



Research paper

Urban land expansion and regional inequality in transitional China

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HIGHLIGHTS

- Urban land expansion in China is highly uneven.
- Inequalities are much higher in the Western region.
- Provincial-level development policies tend to increase urban land expansion and economic development gaps across prefectures.
- Urban land expansion tends to converge within prefectures.
- The core-periphery pattern of urban land expansion intensifies economic gaps across prefectures and provinces in China.

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ABSTRACT

Rising inequality and spatial concentration in China have drawn considerable scholarly interest and social concern. However, sources of spatial inequality in China remain under-studied. This article analyzes spatial patterns and dynamics of urban land expansion in China to better understand the role of institutions and urbanization in spatial inequality. We find that urban land expansion in China is highly uneven at both intra-provincial and intra-prefectural levels, and inequalities are much higher in the Western region than the Eastern region. We also find that provincial-level development policies tend to increase urban land expansion and economic development gaps across prefectures, while urban land expansion tends to converge within prefectures. Such core-periphery growth patterns have intensified economic gaps across prefectures and provinces in China.

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1. Introduction

As a fundamental issue of human society, inequality has been intensified globally, especially since the recent global financial crisis, and there is a growing concern about spatial inequality in China as well (Wei, 2015a). Studies have investigated spatial-temporal patterns of China's economic inequality, with emphasis on economic transition and spatial agglomeration (Li & Wei, 2010; Liao & Wei, 2015; Wei, 1999, 2000). As China is characterized by regional differentials, regional inequalities not only exist across provinces, but also are even more evident within provinces, which triggered the development of the multi-scale and multi-mechanism framework of analysis (He, Bayrak, & Lin, 2017; Li & Fang, 2014; Li & Wei, 2010; Wei, 2002; Wei & Ye, 2009). The notion of multi-mechanism conceptualizes underlying factors of regional inequality based on the triple transition of globalization, decentralization and marke-

tization and typically selects foreign direct investment (FDI), the share of non-state enterprises, share of local budget as independent variables. With addition of control variables, this framework well explains regional disparity in economic development.

At the same time, urbanization and urban expansion have been identified as the most important trends shaping global development (UN Habitat, 2007). Since the deepening of economic reforms in the early 1990s, China has been undergoing rapid urbanization. According to the Fifth and Sixth Census of China, the urbanization rate increased from 36% in 2000 to 49.8% in 2010, and the total urban residential population at the end of 2010 was 660 million. Consequently, recent studies of development and transition in China have added urbanization as the fourth transition in China, and they typically use percentage of population living in cities in an independent variable (Gao, Wei, Chen, & Yenneti, 2015; Li, Wei, Liao, & Huang, 2015). However, urban land expansion or the urbanization of land has been as rapid as demographic urbanization (Bai, Chen, & Shi, 2011). Data from the World Bank East Asia and Pacific Urban Flagship Study show that the total built-up area in China increased from 92,151 km² in 2000 to 118,763 km² in 2010, an increase of 29%. Land is traditionally one of the three key factors

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of economic growth, along with capital and labor (Smith, 2007). But with the maturing of urbanization in developed countries, land has long been dropped out of the neoclassical production function. As China is still largely a developing country undergoing rapid urbanization, urbanization of land might also have significantly contributed to economic growth and regional inequality.

We believe that the rapid urban expansion in the era of reform is interrelated with uneven spatial development in China. However, because of difficulties associated with the land use data constructed by government sectors of planning and land resources, detailed regional inequality of urban land expansion and its implications for overall regional inequality have received relatively less attention. Using the more reliable county-level built-up area data provided by the World Bank, this paper aims to contribute to an enhanced understanding of urban land expansion and its role in regional inequality in China.

2. Literature review and analytical framework

2.1. Perspectives on regional inequality

A longstanding concern with the association between regional inequality and economic growth has generated a variety of schools, such as the convergence, divergence and evolutionary theories (Wei, 2015a). The neoclassical school views regional inequality as a transitory process because factor mobility tends to equalize regional differentials, leading to regional convergence. Divergence theories, however, emphasize capital accumulation and cumulative causation, and tend to view regional inequality as persistent or divergent (Smith, 1984). More closely related to the neoclassical theory is the inverted-U model, a combination of Kuznets' theory of income inequality and Rostow's stage theory of economic growth, which argues that regional inequality is likely to rise during the early stages of development and tends to drop when the economy grows up (Williamson, 1965).

Scholars from institutional perspectives focus on how government intervention and policies affect regional inequality. This stream of literature is traditionally concerned with the top-down style development and growth pole theories. The role of state is particularly vital to understand inequality in most socialist countries (Wei, 2000). Since the state consists of a set of institutions with conflicting goals, different policies may lead to dissimilar influences on regional inequality. In developing countries, urbanization, industrialization, and foreign investment, which are heavily influenced by government policies, tend to exacerbate regional inequality, while political corruption caused by imperfect institutional design is also likely to contribute to a concentration of resources and the rise of regional inequality (Kim, 2008). Moreover, regional and local policies with specific preferences tend to locate labor and investment in their core regions as well (Li & Wei, 2010).

Two important concepts of regional inequality have been employed since the 1990s (Barro & Sala-i-Martin, 1992): sigma-convergence and beta-convergence. The beta-convergence indicates that poorer areas are likely to grow faster than richer areas at the initial stage. The sigma-convergence assumes that due to the beta-convergence, the overall degree of inequality tends to decline in the end. This new convergence theory has triggered a large number of empirical studies which have revitalized the research on regional inequality in economics (Wei, 2015a).

However, existing economic theories have been challenged because of their deterministic views and ignorance of scale and space (Martin & Sunley, 1998; Wei, 2015a; Wei & Ye, 2009). The role of geography has been increasingly recognized in social sciences since the 1980s, and scholars have shown that spatial processes and patterns make a difference to board social and economic pro-

cess (Krugman, 1999; Massey, 1985). Terms such as region, scale, location, and spatiality have been frequently related to inequality (Wei, 1999; Wei & Ye, 2009). Regional inequality varies across countries, due to the nation-specific geographical factors (Kim, 2008). Regional inequality is multi-scalar in nature (Li & Wei, 2010; Wei, 2000), and multi-scalar frameworks have been widely applied to deepen the understanding of regional inequality from a geographical perspective (Wei, 1999; Ye & Wei, 2005). At the same time, regional inequality is also associated with spatial heterogeneity and divergent development trajectories (Liao & Wei, 2015). However, the role of interactions between institutional and geographic factors in regional equality has not been fully examined.

2.2. Urban land expansion in China

A growing body of literature has documented the rapid expansion of urban land in China, mainly by using remote sensing data and GIS spatial analysis. Studies find that in China urban land expansion has kept pace with the rapid urbanization of population (Wei & Ye, 2014; He, Huang, & Wang, 2013). Some even argue urban land expansion has outpaced urban population growth (Bai et al., 2011). The evidence points to the existence of regional inequality in urban land expansion, led by more rapid growth of urban land in core coastal city regions, including the Yangtze River Delta (YRD), the Pearl River Delta (PRD), and Greater Beijing, followed by provincial capitals and special economic zones such as Shenzhen (Gu, Wei, & Cook, 2016; Qiu & Xu, 2017; Qian, Peng, Luo, Wu, & Du, 2016).

Researchers influenced by neoclassical economics have characterized urban expansion in China as an outcome of its economic growth (Deng, Huang, Rozelle, & Uchida, 2006; Deng, Huang, Rozelle, & Uchida, 2008). Scholars have identified FDI, transportation conditions, access to business centers, and availability of land among the major factors of urban land expansion (Gao et al., 2015; Li et al., 2015). For instance, job and income opportunities provided by cities attract migrants from the rural population, who in turn increase the demand for housing and thus lead to urban land expansion (Seto, Fragkias, Guneralp, & Reilly, 2011). Recent studies have also argued that institutional forces, such as the urban administrative system (Li et al., 2015; Ma, 2002), land governance (Xu & Yeh, 2009), and decentralization of power (Wei & Zhao, 2009), are driving forces of urban land expansion. Research has analyzed the role of decentralization and local institutions in demographic and land urbanization, by analyzing the roles of local state corporatism, growth machines, and development/entrepreneurial states (Li, Wei, & Huang, 2014; Ma, 2005; Wei, 2012; Xu & Yeh, 2009; Yang & Wang, 2008).

Scale also matters in studies of urban expansion. At the national level, scholars conclude that the main driving forces of urban expansion are urbanization, adjustment of economic structure, industrialization in rural areas, growth of tertiary industry, and rising incomes (Deng et al., 2006, 2008; Lin, 2009; Lin & Ho, 2005). At the local level, geographers have found that economic growth is the most significant driving force for urban expansion in the Yangtze River Delta, while fixed asset investment and arable land value contribute most in the Pearl River Delta (Xu, 2004; Seto & Kaufman, 2003). Residential area expansion, as well as the relationship between rural and urban areas are unique factors for Shanghai (Han, Hayashi, & Cao, 2009; Li et al., 2014), while the income gap between rural and urban residents is an extra driving force of urban sprawl in Beijing (Xie, Fang, Lin, Gong, & Qiao, 2007). These perspectives are complementary to our arguments, and we maintain that multiple forces have contributed to rapid urbanization and urban expansion in China at multiple scales.

The existing research can be advanced at least in three areas. First, although there has been a series of studies on either economic inequality or urban land expansion in China, few studies focus on

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