Land Use Policy 87 (2019) 104066

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Urban-biased land development policy and the urban-rural income gap: Evidence from Hubei Province, China

Siliang Wang[a], Shukui Tan[b,*], Shengfu Yang[c], Qiaowen Lin[d], Lu Zhang[e]

[a] School of Public Administration, Hunan University, Changsha, China
[b] College of Public Administration, Huazhong University of Science and Technology, Wuhan, China
[c] School of Public Administration, China University of Geosciences, Wuhan, China
[d] School of Economics and Management, China University of Geosciences, Wuhan, China
[e] College of Public Administration, Central China Normal University, Wuhan, China

ARTICLE INFO

Keywords:
Theory of urban bias
Urban-biased land development policy
Urban-rural income gap
Dynamic panel model
Hubei Province, China

ABSTRACT

Developing countries generally face the challenge of significant urban-rural divides during their process of industrialization and urbanization. Following the paradigm of the theory of urban bias (TUB), this article focuses on the urban-biased land development policy (UBLDP) in contemporary China, which refers that local governments expropriate rural land with the inadequate compensation and use a considerable share of net land revenue to develop urban areas instead of rural areas. On the basis of pointing out three practical facts about and proposing the technique to measure the UBLDP, its influence on the urban-rural income gap (URIG) is investigated by employing the GMM dynamic model along with panel data from Hubei Province over the period of 2010-2016. The results show that a 1% increase in the extent to which compensation deviates from the market value of expropriated rural land (ERL) leads to a 0.46% increase in the URIG, while this effect is attributed to an unbalanced urban-rural income growth associated with the land development. These findings not only generate a broad of direct implications for Chinese policymakers but also provide lessons for other developing countries.

1. Introduction

Developing countries generally face the challenge of significant urban-rural divides during their process of industrialization and urbanization, which has been one of the long-standing themes in various disciplines of social sciences. The theory of urban bias (TUB) in the developing economics holds that such phenomenon is exogenous and devotes to explore the roots by analyzing the relevant institutional arrangements (Lipton, 1977; Krueger et al., 1991; Jones and Corbridge, 2010), and in the view of proponents of the theory, development policies implemented by governments of developing countries in response to many economic and social issues always favor cities rather than rural areas (Anderson and Hayami, 1986; Lipton, 1993), leading to a wide range of stark disparities in consumption, earnings, and welfare between rural and urban citizens, particularly shown as the huge income gap (Guan et al., 2018).

The rapid economic growth since the market-oriented reform has pushed China to become the world's second largest economy. During this period when China's GDP per capita grew at an average annual rate of 13 percent, both urban and rural residents have seen significant increases in their absolute income. However, the income advantage of urban residents over rural residents has widened for most of that time, except in the early years of reform and in recent years, making China still one of the countries with the most serious urban-rural income disparity. Currently, the income ratio between urban and rural residents is still higher than that at the beginning of reform. The coexistence of high economic growth and high urban-rural income inequality shown from Fig. 1 indicates that the benefits of development have not been broadly shared, not only forcing the Chinese authorities to prioritize the solution to this issue on the agenda, but also attracting scholars to explain its causes from extremely wide perspectives, which often involves various urban-biased policies (UBPs) implemented by the Chinese government (Cai, 2007).

This paper follows the paradigm of the TUB and focuses on the role of land development policy (LDP) in determining China's urban-rural income gap (URIG). Generally speaking, land is an indispensable factor of production for both urban and rural areas, and land policies are of fundamental importance to sustainable growth, good governance, and the well-being of and the economic opportunities open to rural and urban dwellers (Deininger, 2003). Specific in the contemporary China,

* Corresponding author.
E-mail addresses: sirenxingzhai@126.com, tansk@hust.edu.cn (S. Tan).

https://doi.org/10.1016/j.landusepol.2019.104066
Received 25 October 2018; Received in revised form 19 May 2019; Accepted 20 June 2019
Available online 28 June 2019

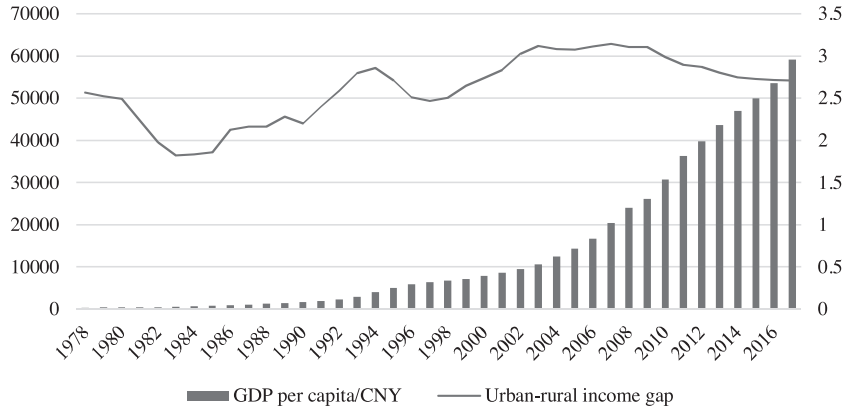

Fig. 1. The coexistence of high economic growth and high urban-rural income inequality.

under a dual land ownership system between urban and rural sectors, it implements the LDP characterized by the compulsory expropriation of rural land and the monopolistic leasing of urban land. Intuitively, this policy is very urban-biased, since it damages the welfare of rural residents with an inadequate compensation for land expropriation, whereas benefits the urban residents as a result of transferring a considerable share of land revenue for urban construction. In this sense, the LDP with urban bias is likely to generate an income distribution effect between urban and rural areas through affecting the allocation structure of land factor, and thus is associated with the dynamic of URIG.

With these considerations in mind, the present article aims to address two progressive questions, which remain largely unanswered to date. First, is LDP in China really in favor of urban areas and residents, if so, to what extent is it urban-biased? Second, can the urban-biased land development policy (UBLDP) predict the URIG in China? The answers to them and the approach by which this article searches for these answers contribute to the existing literature in several aspects. First, the TUB is expanded by introducing the policy case in the field of land use. Second, a novel technique is proposed to measure the degree of urban bias of LDP. Third, a fresh sight is provided to understand the causes of URIG in China with theoretical construction and empirical findings. And last, the income distribution effect of land allocation highlighted from this study not only creates implications for the Chinese government, but generates lessons for other developing countries in a broader international perspective.

The rest of this paper is structured as follows. Section 2 reviews the existing researches in relevant fields. Section 3 outlines an overview on the UBLDP. Section 4 theoretically explains why UBLDP impacts the URIG and proposes several hypotheses with a simple model. Section 5 empirically estimates the effect and identifies the mechanism with data from Hubei Province of China. Section 6 summarizes findings and discusses policy implications.

2. Literature review

2.1. The TUB and its role in understanding the development policy issues for developing countries

The clue to the TUB can be traced back to 1950s, as Myrdal (1957) expressed concern about the anti-rural bias in the policies of many developing countries when putting forward the theory of "backwash effect". The formal appearance of the term of "urban bias" was almost twenty years later, when Lipton (1977) elaborated how the governments of developing countries with the dominant power of factors, direct resources from rural to urban areas and from agriculture to industry sectors without any consideration of efficiency or equity. Another landmark work in the same period was Bates (1981), which illustrated the serious imbalance of political bargaining position between urban and rural residents as a deep-seated reason for governments of developing countries to implement UBPs. From the date of publication, these two masterpieces have been attracting great attention from the peers and leading to a continuous heated discussion. Bezemer and Headey (2008) epitomized the previous views and defined "urban bias" as the "inefficient and systemic bias against agriculture and the rural economy in the allocation of developmental resources". Broadly speaking, the urban bias phenomenon is multi-dimensional, involving many government policies that funnel resources from the countryside to cities, e.g., excess taxation of agricultural goods, food subsidies in urban centers, and different levels of public goods provision in urban and rural areas (Pierskalla, 2015).

The TUB provides a potent tool to understand the development policy issues for developing countries (Moore, 1993), many studies on the countries in Asia, Africa and Latin America have taken it as a theoretical base. For example, Lofchie (1997) explored the nature of urban bias in development policy in Africa and pointed out that urban industrial prosperity could not be obtained through policies to suppress the rural sector. Fesselmeyer and Le (2010) argued that the significant and widening rural-urban gap in Vietnam in the 1990s was related to the manipulation of government policies on investment and price, through which benefit was created to urban dwellers at the expense of people in rural areas. A systematic review on the urban bias in the development of developing countries could refer to Jones and Corbridge (2010).

As the world's largest developing country and with vivid urban-biased examples concerning the development pattern, China provides a variety of fascinating materials to examine the TUB for the reason that the urban bias has been persisting for so long, even after the adverse economic and social effects have become evident (Kanbur and Zhang, 2010). Taking the reform started in 1978 as a watershed, in the era of planned economy before that, in order to fulfill the economic catching-up strategy with development of heavy industry as the priority, Chinese authorities at that time extracted agricultural surplus largely for urban capital accumulation through three institutional approaches: controlling agricultural production and procurement, suppressing food-staple prices, and restricting rural-to-urban migration (Chen and Lin, 2014). In the period of reform, a series of policies that related to the resource allocation, factor flow and social transfer distribution, such as fiscal expenditure, social welfare and security, financial development, and land use, have been biased towards urban residents (Lu and Chen, 2006), meaning that the urban bias is less visible but do exist and even more serious (Yang, 1999). This is partly because urban advocacy groups exert greater pressure on the authorities than their rural counterparts (Cai and Yang, 2000; Chen and Lu, 2008), and partly because self-motivated local officials believe that the non-agricultural output is more essential to the economic growth (Ma and Yang, 2010).

2.2. URIG in China: Facts and causes related to the UBPs

Income inequality in China is roughly attributed to two structural forces: regional disparities and the urban-rural gap (Xie and Zhou, 2014), and the latter plays a more significant role than the former (Yang, 1999; Kanbur and Zhang, 1999; Maddison, 2007). Eastwood and Lipton (2004) even argued that there was no developing country whose income gap between urban and rural areas contributed more to overall income inequality than China's. With respect to the extent, the estimation from Wan (2007) indicated that income gap between rural and urban areas accounted for 70–80% of the national income gap. A later result by Chen et al. (2015) argued that this gap accounted for 58% of the national income gap in 2012. As to the trend of URIG, it shows an inverted U-shaped pattern (Ma et al., 2017), meaning the gap has been continually expanding in most of the time (Nolan, 1979; Zhao, 1993; Kwong, 1994; Wang et al., 2014), however, recent years, some regions have saw a reversed trend towards a widening gap (Wu and Rao, 2017; Chen et al., 2018).

Among the abundant of studies identifying the drivers of the URIG in China, a large proportion have been based on the TUB. Oi (1993) argued that government subsidies to urban residents, such as that on food and housing, significantly increased the URIG in the early years of reform. Khan et al. (1993) also pointed out that housing subsides, which was unavailable for rural residents, accounted for over 30 percent of urban income in the 1980s. Yang (1999) suggested that such UBPs as labor mobility restrictions, welfare systems, and financial policies of inflation subsidies and investment credits to the urban sector, were responsible for the long-term rural-urban divide in China. Yang and Zhou (1999) argued that the rise in rural-urban disparity since 1985 had been a result of the government's financial transfer programs in favor of the urban sector.

Beyond these qualitative analysis conclusions, the first empirical finding was from Lu and Chen (2006), which investigated how the economic policies that were biased toward urban residents contributed to the conspicuous URIG. In recent years, there have been a variety of studies that have published at the international or top Chinese journals focusing on the role of China's policy in a specific field in the URIG, of which the household registration (*Hukou*) system has attracted a special attention. The Hukou system distorts the labor market (Wang et al., 2014) and favors the urban population who has access to more occupation opportunities with higher payment (Wu and Treiman, 2004), making it a potential source of the growing divide between the earnings of urban and rural residents (Boffy-Ramirez and Moon, 2018). Apart from these, the impacts of such UBPs as those related to education budget, financial development, infrastructure investment, and social security and welfare have increasingly been the topics of relevant literature (Chen et al., 2010; Lin and Chen, 2011; Lei and Cai, 2012; Ye et al., 2018).

2.3. Government-intervened distortion of land allocation between urban and rural areas in China

The post-reform China is characterized by the over-regulation of administrative power on the factor allocation of various resources, while talking about the hysteretic marketization phenomenon, land factor allocation is always seemed as the least market-oriented due to the strong government intervention (Huang and Du, 2017). As has frequently illustrated by a variety of studies, a distorted land policy that carries government intervention is highly possible to cause factor misallocation (Glaeser and Ward, 2009; Restuccia and Rogerson, 2013). In urban China, local governments, who control the state-owned land, intervene in the land market through a differentiation strategy for various uses - leasing out industrial land at a lower price, while leasing out commercial and residential land at a higher price (Lin and Ho, 2005).

Apart from the land misallocation within the urban areas, there is another kind of distortion of land allocation that exists between urban and rural areas and is also with a government-intervened color. Under a dual land ownership system that separates the urban and rural land sectors, the local government is the sole buyer in the farmland acquisition market as well as the sole supplier in the urban primary land market (Tan et al., 2009). A common view is that rural land expropriation (RLE) and urban land leasing have been turned into a lucrative business by the local governments (Tao et al., 2010; Du and Peiser, 2014).

Some scholars have noticed the income distribution effect of land allocation between urban and rural areas. The wealth created from RLE for urban development is distributed among various involved parties (Du et al., 2016), and there is a strong evidence that the redistribution of land-based wealth is considerable (Du et al., 2014). What happens frequently is the inequality in land-based income, threatening the livelihood of land-deprived peasants (Yu et al., 2015). According to an investigation in Zhejiang Province of China, Hui et al. (2013) concluded that the amount of compensation had actually been declining as compared to the disposable income. In addition, Sargeson (2013) argued that desires to gain more of the income by urban growth often motived violence in land development.

2.4. A summary

To summarize, on the basis of a systematic review on relevant issues, first, the academic discussion around the TUB has been very mature, the explanatory power of the theory toward the causes of URIG in developing countries has been well recognized; second, there is no doubt that China's road to modernization is riddled with various UBPs, however, the degree of attention paid to their roles is different with each other, while land policy analysis is rarely involved in the perspective of the TUB; last, the income distribution consequences of government intervention in land allocation is largely underexplored, which may limit the understanding on both land and urban-rural divide issues. To fill these gaps, in the following sections, this article will construct the urban-biased feature of China's LDP and link it with the URIG.

3. UBLDP in China: an overview

3.1. Institutional backgrounds

The contemporary China carries out a dual land ownership system, under which land in urban and rural areas is separately owned by the state and villages. And based on that, the flow of land factor is unidirectional and state-controlled, only the expropriation of rural land for urban development is legally permissible, but not vice versa, while the location, time, compensation, and many other affairs related to the expropriation are almost entirely determined by the local government, whereas there is little room for bargaining for the land-expropriated villages and peasants. Given the local government also plays the role of monopoly supplier in the urban land leasing market, it actually owns an absolute power to control urban-rural land factor allocation, which lays the tool foundation for the UBLDP.

In addition to that, a growth-oriented performance evaluation system under decentralization motives Chinese local officials to expediently rely on the UBLDP. In China's governance framework, local governments are responsible for executing central decisions and developing their own regions, and the corresponding performance valuation takes the economic growth rate as the most important indicator. However, the reform towards fiscal decentralization in 1994 resulted in the severe asymmetrical power and responsibility in local fiscal system, forcing local officials to expand the revenue sources through any approach that seems to be legal and feasible. Given urban-rural land factor allocation is totally controlled by the local government and land revenue from that is not incorporated into the public finance system, local

officials thus has a strong urge to depend on and even to be obsessed with the so-called land-based development pattern, prefer to channel the huge land revenue to urban projects that are conducive to performance, the welfare generated from which benefits urban areas more.

3.2. Description of the facts

On the basis of the dual land ownership system that prohibits the market-oriented allocation of land factor between urban and rural areas, driven by the performance valuation system under fiscal decentralization, the outline of UBLDP emerges, and the essence of which can be summarized and described as: local government that is in control of the unidirectional flow of land factor from rural to urban areas, expropriates rural land with the compensation below the market value and puts a considerable proportion of resulting huge land revenue to the development of urban areas instead of rural areas. There are roughly three progressive facts regarding the policy in practice: 1) massive and excessive RLE; 2) inadequate and rigid compensation for RLE; 3) unfair expenditure structure of land development revenue (LDR).

3.2.1. Massive and excessive RLE

In the unprecedented process of rapid urbanization China is undergoing, tens of millions of farmers has been migrating from their rural hometowns to cities for temporary work or for permanent settlement, and the large-scale migration of rural population inevitably promotes the urban expansion, generating a substantial demand of converting rural land for urban use in the cases of the fixed amount of total land and the relative difficulty in revitalizing the urban stock land (You, 2016). The official statistical data shows that over the past 2004–2016 years, the total scale of land expropriation accumulated more than 4.98 million hectares, of which the RLE accounted for 75.4%, as to the trend, the annual scale of land expropriation has risen sharply since 2009 when the whole country launched various stimulus plans to deal with the global crisis, and peaked in 2011, almost double what it was in 2005. Although it has since fallen, the annual scale of land expropriation still exceeded 300 thousands hectares in 2016.

Although large-scale land expropriation reflects the growing demand for land during the rapid urbanization, the fact of serious waste of land resources in urban areas that exists at the same time means the expropriation, especially which to rural land is out of need and inefficient. To some extent it depicts the urban bias the local government holds in the development, local officials prefer to expand the RLE rather than revitalize the urban stock land as the cost of the former is lower, resulting the excessive RLE. And remarkably, although the overall land expropriation scale has been declining these years, the proportion of RLE even increased during the same period.

3.2.2. Inadequate and rigid compensation for RLE

In the case that large-scale RLE has already become an established fact, the compensation is the key element to ensure the interests of land-expropriated farmers. However, the compensation for RLE in China does not follow a market-oriented mechanism, but is calculated based on a set of standards issued by the provincial government in advance. Regarding to the standard, according to the Land Administration Law, it only need to reflect the land value of pre-expropriation purpose, but do not have to consider the value of post-expropriation purpose, meaning that the compensation with respect to the expropriated rural land (ERL) is largely inadequate relative to the market value it deserves.

Facing the situation of increasing conflicts caused by land expropriation, Chinese central government has been asking the local governments to reform and regulate the relevant affairs, of which the most important is to dynamically update the compensation standard to make it keep with the local economic growth pace. However, few provinces have updated their standards in line with the period suggested by the central government (2~3 years). Furthermore, the average annual growth of the compensation standard is only 5.4%, far less than the growth of national income. All the above shows that local governments who intend to maintain the low cost of RLE lack the initiative and enthusiasm to raise the standard, which is a typical reflection of the UBLDP.

3.2.3. Unfair expenditure structure of LDR

Under the current fiscal system in China, the revenue from leasing urban land belongs to the governmental funds, which is soft-constrained and is not included in public finances. Although budget management has been carried out on LDR since 2006, the transparency of the revenue expenditure is still very low compared with the general budget, and local governments have complete autonomy with respect to the expenditure of LDR.

In practice, because of the huge amount and the soft-constrained characteristic, the LDR is endowed with a wide range of uses, which can be divided into two categories: cost expenditure and non-cost expenditure. The former mainly includes compensation for land expropriation, subsidies for land-expropriated farmers, and pre-development and business expenditure for land leasing, while the latter is mainly used for urban construction, rural development and urban affordable housing career. According to the data from the Ministry of Finance, first, the proportion of cost expenditure used for compensation and subsidies decreased, from over 80% in 2010 to less than 70% in 2014; second, the proportion of non-cost expenditure used for rural development was small and continued to decrease; and last, the gap between the expenditure for rural development and that for urban development widened. As a whole, urban residents get more benefits from the expenditure of LDR than rural residents, highlighting the unfairness of expenditure structure, which is also an objective reflection of UBLDP.

4. Theoretical analysis and hypotheses

4.1. Theoretical analysis

Land is a key factor for agricultural production and also the material foundation for the survival of farmers (Hui et al., 2013). The meaning of land for farmers is that it both provides an essential source of agricultural income and carriers the possibility of obtaining compensatory or bonus income. While land expropriation definitely cuts agricultural income of farmers, it opens up a window for compensatory income. In this sense, the influence of land expropriation on the absolute income level of the expropriated farmers can not be generalized. According to the field investigation by a Chinese scholar (He, 2014), it is common for farmers, regardless in developed or underdeveloped regions, to eagerly hope their land to be expropriated.

Although land expropriation does not certainly reduce the income level of urban residents and even has a positive effect (Shi et al., 2011), within the urban-rural land factor allocation framework shaped by UBLDP, the huge divide between land expropriation compensation and land leasing revenue leads to a faster income growth of urban residents than their rural counterparts, generating a certain urban-rural income distribution effect. In detail, land development dominated by the local government realizes a significant wealth effect, in addition to giving a low-level compensation to land-expropriated farmers, the created revenue is mainly used in urban development, including the construction of infrastructure project, provision of enterprise subsidies, and supply of public goods. The rapid urbanization at the same time increases the value of urban housing, which further greatly benefits urban residents. As a contrast, the small proportion of land expropriation compensation in LDR means that land-expropriated villages and farmers do not benefit much, consequently, even possible income growth is limited.

Based on the above analysis, the mechanism of UBLDP impacting on the URIG is already formed: the severe deprivation of land expropriation compensation relative to the market value of converted rural land accounts for the slower growth in the income of rural residents, and it is

this distortion that supports the local government to invest a significant amount of LDR into urban construction, which is indispensable for the rapider growth in the income of urban residents.

4.2. A simple model and hypotheses

Inspired by Cheng and Li (2007), a simple model is deducted to rationalize the mechanism proposed above. Suppose that the urban-rural output is the function of LDR, which can be expressed as:

$$W = W(U, R) = W(U(S_U), R(S_R)) \quad (1)$$

Where W denotes the national welfare, U and R respectively denotes the output of urban sector and that of rural sector, S denotes the LDR, and the share of which for urban sector and that for rural sector is respectively S_u and S_R.

The goal of development is to maximize W as follows.

$$\begin{aligned} &MaxW = W(U(S_U), R(S_R)) \\ &s.\ t.\ S = S_U + S_R \\ &S_U > 0,\ S_R > 0 \end{aligned} \quad (2)$$

The condition for achieving the goal is that the marginal welfare gain resulting from the increase of share of LDR for urban sector equals the marginal welfare loss resulting from the decrease of share of LDR for rural sector, or vice versa, which can be expressed as:

$$\frac{\partial W}{\partial U}\frac{\partial U}{\partial S_U} = \frac{\partial W}{\partial R}\frac{\partial R}{\partial S_R} \quad (3)$$

Thus, the question becomes to maximize the national welfare by determining an appropriate ratio that used to distribute the LDR between urban and rural sectors. And the Eq. (3) can be transformed as:

$$\frac{S_U}{S_R} = \frac{\beta_{W.U}\cdot\beta_{U.S_U}}{\beta_{W.R}\cdot\beta_{R.S_R}} \quad (4)$$

Where $\beta_{W.U} = \frac{\partial W}{W}/\frac{\partial U}{U}$ and $\beta_{W.R} = \frac{\partial W}{W}/\frac{\partial R}{R}$ denotes the welfare elasticity of output in urban sector and that of output in rural sector, respectively; and $\beta_{U.S_U} = \frac{\partial U}{U}\Big/\frac{\partial S_U}{S_U}$ and $\beta_{R.S_R} = \frac{\partial R}{R}\Big/\frac{\partial S_R}{S_R}$ denotes the output elasticity of share of LDR for urban sector and that of share of land development for rural sector, respectively.

Given that:

$$\frac{\beta_{W.U}}{\beta_{W.R}} = \lambda\frac{U}{R},\ \lambda > 0 \quad (5)$$

Combine Eq.s (4) and (5) to obtain:

$$\frac{U}{R} = \frac{1}{\lambda}\frac{S_U}{S_R}\frac{\beta_{R.S_R}}{\beta_{U.S_U}} \quad (6)$$

Which indicates that the urban-rural output ratio (U/R) is proportional to the ratio that used to distribute the LDR between urban and rural sectors. Since the urban-rural output ratio can be taken as the representation of the URIG, while the other ratio represents the degree of urban bias of LDP, the following four hypotheses are thus put forward to be empirically tested.

Hypothesis 1. A higher degree of urban bias of LDP leads to a greater URIG.

Hypothesis 2. A higher degree of urban bias of LDP leads to a higher income level of urban residents.

Hypothesis 3. The urban bias of LDP does not certainly lead to a decrease of income level of rural residents.

Hypothesis 4. The positive effect of UBLDP on the URIG is due to the difference of resulting income growth between urban and rural residents.

5. Methodology

5.1. Measuring the UBLDP

One of the most important prerequisites to examine the effect of UBLDP on the URIG is to measure the former. To ensure that the measurement results effectively reflect the degree of urban bias of the policy, and with the consideration of data availability, the indicator for measurement is constructed as the deviation of compensation relative to the market value of ERL, which could be expressed as:

$$DUB = \frac{MEL - CEL}{MEL} \quad (7)$$

Where DUB denotes the degree of urban bias of LDP, CEL and MEL denotes the compensation for and the market value of ERL, respectively.

5.1.1. The approach to estimate CEL

The public materials on land expropriation are scarce in China, and there is no macro-statistical data on compensation for land expropriation. To overcome this data limitation, CEL is estimated with the stepwise use of the following formula:

$$CEL_i = \sum_{j=1}^{n} sle_j cel_j \Big/ \sum_{j=1}^{n} sle_j \quad (8)$$

Where CEL_i denotes the level of land expropriation compensation in the region i, j denotes a sub-region under the jurisdiction of the region i, sle_j denotes the scale of land expropriation in the sub-region j, cel_j denotes the level of land expropriation compensation in the sub-region j.

5.1.2. The approach to calculate MEL

There is not a free market for the farmland conversion in China, meaning that the market value of ERL can not be obtained based on the real transactions (Zou and Oskam, 2010). Given that where the ERL goes is the urban land leasing market, the price of urban land thus can be used as a baseline value to calculate the market value of ERL. Referring to the cost method in real estate appraisal, the composition of the urban land price is as the formula:

$$PUL = MEL + C + T + I + R + A \quad (9)$$

While the meaning of each component and its formula is as shown in Table 1.

Substituting the formula of each component into the Eq. (9) to

Table 1
The approach to calculate MEL.

Component	Meaning	Baseline value	Formula
PUL	Price of urban land	known	
MEL	Market value of ERL	pending to calculate	
C	Development cost	PUL	PUL × d
T	taxes	MEL	MEL × t
I	interests	MEL, C, T	$(MEL + T)\times(1+i)+C\times(1+i)^{0.5}-(MEL + T + C)$
R	profits	C	C × r
A	Revenue belongs to the local government	PUL	PUL × g

obtain:

$$MEL = PUL \times \frac{1 - d \times (1 + i)^{0.5} - d \times r - g}{1 + t + i + t \times i} \quad (10)$$

Thus, the parameters that are required to calculate the price are d, t, i, r, and g, which denotes the ratio of development cost in the land revenue, tax rates, capital interest rate, profit rate, and government's income by the state ownership of urban land, respectively. At the practical level, the values of each parameter will be determined based on the following rules: 1) According to the data on the local government-managed funds expenditure (MOF, 2010–2013), d is valued as 10% for the year of 2010 and previous years and as 20% for the years after 2010. 2) Referring to Liu (2014), t and r are valued as 3.5% and 15%, respectively. 3) i is valued as the one-year loan rate for the same period. 4) Referring to He et al. (2014), g is valued as 20%.

5.2. Study area

Hubei Province, located in the central China as well as the middle reach of the Yangtze River, has a population of over 58 million and covers an area of 185,900 square kilometers, and is playing an increasing role in implementing some national development strategies, such as the Yangtze River Economic Belt, Rise of Central China Plan, and the Belt and Road Initiative. The reason why Hubei is chose as a study area is that the fundamental materials for calculating the nationwide DUB are unavailable, mainly due to the lack of land expropriation compensation data. Luckily, however, we have obtained all the materials required to conduct an empirical study on Hubei. Moreover, Hubei Province has one sub-provincial city (Wuhan), an autonomous prefecture (Enshi), four directly administrative county-level administrative districts (Tianmen, Qianjiang, Xiantao, and Shennongjia) and eleven prefecture-level cities (the others) under its jurisdiction, seen as Fig. 2. The inter-city inequalities in terms of the economic and social conditions exist in Hubei facilitate us to examine whether there is a causality between UBLDP and the URIG.

5.3. Variables and data collection

5.3.1. Dependent variable

The ratio of income between urban and rural residents (*inc_gap*) is used to directly measure the URIG. It needs to be mentioned that the statistical caliber for the income of rural residents has changed since 2013, and we will consider that in the model.

5.3.2. Primary independent variable

The technique introduced in the Section 5.1 is applied to measure the degree of urban bias of LDP (*pol_ub*).

5.3.3. Control variables

Several variables that may affect China's URIG are controlled, including:

1) Economic development (RGDP). Gross domestic product (GDP) per capita is used to reflect the level of economic development. Taking the Kuznets hypothesis that holds an inverted U relationship between the URIG and the economic development into consideration, the quadratic term of RGDP is also brought into the model.
2) Urbanization (URBAN). The proportion of urban population in the permanent population is used to measure the urbanization level.
3) Financial development (FINAN). The ratio of deposit and loan balance in banking financial institutions to GDP is used to reflect the level of financial development.
4) Opening up (OPEN). The proportion of total import and export in GDP is used to reflect the level of opening up.
5) Fiscal expenditure structure (FISCAL). The proportion of expenditure on the social security, employment and urban community affairs in the fiscal expenditure is used to measure the fiscal expenditure structure.
6) Whether the compensation standard is updated (UPDATE). Considering that Hubei provincial Government updated the standard for land expropriation compensation in 2014, a dummy variable, with zero for the year before 2014 and one otherwise, is used to control the policy effect.

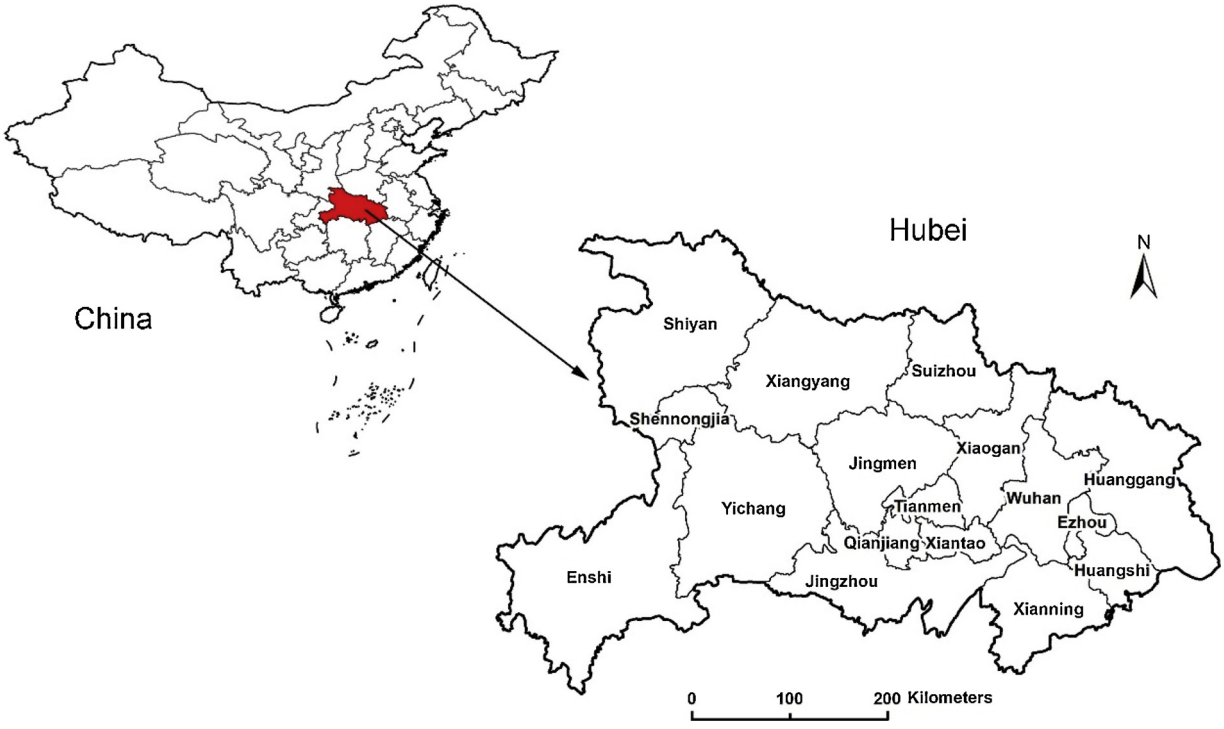

Fig. 2. Location of Hubei Province in China.

7) Whether the statistical caliber is changed (CHANGE). As has mentioned above, the change of statistical caliber for the rural income since 2013 artificially impacted the observed income trend, also, a dummy variable, with zero for the year before 2013 and one otherwise, is used to control this effect.

5.3.4. Data source

The data used in the following empirical study is the city-level panel data of Hubei Province from 2010 to 2016. The reason for choosing 2010 as the start is because the first-edition of the standards for land expropriation compensation was launched in December 2009, while compensation in the pervious years is hard to be obtained. In addition to that, only sub-provincial city and prefectural cities are included in the estimation, while Enshi, Xiantao, Tianmen, Qianjiang, and Shennongjia are excluded due to their particularity. The data are from Hubei Statistical Yearbook, China Land and Resources Statistics Yearbook, China City Statistical Yearbook, Statistical bulletin of Economic and Social Development of each city, and documents for land use approval released by Department of Land and Resources of Hubei Province.

5.4. Model

The main specification is as follows.

$$inc\_gap_{it} = C + \alpha inc\_gap_{i,t-1} + \beta pol\_ub_{it} + \gamma X_{it} + u_i + \varepsilon_{it} \quad (11)$$

Where the coefficient of interest is β. The vector X contains above mentioned variables that may affect URIG, whose coefficients are γ. The first-order lagged value of URIG is added to control the dynamic effect of itself; u_i represents the individual-fixed effect, ε_{it} represents residual error.

6. Results and analysis

6.1. Description statistics

To smooth the data and mitigate the effect of heteroscedasticity, the natural logarithm is taken for the data on the variables outside of the proportional type. Table 2 reports the description statistics on the variables. Since that there are observable inter-city variances for all the variables, it is possible to explore the determinants of URIG, including to link its relationship with UBLDP.

6.2. Baseline regressions

First, the model with pooled data is estimated using the ordinary least squares (OLS) method, and the result is presented as the Column (1) in Table 3. The coefficient of lagged URIG is positive and statistically significant, preliminary indicating a dynamic effect of URIG on itself. The influence of UBLDP on the urban-rural gap is also positive and significant at the 5% level.

Because of the different condition of each city, there may be omitted variables that do not change with time, the panel data model is further estimated using the fixed effects. In Table 3, Column (2) reports a base model that only includes the core variables, Column (3) adds the control variables other than the two policy variables, and Column (4) includes all the variables. It can be seen that the explanatory power of the model gradually enhanced with the successive inclusion of variables. Comparing the estimation results of the pooled OLS and fixed effects, the former overestimated the lagged dependent variable due to not take the region fixed effect into account, while the latter underestimated it as a result of the short period of sample. The coefficients of UBLDP are all positive and significant at the 10% level in the three estimations of fixed effects, which supports the Hypothesis 1.

Table 2
Description statistics results.

Variable	Obs.	Mean	Std. Dev.	Min	Max
inc_gap	84	2.314	0.504	1.750	4.610
pol_ub	84	0.824	0.045	0.666	0.928
RGDP	84	10.539	0.488	9.505	11.622
URBAN	84	0.534	0.099	0.372	0.798
FINAN	84	1.723	0.564	0.956	3.606
OPEN	84	0.066	0.050	0.021	0.223
FISCAL	84	0.206	0.042	0.079	0.328
ADJUST	84	0.429	0.498	0.000	1.000
CHANGE	84	0.571	0.498	0.000	1.000

6.3. Dynamic panel estimation

The OLS and fixed effects estimators are biased and inconsistent due to the endogeneity problem resulting from the presence of the lagged dependent variable among independent variables. Arellano and Bond (1991) have suggested a difference generalized method of moment (GMM), which uses the lagged values of the endogenous explanatory variables as instruments in the estimation. Later, by including the lagged value of first difference of the dependent variable as an instrument, Blundell and Bond (1998) have proposed the system GMM to deal with the poor finite sample property of difference GMM which makes it possible to be affected by the weak instrumental variables. It needs to be noted that both methods are not superior or inferior. On one hand, the Monte Carlo simulation proves that the system GMM result is less biased and more effective than the difference GMM result given the finite sample; while on the other, as more instrumental variables are involved, there is a greater loss for the degrees of freedom using the system GMM, which may reduce the reliability of instrumental variables by weakening the over-identification test result. Moreover, both methods can be conducted in one-step or two-step processes. In the case that model exhibits heteroscedasticity, one-step GMM tends to over-reject the validity of the instrumental variables, whereas the two-step GMM may underestimate the real t value.

Generally, there are two validity test statistics for the GMM estimation: 1) The Sargan test of over-identified restriction (Sargan, 1958). The null hypothesis is that all instruments are valid. The greater the p-value of the Sargen statistic is, the more valid the instruments are. 2) The Arellano-Bond test for serial correlation (Arellano and Bond, 1991). The null hypothesis is that there is no serial correlation in the differences of disturbances. And normally, the first-order serial correlation is acceptable, whereas the second-order serial correlation is not allowed.

Accordingly, Table 4 presents the estimation results of one-step difference GMM, two-step difference GMM, one-step system GMM, and two-step system GMM, respectively. First, the Wald test of joint significance on all the models indicate that they are significant. Second, both the Sargen test in one-step difference GMM and that in one-step system GMM rejects the null hypothesis, indicating that the one-step estimation results over-reject the validity of instrumental variables; both the Sargen test in two-step difference GMM and that in two-step system GMM do not reject the null hypothesis, indicating the validity of instrumental variables. Third, Arellano-Bond tests for second-order serial correlation in the difference of disturbances in both two-step difference GMM and two-step system GMM do not reject the null hypothesis, indicating that there are no second-order serial correlations in the disturbances that after difference transformation. Considering that the p-value in the Arellano-Bond test in two-step difference GMM is greater, we will utilize the estimation results of the two-step difference GMM for a detailed analysis.

Based on the results, the coefficient of lagged URIG is positive and statistically significant, indicating a dynamic panel. The UBLDP, measured as the extent to which the compensation deviates from the market value of ERL, has a positive and statistically significant effect on the URIG, which better verifies the Hypothesis 1, and a 1% increase in the

Table 3
Estimation results of the pooled OLS and fixed effects.

	(1)	(2)	(3)	(4)
L.inc_gap	0.6860*** (12.11)	0.3162** (2.78)	0.2571** (2.46)	0.2080** (1.22)
pol_ub	0.9598** (1.40)	0.8379* (1.53)	0.5415* (0.91)	0.3598* (1.56)
RGDP	6.6250* (1.82)		5.3790 (1.54)	3.7363 (1.03)
$(RGDP)^2$	−0.3083* (-1.81)		−0.3109* (-1.95)	−0.1864 (-1.13)
URBAN	−0.4923** (-1.07)		2.5221 (1.42)	1.2939 (0.66)
FINAN	0.1823 (1.72)		−0.4667*** (-1.64)	−0.3635*** (-1.65)
OPEN	−1.3296** (-1.28)		−3.3246* (-2.27)	−1.0835* (-0.75)
FISCAL	0.8975* (1.29)		1.4872** (1.12)	0.8510* (0.65)
ADJUST	0.0125 (0.25)			−0.1617** (-2.77)
CHANGE	−0.2456*** (-2.31)			−0.1376** (-3.00)
constant	−35.6671 (-1.82)	−12.3651** (-2.96)	−20.2398* (-1.08)	−16.4133 (-0.84)
R^2	0.8173	0.2456	0.5666	0.6162

Notes: 1) L.inc_gap is the first-order lagged term of URIG. 2) *t* value in the parentheses. 3) *p < 0.1; **p < 0.05; ***p < 0.01.

deviation leads to a 0.46% increase in the URIG.

The coefficients of control variables are generally consistent with what have shown in previous studies. Concretely, 1) the coefficient of RGDP is positive while that of the quadratic term of RGDP is negative, evidencing the Kuznets hypothesis. 2) The coefficient of URBAN is negative but not statistically significant, and considering that the results in other three estimations are positive or negative, indicating an uncertain effect of urbanization, which has the potential to reduce the URIG by the integration of urban and rural areas, as well as to expand the gap by the implementation of UBPs. 3) The coefficient of FINAN is significantly negative, indicating that the financial development is help to reduce the URIG by improving the allocation of financial capital and promoting the flow of financial factor. 4) The coefficient of OPEN is negative but not significant, indicating complicated pathways through which it affects the URIG, on one hand, labor-intensive foreign trade industry is a source where rural immigrants obtains wage income, thereby reducing the URIG; on the other, the tax contributed by the industry benefits urban residents more, thereby driving up the gap. 5) The coefficient of FISCAL is significantly positive, indicating that the increase of expenditure on the social security, employment and urban community affairs drives up the URIG.

Additionally, the coefficients of the two policy variables are both negative and statistically significant, which indicates that the update of the standard for land expropriation compensation has narrowed the URIG, and a similar effect the change of statistical caliber for the rural income has artificially created.

6.4. Mechanism identification

To identify the mechanism underlying the effect of UBLDP on the URIG, its influence on the income level of urban residents and that on the income level of rural residents are separately estimated, and the results are shown in Table 5.

Based on the *F* test results, the estimation results of fixed effects are better than that of pooled OLS in both models. The results indicate that urban-biased development policy has significantly positive effects on the income level of both urban and rural residents, which verify the Hypothesis 2 and 3. Furthermore, from the effect values, the influence on the income level of urban residents (0.2036) is greater than that on the income level of rural residents (0.1231), indicating that an unbalanced urban-rural income growth derived from land development accounts for its effect on expanding the URIG, which verifies the Hypothesis 4.

6.5. Robustness check

To check whether the results are robust, the urban-rural consumption gap is used to replace the URIG as the independent variable in a new model, and the GMM estimation results are shown in Table 6.

Following the criteria mentioned in the Section 5.3, the two-step difference GMM shows the best estimation result. Very similar as the regression results on the URIG, there is also a dynamic effect for the urban-rural consumption gap and the coefficients of most variables continue to hold, especially with respect to the effect of UBLDP on the

Table 4
Results of dynamic panel estimation.

	Difference GMM		System GMM	
	One-step	Two-step	One-step	Two-step
L.inc_gap	0.3748** (1.33)	0.2778** (0.15)	0.3434*** (2.65)	0.4145** (2.30)
pol_ub	0.3763* (0.61)	0.4565** (0.62)	1.2675** (1.30)	1.6875** (0.85)
RGDP	0.5140** (0.12)	0.5260*** (0.38)	2.9462** (0.50)	4.8942* (1.67)
$(RGDP)^2$	−0.0317 (-0.16)	−0.0697* (-0.37)	−0.1079* (-0.40)	−0.8768* (-1.67)
URBAN	1.7372 (0.59)	−8.9264 (-0.77)	0.4677 (0.10)	−25.6829 (-1.32)
FINAN	−0.4757* (-1.91)	−0.2773** (-0.25)	−0.6981*** (-2.58)	−0.7816* (-1.89)
OPEN	0.1221 (0.05)	−6.8741 (-0.15)	−4.4360 (-1.63)	−8.9235 (-0.83)
FISCAL	0.7856** (0.68)	0.3147** (0.32)	0.3329* (0.20)	0.5099** (1.56)
ADJUST	−0.1865*** (-2.80)	−0.2307*** (-0.61)	−0.0732** (-0.83)	−0.2370** (-2.54)
CHANGE	−0.1407* (-1.33)	−0.3250** (-0.36)	−0.2571** (-1.79)	−0.2773** (-0.83)
Constant	0.3672** (0.02)	4.6270 (0.45)	8.4626* (0.57)	6.2428* (1.67)
Wald test	100.07 [0.0000]	371.65 [0.0000]	124.87 [0.0000]	1296.63 [0.0000]
Sargan test	44.0140 [0.0001]	2.2874 [0.9998]	51.4425 [0.0001]	1.7979 [1.000]
Arellano-bond test AR(1)		−0.8854 [0.3759]		−0.9904 [0.3220]
Arellano-bond test AR(2)		−0.3330 [0.7391]		1.1807 [0.2377]

Notes: 1) L.inc_gap is the first-order lagged term of URIG. 2) *Z* value in the parentheses. 3) p value of corresponding tests in the square brackets. 4) *p < 0.1; **p < 0.05; ***p < 0.01.

Table 5
Estimation results of the income of urban and rural residents.

	Income level of urban residents		Income level of rural residents	
	Pooled OLS	FE	Pooled OLS	FE
pol_ub	0.3659** (0.92)	0.2036*** (0.93)	−0.4844* (-0.55)	0.1231** (0.63)
RGDP	0.3403** (2.84)	0.5507*** (5.46)	0.4896* (2.18)	0.9497*** (10.55)
URBAN	−0.8265 (-1.27)	1.8000** (2.07)	−1.3120 (-1.15)	0.9542* (1.23)
FINAN	0.1811*** (3.53)	0.1666*** (3.17)	0.0759 (0.75)	0.2500*** (5.34)
OPEN	−1.1521* (-2.17)	−1.2222* (-1.73)	−0.8001 (-0.58)	−0.7821 (-1.24)
FISCAL	2.2898*** (4.87)	0.5112*** (1.40)	4.3217*** (3.33)	0.3029** (2.15)
constant	5.7989*** (7.37)	2.7082*** (3.98)	4.1035** (2.65)	−2.0112*** (-3.31)
R^2	0.6992	0.9175	0.5473	0.9639

Notes: 1) t value in the parentheses. 2) *p < 0.1; **p < 0.05; ***p < 0.01.

urban-rural consumption gap, it is also positive and statistically significant, which verifies the robustness of empirical results.

7. Conclusions and discussion

The post-reform China has made great achievements in growth and urbanization. During this period of unprecedented economic and social transition, local governments have dominated a large-scale flow of land factor from rural to urban areas throughout the country, which not only significantly contributes to the so-called Chinese miracle, but also profoundly changes the social formation of contemporary China. The widespread practice characterized by the compulsory expropriation of rural land and the monopolistic leasing of urban land fully demonstrates the urban-biased notion pursed by the local governments in the land use field.

Focusing on the role of UBLDP in determining China's URIG, and through a rigorous process covering literature review, facts description, theoretical deduction, and empirical analysis, this research has gained a series of findings as follows: 1) UBLDP refers that local government expropriates rural land with a compensation below the market value and uses a considerable proportion of net land revenue to develop urban areas instead of rural areas, which presents as three facts in practice - massive and excessive RLE, inadequate and rigid compensation for RLE, and unfair expenditure structure of LDR. 2) Taking the indicator validity and data availability into account, the UBLDP can be measured by the extent to which the compensation deviates from the market value of ERL. 3) UBLDP has a robust, significant, and positive effect on the URIG, and a 1% increase in the deviation leads to a 0.46% increase in the gap, while the effect is due to an unbalanced urban-rural income growth derived from land development. income distribution effect of land allocation between urban and rural areas. Putting these findings in the grand perspective of the TUB, it is clear that the urban bias characteristic of LDP is in line with studies focusing on UBPs in other fields (Lu and Chen, 2006; Lin and Chen, 2011; Lei and Cai, 2012; Ye et al., 2018). And additionally, it also deepens the understanding on the income distribution effect of land allocation through highlighting the role of distorted land expropriation price in generating such effect.

This study, to the best of our knowledge, is academically novel by providing a feasible technique to measure UBLDP and linking the policy practice with the URIG phenomenon, which not only bring a fresh case into the horizon of TUB, but also adds a new explanation for the URIG. Despite these innovations, it is still limited, mainly reflecting in the data and methods. First, the lack of national data limits the study area to a single province, which may diminish the general significance of the conclusions. Second, although the degree of urban bias calculated by the technique proposed in this paper is infinitely close to the real level, there is still room for improvement following the direction of using an individual land expropriation case as the base of calculation. But still, URIG caused by the imbalance of LDR distribution means that the expropriated peasants have overborne the cost of urbanization, which also accounts for the frequent land conflicts over these years (Lin et al., 2018), a broad of direct implications are thus generated for Chinese policymakers.

First, efforts to establish an integrated land market across urban and rural areas should be persisted in a long term, the urban-biased notion needs to be completely abandoned, including to reduce the administrative power of the local government to rural land conversion, to recognize the equal rights subject status of rural residents in the land

Table 6
Estimation results of robustness check.

	Difference GMM		System GMM	
	One-step	Two-step	One-step	Two-step
L.cons_gap	0.2655* (1.28)	0.3369** (1.05)	0.2587** (1.99)	0.3358*** (1.96)
pol_ub	0.2477**(0.59)	0.3523**(0.36)	1.1785**(1.18)	1.2587* (0.47)
RGDP	0.4258***(0.58)	0.5578***(0.44)	1.5852***(0.47)	2.6977**(2.44)
$(RGDP)^2$	−0.0785*(-0.19)	−0.0788**(-0.52)	−0.0942*(-0.25)	−0.1478*(-1.76)
URBAN	−3.7372(-1.58)	−3.6437(-1.25)	0.5647(0.33)	−2.5874(-1.53)
FINAN	−0.5471*(-1.83)	−0.3544**(-0.36)	−0.5877**(-2.61)	−0.6982*(-1.68)
OPEN	0.2285(0.04)	0.8741(0.13)	−2.3585*(-1.45)	−2.9235&(-0.67)
FISCAL	0.7742*(0.56)	0.2574**(0.31)	0.2896(0.36)	0.4459**(1.28)
ADJUST	−0.1785**(-2.66)	−0.2247***(-0.54)	−0.0874**(-1.01)	−0.2258***(-1.36)
CHANGE	−0.2250**(-1.13)	−0.4732**(-0.39)	−0.2478**(-1.65)	−0.2699**(-0.78)
constant	0.4885**(0.01)	4.5288*(0.37)	7.5869*(0.43)	5.8977*(1.72)
Wald test	118.22[0.0000]	385.69[0.0000]	134.58[0.0000]	1305.56[0.0000]
Sargan test	46.0722[0.0001]	3.1545[0.9999]	48.5245[0.0001]	1.8254[1.000]
Arellano-bond test AR(1)		−0.7554[0.0899]		−0.8851[0.0258]
Arellano-bond test AR(2)		−0.2458[0.6245]		1.2247[0.3155]

Notes: 1) L.inc_gap is the first-order lagged term of URIG. 2) Z value in the parentheses. 3) p value of corresponding tests in the square brackets. 4) *p < 0.1; **p < 0.05; ***p < 0.01.

market, and to promote market mechanism play a leading role in the allocation, flow, and pricing of land factor. Second, the improvement on RLE system should continue in the direction of making the update mechanism of compensation standards more flexible, directing to the normalized, scientized, and localized update practice. Third, the unfair expenditure structure of LDR should be corrected, the proportion of cost expenditure used for compensation and subsidies needs to be maintained at a reasonable level, while rural development affairs should be a priority for the non-cost expenditure. Last and as a technical advice, the methodology of evidence-based decision-making should be emphasized, local governments need to pay more attention on monitoring the land expropriation activities, collecting the actual compensation information, and tracking its effect on the urban-rural income distribution.

Since China leads the developing world in terms of the population, size, and growth speed, there is no doubt that the so-called Chinese story discussed in this article also provides lessons for other developing countries, especially given that the vast majority of African countries is on their road to modernization and during which period both intense land takings and severe urban-rural inequality is very common (Sahn and Stifel, 2004; Peters, 2010; Reardon et al., 2010). This study confirms that land use policy aimed at promoting urbanization, just like "a double-edge sword", fundamentally supports the overall growth of economy, and meanwhile, is possible to become a culprit of urban-rural inequality. It thus rings an alarm bell for the policymakers of these countries, reminding them to balance the efficiency and fairness carried in land development practices, to avoid harming the rights and interests of vulnerable groups, and to make LDP an instrument to intervene in existing inequality rather than to create the new one.

Acknowledgement

This work was financially supported by the National Natural Science Foundation of China (Grant No. 41801205).

References

Anderson, Kym, Hayami, Yujiro, 1986. The Political Economy of Agricultural Protection: East Asia in Perspective. Allen & Unwin in association with the Australia-Japan Research Centre, Australian National University.
Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev. Econ. Stud. 58 (2), 277–297.
Bates, R.H., 1981. Markets and States in Tropical Africa: The Political Basis of Agricultural Policies. University of California Press, Berkeley.
Bezemer, D., Headey, D., 2008. Agriculture, development, and urban bias. World Dev. 36 (8), 1342–1364.
Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Econ. Papers 87 (1), 115–143.
Boffy-Ramirez, E., Moon, S., 2018. The role of China's household registration system in the urban-rural income differential. China Econ. J. 11 (2), 108–125.
Cai, F., 2007. Rural urban income gap and critical point of institutional change. Econ. Chang. Restruct. 40 (1-2), 189–206.
Cai, F., Yang, T., 2000. Political economics on urban-rural inequality. Soc. Sci. China 4, 11–22.
Chen, J., Fang, F., Hou, W., Li, F., Pu, M., Song, M., 2015. Chinese Gini coefficient from 2005 to 2012, based on 20 grouped income data sets of urban and rural residents. J. Appl. Math. 1–16.
Chen, C., Legates, R., Zhao, M., Fang, C., 2018. The changing rural-urban divide in China's megacities. Cities 81, 81–90.
Chen, B., Lin, Y., 2014. Development strategy, urbanization and the urban-rural income gap in China. Soc. Sci. China 35 (1), 5–20.
Chen, Z., Lu, M., 2008. From segmentation to integration: the political economy of urban-rural economic growth and social harmony. Econ. Res. J. 1, 21–32 (In Chinese).
Chen, B., Zhang, P., Yang, R., 2010. Government education budget, human capital investment and urban-rural income disparity in China. Manage. World 1, 36–43 (In Chinese).
Cheng, K., Li, J., 2007. Analysis of mechanism and dynamic econometric relationships between urban bias, urbanization and urban-rural inequality. J. Quant. Tech. Econ. 7, 116–125 (In Chinese).
Deininger, K., 2003. Land Policies for Growth and Poverty Reduction. A co-publication of the World Bank and Oxford University Press, Oxford, New York.
Du, J., Peiser, R.B., 2014. Land supply, pricing and local governments' land hoarding in China. Reg. Sci. Urban Econ. 48, 180–189.
Du, J., Thill, J.C., Feng, C., 2014. Wealth redistribution in urban land development under a dual land system: a case study of Beijing. Papers in Region. Sci. 93 (2), 501–517.
Du, J., Thill, J.C., Feng, C., Zhu, G., 2016. Land wealth generation and distribution in the process of land expropriation and development in Beijing, China. Urban Geogr. 1–21.
Eastwood, R., Lipton, M., 2004. Rural and urban income inequality and poverty: does convergence between sectors offset divergence within them? In: Giaovanni, A.C. (Ed.), Inequality, Growth, and Poverty in an Era of Liberalization and Globalization. Oxford University Press, Oxford.
Fesselmeyer, E., Le, K.T., 2010. Urban-biased policies and the increasing rural-urban expenditure gap in Vietnam in the 1990s. Asian Econ. J. 24 (2), 161–178.
Glaeser, E.L., Ward, B.A., 2009. The causes and consequences of land use regulation: evidence from greater Boston. J. Urban Econ. 65 (3), 265–278.
Guan, X., Wei, H., Lu, S., Dai, Q., Su, H., 2018. Assessment on the urbanization strategy in China: achievements, challenges and reflections. Habitat Int. 71, 97–109.
He, W., Huang, X., Chen, Z., Zhong, T., 2014. Calculation of peasants' land rights and interests loss in the process of urbanization in China in the 1990-2010. J. Land Econ. 1, 137–159 (In Chinese).
He, X., 2014. Agriculture, rural areas and farmers in the reform context. People Tribune 3, 72–95 (In Chinese).
Huang, Z., Du, X., 2017. Government intervention and land misallocation: evidence from China. Cities 60, 323–332.
Hui, E.C.M., Bao, H.J., Zhang, X.L., 2013. The policy and praxis of compensation for land expropriations in China: an appraisal from the perspective of social exclusion. Land Use Policy 32 (3), 309–316.
Jones, G.A., Corbridge, S., 2010. The continuing debate about urban bias: the thesis, its critics, its influence, and implications for poverty reduction strategies. Prog. Dev. Stud. 1 (10), 1–18.
Kanbur, R., Zhang, X., 1999. Which regional inequality? The evolution of rural-urban and inland-coastal inequality in China from 1983 to 1995. J. Comp. Econ. 27 (4), 686–701.
Kanbur, R., Zhang, X., 2010. Fifty years of regional inequality in China: a journey through central planning, reform, and openness. Rev. Dev. Econ. 9 (1), 87–106.
Khan, A.R., Griffin, K., Riskin, C., Zhao, R., 1993. Sources of income inequality in post-reform China. China Econ. Rev. 4 (1), 19–35.
Krueger, A.O., Schiff, M., Valdes, A., 1991. The Political Economy of Agricultural Pricing Policy. Johns Hopkins University Press.
Kwong, T.M., 1994. Markets and urban-rural inequality in China. Soc. Sci. Q. 75 (4), 820–837.
Lei, G., Cai, X., 2012. The distortion of primary income distribution, urban-biased fiscal expenditure policy and urban-rural inequality. J. Quant. Tech. Econ. 29 (3), 76–89 (In Chinese).
Lipton, M., 1977. Why Poor People Stay Poor: A Study of Urban Bias in World Development. Harvard University Press, Cambridge, MA.
Lipton, M., 1993. Urban bias: of consequences, classes and causality. J. Dev. Stud. 29 (4), 229–258.
Lin, Y., Chen, B., 2011. Urbanization and urban-rural inequality in China: a new perspective from the government's development strategy. Front. Chin. Econ. 6 (1), 1–21.
Lin, G.C.S., Ho, S.P.S., 2005. The state, land system, and land development processes in contemporary China. Ann. Assoc. Am. Geogr. 95 (2), 411–436.
Lin, Q., Tan, S., Zhang, L., Wang, S., Wei, C., Li, Y., 2018. Conflicts of land expropriation in China during 2006–2016: an overview and its spatio-temporal characteristics. Land Use Policy 76, 246–251.
Liu, X., 2014. Discussion on the essence of compensation standard for land expropriation - also on the calculation method of market-oriented land expropriation compensation. Prod. Res. 9, 103–106 (In Chinese).
Lofchie, M.F., 1997. The rise and demise of urban-biased development policies in Africa. In: Gugler, J. (Ed.), Cities in the Developing World Issues Theory & Policy. Oxford University Press, Oxford, pp. 23–39.
Lu, M., Chen, Z., 2006. Urbanization, urban-biased policies, and urban-rural inequality in China, 1987-2001. Chin. Econ. 39 (3), 42–63.
Ma, X., Wang, F., Chen, J., Zhang, Y., 2017. The income gap between urban and rural residents in China: since 1978. Comput. Econ. 5, 1–22.
Ma, G., Yang, E., 2010. The Chinese style of decentralization, urban-biased economic policy and urban-rural disparity. Res. Inst. Econ. 1, 10–24 (In Chinese).
Maddison, A., 2007. Chinese Economic Performance in the Long-run. Development Centre of the OECD., Paris.
Ministry of Finance (MOF). (2010-2013). Local Government-managed Funds Expenditure, (In Chinese).
Moore, M., 1993. Economic structure and the politics of sectoral bias: east Asian and other cases. J. Dev. Stud. 29 (4), 79–128.
Myrdal, G., 1957. Economic Theory and Under-developed Regions. Harper & Brothers Publishers.
Nolan, P., 1979. Inequality of income between town and countryside in the people's republic of China in the mid-1950s. World Dev. 7 (4), 447–465.
Oi, J.C., 1993. Reform and urban bias in China. J. Dev. Stud. 29 (4), 129–148.
Peters, P.E., 2010. Inequality and social conflict over land in Africa. J. Agrar. Chang. 4 (3), 269–314.
Pierskalla, J.H., 2015. The politics of urban bias: rural threats and the dual dilemma of political survival. Stud. Comp. Int. Dev. 51 (3), 1–22.
Reardon, T., Taylor, J.E., Stamoulis, K., Lanjouw, P., Balisacan, A., 2010. Effects of non-farm employment on rural income inequality in developing countries: an investment perspective. J. Agric. Econ. 51 (2), 266–288.
Restuccia, D., Rogerson, R., 2013. Misallocation and productivity. Rev. Econ. Dyn. 16 (1), 1–10.
Sahn, D.E., Stifel, D.C., 2004. Urban–rural inequality in living standards in Africa. J. Afr. Econ. 12 (4), 564–597.

Sargan, J.D., 1958. The estimation of economic relationships using instrumental variables. Econometrica 26 (3), 393–415.
Sargeson, S., 2013. Violence as development: land expropriation and China's urbanization. J. Peasant Stud. 40 (6), 1063–1085.
Shi, Q., Jin, H., Zhuo, J., 2011. Does land expropriation certainly reduce farmers' income? A survey of 7 villages in Shanghai. Manage. World 3, 77–82 (In Chinese).
Tan, R., Beckmann, V., Berg, L.V.D., Qu, F.T., 2009. Governing farmland conversion: comparing China with the Netherlands and Germany. Land Use Policy 26 (4), 961–974.
Tao, R., Su, F., Liu, M., Cao, G., 2010. Land leasing and local public finance in China's regional development: evidence from prefecture-level cities. Urban Stud. 47 (10), 2217–2236.
Wan, G., 2007. Understanding regional poverty and inequality trends in China: methodological issues and empirical findings. Rev. Income Wealth 53 (1), 25–34.
Wang, C., Wan, G., Yang, D., 2014. Income inequality in the People's Republic of China: trends, determinants, and proposed remedies. J. Econ. Surv. 28 (4), 686–708.
Wu, D., Rao, P., 2017. Urbanization and income inequality in China: an empirical investigation at provincial level. Soc. Indic. Res. 131, 1–26.
Wu, X., Treiman, D.J., 2004. The household registration system and social stratification in China: 1955-1996. Demography 41 (2), 363–384.
Xie, Y., Zhou, X., 2014. Income inequality in today's China. Proc. Natl. Acad. Sci. U. S. A. 111 (19), 6928.
Yang, D.T., 1999. Urban-biased policies and rising income inequality in China. Am. Econ. Rev. 89 (2), 306–310.
Yang, D.T., Zhou, H., 1999. Rural-urban disparity and sectoral labor allocation in China. J. Dev. Stud. 35 (3), 105–133.
Ye, Z.Q., Qian, L.X., Na, Z., 2018. Financial development, urbanization, and urban-rural income disparity: evidence based on Chinese provincial data. Mod. Econ. 9, 31–60.
You, H., 2016. Quantifying megacity growth in response to economic transition: a case of Shanghai, China. Habitat Int. 53, 115–122.
Yu, A.T.W., Wu, Y., Shen, J., Zhang, X., Shen, L., Shan, L., 2015. The key causes of urban-rural conflict in China. Habitat Int. 49, 65–73.
Zhao, R., 1993. Three features of the distribution of income during the transition to reform. In: Griffin, K., Zhao, R. (Eds.), The Distribution of Income in China. St. Martin's Press, New York.
Zou, X., Oskam, A.J., 2010. New compensation standard for land expropriation in China. China World Econ. 15 (5), 107–120.