



Urbanization bubble: Four quadrants measurement model



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ABSTRACT

The proper understanding of the urbanization bubble is very important to assist local governments in adopting strategies to mitigate the effects of the bubble and guide urbanization toward sustainable development. This paper presents a method of measuring the urbanization bubble with particular reference to China. In referring to the definition of an economic bubble, this study defines the urbanization bubble as a dynamic process in which urbanization rate (U_R) deviates from four urbanization performance variables comprising the proportion of urban population with registration (T_{RP}), urban construction land area (T_{BA}), level of industrial development (L_{ID}) and level of public facilities (L_{PF}). Four coordinates are formed between the rate of urbanization and the four performance variables to examine the practice of urbanization in terms of four quadrants. The ratios between changes in urbanization rate and the changes of the four urbanization performance variables are introduced to measure the urbanization bubble. The method is tested through a case study to show that the coordinate method has the potential to help policy makers detect any bubble in the process of urbanization.

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1. Introduction

Urbanization, commonly defined as the migration of people from rural to urban areas, has been a major trend of the 20th and 21st centuries (United Nations, 2012). China is urbanizing at an unprecedented speed (Hogan, Bunnell, Pow, Permasari, & Morshidi, 2012), and two in every three persons in China will live in urban areas by 2025 (DESA-UN, 2011). Urbanization plays a significant role in enhancing the value of society's total output and increasing economic growth (Brown & Neuberger, 1977). These benefits have motivated the Chinese government to implement various schemes to improve sustainable urban development (Shen & Zhou, 2014).

However, the dramatically increasing levels of urbanization worldwide has created concerns for the sustainability of cities (Isendahl & Smith, 2013). This is especially the case in China, where many local governments increasingly place more emphasis on speed than quality when implementing urbanization strategies. Urbanization in China is of a typical government-lead style instead of one that is market-oriented (Xu, 2004). Previous studies suggest

that ignoring the inherent law of urbanization will result in a mismatch between urbanization and industrialization, urban population growth and urban infrastructure development and cause a conflict of interests between rural migrant workers and urban residents (Fu, Liu, & Zhao, 2012; Zhang, 2006). In particular, these problems lead to a discrepancy between land use and economic growth. For example, from 1981 to 2011, urban construction land in China increased from 7415 km² to 41,861 km², with a 15% average annual growth rate. However, the annual economic growth rate was far below 15% over the same period (China Statistical Yearbook, 2012). Some scholars (e.g. Wang, 2011; Xu, 2004) refer to this phenomenon caused by government-lead urbanization as the urbanization bubble, which results in social problems such as environmental pollution, population explosion, and steep increase in consumables prices hindering sustainable urbanization.

There have been various attempts to address these problems. For example, research on the impact of urbanization on social and eco-environmental systems has been conducted to provide a reference for implementing sustainable urbanization strategies (Lehmann, 2012; Madlener & Sunak, 2011; Morinière, 2012). Assessment models have been established to understand concerns regarding sustainable urbanization and assess the quality of urbanization from the perspectives of economic, social and environmental performance (Bossel, 1999; Hemphill, Berry, & McGreal, 2004; Steurer & Hametner, 2011; Vera & Langlois, 2007). Various

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technological methods such as low carbon emission, air and noise pollution control and waste management have been developed to promote urban environment protection and sustainable urbanization (Haase, Haase, Kabisch, & Bischoff, 2008; Jantz, Goetz, & Shelley, 2004; Ward, Phinn, & Murray, 2000). In a recent study, Shen, Ochoa, Zhang, and Peng (2013) create an experience mining framework to assist city managers in implementing sustainable urbanization strategies so as to prevent the formation of the urbanization bubble.

The only extant research on the urbanization bubble as such is Wang's (2011) study of 35 Chinese cities from 1999 to 2008, which highlighted the general influence of provincial population, economy and space. However, no other studies have developed more specific ways of measuring the urbanization bubble or understanding when a process of urbanization is turning into a bubble situation. In particular, there is a lack of quantitative methods available, which is hindering urban managers and planners in selecting appropriate urbanization strategies. This paper aims to fill this research gap by developing a tool for measuring the urbanization bubble.

2. Sustainable urbanization and the urbanization bubble

2.1. Sustainable urbanization

Urbanization is intimately related to economic development, human livelihood, and profound changes in patterns of human behavior (Bettencourt, Lobo, Helbing, Kühnert, & West, 2007). It is a process in which industrial structure, people's living environment, land and geographical space gradually transform to modern urban society (Ejaro & Abubakar, 2013). Sustainable urbanization aims to achieve an equilibrium between humans and the natural resources (Rasoolimanesh, Badarulzaman, & Jaafar, 2012). This is echoed in many other studies, arguing that sustainable urbanization involves the harmony and balance between economic, environmental and social necessities (Alberti & Marzluff, 2004; Hezri & Hasan, 2004; Shen, Peng, Zhang, & Wu, 2012; Yigitcanlar, 2009). Sustainable urbanization, as the embodiment of sustainable development, occurs only when the urbanization process harmonizes with the principles of sustainable development (Pivo, 1996). It focuses on keeping balance between economic benefit and the environment, ecology and society in order to realize the coordinated development between different regions and sectors. Therefore, cities or towns should develop their social and economic structure in such a way that resources of all kinds can be utilized as efficiently as possible without damaging their natural environment (Rasoolimanesh et al., 2012).

In the case of China, sustainable urbanization not only involves an increase in the city and urban population, but must also bring about improvement of the level of infrastructure, efficiency of land use, level of industrialization, level of agricultural modernization and the quality of people's lives (Wu, 2011; Wu & Sun, 2010). The ultimate goal of urbanization is to improve people's welfare and quality of life through coordinated development between social, economic and environmental dimensions in order to satisfy the needs of both the current and future generations (Van den Berg, Hartig, & Staats, 2007).

2.2. Urbanization bubble

The term "bubble" is a focus of research for economists and financial market participants (Hommes, Sonnemans, Tuinstra, & van de Velden, 2008; Matsuoka & Shibata, 2012; Nneji, Brooks, & Ward, 2013; Painter & Yu, 2013; Stöckl, Huber, & Kirchler, 2010).

An economic bubble, derived from Kindleberger in 1987, is defined as a process in which a continuously rising asset price suddenly collapses (Palgrave, 1987). Although there is disagreement and controversy over the definition of the bubble, most economists and financial market participants consider it to be the rational deviation of the price from an intrinsic value (Blanchard & Watson, 1983; Smith, King, Williams, & Boening, 1993). Furthermore, Noussair, Robin, and Ruffieux (2001) provide two conditions to determine whether there is a bubble in an asset market: (a) the median transaction price in five consecutive periods is at least 50 units of experimental currency (about 13.9%) greater than the fundamental value; and (b) the average price is at least two standard deviations (of transaction prices) greater than the fundamental value for five periods.

The issue of *bubble economy* in China has also been a major research interest. Some economists believe that it is a state of economic growth in which there is a very high rate or expansion rate of scale (Ling, 1998; Xiong, 1998) and of a kind that cannot create any actual benefits to people's living standard, income level or industrial structure of the national economy (Lu, 1998). As Muellbauer and Murphy (2008) indicate, house price bubbling is a systematic deviation of house prices from levels that are explained by fundamentals such as household income and rent. In reality, a bubble economy usually appears as an excessively quick rise of asset prices, such as real estate prices, stock prices, securities and other financial assets. For example, the house price bubble refers to a situation in which the excessive public expectation of future price increases causes real estate prices to be temporarily elevated (Case & Shiller, 2003).

The *urbanization bubble*, sometimes called *false urbanization* or *excessive urbanization*, has not been clearly defined. The connotation of urbanization bubble has been explained from different perspectives. From the population perspective, for example, the urbanization bubble is referred to as the increase in the proportion of urban population to the total population during a given time interval (Namboodiri, 1996; Zhao, 2005). In this situation, the lifestyle and living quality of migrations from rural to urban areas is not substantially improved. As far as land use is concerned, the urbanization bubble is a phenomena where the expansion speed of the urban area exceeds the speed of population urbanization (Ren & Li, 2006). This kind of urbanization relies on extensively enlarging urban areas to realize the local government's goal of becoming an international metropolis. From the economic perspective, the urbanization bubble is primarily driven by demographic forces, particularly rural to urban migration, rather than by economic and industrial activities (Agbola, 2005; Hartshorn, Dent, Heck, & Stutz, 1980). In this case, the speed of urbanization is much higher than that of economic industrialization, leading to the deviation between the urbanization level and economic development level. Others argue that urban infrastructure is a key ingredient in the success of a city in the business world (Shome, 2013). The urbanization bubble happens when cities cannot provide migrants with affordable and accessible public services and supporting facilities, such as regular water and electricity supplies, housing, health services and public transport (Ejaro & Abubakar, 2013).

This suggests the need an equilibrium relationship between population increase, land use, industrial development and the level of public services and infrastructure in order to avoid an urbanization bubble. In other words, the process of urbanization needs to be harmony with the development of the urban economy and living standards. If the equilibrium relationship is disturbed, especially when the urbanization rate exceeds the level of other fundamentals such as public facilities and industrial development, an urbanization bubble will form.

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