Cities 69 (2017) 36–45

Contents lists available at ScienceDirect

Cities

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

Emerging polycentric megacity in China: An examination of employment subcenters and their influence on population distribution in Beijing

Daquan Huang[a], Zhen Liu[b,c], Xingshuo Zhao[d], Pengjun Zhao[e,*]

[a] School of Geography, Faculty of Geographical Science, Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing 100875, China
[b] Institute of Geographic Sciences and Nature Resources Research, Key Laboratory of Regional Sustainable Development Modeling, Chinese Academy of Sciences,11A Datun Road, Chaoyang District, Beijing 100101, China
[c] University of Chinese Academy of Sciences, Yuquan Road 49, Beijing 100049, China
[d] Urban-Rural Planning Administration Center, Ministry of Housing and Urban-Rural Development of China, No.9 San Li He Road, Beijing 100835, China
[e] Centre for Urban Planning and Transport Studies, School of Urban and Environmental Sciences, Peking University, Yiheyuan Road 5, Beijing 100871, China

ARTICLE INFO

Keywords:
Employment subcenters
Population density
Urban spatial structures
Beijing
China

ABSTRACT

Recent decades have witnessed a drastic shift in the spatial structure of China's large cities, from being monocentric to polycentric; however, the existing literature has not completely identified the transformation process, due to a lack of investigation from employment distribution. By using enterprise registration data from 1996, 2001, and 2010, this paper aims to fill the research gap by examining employment subcenters and their effect on population distribution in Beijing. We found that (1) the number of employment subcenters increased from 6 in 1996 to 11 in 2001, and to 16 in 2010; and (2) the population distribution in 2000 was not significantly affected by the appearance of employment subcenters, while the population distribution in 2010 was significantly and positively impacted by distance to the nearest subcenter. These results justify the trend of Beijing becoming a polycentric city.

1. Introduction

In recent decades, urban spatial structure has experienced great changes along with employment decentralization. The classic monocentric model has lost its power to explain these transformations (Clark, 2000), while the polycentric model has been widely studied in relation to Western cities (Cervero & Wu, 1997, 1998; Fernandez-Maldonado, Romein, Verkoren, & Paula Pessoa, 2014; Glaeser & Kahn, 2001; McMillen & McDonald, 1998; Small & Song, 1994; Vasanen, 2012). Currently, a disperse pattern has been explored in some large Western metropolises (Angel & Blei, 2016; Dong, 2013; Garcia-López & Muñiz, 2010). In contrast, the spatial layouts of municipalities in developing countries have transformed at a slow pace, given the fact that most research focuses on whether these cities' spatial structure has shifted from being monocentric to polycentric (Aguilar & Hernandez, 2016; Dowall & Treffeisen, 1991; Fernandez-Maldonado et al., 2014; Suarez & Delgado, 2009).

The spatial structure of China's cities has gained vast attention owing to their rapid expansion since the economic reform of the late 1970s and increasingly serious urban diseases (Dang, Liu, & Zhang, 2014; Hou et al., 2012; Sun, Zheng, & Wang, 2014; Tian et al., 2012; Wang, Ma, & Zhao, 2014; Wen, Sun, & Zhang, 2014). Inspired by the evolution of spatial patterns in Western cities, cities within China have been working to establish a polycentric spatial arrangement in order to alleviate these problems. Beijing, one of its biggest cities, is a typical case. Since the early 1990s, Beijing has tried to decentralize its spatial configuration by implementing a series of policies, chief among them the 1981–2000, 1991–2010, and 2004–2020 city master plans, which focused on creating a polycentric spatial structure by promoting employment subcenters in the suburbs, including industrial development zones, satellite towns, and new towns. By implementing these strategies, the government of Beijing hoped to decrease employment in the city center and make the suburbs more attractive to firms and residents.

After many years of development, Beijing's spatial structure has been largely transformed. Many studies have examined Beijing's spatial structure in view of population distribution, as well as housing and land prices, and concluded that Beijing's configuration has transitioned from monocentric to polycentric (Feng, Wang, & Zhou, 2009; Qin & Han, 2013; Zou, Mason, & Zhong, 2015). However, few of these studies have explored this process from the perspective of employment distribution (Liu, Sun, & Li, 2011; Sun, Wang, & Li, 2012, 2013), which is the starting point of the classic monocentric model (Alonso, 1964; Anas, Arnott, & Small, 1998; Brueckner, 1987; Mills, 1967; Muth, 1969). Moreover, these existing studies contain flaws because they used

* Corresponding author at: The Centre for Urban Planning and Transport Studies, School of Urban and Environmental Sciences, Peking University, China.
E-mail addresses: huangdaquan@bnu.edu.cn (D. Huang), lzhgeog@sina.cn (Z. Liu), pengjun.zhao@pku.edu.cn (P. Zhao).

http://dx.doi.org/10.1016/j.cities.2017.05.013
Received 22 October 2016; Received in revised form 7 May 2017; Accepted 30 May 2017
0264-2751/ © 2017 Elsevier Ltd. All rights reserved.

employment data based on the street (or town) level; therefore, the concept of the polycentric city still lacks sufficient supporting empirical evidence.

This paper examines the formation of employment subcenters and their impacts on population distribution in Beijing in order to contribute to the understanding of changes in the spatial patterns of Chinese metropolises. To achieve this, we used enterprise employment data from 1996, 2001, and 2010 to: (1) identify employment subcenters and analyze their changes in number and size; and (2) test whether these subcenters affect population distribution as measured by population density, and whether their impact has changed over time.

This paper contributes to the existing literature in several ways. First, using municipal registered enterprise data from 1996, 2001, and 2010, we defined a customized grid as our research units to solve a defect of the research units in current studies, which are typically too large. Limited by employment data, these studies often used streets (or towns) as research units, but the average area is about 22 km^2, which is too big compared to those used in investigations on Western cities. One of the main shortcomings is that this affects the outcomes of identifying employment subcenters, especially in the suburbs. Second, we analyzed the evolution of subcenters in terms of number and size, as well as the factors influencing their emergence. This will enhance our understanding of the transformation of urban spatial structure and the role of urban policies in this process. Third, this paper tests the dynamic effect of employment subcenters on population distribution. Although employment subcenters matter, their influence on the location and density patterns of non-central employment centers has also been addressed in theory (Garcia-López & Muñiz, 2010). The effect of employment subcenters on population distribution is one of the most important aspects, and previous studies on the spatial structure of Chinese cities have not paid enough attention to this matter.

The paper is organized as follows: Section 2 is the literature review. Section 3 describes the research area and data for the current study. Section 4 identifies employment subcenters and analyzes their evolution from 1996 to 2010, while Section 5 examines the influences of the identified employment subcenters on the city's population distribution. Finally, Section 6 presents the discussion and conclusions.

2. Literature review

2.1. The urban spatial structure of a megacity

The spatial structure of a megacity has attracted the attention of scholars and policy makers due to their potential economic, social, and environmental challenges. Recently, the polycentric model of new urban economics (White, 1999) has been adopted to investigate the spatial organization of these cities, with a number of employment subcenters influencing the spatial distribution of employment and population (Anas et al., 1998; Baumont, Ertur, & Gallo, 2004). According to empirical studies, many megacities in developed countries are characterized by a polycentric urban spatial structure, such as Chicago, Illinois (McDonald, 1987; McMillen & William Lester, 2003) and Los Angeles, California (Giuliano & Small, 1991; Small & Song, 1994) in the United States, and Ile-de-France in France (Guillain, Le Gallo, & Boiteux-Orain, 2006).

Identifying subcenters is usually the first step to assessing cities' spatial organization, which produces a series of methods (Veneri, 2013). The threshold value setting method was adopted by Giuliano and Small (1991), Small and Song (1994), Bogart and Ferry (1999), and Cervero and Wu (1998), in which they analyze the metropolitan areas of Los Angeles, California; Cleveland, Ohio; and San Francisco, California, with different cut-off values. Another method is identifying the residues of an econometric estimation of employment density based on the distance from the central business district, which can be parametric or non-parametric (McDonald & Prather, 1994; McMillen, 2001; Leslie, 2010). A third method is using employment to determine resident ratios (Craig & Ng, 2001; Gordon, Richardson, & Wong, 1986; McDonald & McMillen, 1990; Redfearn, 2007). Recently, spatial statistics tools and an interaction approach based on commuting flows have also been used in identifying subcenters (Baumont et al., 2004; Riguelle, Thomas, & Verhetsel, 2007; Veneri, 2013).

Further, many authors have evaluated the effects of emergency establishment of employment subcenters on urban development. Some studies consider that employment subcenters help explain surrounding patterns of employment density, population density and land values, and polycentricity to combine many of the advantages of big and small cities (McDonald & McMillen, 1990; McMillen & William Lester, 2003; McMillen & Smith, 2003; Muniz, Garcia-Lopez, & Galindo, 2008). Polycentricity is also considered to be a normative tool to reach important objectives in terms of environment sustainability and social cohesion (Davoudi, 2003). However, some studies indicate that polycentricity can result in a loss of economic efficiency due to heavy public investment in decentralized development (Ding & Bethka, 2005). In particular, multicenter development can fail to reduce traffic demand even as it creates longer commuting distances (Cervero & Wu, 1998). As such, the effects of polycentricty on urban development is still an empirically understudied topic (Veneri, 2013).

Outside of studies on Western cities, some researchers have focused on the spatial structure transformation of megacities in developing countries, and their findings suggest that a polycentric spatial structure is emerging in several cities, such as Mexico City, Mexico; Lima, Peru; and Seoul, South Korea (Aguilar & Hernandez, 2016; Fernandez-Maldonado et al., 2014; Jun, 1996; Suarez & Delgado, 2009). Factors of this transformation are the dynamics of globalization, a shift in economic activities to favor services rather than goods, and the suburbanization of population and jobs (Aguilar & Hernandez, 2016; Fernandez-Maldonado et al., 2014). Nevertheless, there are still few studies about these types of cities in developing countries.

2.2. The transformation of Chinese cities' urban spatial structure

China has undergone a remarkable increase in cities, urban population, and built-up areas in the past three decades, especially in the new millennium. These changes have largely been attributed to the development of markets in urban land and housing (Ding, 2004; Zheng & Kahn, 2008; Zhou & Ma, 2000). In this process, spatial patterns have been dramatically reshaped. Current studies, which have mainly analyzed population distribution or land prices, show that the urban spatial arrangements in some big municipalities (such as Shanghai, Guangzhou, and Hangzhou) have shifted from being monocentric to polycentric (Liu, Yue, & Fan, 2011; Wu, 1998; Zhou & Ma, 2000). Moreover, some medium cities and small cities have also more than one center (Liu & Wang, 2016).

The restructuring of Chinese urban spatiality can be divided into three stages. The first was the development of employment centers since urban land market reform took place in the 1980s. Before this, land use was determined by an administrative decision-making process rather than a market mechanism, leading to a highly mixed land use pattern (Tang, 1994; Vfs, 1985; Wang & Chai, 2009).[1] To promote more efficient use of urban land, China reformed the urban land market along the lines of Western urban economic theories (Hsing, 2010; Lin & Ho, 2005). Gradually, industrial and residential land use in city centers gave way to transport infrastructure and commercial development. In addition, land use in city centers became more specific, resulting in the emergence of central business districts (CBDs) in many municipalities. The monocentric spatial pattern became more and more characteristic

[1] Pre-reform land development was organized by *danwei* (translated as "work unit"), a form of social organization in Maoist China that included both the workplace and workers' homes; thus, urban spaces usually exhibited thoroughly mixed land use patterns. Under this system, land use was often inefficient; for example, warehouses could be seen in the heart of city centers (Bertaud & Renaud, 1995).

Download English Version:

https://daneshyari.com/en/article/5108023

Download Persian Version:

https://daneshyari.com/article/5108023

Daneshyari.com