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The relationship between population growth and capital allocation in urbanization

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ABSTRACT

Over the past three decades, China is experiencing a massive rural-urban migration. Research have identified issues in the rapid urbanization in China and explored the solutions. But the roles that population growth and capital allocation play in urbanization were disconnected in previous studies. As such, this study explores the interaction between urban-rural population distribution and capital allocation in the process of urbanization. In specific, this paper performs an empirical test to examine the population changes and the efficiency of capital allocation based on the data of urbanization in China from 1985 to 2014. The results show that a long-term equilibrium exists between the proportion of urban-rural population and the difference of marginal productivity between urban areas and rural areas. The course of the deterioration of the efficiency of the urban-rural capital distribution is found as well.

1. Introduction

Urbanization is the increase in the urban share of the total population and is an integral element of industrialization and rapid income growth in all countries (Fan, 2017; Henderson et al., 2009; Ianuale et al., 2015). Urbanization changes population distribution, production mode, life style, and ecological environment (De Sherbinin et al., 2007; Zhu, 2005). According to Buhaug and Urdal (2013), urbanization is driven by reproduction rate, rural-urban migration, and reclassification of rural land. Particularly, rural-to-urban migration is consequence of high and increasing population pressure on scarcity of renewable resources like cropland, forests, and freshwater in the countryside (Homer-Dixon, 2010). Also, rural-to-urban migration is the result of labor moving from under-employment in low-productivity rural activities to full employment in higher-productivity urban manufacturing activities (Henderson et al., 2009). Kahl (2006) estimates that in developing countries, rural-urban migration currently accounts for 40–60% of annual city growth. According to UN (2010), rural-urban migration is the most important contributor to urban growth in many developing countries because urban areas have the concentration of investment and employment opportunities. Rural-urban migration can mitigate rural-urban income inequality and gain sustained growth (Henderson et al., 2009).

However, rapid urbanization has posed enormous challenges,

especially when policy structures adjust slowly (Henderson et al., 2009). Other than promoting economy growing, urbanization causes rapid growth of city populations and shortage of public services. Although urban areas have more opportunities for employment, the labor market may struggle to absorb fast-growing populations (Buhaug and Urdal, 2013). In addition, integration of capital markets often fell behind labor market integration facilitated by migration. As a result, more capitals were allocated to key cities, which receive huge migratory inflows. Eventually, over-crowded mega-cities were developed (Henderson et al., 2009).

Over the past three decades, market reform and globalization drove dramatic growth and structural changes in the Chinese economy, society, and spatial organization (Feng and Xu, 2000; Li, 2013; Li and Zhou, 2013; Lin and Yi, 2011). As economy grows, China is experiencing a massive rural-urban migration and expansion of cities and towns (Fan, 2008; Henderson et al., 2009; Hsing, 2010; Lin, 2009; McGee et al., 2007). By 2008, the level of urbanization in China exceeded 45% (CSSB, 2009). But still, China's annual rate of urban population growth, at about 3.5% per year, is below the 5–6% rates typically experienced by other developing countries during their periods of rapid economic growth (Henderson et al., 2009). Urban population in China is expected to continue growing. Meanwhile, rapid urbanization causes issues in China, such as big city malaise, unbalanced regional development, and urban-rural contradictions. Previous studies have explored the causes of

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these issues (e.g. Chan, 2007; Chan and Hu, 2003; Fan, 2008; Zhou and Ma, 2003; Pannell, 2002). From the perspective of capital-driving urbanization, they examined the option between quality and the speed of the development of urbanization, long-term urban-rural dual economic structure, and the difference of regional urbanization development strategy. However, these studies neglected the roles that population growth and the interaction between population growth and capital allocation play in urbanization. In other words, the roles that population growth and capital allocation play in urbanization were disconnected in previous studies. As such, this study explores the interaction between urban-rural population distribution and capital allocation in the process of urbanization, aiming for providing solutions that can help the development of urbanization and the formulation of population policies.

The rest of this paper is organized as following. Section 2 provides the background of this study, particularly the rural-urban migration and capital allocation in China. Section 3 describes how data are collected. In Section 4, an empirical test is performed. Section 5 concludes this paper and provides suggestions for issues identified in this study.

2. Background

From the perspective of dynamic development (Feng and Xu, 1992, 1993; Xu et al., 2008), urbanization is the result of natural agglomeration of population (Zhou, 2015). It is a process in which people in countryside get into city and farmers transform into citizens (Xiong and Xu, 2015). Urbanization is an integral element of rapid income growth and industrialization throughout the world (Henderson et al., 2009), particularly in recent years when industry development is driven by Internet of Things and new generation of ICT (Bi et al., 2014; Chen, 2017; Cheng et al., 2018; Li et al., 2015, 2018; Oliverio, 2018; Wang et al., 2016; Xu, 2011, 2016; Xu et al., 2014; Xu et al., 2017; Xu et al., 2018; Xu and Duan, 2018; Yang et al., 2017; Duan and Binbasoglu, 2017; Viriyasitavat and Martin, 2017). Urbanization is critical to the success of modernization because manufacturing and service production is more efficient when undertaken in urbanized areas (Henderson et al., 2009). In high-density locations, it is easier for firms to learn from other firms about new technologies, to hire the workers with the exact skills they need, and to purchase and transport intermediate inputs (Duranton and Puga, 2004; Rosenthal and Strange, 2004). Cities provide the environment for incubating innovations and developing sophisticated skills via schooling and training systems (Henderson et al., 2009). In developed countries and developing countries, market access, and cost of communication and infrastructure imply that job opportunities become disproportionately located in cities (Buhaug and Urdal, 2013).

Migration is considered to be a key measurement of urbanization (Lin and Yi, 2011). Urban and rural sectors were strictly separated in China and the separation caused rural-urban labor mobility difficult and income inequality (Henderson et al., 2009). Thus, urbanization has been an important feature of China's remarkable economic transformation (Henderson et al., 2009). Since 1978, China has experienced a rapid and unprecedented process of urbanization, created by the history's largest flow of rural-urban migration in the world. During the period of 1978–2013, China's urban population has risen from 170 million to 730 million, and the level of urbanization has reached 53.7% in 2013 (Wang et al., 2015). Rural-urban migration has made dominant contributions to Chinese urban population growth (Zhang and Song, 2003), and reshapes the economic, demographic, and social landscapes of the Chinese city and countryside (Fan, 2008).

Rapid population growth may lead to a reduced per-capita access to subsistence resources (Homer-Dixon, 1999; Homer-Dixon and Blitt, 1998). According to Buhaug and Urdal (2013), rapid population growth can seriously constrain local governments' ability to provide basic public services, including employment, housing, electricity, water, sanitation, enforcement of law and order. Goldstone (2002) points out that crises occur when the job market and the economy cannot keep up

with urban population growth. In China, urbanization process has progressed faster than the economic growth since 2004 (Chen et al., 2013). As a result, some issues occur, including (1) agricultural population has difficulties in getting permanent urban residence certificates; (2) the rate of land acquired for urbanization was growing faster than that of the urban population; (3) the spatial distribution and scale structure of urbanization are imbalanced (Wang et al., 2015).

Concurrent with the rapid growth of the urban population has been the dramatic increase of capital for mega-cities in China. The administrative hierarchy of China's urban system makes the largest cities have special access to capital markets and fiscal resources (Henderson et al., 2009). From 2002 to 2007, investment in fixed assets per capita in the 4 provincial level cities and 26 provincial capitals in China was about 4–5 times higher than that of county cities, which are more manufacturing intensive. Larger investment attracted firms and migrants and further boosted the rapid population growth of over-crowded mega-cities. In mega-cities, it is easier for firms and migrants to seek subsidized capital, licenses, and public infrastructure (Henderson, 2003). As a result, capital is invested in low-return activities even though higher-return opportunities are available. Migrants do not choose cities that would most benefit China from population growth; instead, they choose cities favored in the hierarchy (Henderson et al., 2009).

Research on Chinese urbanization has been focused on defining the urban population, estimating the magnitude of urbanization, analyzing the growth and distribution of rural-urban migration (Chan and Hu, 2003; Zhou and Ma, 2003), identifying spatial and regional patterns, migrants' characteristics, and different types of migration (Fan, 2005a; Li, 2004; Liang and Ma, 2004), exploring economic opportunities, regional disparity, rural development, and network (Fan, 2005b), and analyzing migrants' occupations, housing, communities, fertility behavior and health, and the role of return migrants in the countryside (Gaetano and Jacka, 2004; Jacka, 2006; Pun, 2005; Yang, 2006). Some studies also highlight and evaluate how economic growth drove urban development (Lin, 2002; Ma, 2002; Pannell, 2002).

Some studies explore how capital is allocated and identify capital-related issues in urbanization process (Chu and Mo, 2011; He and Du, 2005; Huang et al., 2006; Jia and Huang, 2010; Li et al., 2012; Zhou, 1998). In specific, Chu and Mo (2011) argue that the Pareto Optimality of resource allocation requires equal the marginal product of capital in each department involved in urbanization, and that in the long run, the marginal product of capital between regions tend to be balanced. Urbanization is a process that capital flows across urban and rural areas and finally reaches the state of Pareto Optimality. He and Du (2005) point out that interregional flow of capital is the basic form of the rational allocation of capital in economic development during urbanization. By analyzing the distribution condition of urban-rural capital, Huang et al. (2006) found that capital flows from rural area to urban area. Li et al. (2012) pointed out the importance of studying the matching between land urbanization and population urbanization by analyzing regional disequilibrium and how disease deconstructed the process of land urbanization. Jia and Huang (2010) applied the urbanization ratio, industrialization level, and the level of non-agricultural indicator in different countries to show the lagging state of the development of urbanization in China. In a study on 157 countries, Zhou (1998) found that a logarithmic curve relationship between the urbanization ratio and GDP per capita.

These studies exam population growth or capital allocation in the process of urbanization and they generate valuable findings. However, the linkage between population growth and capital allocation was neglected. In other words, population growth or capital allocation were disconnected in previous studies. Given the important roles that population growth and capital allocation play in urbanization, this paper explores the interaction between population growth and capital allocation in the process of urbanization by performing an empirical test on urban-rural population distribution, capital allocation efficiency and their relations based on measurement index, aiming for providing

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