha}{1 - \alpha}$ times labor income.

In oligarchy, the following events happen sequentially: (1) the government sets S sector minimal wage; (2) S and P firms hire workers; (3) S and P workers decide whether to support the current political system; (4) the share of supporters determines the political outcome - if oligarchy does not get enough support, the economy switches to the equilibrium in democracy; (5) firms produce, labor and capital incomes are distributed; (6) the government collects tax and makes transfer.

First, the government chooses S sector minimal wage $w_S$ to influence the labor market outcome and the economic benefits of S and P workers. Without loss of generality, we only consider the cases where $w_S \geq w^D$ so the minimal wage constraint is tight.\(^{10}\) Given the minimal wage, the representative S firm chooses labor demand $L_S$ such that wage equals marginal productivity:

$$w_S = (1 - \alpha) (z_S K_S)^{\alpha} L_S^{-\alpha}. \quad (1)$$

Remember that the oligarchic government can not use direct transfer to buy political support, so the final income of S workers is simply $y_{w_S} = w_S$. If the government wants to

\(^{10}\text{Setting minimal wage } w_S < w^D\text{ is equivalent to setting } w_S = w^D.\)
increase S worker income, it has to set a high S sector minimal wage, which distorts the labor market. We can see this in figure 4. Red and blue lines are the marginal productivities of labor in S and P sectors, respectively. The intersection of the two lines pin down the equilibrium in democracy: the S sector labor, wage and worker income in democracy are denoted as $L^D_S$, $w^D$ and $y^D_w$. In oligarchy, $w_S$ pins down S sector labor and its marginal productivity. The rest of labor is in the P sector and pins down the P sector wage $w_P$. Setting $w_S \geq y^D_w$ implies that the marginal productivity of S sector labor is greater or equal to $y^D_w$ and the S firms hire less or equal to $L^D_S$. Then, observing the government policy on $w_S$, a S worker knows her income in oligarchy. She supports oligarchy if and only if her income in oligarchy is higher than in democracy, i.e., $w_S \geq y^D_w$, given the assumption that she lives hand-to-mouth and cares only about one period income. A private sector worker always gets lower income than in democracy and never supports oligarchy. First, high state sector wage pushes down the private sector wage, through general equilibrium effect. Setting high state wage $w_S \geq w^D$ implies low state employment: $L_S \leq L^D_S$, and large size of labor in P sector: $L_P \geq L^D_P$. Then the marginal productivity and wage for P workers are low: $w_P \leq w^D < y^D_w$. Second, the government can not make transfer to the ruled groups, including P workers, so P worker income is equal to its after tax wage, and therefore always lower than in
democracy $w_y = (1 - \tau) w_p < y_{w}^D$. 11

In the case that $w_S$ is high enough, S workers can become supporters of oligarchy, and if the number of S workers is sufficiently large, oligarchy gets enough support and is sustained. As we discussed previously, $w_S \geq y_{w}^D$ implies $L_S \leq L$. Moreover, sufficiently many supporters means $L_S \geq L$, where $L$ is the minimal number of supporters to sustain oligarchy, exogenously given.

To sum up, the political constraint that the government faces is equivalent to two economic constraints. The first is the “high state wage constraint”, i.e. $w_S \geq y_{w}^D$ so that S workers support oligarchy. Then high enough state wage is equivalent to low enough state employment share $L_S \leq L$. The second is the “minimal support constraint”, i.e., $L_S \geq L$. So the government faces a critical labor market trade-off between these two political constraints: increasing $w_S$ guarantees high state wage constraint and buys S workers’ political support while it reduces S sector employment $L_S$, which may violate the minimal support constraint.

If the government chooses $w_S$ such that the two constraints are both satisfied, oligarchy is sustained. However, it is not always true that the two constraints can be both satisfied at the same time. This depends on the capital allocation between S and P sectors. $L$ is an exogenous parameter, determined by political power of workers and the elite. $L$ is endogenously determined by $y_{w}^D$, which depends on the capital allocation $K_S$ and $K_P$, as follows:

$$w_S = (1 - \alpha) K_S^\alpha L_S^{-\alpha} \geq y_{w}^D = \left(1 + \tau^D \frac{\alpha}{1 - \alpha}\right) (1 - \alpha) K_S^\alpha \left(L_S^D\right)^{-\alpha} \Rightarrow$$

$$L_S \leq \nu L_S^D = \nu \frac{zK_S}{zK_S + K_P} = L,$$

where $\nu = \left(1 + \tau^D \frac{\alpha}{1 - \alpha}\right)^{-\frac{1}{\alpha}}$. So if $\frac{zK_S}{K_P}$ is large enough, $L$ can be larger than $L$. In other words, sustaining oligarchy requires that S sector is equipped with enough capital, relative to the P sector capital. The equilibrium is summarized in the following proposition.

**Proposition 1 (Equilibrium given capital allocation).** If there is sufficiently large capital in S sector relative to the capital in P sector, oligarchy can be sustained. In this case, S sector wage and capital labor ratio are higher while capital return is lower than P sector. P sector capital return and entrepreneur income are higher than in democracy because of low private sector wage. If S sector capital is small, oligarchy can not be sustained.

11Notice this is due to the setting that the government can only set S sector minimal wage but not the P sector minimal wage. This is realistic for China because the government has better control over state firms and can guarantee that state firms follow the wage regulation and pay high wage but not the private firms.
In S sector, the capital labor ratio is high and capital return is low because of the high wage and low level of labor, as shown in 4. In P sector, because of the low wage and the abundant labor, capital return is high. In this case, the one period elite income is the following:

\[ y_e = \pi_S - (r + \delta) K_S + \tau w_P L_P + \tau_P \pi_P, \]

where \( \pi_S = \alpha (z K_S)^{a} L_S^{1-a} \) and \( \pi_P = \alpha (K_P)^{a} L_P^{1-a} \) are capital incomes of S and P firms, respectively. An entrepreneur’s income is

\[ y_p = (1 - \bar{\tau}) \pi_P - (r + \delta) K_P. \]

### 3.3.2 Discussions on the Equilibrium Given Capital Allocation

Given capital allocation, the government creates a dual labor market: state workers get high wages and hence support the government, while private workers get low wages. This is the so-called “divide-and-rule” strategy: breaking the group of workers into two sub-groups, and providing different economic interests to gain support from one group at the cost of the other group.

This equilibrium given capital allocation is consistent with three phenomena in current China: (1) large state-private sector wage gap, (2) middle class’s political support for the current regime, and (3) higher capital labor ratio and low capital return in the state sector.

The first fact is discussed in section 2, and is the immediate consequence of proposition 1. High state sector wage is necessary for getting political support from workers, and the general equilibrium effect leads to abundant and cheap labor in the private sector. Entrepreneurs and private firms benefit from the abundant cheap labor, in the short-run. This allows potentially faster capital accumulation and growth of the private sector and the whole economy. We will discuss more on this in the dynamic model.

Second, the middle class workers - state workers in the model - are supportive to the existing political regime because of the economic benefits. This is consistent with the finding of Chen and Lu (2011) discussed in section 2, but on the contrary of the traditional wisdom that the middle class are the natural driving force of democracy, as in the European history. This is not surprising. In the history of democratic movement in Europe, such as the Glorious Revolution and French Revolution, the middle class were against the

12Entrepreneurs, as the other group of the middle-class in the model, also support oligarchy. Their short-run income is higher in oligarchy, so is their lifetime income in most cases. We will discuss their lifetime income and political attitude in the dynamic model.
aristocracy of the Kings, whose political power relied on repression. The middle class did not rely on the state but emerged from private businesses. In contemporary China, the state sector is large and a significant fraction of the middle class are created by and rely on the state, so they become supporters of the state. It is also similar in many other developing countries. This helps to understand why in some emerging markets, economic growth and the burgeoning bourgeoisie do not automatically lead to the same growth of demand for democratization. For example, as reported in The Economist 2009, 95% of adult Kuwaitis work for the government, usually in white-collar civil-service jobs which are typical middle class jobs, while its private-sector middle class consists almost entirely of foreigners. The wage gap between the state and private sector is large there. These distortions keep politically important local workers in the state sector and is a smart way to maintain oligarchy.

The third fact is well documented in the literature. Song et al. (2011) show that state sector capital labor ratio is much larger than the private sector, in every industry. Brandt and Zhu (2010) show that the capital return in the state sector is lower than 5% while the number for the private sector is above 50%. The difference of capital returns is partly due to the difference of wages and distorted labor allocations. The other reason is the capital allocation, as we will see in the dynamic model below.

In a nutshell, the above analysis on the equilibrium given capital allocation is useful to illustrate the interactions of the political and economic systems in oligarchy in each period. On the one hand, the political interests, largely shape the state distortions and economic outcome. Taking into account political considerations, we can explain many economic phenomena and puzzles in China. On the other hand, economic power determines political outcome. Only when the state sector is economically powerful and equipped with enough capital, the elite can keep a large enough supporter base to sustain oligarchy.

### 3.3.3 The Dynamic Equilibrium

Because of the importance of the economic power, the government is motivated to control the capital accumulation and allocation between the state and private sectors. From this subsection, we study the dynamic equilibrium, including how S and P sector capital are allocated, tax decisions, consumption and saving in each period, based on the equilibrium given capital allocation, discussed in subsection 3.3.1.

In democracy, workers control the government to maximize their income. The government does not want to change the political system, and since there is no political constraint in democracy, democracy continues forever in this model. By assumption, the
economy in democracy is a competitive equilibrium given. It is also obvious that the government does not impose any financial repression on the more efficient P firms because more capital in P sector implies higher wage for workers. So P firm leverage can reach $\eta = \bar{\eta}$.

So we can safely assume that the equilibrium in democracy is a competitive equilibrium. Finally, the government taxes the elite and entrepreneurs to the maximal level $\tau = \bar{\tau}$ and transfers the tax income to workers to maximize worker income in this period. The dynamics in democracy is basically a two sector growth model with an initial misallocation which is removed over time, as in Lewis (1954) and Song et al. (2011). The dynamic equilibrium is summarized in the following proposition.

**Proposition 2.** In democracy, the elite members get return on assets at interest rate $r$, and entrepreneur assets yield returns greater or equal to $r$. If $\beta$ is large enough, entrepreneur assets increase over time. Eventually, the relative size of S sector over P sector, measured by $k = \frac{z_S K_S}{K_P}$, decreases to 0. The discounted lifetime income of the elite only comes from its asset and it is $Ra_e$.

The intuition for the above proposition is the following: efficient labor allocation implies the same wage in S and P sector. S firms compete with each other, so the capital return equals the cost of financing, i.e., the interest rate $r$ at which the elite can access. The capital return pins down S firm capital labor ratio and wage. P firms hire workers at the same wage rate as S firms, but they are more productive, so P firm capital return is higher. However, P firms and entrepreneurs face financial constraint, so if entrepreneur asset and P firm capital are small, P firms can’t hire all the workers and S firms still exist. In this case, entrepreneurs get higher return than $r$ on their asset. If $\beta$ is large enough, entrepreneurs savings increase over time, and entrepreneur assets and P firm capital increase over time, and finally P firms hire all workers and S firms all exit. In other words, market force is decisive in such a competitive equilibrium.

In oligarchy, the representative elite controls the government and decides on three policies - minimal wage in S sector $w_S$, S sector capital $K_S$, and P firm leverage $\eta$. Given these policies, the choices of workers and entrepreneurs are simple. S and P workers behave as in subsection 3.3.1, i.e., support oligarchy if and only if the income is higher than in democracy. Then they consume all the income.

Each entrepreneur, being a small agent, takes the political outcome and P sector capital return as given, and maximizes lifetime utility. She applies for bank loans, lends to P firms, consumes and saves for the future. Because an entrepreneur’s income only comes from asset return, and the rate of return does not depend on her asset holding but the equilibrium price, her optimal choice is quite simply, as stated in the following lemma and proved in the appendix.
Lemma 1. In oligarchy, if the $P$ firm capital return in higher than the bank loan interest rate, an entrepreneur’s optimal choice can be decomposed into two steps. First, she borrows as much as possible and invests all into $P$ firms, to maximize her current period income; then, she saves a constant fraction of this period’s total wealth and consumes the rest, to maximize her lifetime utility.

Given our discussion in subsection 3.3.1, we know the equilibrium outcome given $K_S, K_P$ in each period, that is, if $\frac{K_S}{K_P}$ is large enough and $w_S$ is sufficiently high, oligarchy can be sustained. In each period, the representative elite’s dynamic problem contains two steps. First, she chooses to sustain oligarchy or to democratize:

$$W (a_e, a_p) = \max \left\{ W^O (a_e, a_p) , W^D (a_e, a_p) \right\},$$ (3)

where $W$ stands for lifetime utility given elite asset $a_e$ and entrepreneur asset $a_p$, while $W^O$ and $W^D$ are the lifetime utility given that the elite chooses to stay in oligarchy and to democratize, respectively. If the later is chosen, the economy end up in the dynamic equilibrium of democracy discussed above. If the former is chosen, she picks government policies $\eta, K_S, w_S, \tau_p$ to sustain oligarchy in the second step. Also, she decides consumption and saving to maximize her lifetime utility.

$$W^O (a_e, a_p) = \max_{w_S, K_S, \eta, c_e, a_e'} \log c_e + \beta W \left( a_e', a_p' \right)$$ (4)

s.t. $w_S \geq y_w (K_S, \eta, a_p)$,

$L_S \geq L$,

$$a_e' = R a_e + y_e (w_S, K_S, \eta, a_p) - c_e,$$

$$a_p' = \beta \left( R a_p + y_p (w_S, K_S, \eta, a_p) \right).$$

From the expression of $y_e$ in equation 2, we can see that within each period $a_e$ only contributes to the elite’s income through interest revenue, and it does not affect other equilibrium outcomes at all. It also doesn’t directly affect future state variables $a_p'$ and $a_e'$. So the contribution of $a_e$ is simply $Ra_e$ in the elite’s budget constraint. Its only role is consumption smoothing. Therefore the representative elite’s problem, similar to an entrepreneur’s problem, can be separated into two sub-problems, as the following lemma states.

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13 Here we assume that if in the first step oligarchy is chosen, then in the second step the government only pick policies that sustain oligarchy. If the government picks policies that can’t sustain oligarchy, the economy ends up in democracy in the second step, which gives the same elite income - interest revenue on $a_e$ - as democratizing in the first step. The elite is indifferent and assumed to choose to simply democratize in the first step, to save us from infinite equilibria which only differ trivially.
Lemma 2. In oligarchy, the representative elite’s optimal choices can be decomposed into two sub-problems. First, maximization of the lifetime income with discounting rate $\frac{1}{R}$ by choosing government policies. Second, maximization of the lifetime utility using $a_e$ to smooth consumption.

The second sub-problem is straightforward and it doesn’t affect the first one and other politico-economic outcomes. Then the first sub-problem has only one state variable, as follows:

$$V^O(a_p) = \max_{w_S, K_S, \eta, a_p} y_e(w_S, K_S, \eta, a_p) + \frac{1}{R} V\left(a_p'\right)$$

s.t. $w_S \geq y_w^D(K_S, \eta, a_p)$,

$$L_s \geq L,$$

$$a_p' = \beta (Ra_e + y_p(w_S, K_S, \eta, a_p)),$$

where $V^O$ stands for the part of discounted lifetime income of the elite which is not related to its asset $a_e$. Continuation value $V\left(a_p'\right)$ depends on the political outcome of next period, as follows

$$V\left(a_p\right) = \max \left\{V^O(a_p), V^D(a_p)\right\},$$

where $V^D(a_p) = 0$ because the elite income in democracy is simply the asset return $Ra_e$, as stated in Proposition 2.

The dynamic equilibrium does not allow for analytic solution, so we will solve it numerically in the next subsection. However, one important property can be characterized analytically. In oligarchy, the elite prefers a medium size of private sector, as stated in the following proposition.

Proposition 3. When the private sector capital is small enough, if the elite chooses to stay in oligarchy, its current period income increases with private capital, i.e., $\exists K_p$, s.t. $\forall K_p < K_p$, $\frac{\partial y_e}{\partial K_p} > 0$. Moreover, if the elite cares about the current period sufficiently, its lifetime income and utility also increases with private capital, i.e., $\frac{\partial V^O}{\partial K_p} > 0$. When the private sector is large enough, the elite decides to democratize, and prefers a smaller private sector: $\exists K_p$, s.t. $\forall K_p > K_p$, $V^O < V^D$, $\frac{\partial V}{\partial K_p} \leq 0$.

The proposition is proved in the appendix, and the logic is quite intuitive and illustrates an important capital market trade-off for the elite, in addition to labor market trade-off. The benefit of the private sector to the elite is that it contributes tax. So when the private sector is small, the elite prefers to make it larger and let it contribute more tax, e.g., by lending as much as possible to entrepreneurs, $\eta = \bar{\eta}$. However, the cost for the elite is that private employment can be a threat to the supporter base of the government - state
employment. When the private sector capital is large enough, and private sector employs at least \( 1 - \frac{L}{L} \) workers, the political constraint of the government \( L_S \geq L \) becomes tight. Then if the elite prefers to stay in oligarchy, it has to invest proportionally in the state sector to maintain the balance between the state and the private sectors. If there is decreasing return to scale and the private sector capital is sufficiently large, the investment in the state sector has to be large and the net return from the state sector can be negative. This is the cost of the private sector for the elite. When the private sector capital is too large, the cost can dominate the benefit and the elite prefers a smaller private sector, or even prefers to democratize. Will the private entrepreneur asset and private capital keep increasing until democratization is chosen by the elite? How will the dynamics look like? These will be discussed with quantitative analysis in the next subsection.

### 3.4 Quantitative Analysis

In this subsection, I calibrate the model to the Chinese economy and solve the model numerically. The properties of the model will be studied, and simulation of the dynamics will be done, in order to think about China’s development in the past and in the future. The targets of the calibration are the key facts in China’s recent development, including the wage gap, speed of privatization, and the state employment share.

#### 3.4.1 Calibration

The economic parameters are set as follows. First, the production function is Cobb-Douglas with the capital share \( \alpha = 0.5 \) (Bai et al. (2006)) and depreciation rate \( \delta = 0.1 \) (Song et al. (2011)). The state capital efficiency is set to be half of the private capital \( z_S = 0.5 \). This implies that the TFP of state firms is 71% of the TFP of private firms. This is higher than 59% estimated by Hsieh and Klenow (2009) with data before 2005, but is reasonable considering that the trend of declining TFP gap discussed in Hsieh and Song (2013b). Second, the interest rate of bank saving is \( r = 5\% \). Third, the discount factor of entrepreneurs, which is also their saving rate of their lifetime income, is set to \( \beta = 0.9 \) to match the rapid private sector employment share growth from around 40% to around 80% in 5 years, as we can see from figure 2. Finally, the tax rate upper bound is set to \( \tau = 20\% \) to match the state-private wage gap of 30%, as in figure 1. The political parameter in this model is \( L \), the minimal support needed to sustain oligarchy. We set \( L = 20\% \), as the state employment share converges to around 20% as in figure 2.
3.4.2 Numerical Solution

In the following, I explain the properties of the numerical solution of the elite’s dynamic programming problem, in three steps: (1) given $K_S$ and $K_P$, the choices of other variables; (2) given $K_P$, the choice of $K_S$; (3) the choice of $\eta$ that affects $K_P$.

First, given $K_S$ and $K_P$, we know from subsection 3.3.1 that if $K_S$ is large enough, there exists some $w_S$ that sustains oligarchy, or equivalently, some $L_S$ that falls into the region $[L, \bar{L}(K_S, K_P)]$. Generally, the optimal choice of $w_S$ is $y^D_{w_S}$, or equivalently, $L_S = \bar{L}$. This choice implies the least labor distortion but still satisfies high state wage constraint. In other words, the elite prefers not to distort the labor market more than the necessary. Furthermore, $\tau_P$ is generally set at the highest level $\bar{\tau}$.

Then how does the government choose $K_S$, given $K_P$? This is the second part of the solution. In figure 5, we use a numerical example to depict how state sector labor, political outcome, elite income, and marginal benefit of state capital for the elite depend on the choice of $K_S$ (the x-axis). Given a $K_P$, if $K_S$ reaches certain critical level, there can be enough state workers (left-upper panel) - in this figure, $L = 0.2$ - and oligarchy can be sustained (right-upper panel). Then there is a jump of elite income above the critical level of $K_S$ (left-lower panel) because in oligarchy the elite controls the government and the tax system. For this reason, though the capital return goes down to even lower than 0 as more capital is invested in the state sector, the elite still prefers to invest until the critical level of $K_S$ (right-lower panel) to sustain oligarchy.

In the example above, given the particular level of $K_P$, $K_S$ that just sustains oligarchy gives highest current period income to the elite. But for other levels of $K_P$, the situation may be different. As we can see in figure 6, when $K_P$ (the x-axis) is very small, $K_S$ is negatively related to $K_P$ (left-upper panel) and $L_S$ is larger than $L$ (right-upper panel). In this region, a larger $K_P$, corresponds to a larger P sector labor and a smaller S sector labor, hence it is optimal for the elite to reduce investment in S sector - $K_S$ - accordingly. However, when $K_P$ is large enough, and S sector labor reaches the minimal level $L$, a larger $K_P$ implies that the government has to invest more in S sector to maintain oligarchy.

We can see that a larger P sector not only increases benefit for the elite - tax income, but also creates higher cost - larger interest payment for $K_S$ (left-lower panel). Due to the decreasing return to capital, there is a level of $K_P$ that maximizes the elite income (right-lower panel).

$^{14}$This is true as long as the tax rate $\bar{\tau}$ is not too high. One sufficient condition is $\bar{\tau} \leq \alpha$, which is a reasonable constraint, considering that $\alpha$ is estimated to be around 0.5 in China. If $\bar{\tau}$ is too large, the elite can extract more from the private sector than from the state sector, the solution may change, but this is not very reasonable.

$^{15}$Figure 6 comes from the same numerical example as figure 5.
How does the elite set $K_P$ to be closer to the optimal level for them? In the third step here, we discuss the choice of $\eta$ that affects entrepreneur borrowing ability and capital available for P firms. When the government prefers a larger $K_P$, it sets $\eta = \bar{\eta}$ and imposes no financial repression. When it wants a smaller $K_P$, it sets $\eta < \bar{\eta}$, and P firms receive less bank loan than the maximal level. This can be seen in figure 7.\footnote{Figure 7 comes from the same numerical example as figure 5.} The x-axis is $a_P$. As we move $a_P$ from very small to very large, the P firm leverage goes down gradually (left-upper panel) as the government prefers $K_P$ not too small or too large. The S sector capital first goes down but then goes up proportionally to the P sector capital (right-upper panel), because enough S employment share needs to be guaranteed (left-lower panel). The government’s influence on $K_P$ is limited because $\eta$ is bounded by $\underline{\eta}$ and $\bar{\eta}$, so it may not be able to set $K_P$ to its favorite level when $a_P$ is too small or too large. This is why the elite lifetime income is maximized for an intermediate level of $a_P$ (right-lower panel). This is the second trade-off for the elite, in addition to the first trade-off of state wage and employment.

Remark 1 (Trade-off of private sector capital). A larger $K_P$ contributes more tax income, but it also requires larger $K_S$ to sustain oligarchy and more interest expense. As $K_P$ increases from a very small level, the elite’s current-period income first increases and then
decreases. The elite’s lifetime income also follows a similar pattern. This trade-off also applies to entrepreneur asset because it determines private capital.

Under which conditions does the government choose to democratize or to sustain oligarchy? The government can invest as much as it wants in S sector to guarantee enough state employment with high wage, for any size of P sector capital. However, large investment in S sector means large cost, while the return can be small due to decreasing return to scale. If P sector capital is large enough, sustaining oligarchy gives lower lifetime income to the elite compared to democracy - the line for the elite’s income in figure (7) can drop below the horizontal zero line: \( V(a_p) < 0 = V^D(a_p) \) if \( a_p \) is large enough. In this case, the elite chooses to democratize.

### 3.4.3 Simulation and Dynamics

Given these parameters and the numerical solution, we can simulate the economy starting from a very small private sector: \( a_e = 0.05 \). Figure 8 and 9 plot key variables and output during the transition in this calibration, where \( L = 0.2 \). If the political system starts in democracy, the transition is the blue dashed line, while the transition in oligarchy is the red solid line. Starting in oligarchy, during the first stage, the private sector is small,
therefore not a threat to oligarchy. The elite encourages the growth of private capital to extract more tax income. So the government sets \( \eta = \bar{\eta} \) to lend to private firms as much as possible (left-lower panel of figure 8). Moreover, private firms and entrepreneurs benefit from low wage and abundant labor, so private sector capital grows rapidly (left-upper panel). State employment and capital decline accordingly (right-upper panel). Because the more efficient private sector is reallocated with more capital and labor (right-lower panel), the economic growth is rapid (figure 9). For this reason, this stage is called “rapid growth”.

As the private sector grows larger and the state employment share declines to the critical level \( L \), the economy enters the second stage. The declining state employment share threatens the supporter base of oligarchy. If no action is taken, the elite can’t keep their political power any more. So it increases state investment and then restricts private firms’ access to the financial market. Because of the policies in favor of state firms, the state sector keeps its relative economic power and the ability to hire \( L \) labor with high enough wage. The privatization stops, and no more labor reallocation to the more efficient private sector. However, the large investment in state sector can still keep growth high for a while. But the growth gradually slows down because the financial repression on private firms harms the economic efficiency, as shown in the middle section of figure 9. This stage
features large state investment and financial repression on private firms, so it is a stage of “state capitalism”. Notice that though the initial output is lower in oligarchy than in democracy, due to the labor market distortion, the output can catch up with democracy in the second stage due to rapid capital accumulation and large state investment.

In the long-run, the elite finds it optimal to always sustain oligarchy. It keeps over-investing in the state sector as the private sector capital grows to its steady state level. Employment share stays at \( L \). Though the elite has to pay large investment cost, it still extracts from tax income from the private sector, so it doesn’t want to democratize. The economy continues as the second stage: over-investment in state firms, financial repression on private firms, no labor reallocation to private firms. The inefficient capital market harms growth. Furthermore, due to decreasing return to capital, growth gradually slows down and eventually output stops growing at the middle level, which is lower than the level in democracy. So in this case, the third stage is called “middle-income trap”.

This calibration predicts that China will stay in oligarchy and fall into the middle-income trap, given the current conditions. This is not surprising. The government is right-now strong, politically and economically, meaning that a relatively small fraction of the citizens’ support is sufficient to sustain the current regime, and it has enough financial
resource - for example, large foreign reserves - to build up the state sector if it needs to. After 2008 financial crisis, the Chinese government initiates the 400 billion stimulus package and bails out mostly state firms while letting many private firms die. This shows that it keeps the economy and resource allocation under control and stable, and it is able to maintain a powerful state sector to guarantee political stability, according to this theory.

Since the political power of the government, captured by $L$, is an important parameter determining the cost of sustaining oligarchy and the decision of the elite on whether to democratize, a large $L$ may imply a different long-run development paths. Keeping the other parameters in this calibration, if $L$ is changed to be large enough, democratization will occur. In this case, sustaining oligarchy requires many S workers, so the elite has to invest a lot in S sector proportional to the P sector capital. As P sector capital grows larger and larger, the elite finds the cost of maintaining the state sector too large, and it is optimal to democratize for them. This development path is different in the long-run compared to the development in the calibration to China, but it is similar in the early stages: starting from small P sector, in the beginning, P sector employment share grows until it reaches the critical level for sustaining oligarchy; then the government over-invests in S sector to maintain enough supporters for oligarchy; finally the two paths differ in the long-run. This divergence of two paths is the so-called “critical juncture” of development in

Figure 9: Output in democracy (blue) and oligarchy (red) ending in middle-income trap.
Figure 10: Dynamics in democracy (blue) and oligarchy (red) ending in sustained growth.

Acemoglu and Robinson (2012).

The dynamics with $L = 0.5$ is simulated and showed figure 10. In this case, the elite chooses to democratize when the private sector capital reaches certain level. The cost for the elite to keep enough workers in the state sector with high wage keeps growing as the private sector capital grows. Additionally, marginal return of capital decreases, so the elite finds the cost of maintaining oligarchy dominates the income in oligarchy when private sector capital grows large enough. It chooses to democratize. As we can see in figure 10, the state capital quickly drops while the private capital soars up because the financial repression is removed. The output, as shown in figure 11, though slightly goes down due to super rapid decline of the state sector, eventually recovers and converges to the high level in democracy.

In both cases, the transition is featured with three stages, and its properties are summarized in the following.

Remark 2 (Three stage transition). The economy, starting with a small enough private sector, develops along the following path with three stages:
Stage 1: “Rapid growth”. Growth rate is high. Private sector grows rapidly, benefiting from the low wage. Moreover, the government encourages private sector growth and doesn’t impose financial repression: $\eta = \bar{\eta}$. Rapid privatization reallocates labor from the
state to the private sector.
Stage 2: “State capitalism”. Growth continues. The government over-invest in the state sector, while restricting private firms’ access to the financial market: \( \eta < \bar{\eta} \). Privatization stops and the state employment share stays at the critical level \( L \).
Stage 3: Two cases.
Case 1: “Middle-income trap”. Oligarchy is sustained permanently and growth slows down. State investment keeps growing at the same rate of the private sector capital, to keep state employment share at \( L \). Financial repression on private firm reaches the tightest level \( \eta = \bar{\eta} \). This happens if \( L \) is sufficiently small.
Case 2: “Sustained growth”. Democratization occurs and output growth becomes rapid again. Financial repression and labor market distortion disappear. State sector declines while private sector grows. This happens if \( L \) is sufficiently large.

3.5 Discussions and Policy Implications

The first two stages of the calibrated dynamic model are consistent with China’s recent development. From 1997 to around 2003, it is a stage of rapid privatization, as the state employment share declines dramatically. The private sector, in terms of employment
share and GDP, grows rapidly, for two reasons. First, the wage is low in the private sector. Compared to state firms which face the regulations on the wage and other payments, including pension tax, health insurance, unemployment insurance and so on, private firms pay relatively low wages, which result in high capital returns. Therefore, private firms accumulate capital rapidly and grow fast. The low wage keeps Chinese private firms competitive. It contributes a lot to the growth of export, and the growth of the economy. Second, the government encourages the private sector growth, because a larger private sector contributes more tax while it is still not too large to threat the supporter base of the government - state employment. So the government encourages various financial resource flowing into the private sector, not only bank loans but also foreign direct investment (FDI), and so on.

At around 2003, as the state employment share approaches the critical level, the privatization slows down and stops dramatically. The direct reason is that more and more investment is diverted to state firms but not private firms. State sector investment share stays at around 60% though its employment is much smaller (see Brandt and Zhu (2010)). The state over-investment retains state employment, but reduces the capital return. In the private sector, the capital return is high, not only because they are more efficient, but also because the credit constraint: private firms can’t get enough bank loans for their high return projects. In fact, the financial constraint on private firms has been getting tighter over time, signaling growing financial repression on them. The growing financial repression on private firms is formally documented as the growing state-private capital wedge in Brandt and Zhu (2010). The protection on state firms and repression on private firms have gained much attention and are called “the state advances as the private sector retreats”. For example, in the passenger airline industry, by 2006, eight private carriers had grew rapidly and had challenged the three state-controlled majors, thanks to the previous government policies encouraging private investors to enter. However, afterward, the government starts supporting the state airlines and keep them alive with policies including stock purchase from the central government. The state airlines not only survived and also are able to keep their dominance. Our theory’s prediction indeed explains why this is happening in the second stage “state capitalism”. The elite prefers to maintain a sufficiently strong state sector to guarantee the political control. This model’s prediction on the capital return in the second stage is broadly consistent with the trend: a large gap between the state and private capital returns and declining state capital return. Though the capital return in state firms is so slow, the government still keep investing into them to keep them alive.

Is China doomed to fall into the middle-income trap? Not necessary. If the under-
lining conditions change, the policies and the development path can change accordingly. Mapping into the model, if the parameters such as $L, \eta, z_S$ change, the government policies and the dynamics, including the third stage, will change. Many policy suggestions on how to switch China’s development to a more sustainable path have been made by economists and China watchers. For example, Gary Becker suggested that financial reform should be taken to allocation more resource to private firms, and rural immigrants should be given more rights. Will the government take the suggestions and implement all the policies and reforms that sustain growth? We need to notice that policies or reforms that benefit economic growth may not benefit the elite, who is very influential in the government.

Suppose the government takes a reform that gives more political rights to workers, especially the immigrant workers. This implies that the government has to buy support from a larger fraction of the population. We know that if $L$ increases from 0.2 to 0.5 leads to democratization and sustained growth. But does the elite like that? Its income goes down to 0 if democratization occurs, so obviously this reform will encounter strong resistance from the elite.

In the above model, we assume that the government is completely under the control of the elite. Some may believe that, in some cases, some technocrats become powerful in the government, and they care only about the output growth in the long-run, but not the economic benefit of the elite. In this case, they can initiate reforms which correspond to changing the key parameters of the model, such as $L, \eta, z_S$. To which extend they can push the reform to depends on their political power in the government, which is modeled as the Nash bargaining power of the following bargaining between technocrats and the elite:

$$\max_{P} (Y_\infty (P) - Y_\infty) \alpha (V (P) - V)^{1-\alpha},$$

where $\alpha$ is the bargaining power of technocrats, $V (P)$ is the lifetime income of the elite and $Y_\infty (P)$ is the long-run output given the new parameters after the reform. $P$ can be one of the key parameters $L, \eta, z_S$. Notice that we consider reform as changing parameters but not the endogenous policy variables such as $K_S, \eta$. This implies that technocrats only get a key moment to push for a big change of the society and the political and economic system, and afterwards, the government decisions will be made by the elite again.

Figure 12 depicts that technocrats would like to increase workers’ political rights and increase $L$ from the current level $L = 0.2$, because this makes the government invest more in the state sector, or even choose to democratize. Both of them lead to larger output levels. However, the reform as the result of the bargaining can only push $L$ to the right
limited by $\alpha$. If $\alpha$ is small, the increase of workers’ political rights won’t be large.

Similarly, financial reform, which reduces the financial repression on private firms can be considered as increasing $\eta$. It again increases output, because the private firms can grow larger, and it may even leads to democratization. But again, it harms the elite interests and is hard to be implemented.

One exception is the state firm reform. If a successful reform is taken to increase state firm productivity and reduce the TFP gap between the private and state firms, it increases the output potential. More than that, under the condition that oligarchy is sustained, a more efficient state sector implies that the government can allow the private sector to grow more without worrying about their supporter base - state workers. Less financial repression on private firm is needed and higher economic efficiency can be achieved. This reform also increases elite income because of higher total output. Figure 13 plots how the long-run efficiency, measured as the long-run output in oligarchy over democracy, can be improved by a more efficient state sector (in the region $z_S \in [0.6, 0.75]$), while the elite income always increase with that. This reform is more likely to be implemented the government. In fact, this is happening right now in China. Hsieh and Song (2013b) document the state-private TFP gap is declining. The so-called “industrial upgrading”, which aims at building high-tech state firms, is at the top of the agenda for China’s further economic
reforms. However, it is also very difficult to completely close the gap between the state and private firms, because they are less flexible and provide less economic incentives for the managers, compared to private firms.

4 Conclusion

This paper provides a political-economic theory to study China’s future economic and political transition and to understand China’s recent development. Based on a dynamic growth model, I add the political constraint that the ruling elite faces: sufficient political supporters. To satisfy the constraint, the government creates a dual labor market, which gives high wages to state workers and turn them into supporters. Moreover, in the financial market, the government encourages private sector growth when it is small enough, but switches to protecting state sector and restricting the private sector when the private sector capital is too large. The economic policies lead to a three-stage transition. The first two stages are “rapid growth” and “state capitalism”, which are consistent with a couple of salient aspects of China’s development, including (1) rapid growth with repressed wage in the private sector; (2) political support from the middle class, including state sector workers and private entrepreneurs; (3) financial constraints on private firms.
and support for state firms. In the future, i.e., the third stage of development, China is likely to enter a “middle-income trap” given the current conditions, especially the economically and politically powerful state. To switch to the other development path that leads to “sustained growth”, necessary reforms have to be taken, though they may face resistance from the elite.

Even though the focus of this paper is on China, it is also useful to study the development of many other emerging countries and even some developed countries with similar patterns compared to China. First, the key political constraint in the theory also exist in some other countries such as Kuwait, Korea in the 80s, and Greece, as the political elite or politicians need to buy political support from public workers or workers in industries under their control. So similar stories occur in these countries. Before the 90s, the large local conglomerates (chaebol) in Korea are granted privileged access to low-cost credit. In Kuwait, the oil industry is under the control of the government, so the public sector can hire more than 90% of Kuwaiti nationals with relatively high wage while the private sector is populated with expatriates. Greece public sector workers also receive more than 20% premium (see Giordano et al. (2011)). Second, the theory is also useful to think on a question in development: whether other developing countries should apply the “China model” - the combination of authoritarian politics and state-guided capitalism - to promote economic growth. Some suggestions in favor of adopting this model is based on its past success, but the long-run outcome should be carefully examined and distinguished from the short-run effect. Our theory provides a quantitative framework to evaluate the economic and political consequences.

Further empirical work can be done to examine the theory, especially the three-stage political-economic transition. Which conditions determine the transition to democracy and the long-run growth? Is it consistent with the theory? The theory predicts that if a country can easily build a large state sector - for instance due to rich natural resource - is more likely to sustain the oligarchy, while if efficiency is very important for a country - for example because of exposure of international competition - democratization is more likely to occur. Anecdotal evidence on Gulf countries compared to export oriented economies like Taiwan seem to support the theory. Still, more systematical evidence will be useful to check and improve the theory.

References


5 Appendix

5.1 Proof of Proposition 1

There are two possible cases that makes whether oligarchy can be sustained in this period.

1. $[L, \bar{L}] = \emptyset$. Oligarchy can not be sustained. The government can not strategically make sufficient workers support the oligarchy: if it sets $L_S < L$, there’s not sufficient support; but if $L_S \geq L > \bar{L}$, workers in S sector don’t get high enough wage. The only possible political outcome is democracy. Since $L$ is exogenous and $\bar{L} = vL_S^D = \nu \frac{zK_S}{K_P}$ depends on $\frac{zK_S}{K_P} = k$, we can simplify the condition $L < L$ to $vL_S^D = v\frac{k}{1+k} < L \iff k < k = \begin{cases} \frac{L}{v-L} & \text{if } v-L > 0 \\ +\infty & \text{if } v-L \leq 0 \end{cases}$, given $k > 0$. In the case $k = \frac{L}{v-L}$, we know that when there are not enough capital in S sector compared to the capital in P sector, oligarchy can’t be sustained.

2. $[L, \bar{L}] \neq \emptyset$. Oligarchy can be sustained. The government can choose to sustain the oligarchy by setting some $L_S \in [L, \bar{L}]$ or choose democratization.

5.2 Proof of Lemma 1

The entrepreneur’s one period income can be written as:

$$\max_{K_P} (1 + r_P) K_P - R (K_P - a_p),$$

s.t. $K_P \leq \eta a_p$,

where $R = 1 + r$, $a_p$ is the entrepreneur asset, and $r_P = (1 - \tau_P) aK_P^{a-1}L_P^{1-a} - \delta$ is the P sector capital return. The entrepreneur’s choice on $K_P$ is obvious: if $r_P > r$, the entrepreneur chooses to invest as much as possible, the income is proportional to $a$ and the return to her asset is larger than $r$. If P sector capital return is smaller or equal to $r$, she doesn’t invest to the maximal level and gets asset return $a_p$. Since she lives only on asset return, given the logarithmic utility form, she always saves a constant fraction $\beta$ of her total income to the next period.