



Driving force of urban growth and regional planning: A case study of China's Guangdong Province

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A B S T R A C T

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Since China's economic reforms began in 1978, rural–urban migration has accelerated urban growth and the consequential need for regional planning. In order to make effective strategic decisions on regional planning, it is essential to identify the determinants that promote or restrain urban growth. Based on the theoretical underpinnings of classical economics, spatial economics and sustainable development, this paper establishes a theoretical model of urban population growth and uses a case study of China's Guangdong Province to test a hypothesis. The driving force of urban population growth is derived from natural and mechanical increases that include original urban size, living environment, industrial agglomeration, and location. Regression results from the case study reveal that during the period 2000–2010, factor of dominant industry significantly and consistently impacted urban growth, whereas the influence of living conditions and location on urban growth varied from year to year. These findings imply that local government pays less attention to residents' livelihood and more to the effect of location on urban growth. The paper concludes by proposing some regional planning policies for sustainable development.

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1. Introduction

With the establishment of a socialist market economy in the late 1970s, China entered an era of social and economic development. After it became a member of the World Trade Organization at the start of the new millennium, urban construction became an imperative for the Chinese government as low labor costs made China the factory of the world. Urban population growth is the prerequisite of regional growth and industrial agglomeration. The relationship between growth and agglomeration depends crucially on the mobility of labor between regions (Baldwin & Martin, 2004; Jurajda & Terrell, 2009; Piras, 2012). Furthermore, population growth in a city, as a part of urban growth, plays an important role in promoting the development of entire regional economies (Duncan & Vernon, 1999; Liu, Wang, & Long, 2008). China's government encourages rural–urban migration to promote urbanization. The past decade has witnessed a consistent increase of urban population and urban land scale, especially in the coastal areas of south and east China (Bao, Chang, Sachs, & Woo, 2002). Since the Chinese government abolished the household register regulations in 1979,

individuals have been allowed to move freely within a regional area. For example, according to the sixth census of China, the permanent resident population of Guangdong Province is 104.3 million while the floating population (people who live in an area different from the place of their household registration) is 31.28 million; this is the largest residential and floating population in China. However, this rapid economic development and urban growth engenders numerous social and environmental problems, which are the greatest challenges to the sustainable development of cities, especially in developing countries (Oguz & Hakan, 2012). China has been confronted with the problems of excessive land development and serious air pollution in metropolises like Beijing and Shanghai (Jiang, 2012; Tan et al., 2008). It is therefore essential that China's government plans for population movement in order to strike a balance between regional growth and environment protection.

Regional development theories, such as Williamson's (1965) Inverted-U Theory and Hirschman's (1958) theory of unbalanced growth, stress that regional growth is an imbalanced evolutionary process. Regional economic growth always depends on one or several pole centers that promote the economic growth of neighboring cities (Friedmann & Wolff, 1982). Krugman (1991) used the Core-Periphery Model to describe spatial industrial agglomeration and unbalanced development. From the spatial perspective, evolution of the European economy focused on the differences

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between the regional and national industrialization processes, and polarization explains regional economic imbalances in Europe (María, Fernando, & Vicente, 2006). It has been perceived as reasonable to attempt imbalanced development, especially for developing countries (Cohen, 2004; Scott & Storper, 2003). Zhong (1997) conducted a survey in Guangdong Province and found that the imbalanced expansion in the province was beneficial for the entire regional economic growth. Shen (2002) found that several industrial clusters formed growth poles which promoted the entire regional growth. Industrial agglomeration brought about concentrations of high employment and growth in central cities that had a spillover effects on neighboring cities and led to national growth (Chen & Wu, 2010; Fan & Scott, 2003). Xu, Chen, and Lu (2010) empirical study of China's cities showed that sustainable growth of urban economies must take sufficient advantage of the agglomeration effect.

Krugman (1991) emphasized the effect of transport costs on industrial locations in an imperfectly competitive market. In an economic geography model, it is essential to take into account the centripetal force and centrifugal force that promotes population and economic agglomeration (Audirac, 2005; Cook, Pandit, Beaverstock, Taylor, & Pain, 2007; Krugman & Elizondo, 1996). Centripetal force is derived from economies of scale, which also means industrial agglomeration, while centrifugal force is derived from transport costs, the effects of congestion, and the effects of pollution (Benguigui, Czamanski, & Marinov, 2001; Palivos & Wang, 1996; Tabuchi, 1998). Fujita and Thisse (2002) used an empirical study to analyze the relationship between industrial clusters and transport infrastructure based on the New Economic Geography research framework. From the perspective of regional spatial structure theorists, externalities and transport costs are essential interactions between different economic spaces (Armin, 1999). Favorable traffic conditions promote regional industrial agglomeration. Cities that have an effective transportation infrastructure can expand spatially and are therefore attractive to firms as places to locate (Howard, 1970; Mori & Nishikimi, 2002; Song, Lee, Anderson, & Lakshmanan, 2012).

With the rapid increase of city populations, urban construction has accelerated and urban land-use has changed substantially in developing countries (Yeh & Li, 1999). Increasing use of land for industrial purposes has led to a decrease of arable land and wetland of entire regions. From an urban planning perspective, this is not a reasonable and sustainable land-use pattern (Cai, Zhang, Pan, Chen, & Wang, 2012; Tan et al., 2008; Yeh & Li, 1998). Governments should take important urban environments into account and strictly manage urban growth and development in terms of land use patterns (Cheng & Masser, 2003; Kong, Yin, Nobukazu, & James, 2012). Knapp and Gravest. (1989) and Clark, Lloyd, Wong, and Jain (2002) believed that amenities would drive urban growth in the future because citizens in postindustrial cities increasingly select their own urban location according to the quality of life. Amenity consideration is a sustainable development pattern, and in the long run, regional planning should strive for sustainable economic growth, especially in developing countries with rapid urbanization. Sustainability has to be integrated into planning (Edward, 2001). The major problems underlying regional development are extensive resource exploration, fast population growth, excessive land development, irrational industrial structure, and environmental pollution (Jantz, Goetz, & Shelley, 2004; Zheng & Dai, 2012). Shift-Share analysis can be used to describe regional economic growth or to examine the effects of regional planning by dividing economic variables, such as income, output and employment, into different parts (Knudsen, 2000).

A systematic literature review conducted for this study revealed that the driving force and determinants of urban or regional growth

varies significantly from one study to another. Most previous studies focused on one single factor for regional or urban growth with very few of them taking account of other factors such as location, industrial agglomeration and land-use structure. As a representative developing country, China is experiencing rapid urbanization and land development. Although the Chinese government has introduced an extensive urban land-use policy (Tan et al., 2008), there has not been any research into the relationship among urban population growth, economic agglomeration, location, and land-use in different cities on a regional scale. Urban economies experience endogenous economic growth and exogenous population growth (Duncan & Vernon, 1999). This paper focuses on the exogenous population growth of the regional economy and explores how urbanization affects efficiency of the growth process. With reference to China's Guangdong Province, this paper investigates the driving force and determinants of urban population growth and proposes strategies for sustainable regional development.

2. Research hypothesis and method

In the developing world, the proximate determinants of urban growth lie in the natural increase of urban populations and migration, both intranational (rural-to-urban and urban-to-urban) and international (Kasarda & Crenshaw, 1991). Hence it is hypothesized that population growth could be categorized as either a natural increase or a mechanical increase. Natural increase is related to the original population size in addition to birth and death rates, and the natural environment (such as climate and geographic location), since good living environment not only makes the existing residents not move out but also attracts more population to move in. While mechanical increase is due to migration and immigration. Movement of population largely depends on employment opportunity and accessibility which are exogenous (Ma & Fan, 1994; Ma & Lin, 1993; Sohn, 2012; de Graaff, van Oort, & Florax, 2012). Most previous research concentrated on the relative contributions of natural increase and migration (Chen, 1996; Klink, 2008; Mobrand, 2006). Rural-to-urban migration has been the principal focus of investigations as it is easy to modify through national policies (Fan & Stark, 2008). Government is able to introduce policies to accelerate the speed of urbanization and promote urban growth. Migration shows the capability of labor absorption in a given city, while employment opportunities drive population agglomeration and economic agglomeration. The theoretical model for urban population growth (see Fig. 1) is developed based on a hypothesis of natural increase and mechanical increase. Natural increase is derived from the original urban size and living environment, which can also be described as endogenous growth and mechanical increase is attributed to exogenous growth of industrial agglomeration and the location of a particular city.

A simple explanatory framework is established for this study according to the multi-disciplinary theoretical foundation,

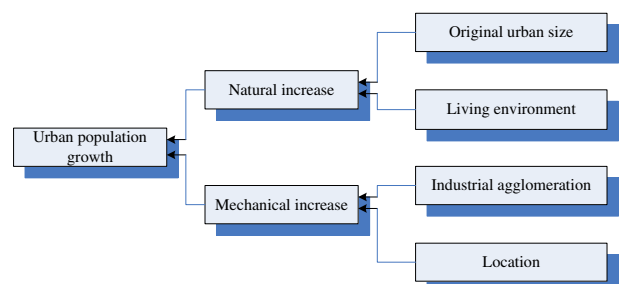


Fig. 1. Theoretical model.

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