

# Structural change, urban bias and the political economy of rural land policy in China

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## Abstract

Despite China's pro-market reforms in many areas, the rural land policy still features a very restrictive property right. While peasants have the right to farm their plots (which are allotted to them by village administrations), their rights to sell and/or rent the plots are severely restricted. These restrictions have been argued to entail enormous efficiency costs, adversely affecting the welfare of hundreds of millions of rural residents. However, the political incentives to remove the ownership restrictions have been lacking. In this paper, we present a political economy model of rural land policy taking into account some key characteristics of China's context. Our model features structural transformation under a political regime that caters predominantly to the interest of urban residents. We assume a government facing conflicting incentives on whether to remove restrictions on ownership of rural land. By providing further incentives for rural-urban migration, removing the restrictions releases labor to the urban sector, expands the modern sector and, as a result, increases the leader's rent base. On the other hand, the possibly large increase in labor supply following land reform increases the risk of urban unrest due to wage depression (or unemployment) in the urban sector. To take into account the two conflicting motives of the government, we consider a two-sector economy where the government's rent base depends on the size of the urban sector. Our analysis sheds light particularly on how the rapid transformation of China's economy toward more urbanization and higher productivity of the urban sector could affect the government's incentive toward the choice of rural land property right. The model shows that while a higher urbanization increases the government's incentive to remove the ownership restrictions, improvements in productivity of the urban sector have a counteracting effect.

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# 1 Introduction

Property rights are considered crucial to structuring incentives in political, economic and social exchanges (North, 1990). Rural land ownership rights are particularly important in developing countries because of the dominant share of the rural sector.<sup>1</sup> Rural land policy during the early periods of the People’s Republic, dating back more than half-a-century, barred peasants from leasing and/or selling their land. Notwithstanding the extensive liberalization reforms across the broad swaths of China’s economy over the past four decades, the peasants’ land ownership rights remain limited. Land within a village is collectively owned and allocated to peasants based on largely egalitarian criteria, namely household size (Brandt et al., 2002; Kung and Bai, 2011). While peasants are granted the right to farm/use their allotted plots, rights to transfer ownership of their plots to third parties are highly restricted.

The consequences of this lack of land markets in the rural sector, where nearly half of the labor force is employed, has therefore received increased attention in the literature and is argued to have caused large efficiency losses to China’s economy.<sup>2</sup> Owing to its implications to efficiency of the economy as well as the welfare of hundreds of millions households, China’s rural land reform remains a central policy issue (Tao and Xu, 2007; Henderson, 2009; World Bank, 2014). Nevertheless, the question of how the political incentives toward the choice of rural land policy interact with the economy remains underexplored. In this paper, we present a political economy model to analyze the equilibrium determination of rural land policy. Our analysis sheds some light particularly on how China’s land policy may evolve in response to the rapid transformation of the economy.

The model features some key characteristics of politics and economics in China. We consider structural transformation under a political regime that caters predominantly to the interest of urban residents. Since our primary focus is analyzing the government’s incentives in the context of structural transformation, we consider an economy characterized by the standard two-sector models—much in the spirit of the classic dual economy models (Lewis, 1954; Jorgenson, 1961; Todaro, 1969; Harris and Todaro, 1970). Structural transformation occurs through rural-urban migration. In both the rural and urban sectors, we assume that the marginal product of labor is decreasing in the number of workers. Thus, an increase in rural-urban migration

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<sup>1</sup>See, e.g., Binswanger et al. (1995); Besley and Burgess (2000); Bardhan et al. (2014); Chernina et al. (2014); Keswell and Carter (2014); Besley et al. (2016).

<sup>2</sup>For example, Adamopoulos et al. (2017) estimate that over 80% of China’s rural labor force (which constitutes 46% of the total labor force) is inefficiently tied in the rural sector due to the missing land market; Benjamin and Brandt (2002) find that the constraints on rural land property rights lower agricultural efficiency.

increases rural wages and decreases urban wages. Rural-urban migration incentives are driven by consideration of earning differences between working in the rural versus the urban sectors.

On the political side, our assumptions feature two main aspects of the Chinese context. First, the Communist Party has remained ambitious to industrialize China. Prior to the 1980s, this took in the form of massive government investment in state-owned manufacturing enterprises. The post-Mao central government instituted a mechanism where officials are promoted based on their their record on achieving higher economic growth (Xu, 2011, p. 1097). Thus, observers of China emphasize the crucial role of the Party's political resolve to modernize the economy in driving the spectacular industrialization of post-Mao China. In our model, we formalize government's desire to modernize the economy by assuming that the leader's rent base expands as the size of the modern sector increases.

The second important feature of Chinese politics is policy biases that favor urban residents (Wallace, 2014). As compared to their rural counterparts, the disproportionate political power of urban residents has long been acknowledged as a common feature of politics in developing countries (Lipton, 1977). Due to their geographic concentration and proximity to power centers, street protests by residents of major cities often pose a serious threat to survival of non-democratic regimes, which forces governments to be more responsive to the needs of their urban residents than those of rural residents (Bates, 1984). Located in remote rural areas far from power centers, peasants often lack this kind of influence. Even though the Communist Party came to power through mobilizing peasants for armed resistance, once the government consolidated its control, it quickly adopted "highly distortive political and economic arrangements" that sidelined the interest of rural residents and instead favored the urban population, resulting massive gap in living standard between urban and rural residents (Zhou et al., 2016, p. 611). As described succinctly by Fukuyama (2011),

Dispersed, indigent, and poorly educated peasants could seldom achieve significant collective action . . . peasants uprising could help overturn a Chinese dynasty. But the peasantry could seldom act as a corporate group or force long-term institutional change that would take its interest into account (p. 423).

Rural land policy in China has played a crucial role in sustaining the urban-rural gap. Naturally, the policy-driven disparity in living standards between urban and rural residents provides incentives for massive rural-urban migration, posing a threat of explosive growth in urban population, undermining the fiscal sustainability of urban privileges and endangering stability of the regime (Ades and Glaeser,

1995). China’s government responded to this threat by institutionalizing barriers to rural-urban migration through the infamous household registration system named *hukou*, which tied social policies with residency status in a way that privileged urban residents. A pillar of this migration restriction is the rural land policy, which tied access to rural land with residency requirement in the rural village where those who migrate to urban areas risk losing their access to farm land and hence “give up a stream of future land earnings” (Yang, 1999, p. 309).

Our model features this key role of land policy to control migration. We assume that the leader chooses between two types of land ownership rights, which we refer to as *unrestricted ownership right* and *restricted ownership right*. Under unrestricted ownership right (UOR), we assume that land is owned by private owners with unrestricted rights to sell and rent, and there is a fully functional land and labor markets in the rural sector. The restricted ownership right (ROR), on the other hand, resembles more like the currently existing rural land tenure in China where (1) land is equally distributed among peasants and (2) peasants have only the right to use their plot (i.e., farm their plot) but they do not the right to transfer their plots through land markets. The important implication of these differences between ROR and UOR relates to how they affect migration incentives. Under ROR, peasants who move to cities need to give up compensation to both labor and land in agricultural production. However, under UOR with a well functioning land market, peasants who move to cities give up compensation only to their labor. Thus, the opportunity cost of rural-urban migration is higher under ROR than under UOR.

The leader seeks to maximize the total amount of rent she extracts, which is assumed to depend on the size of the modern sector. In order to maximize her rent, the leader utilizes two policy instruments—the tax rate on the modern sector and the type of land ownership right (ROR versus UOR). From the leader’s perspective, the choice of land policy is important because the policy affects the equilibrium number of rural-urban migrants. Thus, rural land policy serves as a tool to manipulate rural-urban migration. As the opportunity cost (for migrants) of migration is higher under ROR than under UOR, the latter land policy leads to increases in the equilibrium number of migrants and decreases in the equilibrium urban wage. Since total output of the modern sector increases with the number of workers in the sector, the leader has an incentive to encourage rural-urban migration so as to expand her rent base. On the other hand, large scale rural-urban migration, by increasing labor supply in the urban sector and hence lowering urban wages, could trigger political opposition by urban residents. Similarly, increasing the tax rate on the urban sector could face political opposition from the urban residents. Thus, the leader’s use of both policy instruments (to maximize her rent) is subject to the political constraint imposed by

urban residents.

We formalize the urban political power by assuming that the leader has to guarantee a minimum level of consumption (i.e. after-tax urban wage) for urban residents (Acemoglu, 2005; Shifa, 2013). The level of this minimum urban consumption is interpreted as the amount of political power wielded by urban residents. For a given tax rate, this can be achieved by restricting migration so as to boost pretax urban wage. Alternatively, the leader can allow more migration and compensate for the associated decrease in urban wage by lowering the tax rate. Thus, should the leader adopt UOR, the political resistance to decreases in pretax urban wages due to rural-urban migration could be muted by lowering the tax rate. Similarly, the higher pretax urban wages under ROR allow the leader to impose a relatively higher tax rate. Thus, whether the leader prefers UOR to ROR depends on whether the gain from expansion of the urban sector (i.e. the rent base) following adoption of UOR is larger than the loss from the tax rate reduction that is needed to compensate for the decreases in pretax urban wages.

The central focus of our model analysis relates to how changes in productivity of the modern sector and urbanization levels affect the leader's choice of land policy. In doing so, we shed some light on implications of the tremendous productivity and urbanization growth that China is experiencing for the prospect of China's land policy. We find that with regard to the choice between UOR and ROR, increases in urbanization and productivity pull the leader's incentives in opposite directions. Whereas a higher level of urbanization encourages a switch to UOR (from the current ROR), an increase in urban productivity has the opposite effect. Thus, whether China will move toward adopting UOR in response to increases in productivity and urbanization will crucially depend on whether the effect of higher urbanization dominates that of improved productivity. This race between the effects of urban productivity and that of urbanization is in turn found to depend on the income share of labor (vis-à-vis land) in the rural sector, the level of political power by urban residents and the elasticity of labor demand in the urban sector. While increases in the income share of rural labor and the elasticity of demand for urban labor make adoption of UOR more likely, an increase in urban political power has the opposite effect.

The level of urbanization matters because of two reasons. First, the effect of migration on the marginal product of labor (in the urban sector) depends on the number of migrants *relative to* the existing number of urban residents.. Holding the number of migrants constant, an increase in urbanization decreases the share of new migrants in the total urban population. This decline in the relative quantity of migrants implies that the decrease in urban wages induced by the supply of migrant labor becomes less pronounced. That is, the marginal product of migrant labor is in-

creasing in the initial level of urbanization. Thus, as the urbanization level increases, the marginal contribution of migrant labor to the leader's rent base (i.e. the urban sector) increases, incentivizing the leader to adopt UOR. On the other hand, as urbanization increases, a given decrease in the marginal product of labor will cause a larger decrease in the leader's rent. This happens because for each decrease in urban wages, all the urban residents must be compensated through tax rate reductions. Since the tax rate reduction applies to all urban residents, the revenue loss (to the leader) from the tax reduction increase with the level of urbanization. This effect implies that an increase in urbanization discourages the leader from adopting UOR. We find that when the elasticity of labor demand in the urban sector is sufficiently high and/or the political power of urban residents is sufficiently low, a high enough urbanization leads to the adoption of UOR.

Urban productivity has two counteracting effects on the leader's incentive with respect to the choice of land policy. On the one hand, an increase in urban productivity increases the productivity of labor in the urban sector and, hence, contributing positively to the leader's rent base. All else equal, this effect provides more incentive for the leader to prefer UOR. On the other hand, an increase in urban productivity increases rural-urban inequality and leads to more migration. The increase in migration leads to a further decrease in the marginal product of labor in the urban sector, hence decreasing the marginal contribution of migrants to the leader's rent base. This latter effect implies that the leader's incentive to prefer UOR decreases as urban productivity increases. For a lower level of urban productivity, the former effect tends to dominate so that the government adopts UOR. The opposite is true for a higher level of urban productivity.

This paper is structured as follows. Section 2 discusses the related literature. Section 3 introduces the historical and institutional background of rural land ownership regime in China. Section 4 presents the model. Section 6 concludes. Detailed proofs and derivations are provided in the Appendix.

## 2 Related Literature

Our paper is related to the literature on endogenous institutions, especially on the emergence and persistence of inefficient institutions. Besley and Ghatak (2010) provide a comprehensive analysis to the interactions between property rights and economic development. They develop a unified framework to analyze how property rights affect economic activities and how different property rights emerge and evolve over time. Acemoglu (2006) develops a model for why inefficient institutions, those not maximizing the growth potential of an economy, emerge and persist. He argues that,

in a society with different interest groups, inefficient institutions will emerge if the powerful group prefer institutions and policies that cannot push economic growth effectively. Our theory in this paper explains the persistence of collective land ownership, which has been shown inefficient, and shows the mechanism through which private land ownership emerges. Our model is different from the previous ones when modelling endogenous institutions, although it shares a similar topic. First, following the literature on structural change initiated by Lewis (1954), Todaro (1969) and Harris and Todaro (1970), the environment in our model typifies a developing economy with rural areas, urban areas, and rural-urban migration. Second, we introduce the idea of urban bias into our model, in the sense that urban residents can put pressure to the government to protect their own interest (Lipton, 1977; Bates, 1984).

A few papers discuss the design of rural land ownership regime from the perspective of political economy.<sup>3</sup> Assuming that peasants can be engaged in appropriative activities, Grossman (1994) shows that if the technology of extralegal appropriation of peasants is effective, landlords would like to distribute land to peasants and attract them not to do appropriative activities. Horowitz (1993) shows land reforms can be a dynamic process because the current reform contains the seed of future reform. However, these theories are not applicable to China where rural land is collectively owned by rural collectives rather than individual landlords. Fergusson (2013) explains the emergence of dual structure of property rights over land in some developing countries, where a group of large landowners with private ownership coexists with many small peasants who only have restricted ownership. In his model, the powerful elite group owns land, taxes peasants and design the property right regime while peasants only have labor. When choosing property rights, the elite faces the trade-off between maximizing tax revenues from peasants and maximizing farm profits. Peasants need to stay in the rural sector to protect their property. To maximize farm profits, the elite chooses weak property rights that increase peasants willingness to work for the elite, reduces wage and increases profits of the elite. However, weak property rights also hurt peasants, reduces agricultural productivity and decreases tax revenues. When urban wage, the outside 'choice of peasants, is higher, the elite is more likely to choose poor property rights. Fergusson et al. (2015) found that in Mexico, allocating communal land rather than investing in state capacity was used as clientelistic transfers by the the incumbent parties to help them win the competition

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<sup>3</sup>Some early theoretical work investigated the change of land ownership regime without considering the political incentives. For example, Moene (1992) shows that land redistribution reduces poverty only when land is scarce. Rosenzweig (1978) builds a three-sector competitive general equilibrium model of a dualistic agricultural labor market and heterogeneous labor, and found a negative association between rural wage and landholding inequality.

with the opponents in areas where the incumbent clientelistic parties are politically challenged. Diaz (2000) also explains why peasants in Latin American countries did not receive the full property right of the land after the redistributive land reforms. It is shown that the land rent is decreasing with the amount of privately owned land. Therefore, in the land reforms which are intended to favor the elite instead of the peasants, the powerful elite choose to give peasants restricted ownership. Both Fergusson (2013) and Diaz (2000) emphasize the determinant role of the rural elite in choosing the rural land ownership regime. However, if we think about the case of China, the rural elite there is not that strong and has no power to design the land ownership regime. Different from their studies, in our theory, the revenue-maximized government who cares about urban residents chooses the rural land ownership regime in a dual economy with rural-urban migration.

A few papers discussed the inefficiency of the current agricultural land regime in China. Ngai et al. (2016) show that the current land policy leads to overemployment in the agricultural sector since peasants without full ownership cannot put their land in a frictionless market. Adamopoulos et al. (2017) find the land policy decreases productivity and leads to inefficiency in both the agricultural sector and the whole economy. However, why the inefficient agricultural land regime exists has not been fully discussed. Cheng and Chung (2017) is an exception by showing that the insecure land tenure in rural China may be a constrained efficient design. In their model, migrant workers may go underground and induce negative externality to cities, especially during the economic hard time. Since migrant workers do not internalize the negative externality when moving to cities, government has to provide payments to peasants to realize the internalization. They argue that monetary payments are infeasible because of corruption of local officials, who may steal monetary payments and run away. In contrast, immobile land functions well when playing the role of internalize the negative externality from migration. Under the corruption constraint of local officials, insecure land tenure under which peasants' claims on land depends on their migration decisions is necessary for efficiency. Different from Cheng and Chung (2017), we propose a theory of how government chooses the rural land ownership regime in an environment with some outstanding Chinese features, such as a government of urban bias, a dual economic structure with rural-urban migration and interest conflict between urban residents and rural migrants.



## **3 Institutional and historical background**

### **3.1 Urban bias in China**

Policies biased towards urban residents and urban sectors have been implemented since the establishment of P.R.C. The government implemented urban-biased policies towards wage and the supply of consumption goods to maintain the living standard at a higher level in cities, where government officials and employees of state-owned companies are located (Chang and Brada, 2006). For example, the government started to impose mandatory grain quotas on agricultural households to guarantee the food supply to urban households in the early 1950s (Kung, 2002b). Another obvious example for urban-biased policies in Maos era is the Great Leap Famine during 1958-1961, when more than 20 millions of people died in rural areas while less deaths occurred in cities (Chang and Wen, 1997). Moreover, to carry out the industrialization strategy favoring urban residents, the government extracted a huge amount of resources from rural areas to urban areas (Zhou et al., 2016; Lin et al., 2003).

During the era of reform from the end of 1970s to today, urban bias is still the direction of policies in China. When making policies, one main concern of the government is to avoid the heavy shock of rural migrants on urban residents wage and employment. In the early stage of reform, the government still can grant urban residents enough jobs because of the large state sector in Chinese economy (Solinger, 1999). With the advance of reform, unemployment becomes an important issue in China and the government keeps stringent restrictions over labor flows to urban areas (Fang and Chan, 2000). Another concern of the government is to keep stability in urban areas. It is difficult for the government to keep the society in order if rural people flock to cities (Cheng and Selden, 1994). With the fear of the emergence of unequal megacities, slums, crime, and social instability, which has appeared in Latin America, the government implement urban biased policies to make rural-urban migration under control Wallace (2013). Today, China is still in the dilemma of developing the economy and keeping rest in urban areas (Huang 2011). The delay of land privatization is one of those policies.

### **3.2 Evolution of the agricultural land regime in China**

Over the past seven decades, the land regime of the Communist Party of China (CCP) has experienced three stages: land privatization, collectivization, and adjusted collectivization. The corresponding regime in three stages can be summarized

as land to the tillers, agricultural collectivization and the People's Commune, and the Household Contract Responsibility (HCR) system.

### **3.2.1 Land to the tillers**

Before and after the establishment of PRC in 1949, the CCP carried out the land reform in rural areas by redistributing land from landlords and rich peasants to poor peasants who have no land or only a small area of land. Before 1949, the reform was implemented only in areas controlled by CCP. The objective of the reform is to help the CCP get support of poor peasants, who were an overwhelmingly majority in Chinese population at that time, and seize the state power in the civil war with the Nationalist Party of China, which was the ruling party before 1949. In 1947, the CCP promulgated its programmatic document at the issue of land, Outline Land Law of China, which stipulates the following: Abolish the land system of feudal and semi-feudal exploitation and put into effect of the system of land to the tillers (Article 1). After seizing the power in 1949, CCP continued the policy of land reform in the new controlled areas. The land reform in the whole country was basically completed in 1952. After the land reform, around 300 million of peasants obtained land from the government. The Constitution of the People's Republic of China (1954) establishes the right of peasants as land owner in Article 8, which states that, "The state protects the right of peasants to own land and other means of production according to law".

### **3.2.2 Agricultural collectivization and the People's Commune**

After the Communism regime was consolidated in the beginning of 1950s, CCP started to conduct the socialist transformation in the agricultural sector. Until the end of 1956, around 96.4 percent of rural households had joined the agricultural cooperatives and the private land ownership was transformed into the collective ownership (Su, 1980). In the beginning of socialist transformation, the party acknowledged peasants ownership of their land and encouraged them to cooperate voluntarily in agricultural production. At the end of 1950s, however, government withdraw the land ownership of peasants and implemented the policy of collectivization, under which small holders were encouraged or forced to give up their land ownership. Finally, the People's Commune or production team became the land owner and operated land in rural areas.<sup>4</sup>

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<sup>4</sup>The party established three levels of administration in rural areas including the People's Commune, the production brigade, and the production team, which is the basic farm production unit. In the beginning, the collective owning land is the People's Commune. Later, government adjusted the land ownership among the three administrative levels and the production team became into the

The objective of collectivization is to extract agricultural surplus and make the agricultural sector and peasants play a supporting role in the national strategy of industrialization. Chinese government adopted the development strategy of giving priority to the heavy industry based on the domestic and international situation.<sup>5</sup> At that time, China was a poor country and lacked capital for heavy industry, which is capital intensive. Without foreign investment, the only way to accumulate capital is to extract surplus from the agricultural sector. To do that, government implemented the planned economy and then fully controlled rural resources including agricultural land and labor. As explained in Lin et al. (2003), under the regime of the People's Commune, rural residents were locked on land and had no freedom of migration.<sup>6</sup> After fully controlling the agricultural sector, government adopted price control and transferred agricultural surplus to non-agricultural sectors at low prices.<sup>7</sup> Until 1979, rural residents in China had to stay on the collective land and were not allowed to move freely to cities or non-agricultural sectors.

### 3.2.3 The HRC system

In the end of 1970s, the rural regime represented by the People's Commune started to collapse because of its poor performance in pushing the growth of agricultural sector and raising income of rural people. The HCR system started to appear in some areas. Different from the regime of the People's Commune under which land is owned and managed by the collective, the HCR system realizes the separation of collective land ownership and management rights. Peasants obtain the usage right of land on the basis of collective ownership. In a word, the HCR system establishes

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main land owner.

<sup>5</sup>Lin et al. (2003) proposed three reasons why the Chinese government gave priority to heavy industry. First, as a symbol of industrialization, the development of heavy industry would help China catch up developed countries and be a winner in the international competition. Second, the outbreak of the Korean War cut off the economic connections between China and western countries, so China was in a pressing need of developing its own industry system, in which the heavy industry is the crux. Third, the CCP leaders learned from the experience of the Soviet Union, which also gave the first priority to heavy industry.

<sup>6</sup>Aside from the collective land regime, Chinese government also adopted the hukou system to restrict labor mobility from rural areas to urban areas. The Hukou system is a residence registration system, which grants urban hukou to urban residents and rural hukou to rural residents. In urban areas, holders of urban hukou have the rights to access public welfare, such as public housing, education and medical care, and get a life-time job in state-owned enterprises. Under the hukou system, rural migrants cannot enjoy these benefits after moving to cities because they still hold rural hukou. A detailed introduction to hukou can be found in Chan and Zhang (1999).

<sup>7</sup>From 1950s to 1980s, the total amount of surplus transferred from the agricultural sector to non-agricultural sector is between 500 billion yuan and 800 billion yuan (Lin et al., 2003).

a new farming mode under which households are the basic contract unit and have the right of land management on the basis of collective land ownership. In 1984, the People's Commune dissolved and the HCR system was implemented in the whole country.<sup>8</sup>

It is worth noting that the collective land ownership is kept after the HCR system replaces the People's Commune. The Constitution of the People's Republic of China (1982) establishes the right of collectives in Article 10, which states that, "Land in the rural and suburban areas is owned by collectives except for those portions which belong to the state in accordance with the law." The constitution also restricts the right of peasants on land. It emphasizes that "No organization or individual may appropriate, buy, sell, lease or otherwise engage in the transfer of land by unlawful means" (Article 10). That is, peasants have no full property rights over their land.

Today, the basic land regime in rural China is still defined by the Household Contract Responsibility system. Peasants only have the usage right of land, so they cannot sell their land in the market. Since rural households have no full property rights over their land, it is costly for them to put their land in the selling market or leasing market. If a peasant moves to urban areas and finds a job in non-agricultural sectors, he/she has to give up part of or all revenues from agricultural land. Sometimes, they have to abandon their land. Under the current land regime, land is an opportunity cost of migration and decreases rural people's propensity for moving to cities.

### 3.2.4 Adjustments to the HCR system

Although the collective land ownership is not changed, the HCR system keeps evolving to acclimate the rapid growth of Chinese economy. In the past several decades, the Chinese government has made some adjustments to the HCR system by enacting laws and regulations on land. However, all these adjustments are made on the basis of the collective land ownership and deny rural people's right of land dealing. For example, the Land Management Law adopted in 1986 and the Law of the People's Republic of China on Land Contract in Rural Areas adopted in 2002 stipulated that land should be owned by the collective.<sup>9</sup> The adjustment to the HCR system reflects

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<sup>8</sup>The implementation of the HCR system across the country was announced in Circular of the Central Committee of the Communist Party of China on the Work of Rural Areas in 1984. See <http://cpc.people.com.cn/GB/64162/135439/8134254.html>

<sup>9</sup>The Land Administration Law of People's Republic of China was adopted in 1986 and revised twice in 1998 and 2004. The collective land ownership is emphasized in all three versions. Another recent regulation issued by the Central Committee of the CCP and the State Council of P.R.C in January 19, 2014 is Some Opinions on Comprehensively Deepening the Rural Reform and Speeding up

the interest conflicts between the national state, the local authorities, and the present and future individual households. The complexity of interest conflicts leads to the regional and temporal variation of the system of rural property rights in China (Liu et al., 1998).<sup>10</sup> Now, the basic principle that rural land should be collectively owned is still followed.<sup>11</sup>

One important reason for keeping the collective land ownership in the HCR system is that it can alleviate the shock of migration to cities and the whole society. The Chinese government has a long tradition to make migration to cities under control. For instance, to alleviate the pressure to cities, the party implemented the policy of stopping “blind influx to cities” immediately after taking the power in the beginning of 1950s (Wallace, 2014, page 84). In 1980s and 1990s, government encouraged to develop township and village enterprises under the slogan of “leave the land but not the village” (Oi, 1999). If rural land were privatized, many peasants would be hired as agricultural workers and might move to cities to earn higher wages there. Due to the large size of rural population, privatization of land would lead to many small farmers, who are more likely to sell their small area of land and move to cities. In current China, there still exists a large potential of rural-urban migration if rural people can deal with their land freely. For example, the share of rural population in total population is 42.7 percent in 2016 while the share of product of primary industry is total GDP is only 8.6 percent (National Bureau of Statistics of China, 2017), meaning there is a large amount of surplus labor in rural areas. If the urban sector fails to absorb the huge amount of potential migrants after privatization, then they may create a series of social problems such as unemployment, slums and conflicts (Tao and Xu, 2007; Wen, 2009; Jian, 2013; Wen, 2014).<sup>12</sup>

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the Modernization of Agriculture (see [http://www.gov.cn/jrzq/2014-01/19/content\\_2570454.htm](http://www.gov.cn/jrzq/2014-01/19/content_2570454.htm)), which stabilizes farmers’ contract rights on the basis of implementing rural land collective ownership (Article 17).

<sup>10</sup>Local leaders also play an important role in determining the rural land regime. For instance, Rozelle and Li (1998) show that village leaders design land-rights regime in their villages to maximize their personal interest, to minimize the administrative costs, and to improve both equity and land-use efficiency.

<sup>11</sup>All agricultural land reforms since the end of 1970s were made on the basis of collective ownership. In these partial reforms, some pro-market modes or factors still make contributions to the excellent economic performance of China in the past decades through their enhancing effects on productivity, investment, and effective use of labor (Lin, 1992; Deininger and Jin, 2005; Jacoby et al., 2002; Wang et al., 2015).

<sup>12</sup>In a speech in 1996, President Jiang Zemin shows his worrying about urban unemployment with many surplus labor in rural areas. He said, “At present, registered unemployment has already reached 5.2 million; 6.6 million workers have been laid off by enterprises that have closed or reduced production; 2.2 million people are classified in the categories of either disguised unemployed or

Recent studies on China have verified the close interactions between the rural land ownership regime and rural-urban migration in the past decades. On the one hand, the institutional arrangement of rural land affects the migration decision of rural people. Deininger et al. (2014) find that land tenure insecurity under the HCR system measured by past land reallocations reduces rural people’s propensity for migration while the recognition of land rights protected by governments’ formal certificates encourages migration. Under the HCR system, rural land is allocated according to household size. Since the household size is unstable due to marriage, death and birth, land reallocations are unavoidable. According to the result of Deininger et al. (2014), the current HCR system will reduce the number of migrants to cities in future. Mullan et al. (2011) also find the reducing effect of tenure insecurity on migration. On the other hand, with the development of the labor market, the rural land regime is also adjusted. With the development of off-farm labor markets, the land rental market becomes active (Kung, 2002a).

## 4 Model environment

### 4.1 Production

We consider a standard dual economy model with rural and urban sectors. The initial size of the urban and rural working-age populations equal  $N_r \in (0, \infty)$  and  $N_u \in (0, \infty)$ , respectively.

Some of the rural population could migrate out of the rural sector in order to work in the urban sector. Thus, the total number of workers in the rural and urban sectors, respectively, are  $L_r \equiv N_r - m$  and  $L_u \equiv N_u + m$ , where  $m$  represents the number of rural-urban migrants.

Production in the rural sector utilizes labor and land. The economy is endowed with  $A \in (0, \infty)$  units of agricultural land. Output per worker in the agricultural sector,  $y_r$ , is given by

$$y_r = \left( \frac{A}{L_r} \right)^\alpha = \left( \frac{A}{N_r - m} \right)^\alpha, \quad \alpha \in (0, 1) \quad [1]$$

This agricultural production exhibits positive but diminishing marginal products of labor and land.

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underemployed; and there are 130 million surplus farm laborers in need of nonagricultural work in cities. It can be said that one of the thorniest problems in deepening economic restructuring and changing the pattern of economic growth is finding jobs for everyone...” (Jiang, 2010).

We assume that production in the urban sector uses only labor. Output per worker in the urban sector, which also equals wage per worker, is as follows.

$$y_u = z \left( \frac{N_u}{L_u} \right)^\lambda = z \left( \frac{N_u}{N_u + m} \right)^\lambda, \quad \lambda \in (0, 1) \quad [2]$$

where  $z$ , henceforth referred to as “TFP”, represents the level of productivity in the urban sector.<sup>13</sup> An increase in  $m$  is thus viewed as a labor supply shock, whose effect on urban wages depends on the number of migrants relative to the urban population. The parameter  $\lambda$  represents the inverse of labor demand elasticity in the urban sector:

$$\frac{\partial \log \left( \frac{N_u + m}{N_u} \right)}{\partial \log w_u} = -\frac{1}{\lambda}$$

This effect of rural-urban migration on urban wages constitutes the economic motivation for migration restrictions. In reality, the government may consider other economic motivations (than lower wages) that may associate increased risk of urban political unrest with rural-urban migration, such as higher unemployment rate and increased congestion of local amenities. However, even though we do not directly incorporate such motivations, this does not preclude interpreting the wage decreases in our model more broadly as decreases in expected consumption (of both public and private goods) by urban residents.

We consider two types of land property rights, which we refer to as *restricted ownership right* and *unrestricted ownership right*. Under unrestricted ownership right (UOR), we assume that land is owned by private owners with unrestricted rights to sell and rent, and there is a fully functional labor and land markets in the rural sector. We assume that rural wages in such a market equal  $\eta_l y_r$ , where  $y_r$  is output per worker in the rural sector (given [1]),  $\eta_l \in (0, 1)$  represents an exogenously given income share of workers in the rural labor market. The income share of land,  $\eta_r$ , is assumed to equal  $1 - \eta_l$ .

The restricted ownership right (ROR), on the other hand, resembles more like the existing land tenure in China where (1) land is equally distributed among peasants and (2) peasants have only the right to use their plot (i.e., farm their plot) but not

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<sup>13</sup>This production function could be considered as a shorthand for assuming that (1) total output in the urban sector,  $Y$ , is a Cobb–Douglas function of capital and labor,  $Y = \theta K^\lambda L_u^{1-\lambda}$ , (2) the capital stock is proportional to the current current size of urban population  $N_u$  and the productivity level  $\theta$ , and (3) urban wage equals the marginal product of labor.

the right to sell or rent. Under ROR, peasants who migrate to cities in search of jobs will not be able to earn income from renting or selling her land. The land will instead be redistributed to the peasants who remain in the rural sector. The important feature of these differences between ROR and UOR relates to how they affect migration incentives. Otherwise, the assumption of outright redistribution of migrants' land is a shorthand for capturing the missing land market and is not essential for our conclusions. The conclusion will remain the same if we instead assume, more realistically, that land reallocation occurs with some positive probability. The opportunity cost of migration under ROR equals  $y_r$ . On the other hand, the opportunity cost of migrating under UOR is only  $w_r$ , as the income that a land-owner may receive is not conditional on her location of work.

## 4.2 Politics

Our assumptions regarding the politics mimic two main aspects of the Chinese context: (1) a government whose rent base expands with the size the modern sector and (2) urban people (compared to their rural counterparts) wield a disproportionate level of political power to challenge the government. In order to capture the first feature, we assume a leader whose rent is proportional to the size of the urban sector

$$T = \tau y_u (N_u + m) = \tau z N_u^\lambda (N_u + m)^{1-\lambda} \quad [3]$$

where  $\tau$  is the tax rate and  $T$  is the leader's revenue. Thus, the leader's rent is increasing in total output by the urban sector, which equals  $z N_u^\lambda (N_u + m)^{1-\lambda}$ .

The after-tax income for urban workers, which we also refer to as urban consumption, is given by

$$C_u = (1 - \tau) y_u = (1 - \tau) z \left( \frac{N_u}{N_u + m} \right)^\lambda \quad [4]$$

Equations [3] and [4] reflect the conflict between the urban population and the leader. All else equal, an increase in the number of urban workers benefits the leader in the sense that the leader's rent base expands. For a given tax rate, an increase in  $m$  means a higher revenue for the leader. Higher tax rates, all else equal, also increase the leader's rent. On the other hand, both migration and the tax rate have the opposite effect on the consumption of urban population—migration lowers pretax wage and taxes lower after-tax income.

We model the political power of the urban population by assuming that they impose a constraint on the leader's ability to push down their consumption:

$$C_u \geq \gamma z \quad [5]$$



where  $\gamma \in [0, 1]$  is a parameter capturing the level of political power wielded by the urban population. Higher  $\gamma$  means that the leader has to ensure that urban residents receive higher consumption.

For a peasant, the opportunity cost of migrating to the urban sector is the income that she could have earned had she remained in the rural sector. The earnings of rural residents, which we also refer to as rural consumption and denote by  $C_r$ , depends on the land property right regime,  $p$ :

$$C_r = \begin{cases} y_r & \text{if } p = 0 \\ w_r = \eta_l y_r & \text{if } p = 1 \end{cases} \quad [6]$$

where  $p$  equals 1 for the unrestricted ownership right and 0 otherwise. We assume that migration continues until the income from working in the urban sector equals the opportunity cost of leaving the rural sector:

$$C_u = C_r \quad [7]$$

We abstract from migration costs, which could be large particularly in China due to myriads of government restrictions (through the hokou). But this assumption is not crucial since our conclusions hold if we instead allow for non-zero migration cost so that [7] is replaced by  $C_u = C_r + t_c$ , where  $t_c > 0$  represents migration cost.

Given the political constraint imposed by the urban population (Equation [5]) and the migration parity condition (Equation [7]), the leader chooses the tax rate  $\tau$  and land property right regime  $p \in \{0, 1\}$  to maximize her total rent  $T$ :

$$\begin{aligned} \max_{\tau, p} T &= \tau y_u (N_u + m) & [8] \\ \text{s.t.} & \quad [5], [6] \text{ and } [7] \end{aligned}$$

Throughout our analysis, we restrict our attention to the case where migration occurs only from rural to urban areas so that  $0 \leq m \leq N_r$ . The reverse case where initial rural wages are higher than urban wages does not look relevant for our question since Chinese productivity levels in urban areas are much larger than those in rural ones.. This restriction achieved by assuming that initial incomes are higher in urban areas. In summary, our parameter space, denoted by  $\bar{\Omega} \subset \mathbb{R}^8$ , is given as:

$$\begin{aligned} \bar{\Omega} = \left\{ (\gamma, \lambda, \eta_l, \alpha, z, A, N_r, N_u) : \right. \\ \gamma, \lambda, \eta_l, \alpha \in (0, 1); \\ z, N_r, N_u \in (0, \infty+); \\ \left. \left( \frac{A}{N_r} \right)^\alpha < \gamma z \right\} \quad [9] \end{aligned}$$

The last inequality rules out the possibility that rural residents receive a higher consumption than urban ones.

## 5 Analysis

We present analysis of the model in two stages. First, we show that if the political constraint does not bind, the leader chooses UOR. This result therefore ties the choice of land property right with urban bias. We characterize the conditions under which the political constraint does not bind. Next, we show that even if the political constraint is binding, this does not necessarily preclude the leader from adopting UOR. We present the conditions for whether the leader adopts UOR under the scenario of binding political constraint.

We then use these conditions (expressed as inequalities) as the basis to examine the effect of different parameters on the leader’s choice of property right. In Section 5.2, we discuss how the choice of land policy is affected by urban political power ( $\gamma$ ), the income share of labor in the rural sector ( $\eta_l$ ) and the elasticity of urban wage to labor supply shock ( $\lambda$ ).

China’s modern sector is going through a rapid expansion both in terms of improved productivity and employment share (see Figures 6 and 7). Hence, how such an expansion of the modern sector could influence the government’s incentive toward rural land policy is an important question. We analyze the implications of two key parameters in our model, namely the level of urbanization (as captured by  $N_u/(N_u + Nr)$ ) and urban productivity ( $z$ ). The main result is that the equilibrium land property right features what could be characterized as a race between urbanization and TFP—while an increase in urbanization encourages the shift toward UOR, an increase in TFP has the opposite effect. We then turn to examining the conditions that determine which one of these two opposing effects dominates the choice of land property rights.

### 5.1 The role of political constraint

In order to see how the political constraint [5] affects the choice of rural land policy, it is instructive to focus on the case where this constraint is not relevant (i.e. not binding). Rearranging [4],

$$\tau y_u = y_u - C_u \tag{10}$$

Plugging this back into the leader's rent function [8], the maximization problem in [7] can be rewritten as

$$\begin{aligned} \max_{m \in [0,1], p \in \{0,1\}} T &= (y_u - C_u)(N_u + m) = zN_u^\lambda(N_u + m)^{1-\lambda} - C_u(N_u + m) \quad [11] \\ \text{s.t.} \quad & [5], [6] \text{ and } [7] \end{aligned}$$

This maximization lends itself to an intuitive interpretation. Notice that the maximization of  $T$  is now taken with respect to  $m$  (instead of  $\tau$ ). The first term of  $T$  represents the total output produced by the urban sector. The second term equals the total consumption by urban workers. The difference between these terms—the portion of urban output that is not consumed by urban workers—equals the leader's rent. Thus, it is as if the leader is manipulating migration through urban consumption and land policy to maximize her rent. On the one hand, increasing  $m$ , which can be attained by increasing urban consumption via lowering the tax rate  $\tau$ , expands the rent base and hence can have a positive contribution to the leader's revenue. On the other hand, the arrival of more migrants increases the cost of financing urban consumption, which is represented by the second term.

We can thus approach the leader's maximization problem in two stages: first choose the optimal level of migration under each of the two property right regimes and then select the regime with the highest  $T$ . Let  $m_0^*$  and  $m_1^*$  denote the level of migration that maximize the leader's revenue under ROR and UOR, respectively:

$$m_p^* = \operatorname{argmax}_m T(p, m) \quad [12]$$

The change in the leader's revenue due to switching from ROR to UOR equals

$$\Delta = T(1, m_1^*) - T(0, m_0^*). \quad [13]$$

The leader chooses UOR over ROR if this gain is positive:

$$p^* = \operatorname{argmax}_{p \in \{0,1\}} T(p, m_p^*) = \begin{cases} 1 & \text{if } \Delta \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad [14]$$

In the Appendix, we provide the proof for the uniqueness of this equilibrium land land policy and the associated level of migration  $(p^*, m_{p^*}^*)$ .

The top panel of Figure 2 shows the relationship between  $T$  and  $m$  under the two ownership regimes. The graph labeled  $T_1$  represents the leader's revenue under UOR while  $T_0$  represents the revenue under ROR. Notice that for each level of  $m$ , the value of  $T$  under UOR is larger than the value under ROR. Plugging the values

of  $C_r$  and  $C_u$  from [6] and [4] into the the expression for the leader's rent [11], this vertical gap between the two curves is given by

$$\begin{aligned} T(p = 1, m) - T(p = 0, m) &= (C_r(0, m) - C_r(1, m))(N_u + m) \\ &= (1 - \eta_l) \left( \frac{A}{N_r - m} \right)^\alpha (N_u + m) \end{aligned} \quad [15]$$

where [15] follows from [6]. This gap is always positive since the labor share parameter  $\eta_l$  is less than 1. The maximum value of  $T_1$  is indicated by point  $A$ , which is greater than the maximum value of  $T_0$  (point  $B$ ). If unbounded by the political constraint, the leader thus prefers UOR to ROR as the former option delivers the highest revenue. Hence, whether the political constraint binds or not is crucial for adoption of ownership restrictions.

Whether the the political constraint binds in turn depends on the contribution of the marginal migrant worker to the leader's revenue. Figure 1 illustrates this point. Taking the derivative of  $T$  with respect to  $m$ ,

$$\frac{\partial T(p, m)}{\partial m} = (1 - \lambda)z \left( \frac{N_u}{N_u + m} \right)^\lambda - \left( C_r(p, m) + (N_u + m) \frac{\partial C_r(p, m)}{\partial m} \right) \quad [16]$$

The downward slopping  $MR$  curve and the upward slopping  $MC$  curve are given by the first and second terms in this equation, respectively:

$$MR(m) = (1 - \lambda)z \left( \frac{N_u}{N_u + m} \right)^\lambda \quad [17]$$

$$MC(p, m) = C_r(p, m) + (N_u + m) \frac{\partial C_r(p, m)}{\partial m} \quad [18]$$

The  $MR$  curve represents the marginal contribution of an additional migrant to the total rent base while  $MC$  captures the marginal effect of an additional worker on total urban consumption. Holding the urban consumption per worker constant, increase in the number of urban workers increases the total consumption in the urban sector  $(N_u + m)C_u$ . In addition, an increases in  $m$ , by increasing the land-labor ratio in the rural sector, increases  $C_r$ . Since  $C_u$  and  $C_r$  have to equalize in equilibrium, the increase in  $C_r$  implies an increase in urban consumption. This latter effect is captured by the term  $(N_u + m) \partial C_r(p, m) / \partial m$ . The curve  $C_r$  describes the positive relationship between rural-urban migration and rural consumption. Since  $C_r = C_u$ , this curve also represents the supply of migrants as function of  $C_u$ . If the political constrain does not bind, the leader's optimal level of migration is given by

the intersection of the  $MC$  and  $MR$  curves. The corresponding urban consumption and migration levels equal  $\hat{C}_u$  and  $\hat{m}$ , respectively.

Suppose that  $\bar{\gamma}$  and  $\underline{\gamma}$ —respectively corresponding the top and bottom horizontal lines in Figure 1—represent two scenarios regarding the political power of urban residents. The optimal migration level  $\hat{m}$  is attainable if  $\gamma = \underline{\gamma}$ . In this case, the constraint does not bind so  $m^{*n}$  is politically feasible. In contrast, if we consider the scenario where the constraint is given by the top horizontal line (i.e.  $\gamma = \bar{\gamma} > \underline{\gamma}$ ), setting urban consumption at the level of  $\hat{C}_u$  is politically unfeasible. At a minimum, the leader must provide  $\gamma z$  to urban residents, i.e. the lowest amount of urban consumption that is politically feasible. This will result in  $\bar{m}$  level of migration.<sup>14</sup> From [6] and [7], this migration level under ROR and UOR is given by

$$\bar{m}_0 = N_r - A \left( \frac{1}{\gamma z} \right)^{\frac{1}{\alpha}} \quad [19]$$

$$\bar{m}_1 = N_r - A \left( \frac{\eta_l}{\gamma z} \right)^{\frac{1}{\alpha}} \quad [20]$$

Since the opportunity cost of migrating (for peasants) is lower under ROR,  $\bar{m}_1$  is greater than  $\bar{m}_0$ .

Whether the political constraint binds depends on whether  $MC$  is greater than  $MR$  at the point of intersection between the horizontal constraint curve and the  $C_r$  curve. Plugging the value of  $\bar{m}_0$  from [19] into the expressions for MC and MR ([18] and [17]), the political constraint under ROR binds if

$$MC(0, \bar{m}_0) \geq MR(\bar{m}_0). \quad [21]$$

Similarly, the constraint binds under UOR if

$$MC(1, \bar{m}_1) \geq MR(\bar{m}_1). \quad [22]$$

Since  $\bar{m}_1 > \bar{m}_0$  and  $n_l < 1$ , condition [22] is more stringent than [21] in the sense that if the political constraint binds under ROR, it also binds under UOR (see Lemma 1). Intuitively, the political constraint binds when the leader is forced to set urban consumption at a level that is higher than she ideally wants and, as a result, is faced with excessive migration. If this problem of excessive migration exists under ROR,

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<sup>14</sup>Higher urban consumption due to the political pressure by urban residents is cited as an explanation for the emergence of mega cities in developing countries (Ades and Glaeser, 1995).

it should also exit under UOR since the latter ownership regime results in a higher level of rural-urban migration.

The following Lemma describes the parameter space for two scenarios: (1) binding under both UOR and ROR versus (2) binding under nether ROR nor UOR.<sup>15</sup>

**Lemma 1.** *The political constraint binds both under ROR and under UOR if*

$$(1 - \lambda) \left( \frac{N_u}{N_u + N_r - A \left( \frac{1}{\gamma z} \right)^{\frac{1}{\alpha}}} \right)^\lambda \leq \gamma + \frac{\alpha}{A} z^{\frac{1}{\alpha}} \gamma^{\frac{\alpha+1}{\alpha}} \left( N_u + N_r - A \left( \frac{1}{\gamma z} \right)^{\frac{1}{\alpha}} \right). \quad [23]$$

*The political constraint binds neither under ROR nor under UOR if*

$$(1 - \lambda) \left( \frac{N_u}{N_u + N_r - A \left( \frac{\eta_l}{\gamma z} \right)^{\frac{1}{\alpha}}} \right)^\lambda \geq \gamma + \frac{\alpha}{A} \left( \frac{z}{\eta_l} \right)^{\frac{1}{\alpha}} \gamma^{\frac{\alpha+1}{\alpha}} \left( N_u + N_r - A \left( \frac{\eta_l}{\gamma z} \right)^{\frac{1}{\alpha}} \right). \quad [24]$$

*Proof.* See Appendix A.1. □

In terms of Figure 2, if the condition is binding under none of UOR and ROR, the leader chooses freely between the two maximum points on  $T_0$  and  $T_1$ , which results in the adoption of UOR. The following proposition summarizes this result.

**Proposition 1.** *Let  $p^* : \bar{\Omega} \rightarrow \{0, 1\}$  where  $p^*$  is given by [14]. For all  $\omega \in \bar{\Omega}$  such that [24] is satisfied,  $p^*(\omega) = 1$ .*

*Proof.* See Appendix A.2. □

Even though [24] provides a sufficient condition for the adoption of UOR, it is not a necessary one. The leader still could choose UOR even if this inequality is not satisfied. Figure 2 illustrates this point. In both panels, the political constraint

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<sup>15</sup>A third scenario is that the constraint binds under UOR but does not bind under ROR. We show in Appendix B that consideration of this case does not change our conclusions.

is assumed to bind. Panel (a) represents a scenario where the leader chooses UOR while she adopts ROR in panel (b).

The upward slopping curves in the bottom panels present  $C_r(p, m)$ , i.e. rural consumption as a function of migration. By increasing the land-labor ratio in the rural sector, an increase in  $m$  increases rural consumption. Since  $C_r = C_u$ , the vertical axes in the bottom plots also represent urban consumption. Thus, the curves in the bottom panels represent migration supply curves as a function of urban consumption. Notice that for each level of urban consumption, migration supply under UOR is larger than the one under ROR:  $C_r(0, m) > C_r(1, m)$ . This holds because the opportunity cost of migration is lower under UOR.

The points  $A_0$  and  $A_1$  represent the points at which the leader's rent is maximized under ROR and UOR, respectively. In the absence of the political constraint,  $A_1$  is preferable in both panels. However, choosing between these points implies setting urban consumption below  $\gamma z$ , which is not feasible due to the political constraint. Hence, the leader will instead set urban consumption at  $\gamma z$ , corresponding to the points  $A'_0$  and  $A'_1$ . This will result in migration levels of  $\bar{m}_0$  and  $\bar{m}_1$ , which given by [19] and [20], respectively. In Panel (a),  $A'_1 > A'_0$  and, hence, the leader chooses UOR. The opposite is true in Panel (b). Thus, when the constraint binds, the leader's choice of property right depends on the value of  $T$  evaluated at the point where  $C_u = \gamma z$ .

The following Lemma presents the condition for adoption of UOR when the political constraint binds.

**Lemma 2.** *Let  $p^* : \bar{\Omega} \rightarrow \{0, 1\}$  where  $p^*$  is given by [14]. For all  $\omega \in \bar{\Omega}$  such that [23] is satisfied,  $p^*(\omega) = 1$  if and only if*

$$N_u^\lambda \left\{ \left( N_u + N_r - A \left( \frac{\eta_l}{\gamma z} \right)^{\frac{1}{\alpha}} \right)^{1-\lambda} - \left( N_u + N_r - A \left( \frac{1}{\gamma z} \right)^{\frac{1}{\alpha}} \right)^{1-\lambda} \right\} \geq \gamma A \left( \frac{1}{\gamma z} \right)^{\frac{1}{\alpha}} \left( 1 - \eta_l^{\frac{1}{\alpha}} \right) \quad [25]$$

*Proof.* See Appendix A.3. □

The left-hand side of [25] represents the leader's gain from adopting UOR while the the right-hand side captures the cost. Recall that UOR leads to a larger number of migrants (i.e.  $\bar{m}_1 > \bar{m}_0$ ). So UOR benefits the the leader by increasing the rent base. On other hand, extra migrants are also costly as they increase the total urban consumption, which equals  $\gamma z$  times the number of urban workers. The right-hand of [25] captures this cost. Adoption of UOR is optimal when the benefit exceeds the cost.

To sum up, the conditions under Lemma 1 and 2 show two possibilities that may result in adoption of UOR. Either the political constraint does not bind (i.e. [24] is satisfied) or the political constraint binds but the leader still chooses UOR (both [23] and [25] are satisfied). The condition [24] implies that the the government wants more migrants in the urban sector. This is clearly not the case in present-day China where the government still discourages migrants from moving into many of its major cities with better job opportunities. Thus, in analyzing the effect of various parameters, we mostly restrict our focus on the case where the political constraint binds so that the parameter space is given by

$$\Omega = \{\omega \in \bar{\Omega} \text{ such that [23] holds}\}, \quad [26]$$

where  $\bar{\Omega}$  is given by [9]. This restriction helps simplify the analysis since we can examine the effects of changes in parameters values by simply looking how those changes affect whether condition [25] holds. Otherwise, as we show in Appendix B, our main conclusions remain the same if we remove the restriction in [26] so that the parameter space includes possibilities where the constraint does not bind.

## 5.2 Urban labor demand, rural labor share and political power

We now discuss how changes in  $\lambda$ ,  $\gamma$  and  $\eta$  affect the leader's incentive to adopt UOR. The effects of these three parameters highlight the mechanisms behind the leader's choice of land property rights.

An increase in  $\lambda$  implies that labor demand in urban sector is less elastic. That is, the decrease in urban wages in response to rural-urban migration is more pronounced. Given the political constraint, this decrease in urban wages makes the leader less inclined to adopt UOR. Thus, a more elastic labor demand in the urban sector (captured by lower  $\lambda$ ) would provide a stronger incentive for the leader to adopt UOR.

A higher  $\eta_r$  implies that all else equal, rural wages will be lower should the leader adopt UOR. This implies that the number of rural-urban immigrants induced by the adoption of UOR increases when  $\eta_r$  increases (see [20]). Thus, a increase in  $\eta_r$ , by increasing the rural-urban migration following the adoption of UOR, could worsen the threat of excessive migration and discourages the leader from adopting UOR.

A higher  $\gamma$  means that the leader has to ensure a higher level of consumption for the urban population. As this constraint tightens further, accommodating decreases in urban wages becomes politically less tolerable. An increase in  $\gamma$  would thus in-



creases the incentive to discourage rural-urban migration, reducing the incentives to adopt UOR.

The following proposition summarizes these effects of the three parameters on the choice of land policy.

**Proposition 2.** *Let  $p^* : \theta \rightarrow p$  where  $p^*(\theta; \boldsymbol{\omega}_\theta)$  is given by [14],  $\theta \in \{\gamma, \eta_r, \lambda\}$ ,  $p \in \{0, 1\}$  and  $\boldsymbol{\omega}_\theta$  is a vector containing all parameters except  $\theta$ .*

- *If  $p^*(\theta; \boldsymbol{\omega}_\theta) = 1$  for some  $\theta = \bar{\theta}$ , then for all  $\theta < \bar{\theta}$ ,  $p^*(\theta; \boldsymbol{\omega}_\theta) = 1$ .*
- *If  $p^*(\theta; \boldsymbol{\omega}_\theta) = 0$  for some  $\theta = \underline{\theta}$ , then for all  $\theta > \underline{\theta}$ ,  $p^*(\theta; \boldsymbol{\omega}_\theta) = 0$ .*

*Proof.* See Appendix A.4. □

To sum up, an increase in either of the parameters  $\lambda, \gamma$  and  $\eta_r$  could discourage the leader from adopting UOR since, according to Proposition 2, the leader prefers ROR if the values of these parameters are above some threshold levels.

### 5.3 TFP and land policy

Figure 3 presents an example on how  $z$  affects consumption, migration and the leaders choice of property right. The top plots the relationship between  $z$  and consumption. This relationship is plotted for each of the ownership regimes. The upward slopping straight line is the minimum consumption level imposed by the political constraint. The middle panel shows the relationship between of  $z$  and migration. The bottom panel displays  $\Delta$  as a function of  $z$ , i.e. the leader's gain from switching to UOR from LOR (see [13]).

When  $z$  is sufficiently low, the political constraint does not bind. The leader sets urban consumption above the level dictated by the political constraint (the straight line) to entice more migrants to the urban sector. Thus, the problem of excess migration does not concern the leader. This happens because rural-urban inequality is too low to cause excess migration. As  $z$  increases further, the political constraint starts to bind: the consumption curves hit the straight line (i.e., urban consumption is set to equal  $\gamma z$ ). Notice that, for each level of  $z$ , the number of migrants is larger under UOR than it is under ROR. This is true because UOR lowers the opportunity cost of migration. Notice also that the level of  $z$  at which the political constraint starts to bind under UOR is less than that of the level under LOR (see Lemma 1). Once the constraint starts to bind, the increase in consumption is proportional to  $z$  (with  $\gamma$  being the proportion).

The relationship between  $z$  and  $m$  also shows a distinguishable break at the point where the political constraint starts to bind. At low levels of  $z$  where the political constraint does not bind, the effect of  $z$  on consumption is more modest. However, once the political constraint starts to bind, the leader is forced to increase consumption faster. This increase in consumption results in a larger increase in migration. The increase in migration eventually flattens—as more workers leave the rural sector, the marginal product of labor in the rural sector increases, making migration an attractive option to fewer and fewer rural workers.

The pattern of the leader’s gain from switching to UOR (displayed in the bottom panel) is driven by two counteracting effects of  $z$ . An increase in  $z$  increases the productivity of labor in the urban sector, increasing the contribution labor to the leader’s rent base. All else equal, this effect provides more incentive for the leader to adopt UOR. On the other hand, increases in  $z$  increase rural-urban inequality and lead to more migration. The increase in migration decreases the marginal product of labor in the urban sector, hence decreasing the marginal contribution of migrants to the leader’s rent base. This latter effect implies that the leader’s incentive to prefer UOR decreases as  $z$  increases. At a lower level of  $z$ , the former effect tends to dominate while the latter one tends to dominate at higher values of  $z$ .

Because of these counteracting effects, the leader’s gain from switching to UOR (from ROR) first increases as  $z$  increases, then starts to decrease and turn into a loss (i.e., becomes negative). As  $z$  increases further, the loss starts to reverse). This reversal happens because the effect of  $z$  on  $\Delta$  is driven by the number of migrants under the two land ownership regimes. As  $z$  becomes very large, much of the rural labor leaves agriculture irrespective of the land ownership regime, leading to an ever smaller difference in the number of migrants between the two regimes. However, once  $\Delta$  becomes negative (crosses the horizontal line), it remains negative when  $z$  increases. The following proposition formally summarizes the effect of  $z$ .

**Proposition 3.** *Let  $p^* : z \rightarrow p$  where  $p^*(z; \omega_z)$  is given by [14],  $p \in \{0, 1\}$  and  $\omega_z$  is a vector containing all parameters except  $z$ .*

- *If  $p^*(z; \omega_z) = 1$  for some  $z = \bar{z}$ , then for all  $z < \bar{z}$ ,  $p^*(z; \omega_z) = 1$ .*
- *If  $p^*(z; \omega_z) = 0$  for some  $z = \underline{z}$ , then for all  $z > \underline{z}$ ,  $p^*(z; \omega_z) = 0$ .*

*Proof.* See Appendix A.5. □

## 5.4 Urbanization and land policy

Figure 4 illustrates an example on how initial urbanization, defined as  $U \equiv N_u/(N_u + N_r)$ , affects consumption, migration and the leader’s choice of property right. In

terms of our model, one can manipulate  $U$  by changing either  $N_r$  or  $N_u$ , or both. The effect of  $N_r$  is quite complicated and not so instructive because such an effect conflates two mechanisms. In addition to affecting  $U$ , changes in  $N_r$  also change rural land-labor ratio, affecting rural-urban differences in initial income. Given our setup, the latter effect does not arise when we change only  $N_u$ . Thus, we manipulate  $U$  by changing  $N_u$ , which allows us to focus on the effect of initial urbanization while holding rural-urban differences in initial income constant.

The horizontal line in the consumption plot (top panel) represents  $\gamma z$ , the minimum consumption level dictated by the political constraint. For low level of urbanization, the leader wants to limit migration, hence sets consumption at  $\gamma z$ , which is the lowest level of consumption that is politically feasible. As  $N_u$  increases, the leader's value of migrant labor increases. She thus offers consumption above  $\gamma z$  leading to increases in the number of migrants (middle panel). However, as  $U$  increases further, the leader's value of migrant labor decreases and the trend in consumption and migration reverses. Further increases in  $U$  lead to further decreases in consumption and migration until the leader hits the political constraint.

The intuition for these patterns lies in two opposing effects of urbanization. One the hand, an increase in urbanization expands the urban sector's capacity to absorb more migrants. This can be seen from the expression for  $MR$ , i.e. marginal contribution of the migrant labor to the leader's rent base (see Equation [17]). This effect implies that increases in urbanization increases the leader's demand for migrant labor.

On the other hand, an increase in urbanization increases the cost of attracting migrant labor through offering more consumption. This effect is captured in the expression for  $MC$  (see Equation [18]). If the leader increases consumption to attract more migrants (captured by the term  $\partial C_r(m)/\partial m$ ), this increase applies to the consumption of *all* workers in the urban sector (hence the factor  $N_u + m$ ). Thus, increases in initial urbanization increases the cost of attracting new migrants through increasing urban consumption. This effect will eventually dominate in the sense that the leader starts to lower consumption in response to increases in urbanization.

Nonetheless, according to the bottom plot, the gain from UOR is always increasing in  $N_u$ . We provide the proof for this result in Appendix (see Proposition 4). Intuitively, a combination of three explanations underlie as to why the gain from adopting UOR could be increasing in  $N_u$ . First the contribution of  $N_u$  is always positive to  $MR$ . Second, whenever the migration constraint binds, migration is set at a fixed value, given by  $C_r^{-1}(\gamma z)$ . Hence, when the constraint binds, an increase in  $N_u$  does not affect the cost of financing urban consumption via  $\partial C_r(m)/\partial m$ . Third, when the political constraint does not bind, it means that migrant labor is valued

sufficiently that the effect of  $N_u$  on  $MR$  dominates the effect of  $N_u$  on  $MC$ .

The following Proposition summarizes this effect of urbanization.

**Proposition 4.** *Let  $p^* : N_u \rightarrow p$  where  $p^*(N_u; \boldsymbol{\omega}_u)$  is given by [14],  $p \in \{0, 1\}$  and  $\boldsymbol{\omega}_u$  is a vector containing all parameters except  $N_u$ .*

- *If  $p^*(N_u; \boldsymbol{\omega}_u) = 1$  for some  $N_u = \underline{N}_u$ , then for all  $N_u > \underline{N}_u$ ,  $p^*(N_u; \boldsymbol{\omega}_u) = 1$ .*
- *If  $p^*(N_u; \boldsymbol{\omega}_u) = 0$  for some  $N_u = \bar{N}_u$ , then for all  $N_u < \bar{N}_u$ ,  $p^*(N_u; \boldsymbol{\omega}_u) = 0$ .*

*Proof.* See Appendix A.6. □

The impact of urbanization on institutional change has been investigated in the literature. Glaeser and Steinberg (2017) point out that urbanization promotes democratic change by facilitating coordination of public actions and enhancing the effectiveness of uprisings, increasing demand for democracy, and enabling citizens to improve their institutions. Our finding here indicates that urbanization pushes government to grant full ownership to rural households, an important institutional change in China. However, the channel behind the urbanization effect is different. In our model, the shrinking rural sector due to urbanization lures government, which collects taxes from the urban sector, to reform rural land regime and release labor from rural sector to urban sector. Andreas and Zhan (2016) argues that to promote urbanization, China is moving in a direction of relaxing the constraints of migration and granting more rights of land to households in rural areas. This is consistent with our results here.

## 5.5 The race between urbanization and TFP

When it comes to land policy choice, the increases in TFP and urbanization pull the government's incentive in the opposite directions—while further urbanization is more likely to encourage the adoption of UOR, higher TFP does the opposite. We now show how the interaction between these two competing incentives depends on the elasticity of labor demand in the urban sector and the political power by urban residents, i.e. the parameters  $\lambda$  and  $\gamma$ .

First of all, whether the leader prefers UOR even for very large level of  $N_u$  is not without qualification. It is possible, for example, the effect of an increased level of urbanization is fully countered by increases in TFP so that UOR is never adopted. The following proposition presents a crucial condition for whether the leader will adopt UOR in response to a sufficiently high level of urbanization.

**Proposition 5.** *Let  $p^* : N_u \rightarrow p$  where  $p^*(N_u; \boldsymbol{\omega}_u)$  is given by [14],  $p \in \{0, 1\}$  and  $\boldsymbol{\omega}_u$  is a vector containing all parameters except  $N_u$ . Then,  $\lim_{N_u \rightarrow +\infty} p^*(N_u; \boldsymbol{\omega}_u) = 1$  if and only if*

$$1 - \lambda - \gamma > 0. \quad [27]$$

*Proof.* See Appendix A.7. □

This proposition has two important implications. First, labor demand in the urban sector should be elastic enough in order to absorb new workers without significant wage depression. Second, the power of urban people should be sufficiently diminished to contain their political resistance. Without a combination of these two preconditions in place so that [27] holds, higher urbanization in its own is not destined to lead to UOR.

The values of  $\lambda$  and  $\gamma$  also affect the levels of  $z$  and  $N_u$  for which the leader prefers UOR. Figure 5 displays an example on how the  $(z, N_u)$  space interacts with  $\gamma$  in determining the choice of land policy. The shaded area represents the set of  $(z, N_u)$  such that UOR is the leader's choice. The graphs are plotted for small and large values of  $\gamma$ . At sufficiently low levels of  $N_u$ , UOR is not the leader's choice. As urbanization increases, UOR becomes a preferred policy. Moreover, an increase in  $z$  counters the effect of  $N_u$  in the sense that the leader is willing to adopt UOR for relatively low levels of  $N_u$  when  $z$  is small. This result implies, all else equal, rapid TFP growth would delay adoption of UOR.

The comparison between the two plots show how this interaction between  $N_u$  and  $z$  depends on  $\gamma$ . Higher  $\gamma$  makes it harder to adopt UOR. For each level of  $z$ , the required level of urbanization to adopt UOR increases, an effect represented by shrinking of the shaded area further to the right. An increase  $\lambda$  (not displayed here) has qualitatively identical result, i.e. it shrinks the shaded area to the right. In short, to the extent that both urbanization and TFP continue to grow in China, the model predicts that they present opposing incentives toward the choice of land policy. How the race between urbanization and TFP determines the choice of property rights in turn depends on the political power of the urban population and the elasticity of labor demand in the urban sector.

## 6 Conclusion

Even though China has moved toward market-friendly policies over the past several decades, its rural land policy has shown very little change. China's vast rural peasants

still face a very restrictive property right. While they have the right to farm their plots, their rights to sell and/or rent the plots are severely restricted. Many argue that these restrictions entail enormous efficiency costs, adversely affect the welfare of hundreds of millions of rural residents, and hence should be eased. However, the government has remained reluctant to adopt such a reform.

In this paper, we took a positive approach and ask the conditions under which the government may be willing to reform China's rural land policy. We develop a political economy model taking into account some important features of China. We consider a political regime that caters predominantly to the interest of urban residents. The government faces conflicting incentives on whether to remove ownership restrictions of rural land. Removing the restrictions lowers the opportunity cost of rural-urban migration and, hence, releases labor to the urban sector. This migration increases the leader's rent base, increasing the government's incentive to remove the restrictions. In the contrary, a large increase in labor supply following land reform increases the risk of urban unrest due to wage depression (or unemployment) in the urban sector. The central result of our model show how the rapid transformation of China's economy could affect the government's incentive toward the choice of rural land property right. The model shows that while increased level of urbanization increases the government's incentive to remove the ownership restriction, improvements in productivity of the urban sector has a counteracting effect.

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## **Appendix A Proofs**

### **A.1 Proof of Lemma 1**

Under construction.

### **A.2 Proof of Proposition 1**

Under construction.

### **A.3 Proof of Lemma 2**

Under Construction.

### **A.4 Proof of Proposition 2**

Under Construction.

### **A.5 Proof for Proposition 3**

Under Construction.

### **A.6 Proof of Proposition 4**

Under Construction.

### **A.7 Proof of Proposition 5**

Under Construction.

### **A.8 The effect of $z$ (Proposition 3)**

Under Construction.

### **A.9 The effect of $N_u$ (Proposition 4)**

Under Construction.

## **A.10 Effect of $N_u$ (Proposition 5)**

Under Construction.

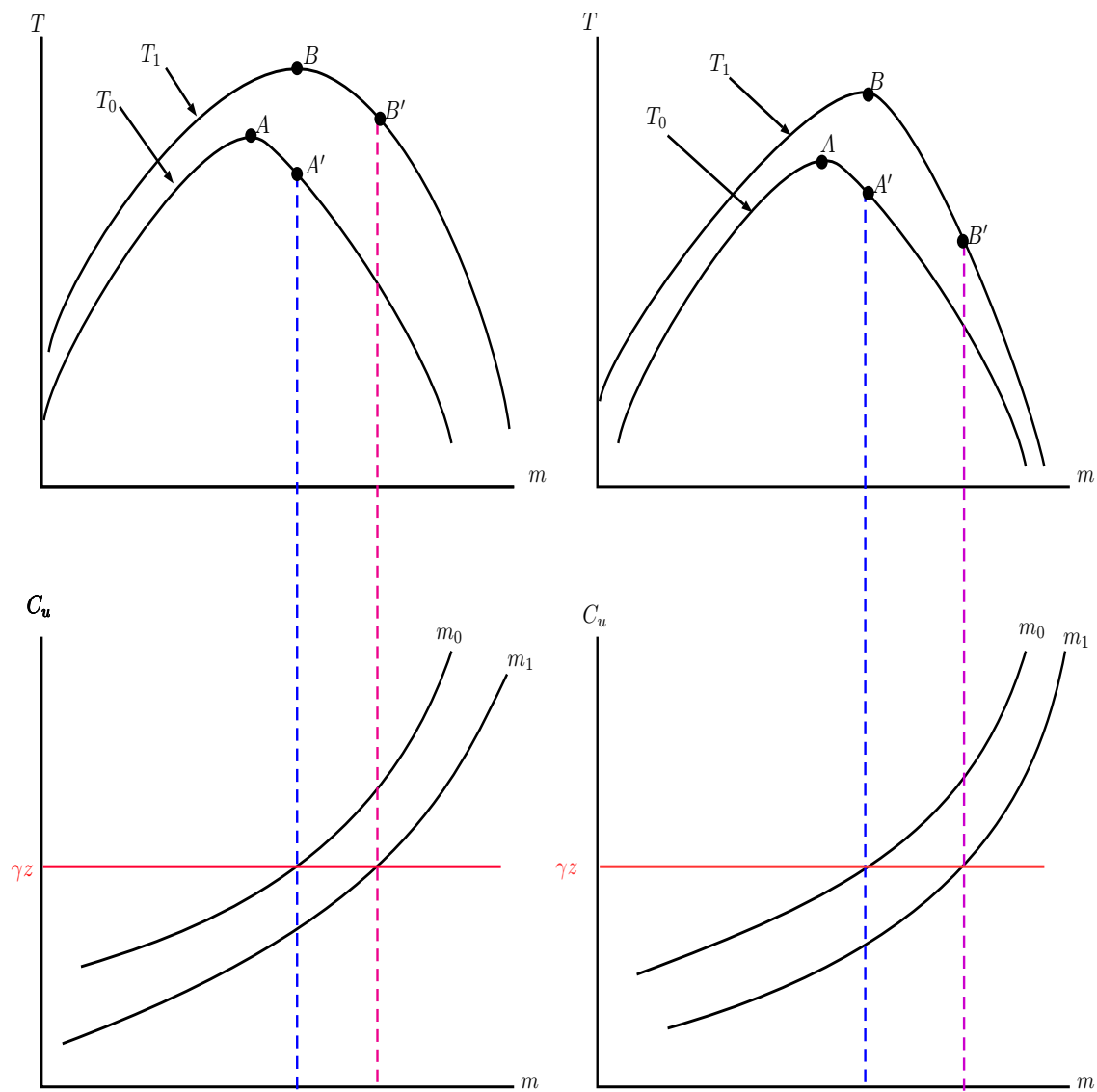


Figure 1: Land policy choice and political constraint

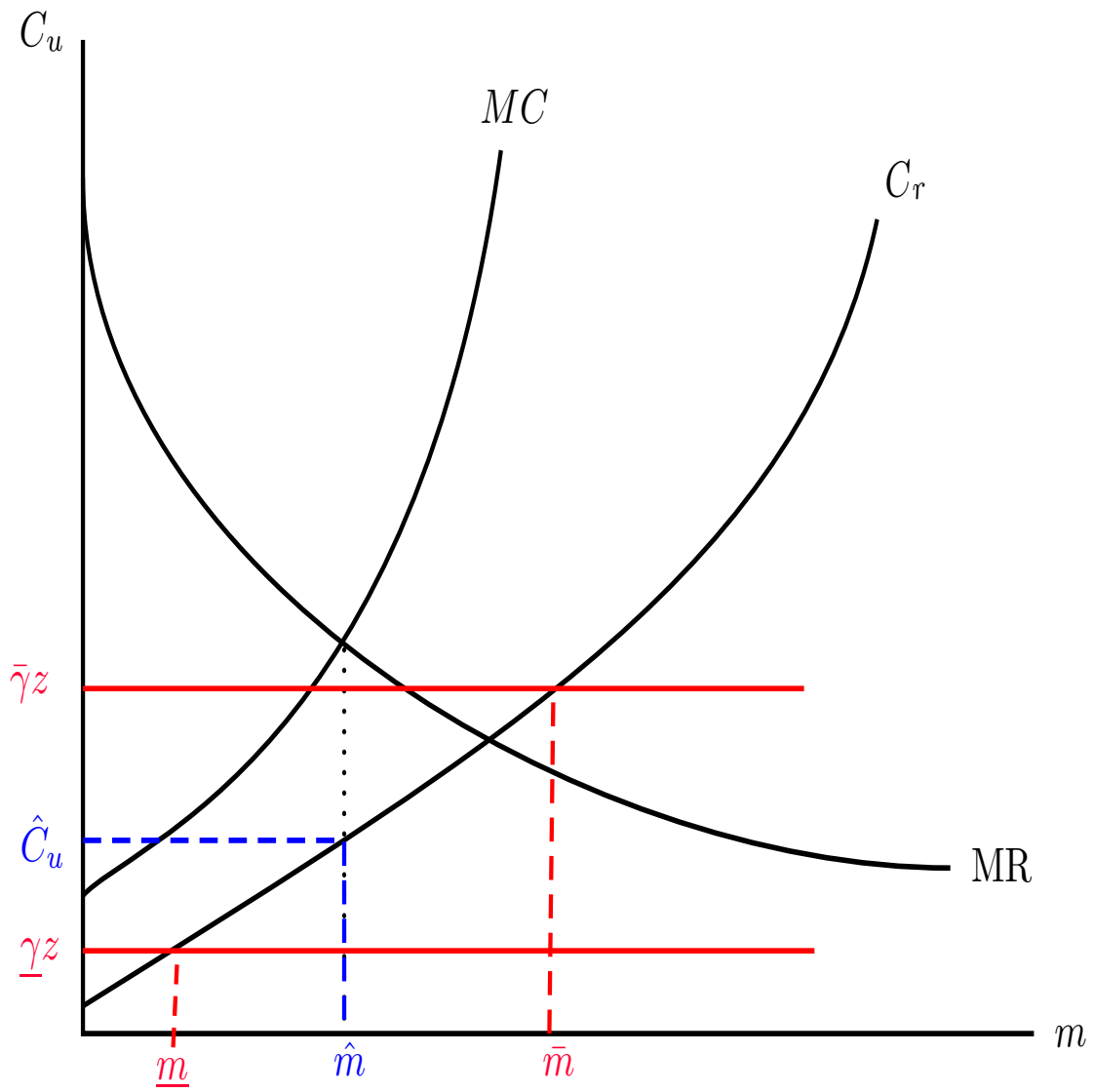


Figure 2: Land policy choice and political constraint

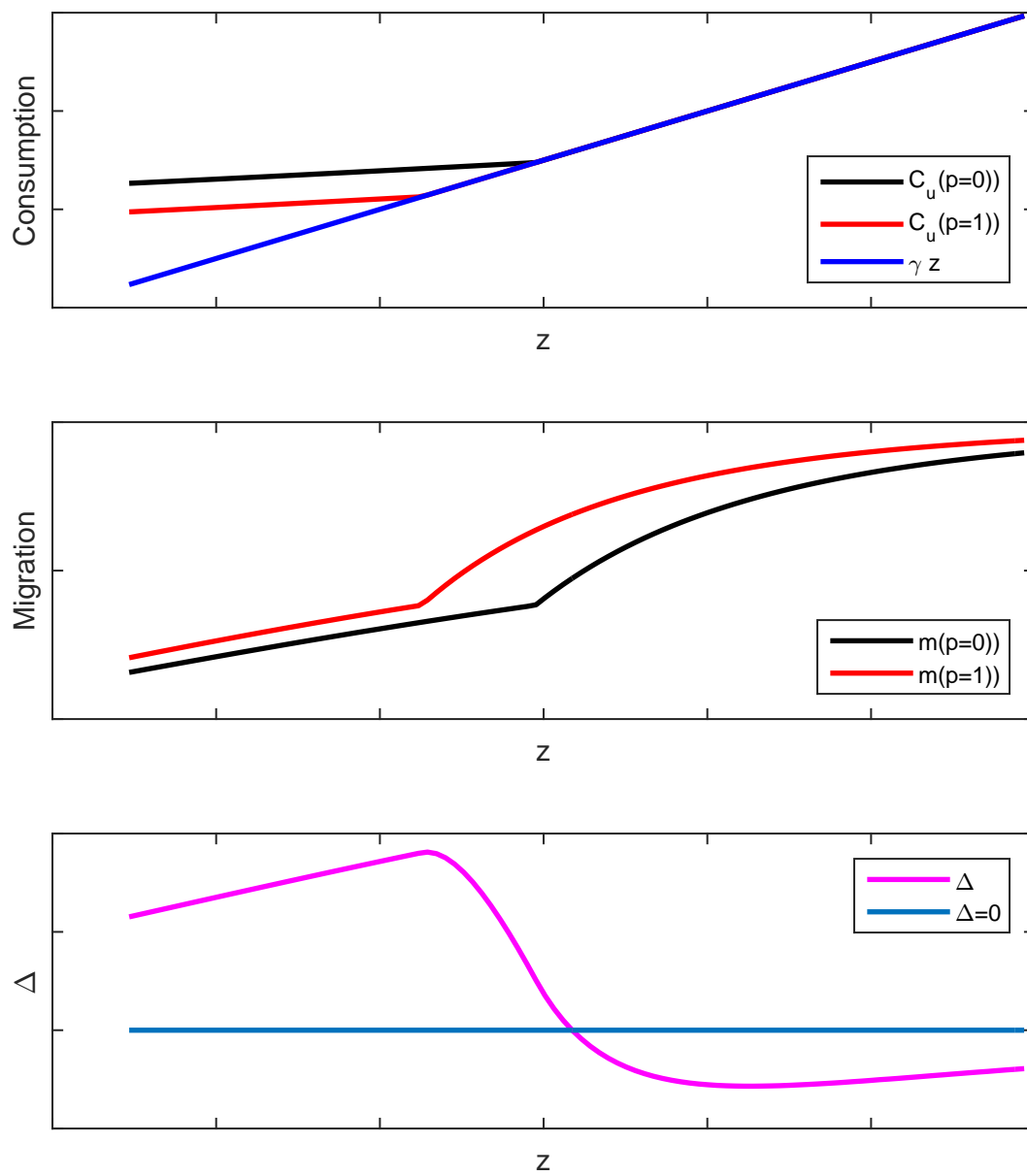
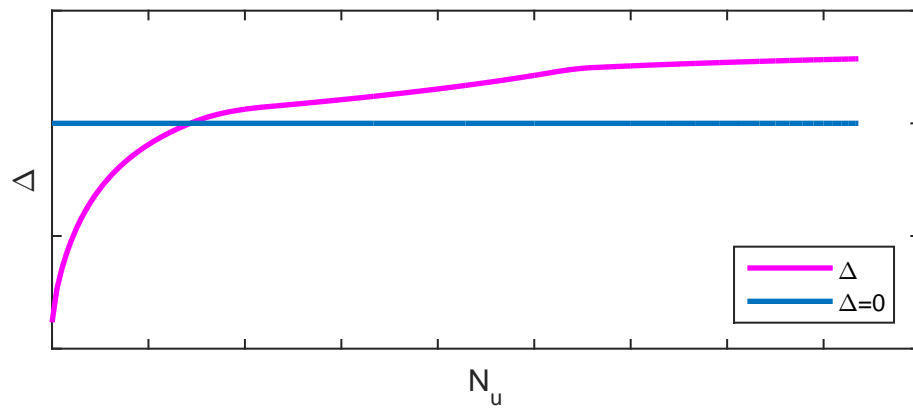
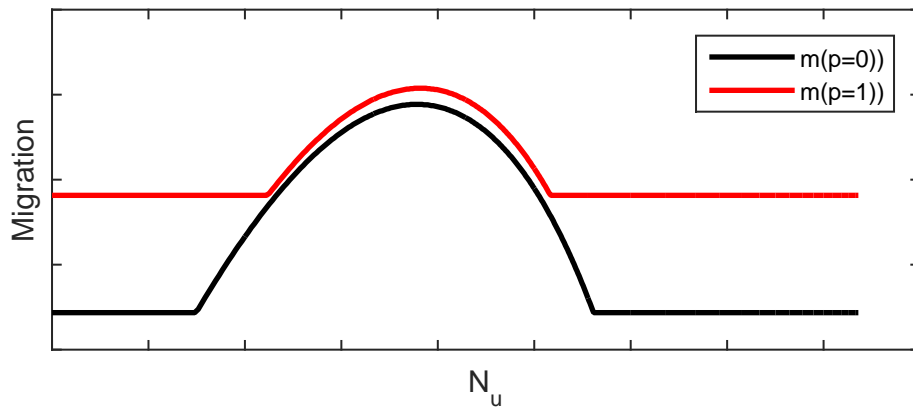
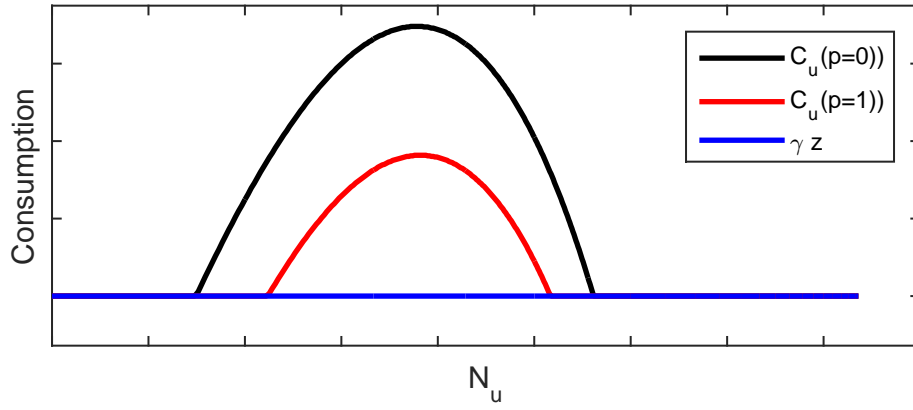


Figure 3: Effect of  $z$





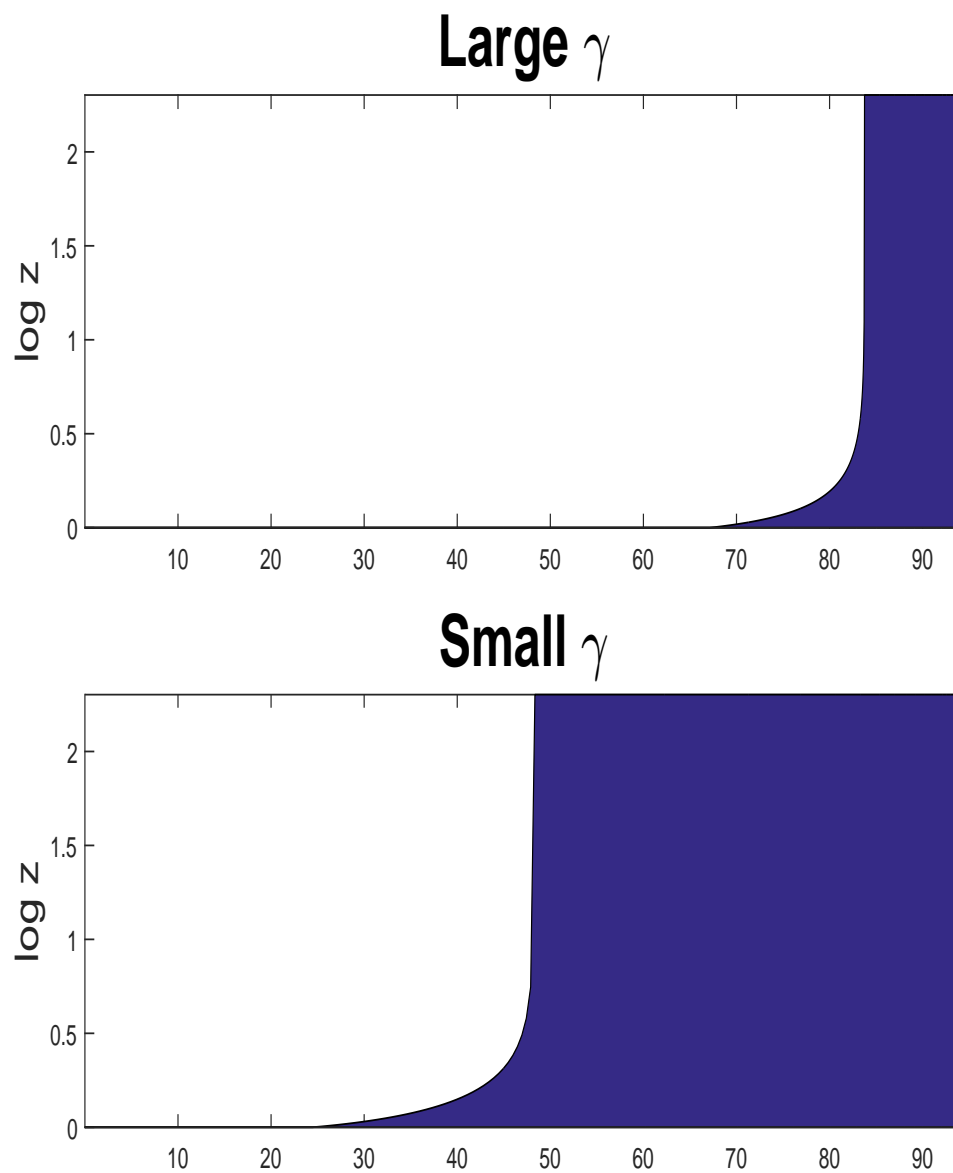


Figure 5: The race between TFP and urbanization

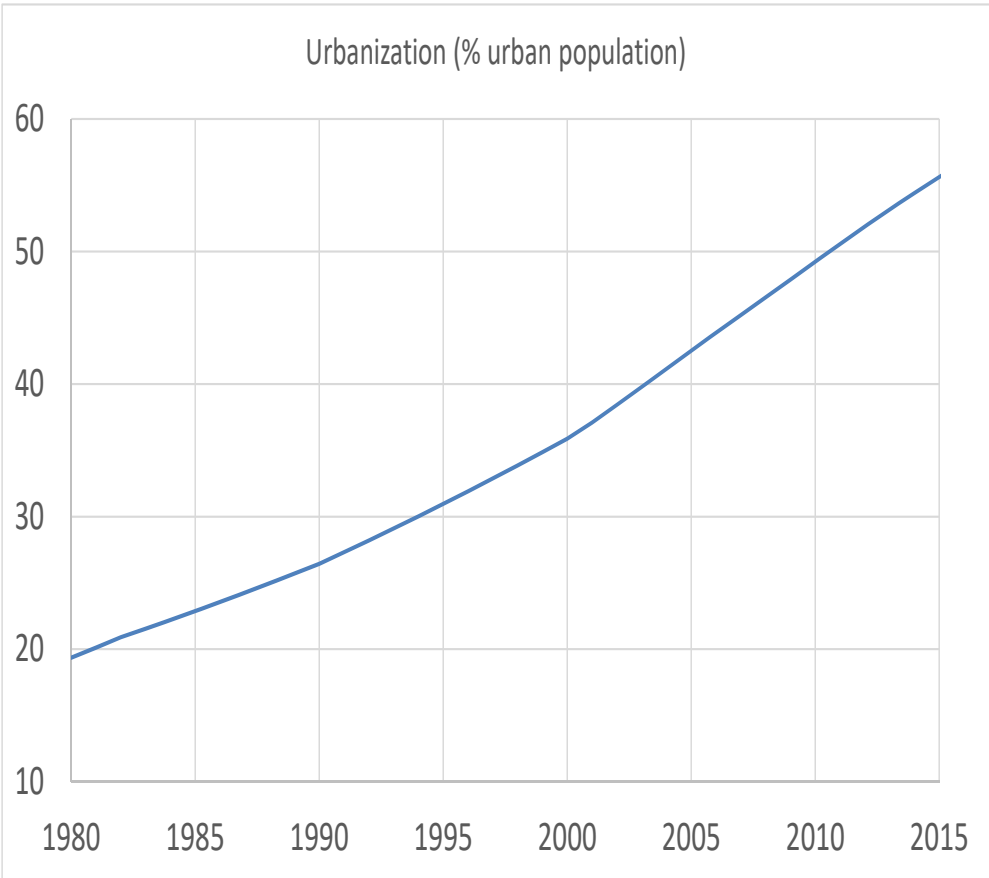


Figure 6: Urbanization in China.

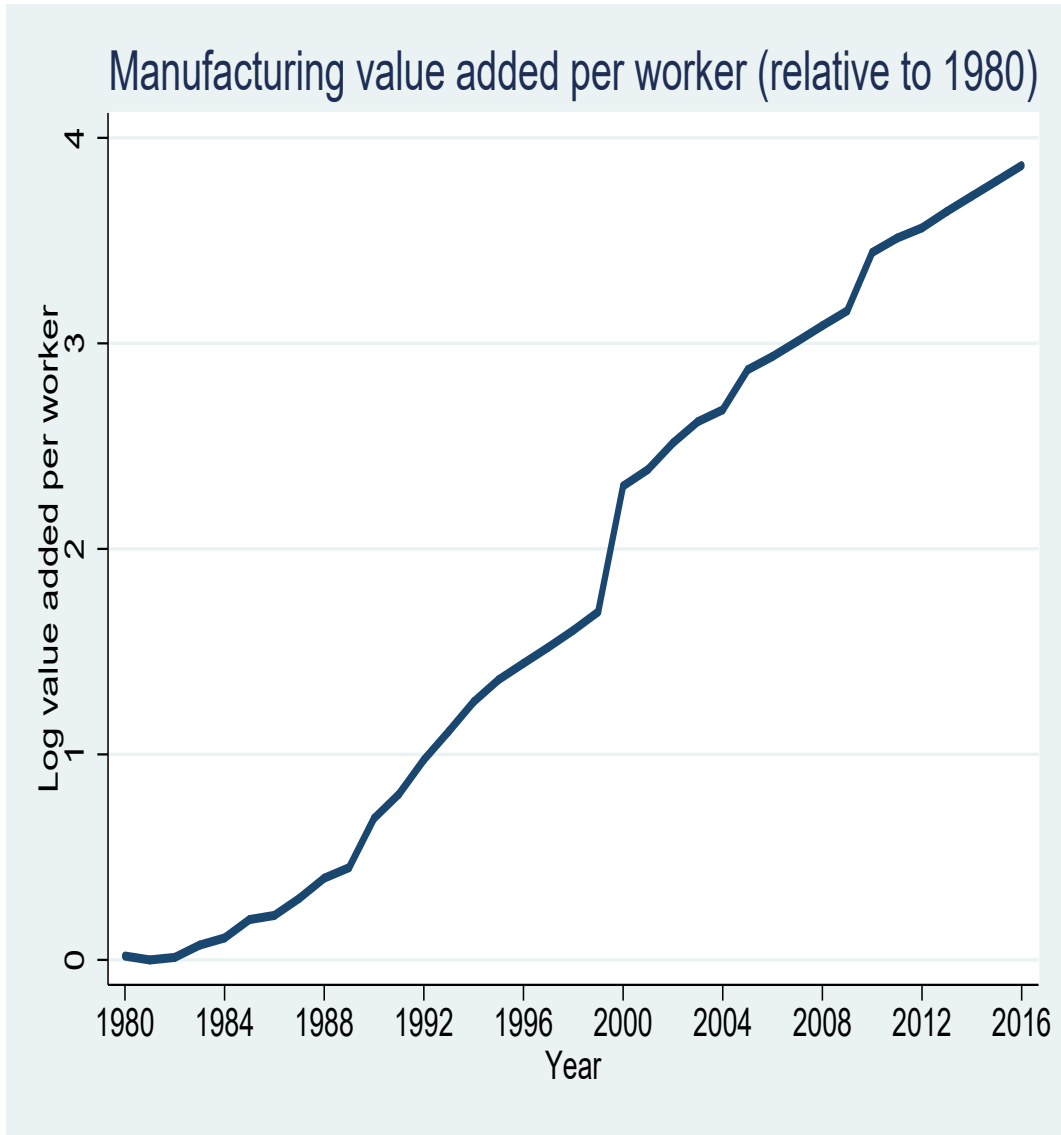


Figure 7: Manufacturing value added per worker in China.